

ΕΠΙΣΤΗΜΟΛΟΓΙΑ

The theory of knowledge

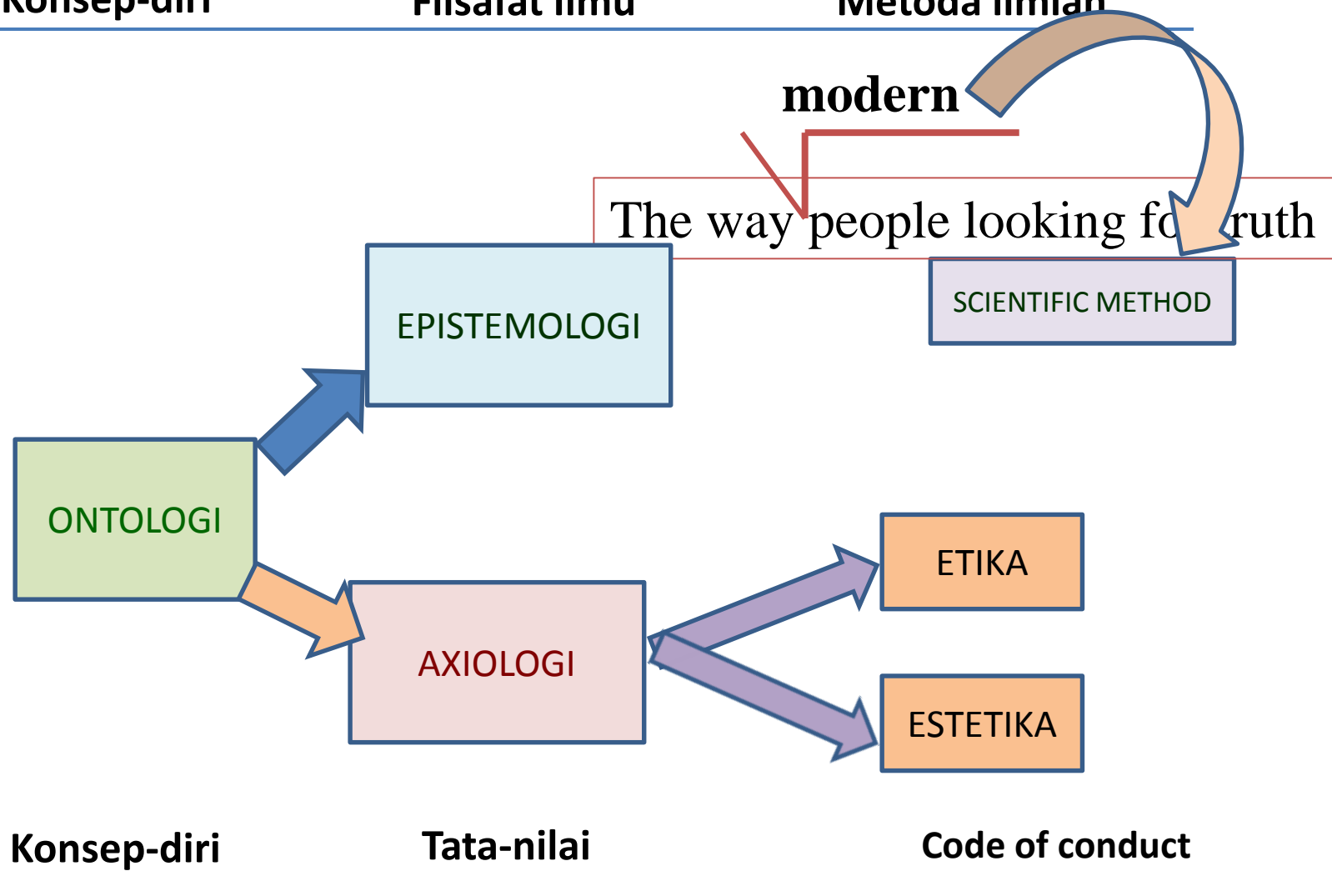


Rudyanto Soesilo

Konsep-diri

Filsafat Ilmu

Metoda ilmiah



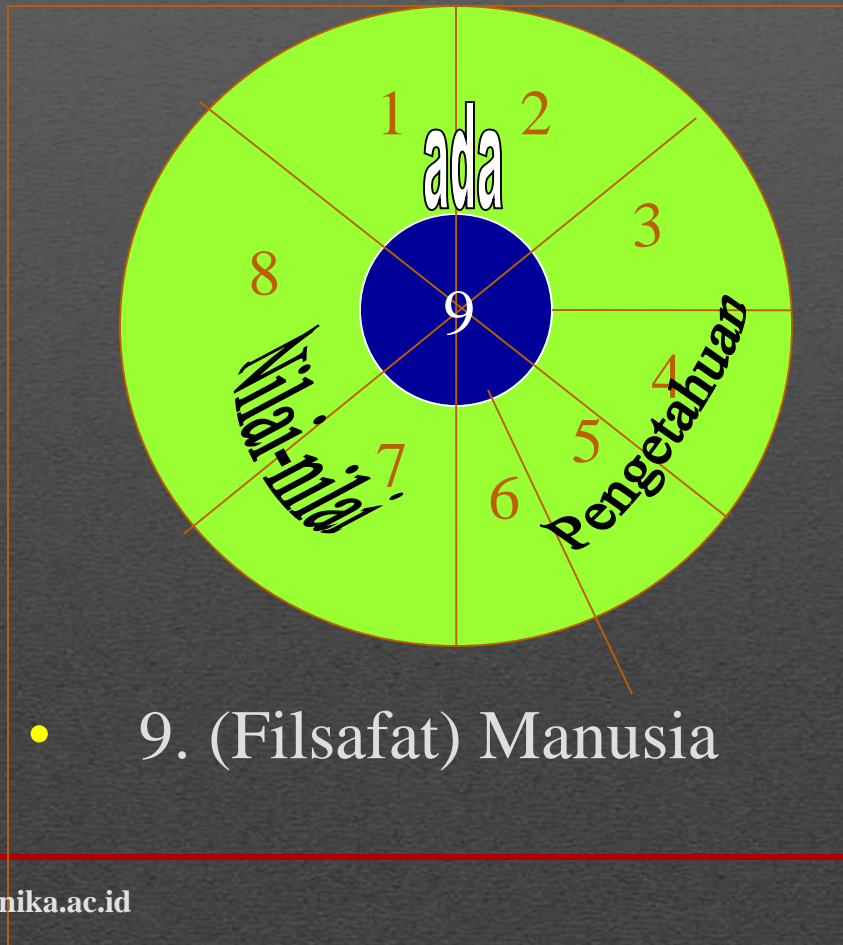
Konsep-diri

Tata-nilai

Code of conduct



Wilayah Filsafat



1. Metafisika
2. Ontologi
3. Epistemologi
4. Logika
5. Metodologi
6. Filsafat Ilmu
7. E.t.i.k.a.
8. Estetika

ΕΠΙΣΤΗΜΟΛΟΓΙΑ ,

The theory of knowledge

- Epistemology from Greek ἐπιστήμη, epistēmē, meaning 'knowledge', and λόγος, logos, meaning 'logical discourse')
- is the branch of philosophy concerned with the theory of knowledge
- Epistemology studies the nature of knowledge, justification, and the rationality of belief.



ΕΠΙΣΤΗΜΟΛΟΓΙΑ

The theory of knowledge

- Epistemology is the study of the nature and scope of knowledge and justified belief.
- It analyzes the nature of knowledge and how it relates to similar notions such as truth, belief and justification.
- It also deals with the means of production of knowledge, as well as skepticism about different knowledge claims.



ΕΠΙΣΤΗΜΟΛΟΓΗ

The theory of knowledge

- epistemology centers on four areas:
- (1) the philosophical analysis of the nature of knowledge and how it relates to such concepts as truth, belief, and justification
- (2) various problems of skepticism,
- (3) the sources and scope of knowledge and justified belief, and
- (4) the criteria for knowledge and justification.



ΕΠΙΣΤΗΜΟΛΟΓΙΑ

The theory of knowledge

- Epistemology addresses such questions as:
- "What makes justified beliefs justified
- "What does it mean to say that we know something?",
and fundamentally
- "How do we know that we know?"



The problem of skepticism

- Skepticism questions whether knowledge is possible at all.
- Skeptics argue that the belief in something does not necessarily justify an assertion of knowledge of it.
- The evil demon skepticism described by Descartes (previously known from Plato's cave); supposes that our sensors have been placed under the control of some external power such as a demon, mad scientist, etc.



The problem of skepticism

- As such, everything we see is a fake, and
- we can never know anything about the 'real' world inhabited by the demon or mad scientist.
- Even if these external powers do not exist, we still must depend on only the information provided by our senses and can therefore make no definite statement about anything beyond that information



Skeptics oppose,

- dogmatic foundationalism
- Fictionalism
- Philosophical fideism (as opposed to)
- religious Fideism
- pragmatism



dogmatic foundationalism

- dogmatic foundationalism, states that there must be some basic positions that are self-justified or beyond justification without reference to others. (One example of such foundationalism may be found in Spinoza's Ethics.)
- The skeptical response to this can take several approaches. claiming that "basic positions" must exist amounts to the logical fallacy of argument from ignorance combined with the slippery slope.



Skeptics oppose,

- Fictionalism would not claim to have knowledge but adheres to conclusions on some criterion such as utility, aesthetics, or other personal criteria without claiming that any conclusion is actually "true".
- Philosophical fideism would assert the truth of some propositions, but does so without asserting certainty.
- religious Fideism
- pragmatism would accept utility as a provisional guide to truth but not necessarily a universal decision-maker.



- there is an important distinction between "knowing that" (know a concept),
- "knowing how" (understand an operation), and
- "acquaintance-knowledge" (know by relation),
- with epistemology being primarily concerned with the first of these



B.e.l.i.e.f.

- is typically an expression of faith or trust in a person, power or other entity—while it includes such traditional views, epistemology is also concerned with what we believe.
- This includes 'the' truth, and everything else we accept as 'true' for ourselves from a cognitive point of view.
- Belief is the state of mind in which a person thinks something to be the case with or without there being empirical evidence to prove that something is the case with factual certainty.
- a mental representation of an attitude positively oriented towards the likelihood of something being true.
- Ancient Greek: pistis and doxa.
- pistis refers to "trust" and "confidence",
- doxa refers to "opinion" and "acceptance".
- The English word "orthodoxy" derives from doxa.
- belief has the purpose of guiding action rather than indicating truth.
(Jonathan Leicester)



T.r.u.t.h.

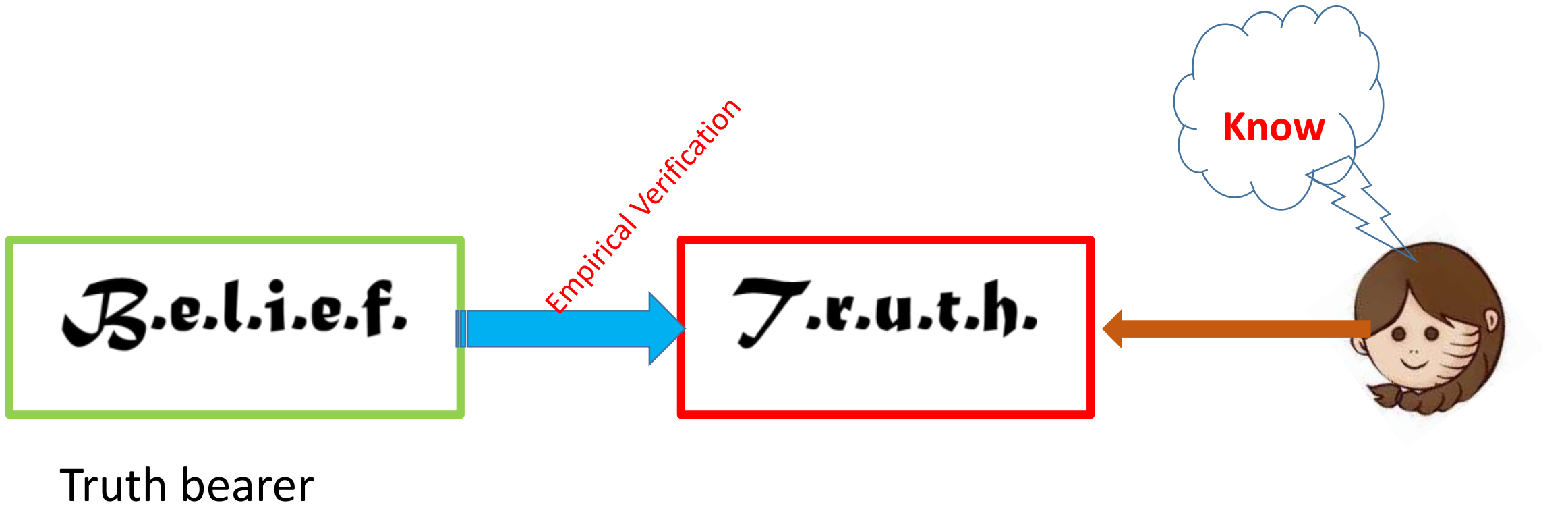
- to mean being in accord with fact or reality, or fidelity to an original or standard.
- Truth may also often be used in modern contexts to refer to an idea of "truth to self," or authenticity.
- belief is the proper truth-bearer.
- knowledge as a system of justified true propositions,
- as a system of justified true sentences.
- Plato, in Gorgias : belief is the most commonly invoked truth-bearer.



criteria of truth

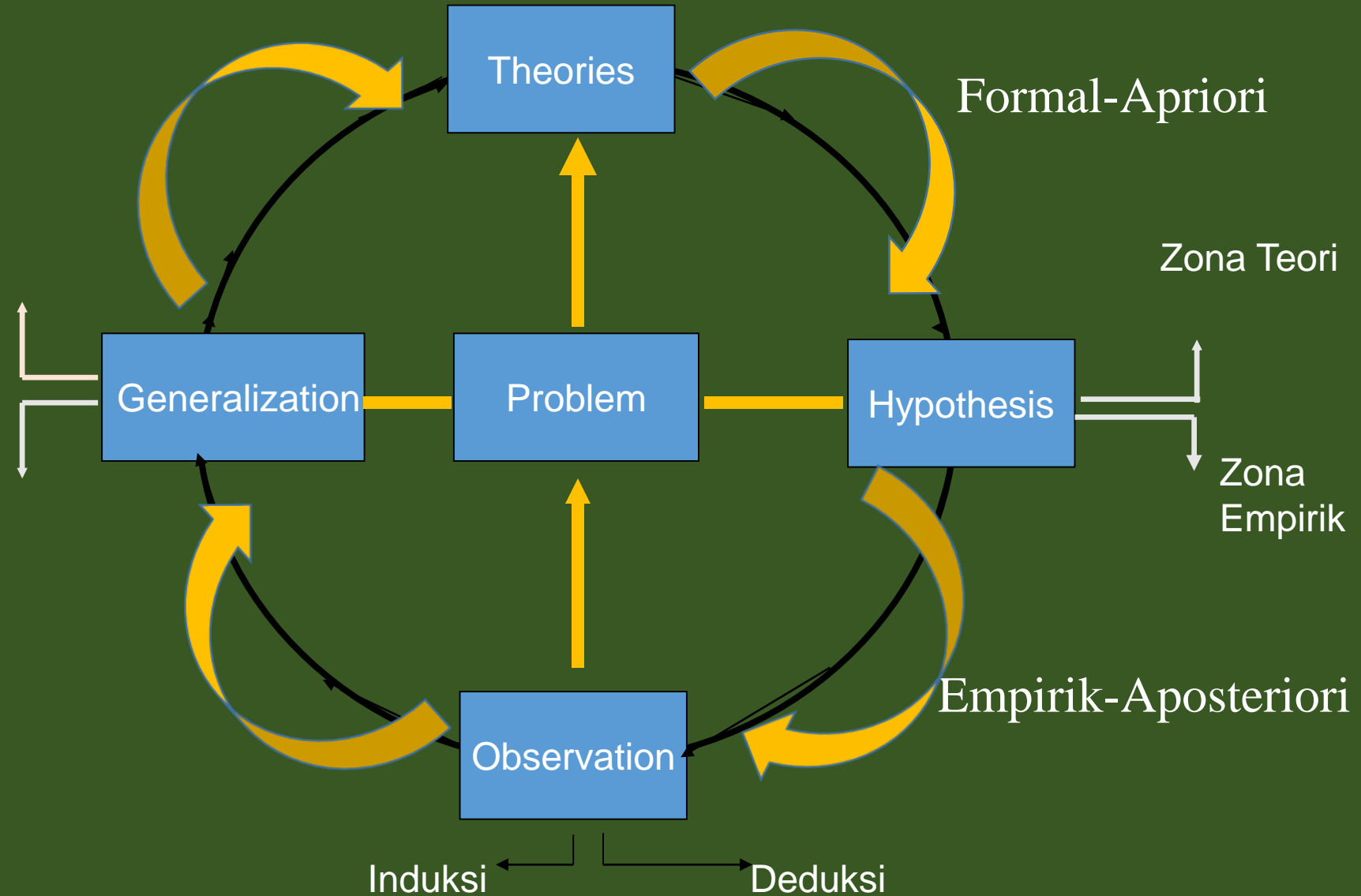
- (or tests of truth) are standards and rules used to judge the accuracy of statements and claims.
- tools of verification.
- Understanding a philosophy's criteria of truth is fundamental to a clear evaluation of that philosophy.
- This necessity is driven by the varying, and conflicting, claims of different philosophies.
- The rules of logic have no ability to distinguish truth on their own.
- An individual must determine what standards distinguish truth from falsehood.
- Not all criteria are equally valid.
- Some standards are sufficient, while others are questionable.





Metoda Ilmu Pengetahuan :

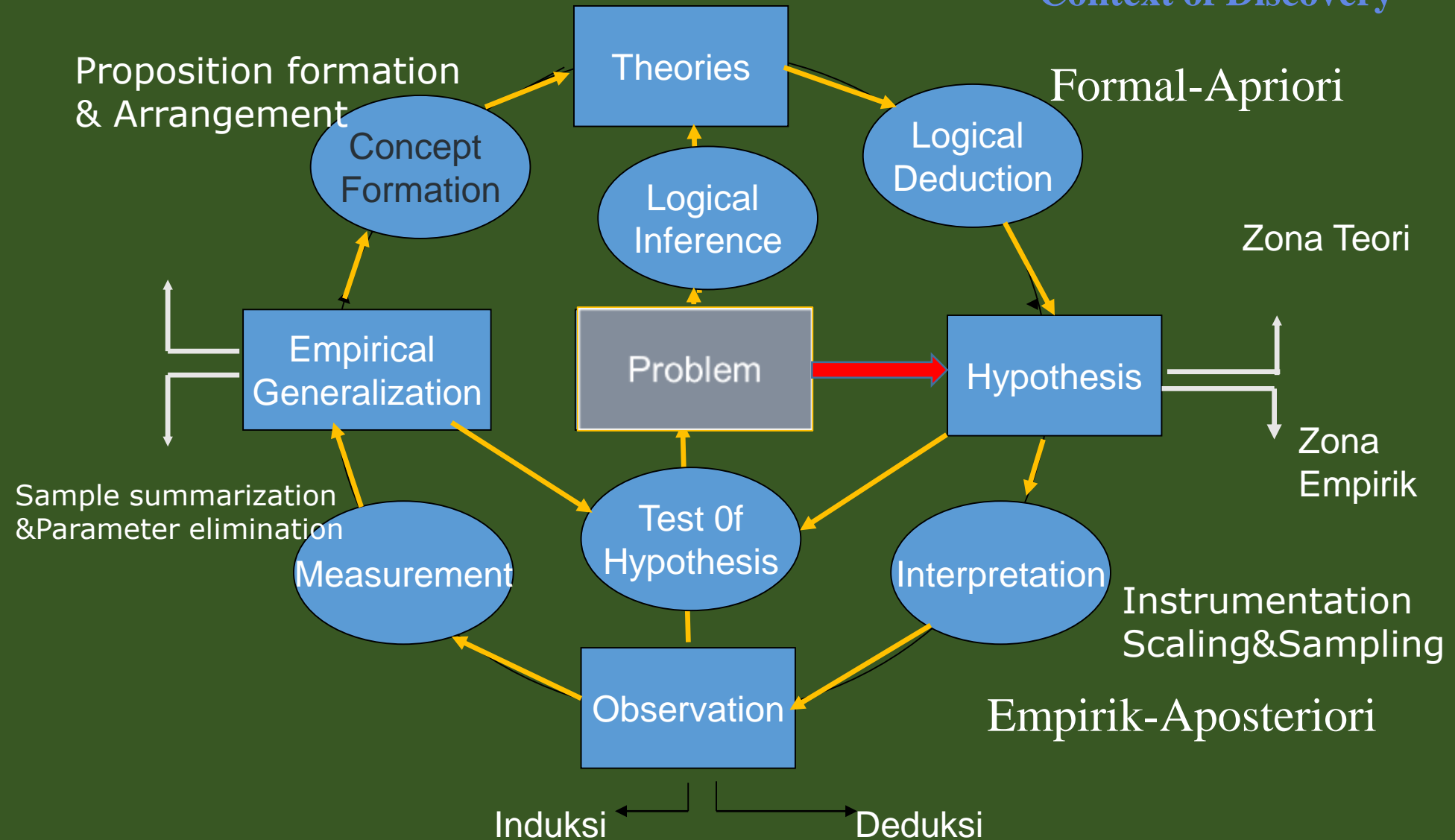
Siklus Empiris, Hipotetiko Dedukto Verifikatif

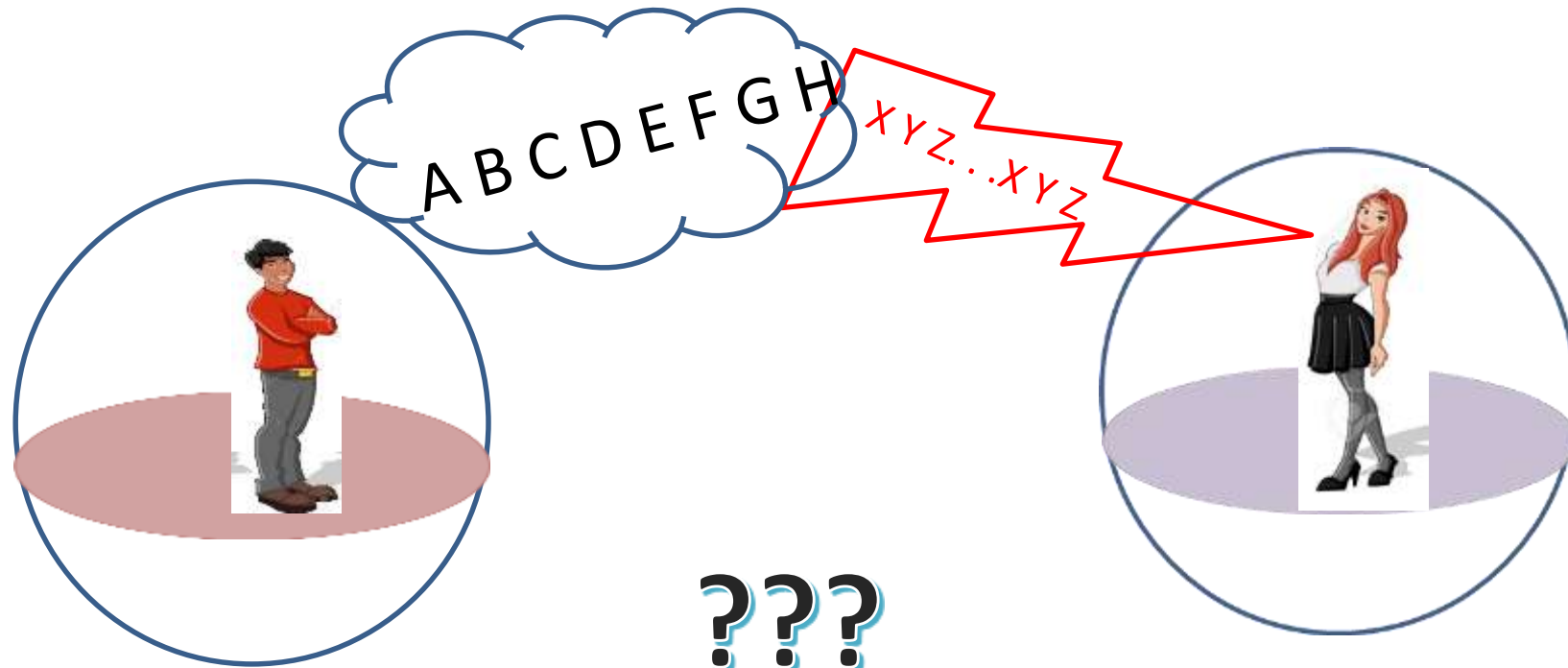


Siklus Empiris, Hipotetiko Dedukto Verifikatif

Context of Justification

Context of Discovery

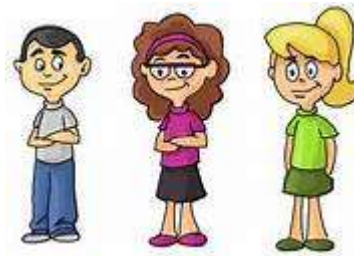




Ontology A

Ontology Z

???



Different ontological debate



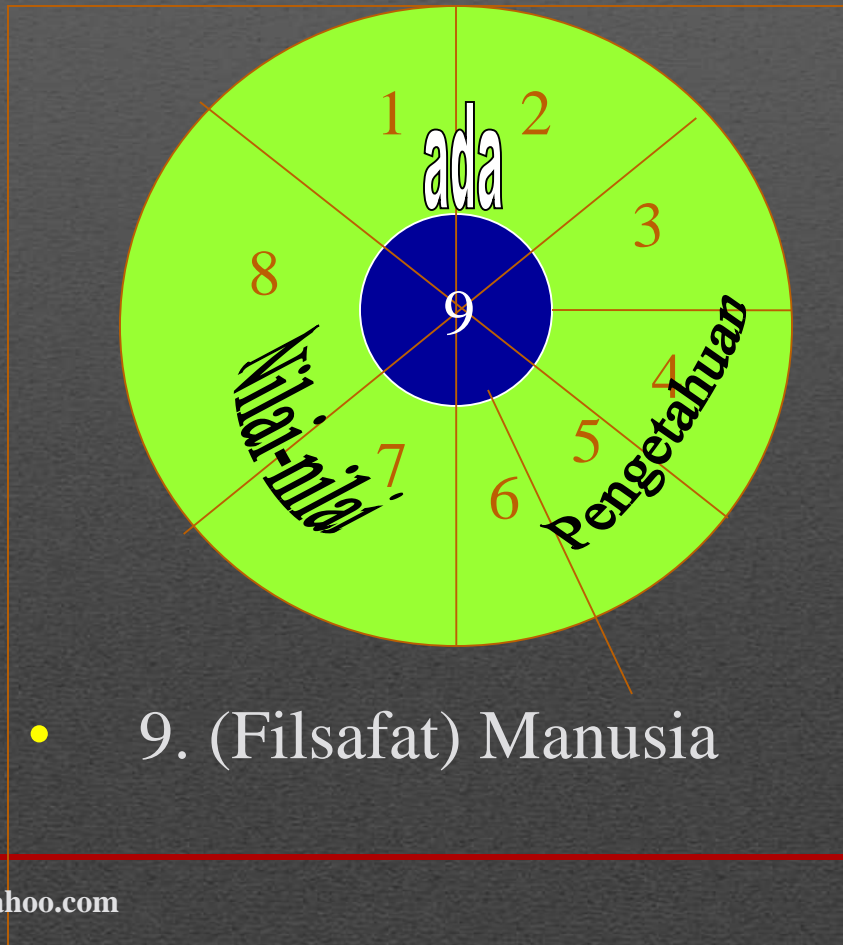
Epistemologi Ilmu-pengetahuan



Oleh : A. Rudyanto Soesilo



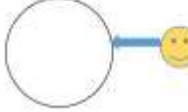



Wilayah Filsafat



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Ontologia Epistemologia Axiologia

	Ontologia	Epistemologia	Axiologia
	Cosmoscentrism	Animism Dynamism	Mysticism Tribalism
	Theoscentrism	Polytheism Monotheism	Revelation Fatalism
	Anthroposcentrism	MODERNISM	Positivism Existentialism Secularism
	Logoscentrism	POSTMODERNISM	Pluralism Local genius
			Phenomenology Hermeneutic

Filsafat Ilmu :

- Cabang filsafat yang mengkaji: Ciri2 Sains dan cara2 memperolehnya, menggunakan :
 - Epistemologi, u validitas pengetahuan > 3 teori kebenaran
 - Logika, u Context Of Discovery & Justification
 - Metodologi, u langkah2 memperoleh sains.
- Landasan: Validitas Korespondensi dng Kebenaran Ilmiah-Empiris lewat Metoda yg ketat.



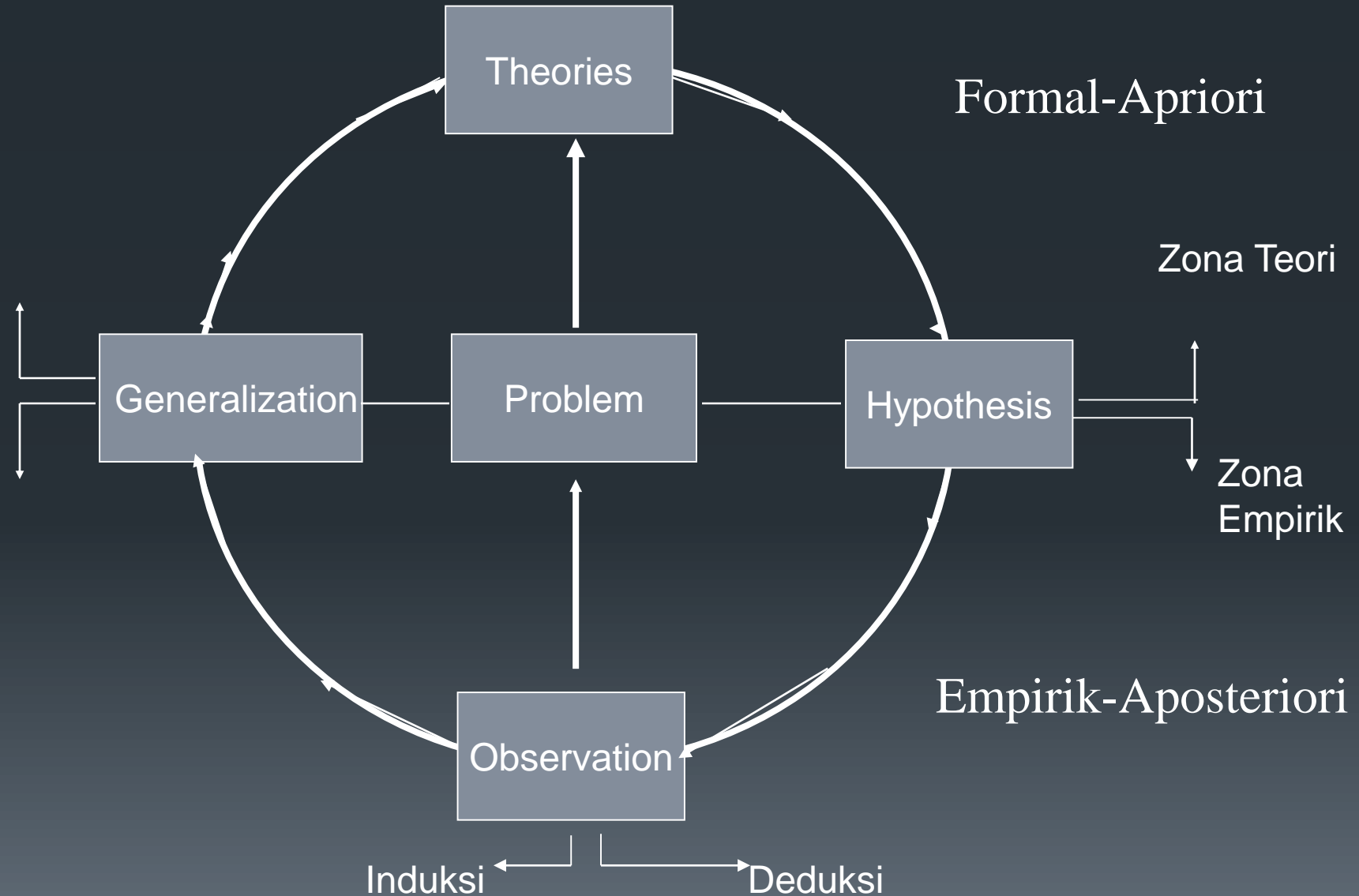
Epistemologi :

- Mengkaji hakekat Pengetahuan:
 - Validitas, struktur, batas & sumber
- Mengkaji Pengetahuan Umum(seluas2nya)
- *Validitas : 3 Teori Kebenaran*

Towards Positivism

- Rene Descartes ,
 - 1596 - 1650
 - David Hume
 - 1711 - 1776
 - John Locke
 - 1632 1704
 - George Berkeley
 - 1685 - 1753
 - August Comte
 - 1685 - 1753
-
- RASIONALIME
 - EMPIRISISME
 - POSITIVISME
- 

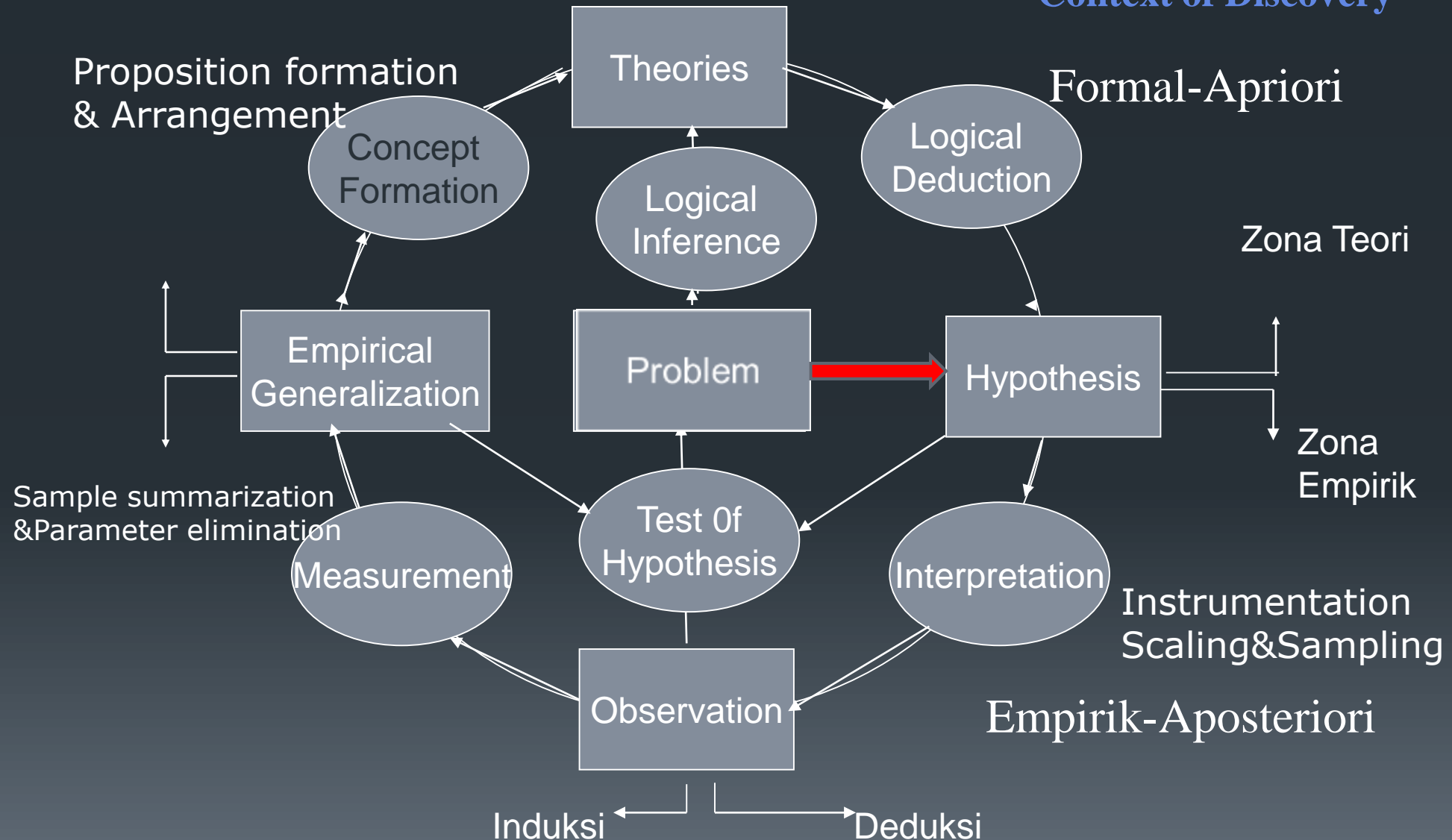
Metoda Ilmu Pengetahuan : Siklus Empiris, Hipotetiko Dedukto Verifikatif



Siklus Empiris, Hipotetiko Dedukto Verifikatif

Context of Justification

Context of Discovery



Positivism August Comte

ILMU : < explanatoris < POSITIVISTIK
prediktif

- Obyektif
- Fenomenalis (anti Metafisis)
- Reduksionalis : Fakta
- Naturalistis : Mekanistis-Deterministis-alami

- UNIFIED SCIENCE : paradigma tunggal
- UNIFIED LANGUAGE : Positivisme Logis
- UNIFIED METHOD : Metode verifikasi empiri



Auguste Comte



Positivist temple in Porto Alegre



August Comte :

3 Tahap perkembangan Sejarah :

◎ Teologis

> Animisme - Politeisme - Monoteisme

◎ Metafisik

> Filosofis

> Alam - Panteisme

◎ Positif

> Sains-Teknologi, Metodologi ilmiah

> Agnostisme-Deisme-Panteisme-Atheisme

> MODERNISME-Individualisme-Liberalisme




The Theological phase

- was seen from the perspective of nineteenth century France as preceding the Enlightenment, in which man's place in society and society's restrictions upon man were referenced to God.
- Comte believed all primitive societies went through some period in which life is completely theocentric.
- In such societies, the family is the prototypical social unit, and priests and military leaders hold sway. From there, societies moved to the Metaphysical phase.



Metaphysical phase

- Here, Comte seems to have been an influence for Max Weber's theory of democracy in which societies progress towards freedom.
 - Weber wrote of oligarchies having more freedom than tyrannies, and democracies having more freedom than oligarchies.
 - Comte's belief that universal rights were inevitable seems to be foretelling of Weber's theory.
 - In this Metaphysical stage, Comte regarded the state as dominant, with churchmen and lawyers in control.
- 

Positive stage

- Comte gave the name Positive to the last of these because of the polysemous connotations of the word.
- Positive can refer both to something definite and to something beneficial. Comte saw sociology as the most scientific field and ultimately as a quasi-religious one.
- In this third stage, which Comte saw as just beginning to emerge, the human race in its entirety becomes the social unit, and government is by industrial administrators and scientific moral guides.

love on principle order by basis and
progress at last

**“O amor por princípio,
a ordem por base
e o progresso por fim”**

Auguste Comte
França, ★1798 †1857

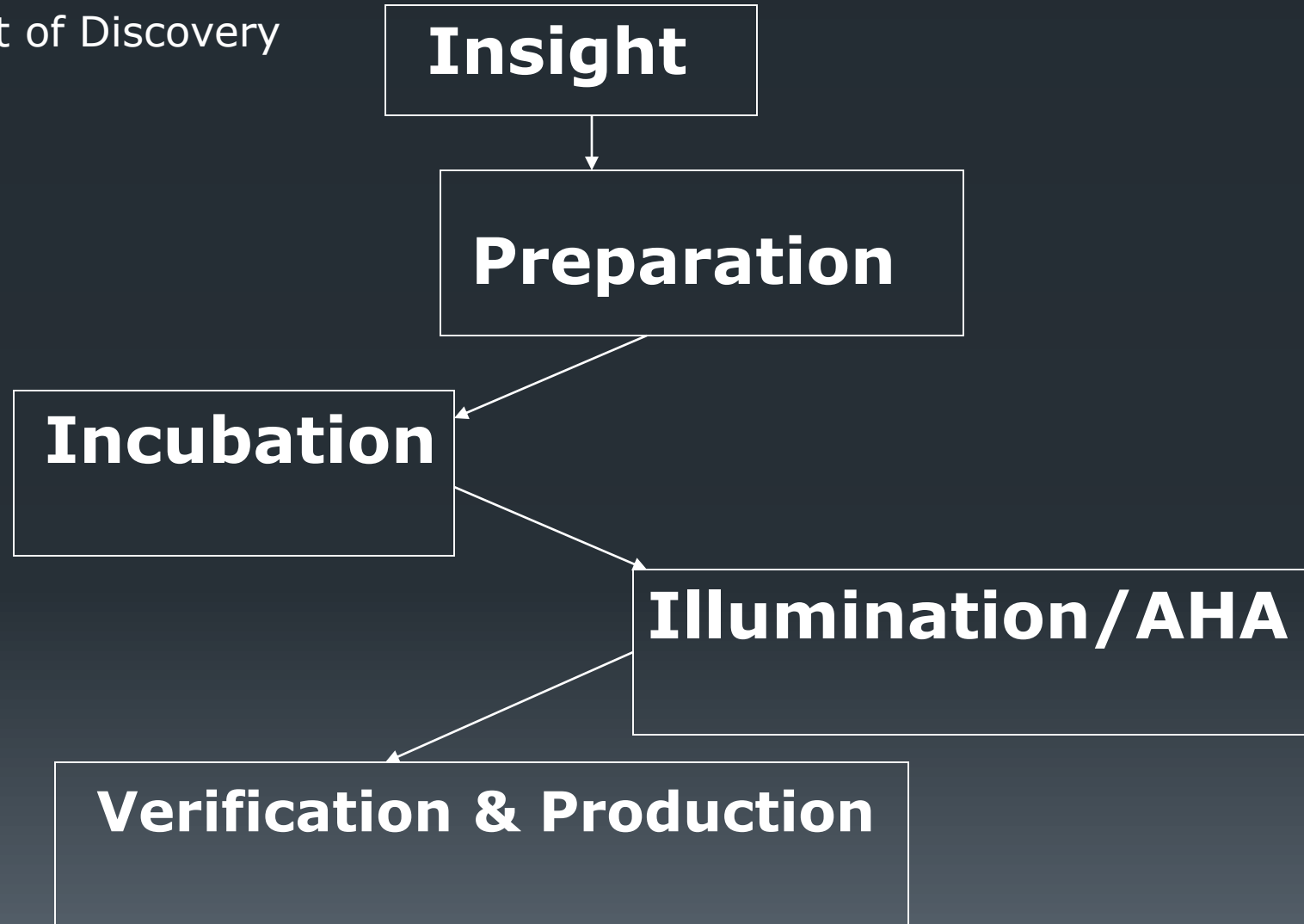


“O Amor por
princípio, a Ordem
por base e o
Progresso por fim.”

Auguste Comte

Creative Process

Context of Discovery




Validitas : 3 Teori Kebenaran

- Korespondensi :
 - Keselarasan gagasan - realitas external
> Kebenaran Empiris-
Induktif: Fisika, Kimia, Biologi
- Koherensi :
 - Keselarasan Proposisi Logis > Kebenaran
Formal Deduktif : Matematika, Logika
- Pragmatis :
 - Kriteria Instrumental & Kebermanfaatan
> Kebenaran Fungsional: Ilmu Terapan,
Kedokteran, Manajemen, Hukum,
Arsitektur dll

Bidang2 Ilmu Pengetahuan :

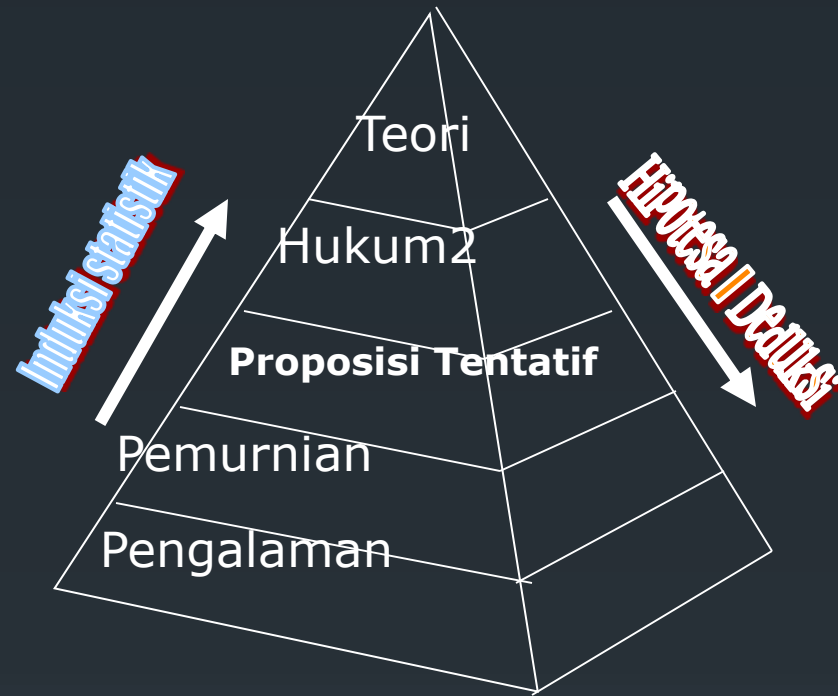
ILMU2 FORMAL DEDUKTIF	ILMU2 EMPIRIS INDUKTIF						
Matematika Logika	Ilmu2 Alam Anorganik	Ilmu2 Alam Organik	Ilmu2 Sosial	Ilmu2 Budaya	Kedokteran, Arsitektur dll		
KOHERENS	KORESPONDENS			PRAGMATISME			
	Ilmu-Ilmu Murni			Ilmu2 Terapan			

Tujuan Ilmu Pengetahuan

- Deskripsi (verstehen) Idiografis
 - Interpretasi
 - Eksplanasi (erklaren) Nomotetis
 - Prediksi
- 

3 Dikhotomi Ilmu2

- Formal Deduktif >< Empiris
Induktif
- Terapan >< Murni
- Nomotetis >< Idiografis
- (erklaren) >< (vestehen)



Gerak Pencapaian Ilmu Pengetahuan

- Logika Induktif,
- Ilmu bergerak naik dari fakta2 phenomental menuju generalisasi teoritik
- Validitas lewat empiri
- Ontologis Positivisme :
realitas dapat dipecah-
pecah,dapat dipelajari
independen, dapat
dieliminasi dari obyek
lain, dapat dikontrol
- Variabel



Metoda riset Positivistik

Gerak Pencapaian Ilmu Pengetahuan

- Pengalaman/empiri diolah dengan penalaran(pemurnian) : bahasa, akal sehat, persepsi> definisi, deskriptif
- Menyusun Proposisi tentatif, pernyataan yg dpt dibuktikan salah/benarnya/dpt diverifikasi >> “Hipothesa” >>
- Dibuktikan lewat penelitian >> dikukuhkan menjadi : “ Hukum-hukum”
- Hukum : hipotesa yg tlg dibuktikan scr Positif
- “Teori” : seperangkat Hukum yg saling menunjang



Gerak Pencapaian Ilmu Pengetahuan

Proses terbentuknya I.Pengetahuan

- Induksi
- Bertolak dari kasus2 konkrit menuju kesimpulan yg abstrak
- Dibantu oleh statistik
- Dari hal2 yg partikular/khusus ke yg Umum



Gerak Pencapaian Ilmu Pengetahuan

Scientific method

A. Rudyanto Soesilo

Scientific method

Scientific method refers to :

- a body of techniques for investigating phenomena,
- acquiring new knowledge, or correcting and
- integrating previous knowledge.

The Basis :

- To be termed **scientific**, a method of inquiry must be based on gathering :
 - **observable**,
 - **empirical and**
 - **measurable**evidence subject to specific principles of reasoning.
- A scientific method consists of the collection of data through observation and experimentation, and the formulation and testing of hypotheses.

Scientific procedures

- Although procedures vary from one field of inquiry to another, identifiable features distinguish scientific inquiry from other methodologies of knowledge.
- Scientific researchers propose hypotheses as explanations of phenomena, and design experimental studies to test these hypotheses.

Scientific procedures

- These steps must be **repeatable** in order to dependably predict any future results.
- Theories that encompass wider domains of inquiry may bind many independently-derived hypotheses together in **a coherent, supportive** structure.
- This in turn may help form new hypotheses or place groups of hypotheses into context.

objectivity

- Among other facets shared by the various fields of inquiry is the conviction that the process be objective to **reduce biased interpretations** of the results.

objectivity

- Another basic expectation is to document, archive and share all data and methodology so they are available for **careful scrutiny** by other scientists,
- thereby allowing other researchers the opportunity to verify results by attempting to **reproduce** them.
- This practice, called **full disclosure**, also allows statistical measures of the reliability of these data to be established.

hypothetico-deductive model

In the twentieth century, a hypothetico-deductive model for scientific method was formulated:

- Use your experience: Consider the problem and try to make sense of it. Look for previous explanations. If this is a new problem to you,

hypothetico-deductive model

- 2. Form a conjecture: When nothing else is yet known, try to state an explanation, to someone else, or to your notebook.
- 3. Deduce a prediction from that explanation: If you assume 2 is true, what consequences follow?
- 4. Test: Look for the opposite of each consequence in order to disprove 2. It is a logical error to seek 3 directly as proof of 2. This error is called affirming the consequent.

hypothetico-deductive model

- This model underlies the scientific revolution. One thousand years ago, Alhazen demonstrated the importance of steps 1 and 4.
- Galileo (1638) also showed the importance of step 4 (also called Experiment) in *Two New Sciences*.
- One possible sequence in this model would be 1, 2, 3, 4. If the outcome of 4 holds, and 3 is not yet disproven, you may continue with 3, 4, 1, and so forth; but if the outcome of 4 shows 3 to be false, you will have to go back to 2 and try to invent a new 2, deduce a new 3, look for 4, and so forth.

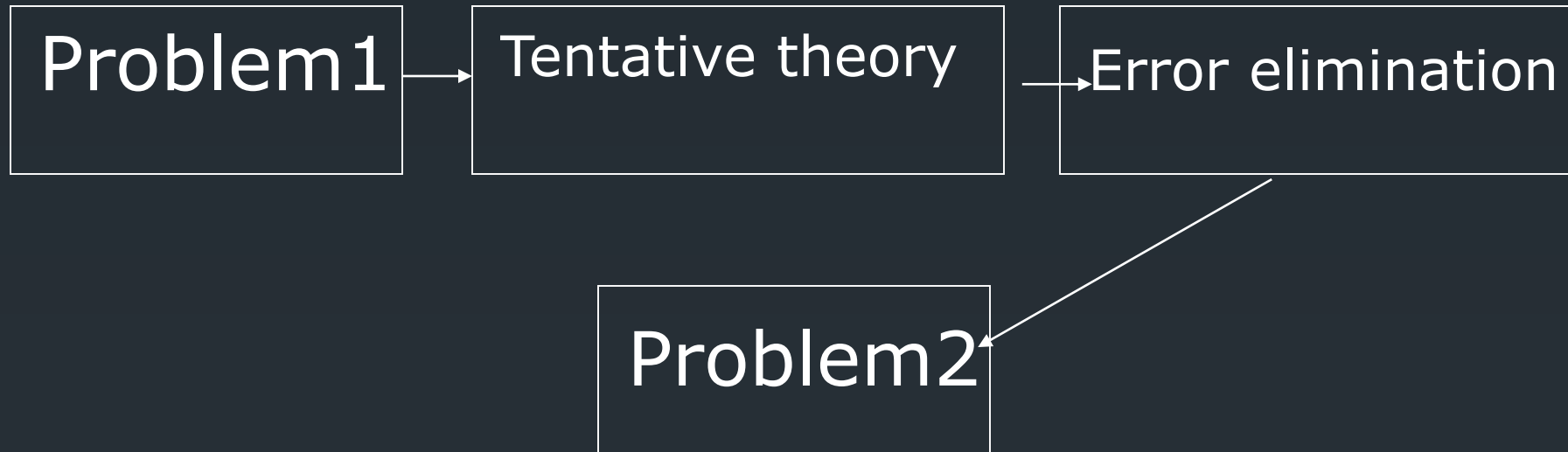
hypothetico-deductive model

- Note that this method can never absolutely verify (prove the truth of) 2. It can only falsify 2.
- (This is what Einstein meant when he said "No amount of experimentation can ever prove me right; a single experiment can prove me wrong.")
- However, as pointed out by Carl Hempel (1905-1997) this simple Popperian view of scientific method is incomplete; the formulation of the conjecture might itself be the result of inductive reasoning.

hypothetico-deductive model

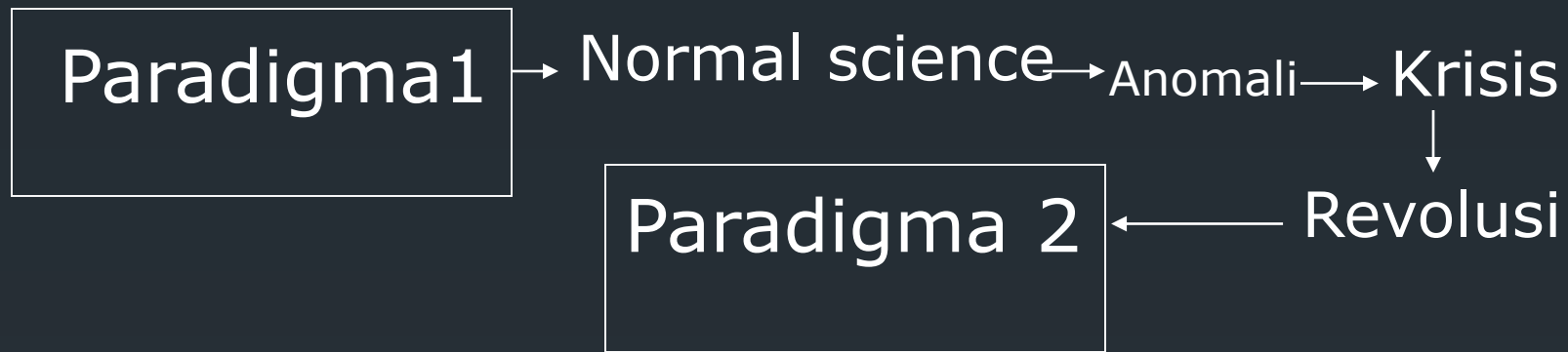
- Thus the likelihood of the prior observation being true is statistical in nature and would strictly require a Bayesian analysis.
- To overcome this uncertainty, experimental scientists must formulate a crucial experiment, in order for it to corroborate a more likely hypothesis.

Karl Popper

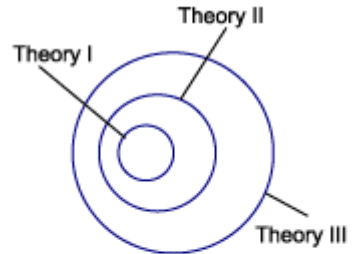


- Tentative theory = Hypothesis
- Error elimination through observation
- Objective knowledge :evolutionary approach

Thomas Kuhn

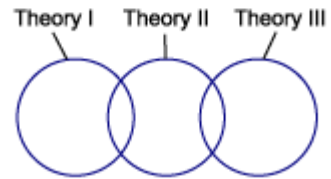


- Paradigma :
 - Worldview, metoda, teknik, nilai2, asumsi, menopang teori yg dominan



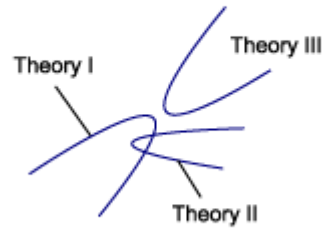
“Popper”

Each theory builds progressively on the theories preceding it.



“Kuhn”

Paradigms are incommensurate, and encompass some parts of previous paradigms but reject other parts.



“Feyerabend”

Theories have little to do with previous theories, and are not coherent or consistent.

Syarat2 I. Pengetahuan Ilmiah

Positivisme

- Observable
 - Repeatable
 - Measurable
 - Testable
 - Predictable
- Object of Science
- Scientific Proposition
-
- ```
graph LR; A[Observable] --- B[Object of Science]; C[Repeatable] --- B; D[Measurable] --- B; E[Testable] --- F[Scientific Proposition]; G[Predictable] --- F;
```



***Conjectures and Refutations:  
The Growth of Scientific Knowledge***

A.Rudyanto Soesilo

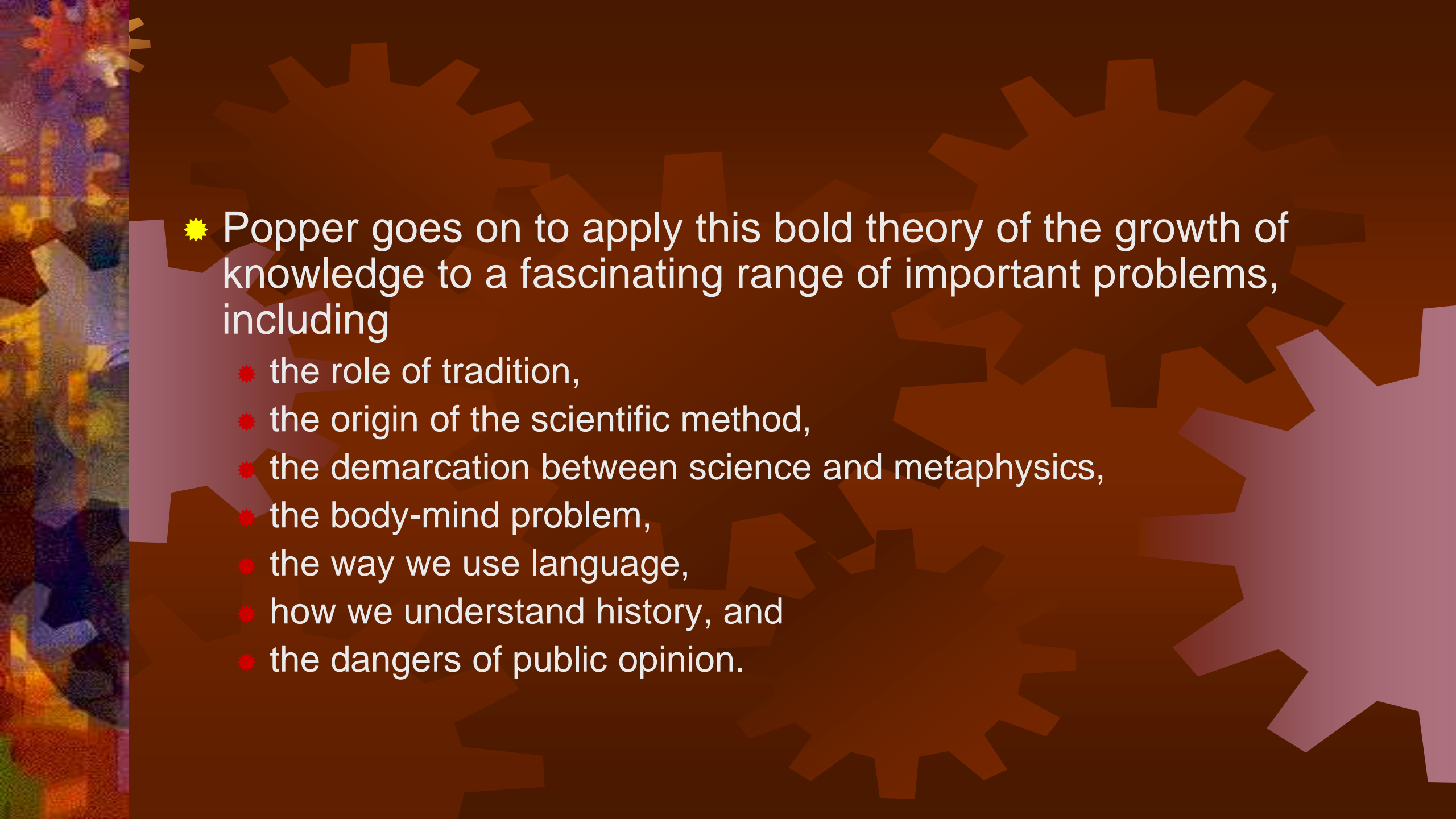
# *Conjectures and Refutations: The Growth of Scientific Knowledge*

- ✦ is a book written by philosopher Karl Popper. Published in 1963 ,
- ✦ Popper suggested that all scientific theories are by nature conjectures and inherently fallible,
- ✦ refutation to old theory is the paramount process of scientific discovery. Should any new theory survive more of such refutations, it would have a higher verisimilitude and therefore, closer to truth.



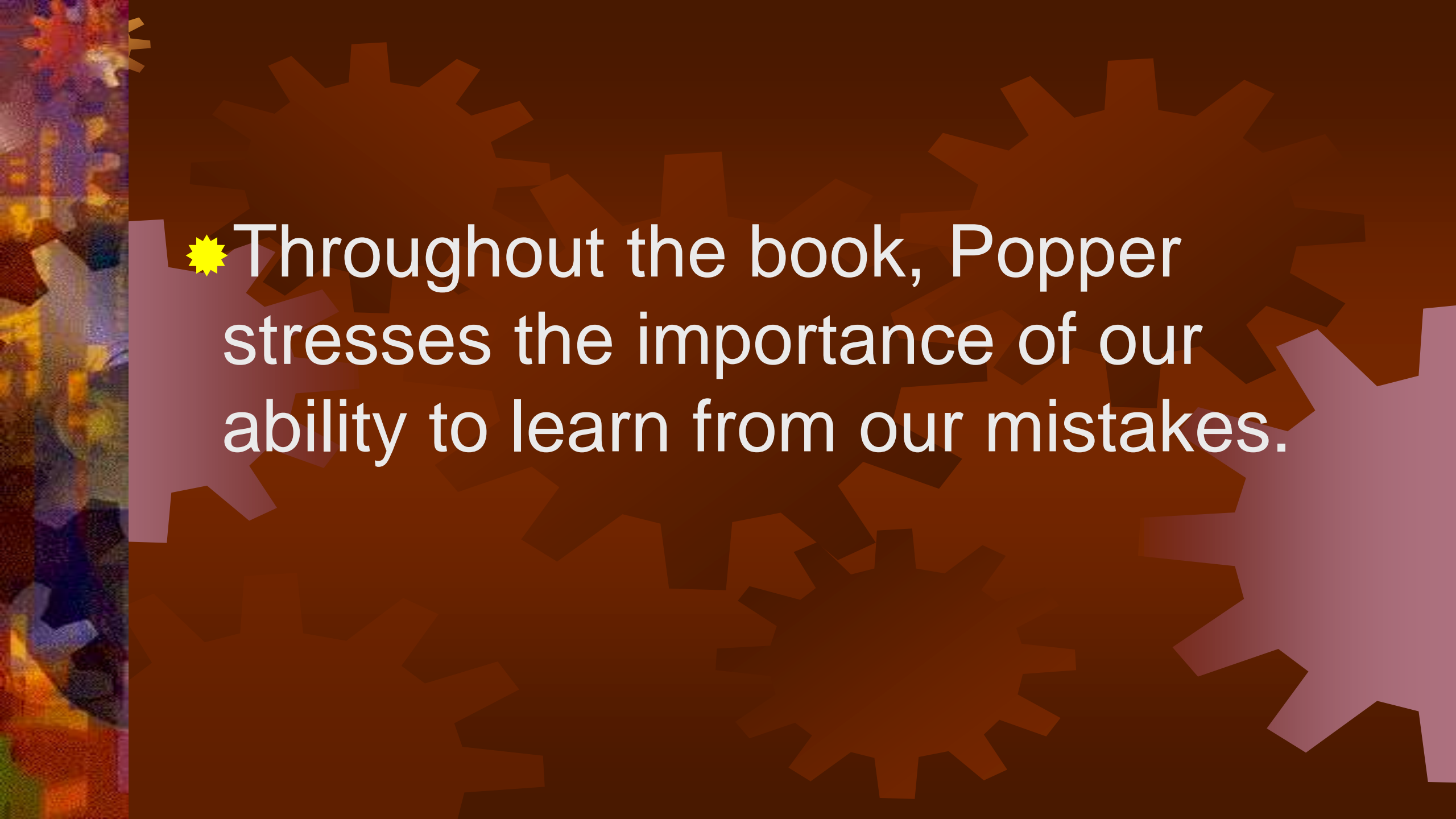
# Conjectures and Refutations

- ✦ Conjectures and Refutations is acute insight into the way scientific knowledge grows, but also for applying those insights to politics and to history.
- ✦ It provides one of the clearest and most accessible statements of the fundamental idea that guided his work: not only our knowledge, but our aims and our standards, grow through an unending process of trial and error.

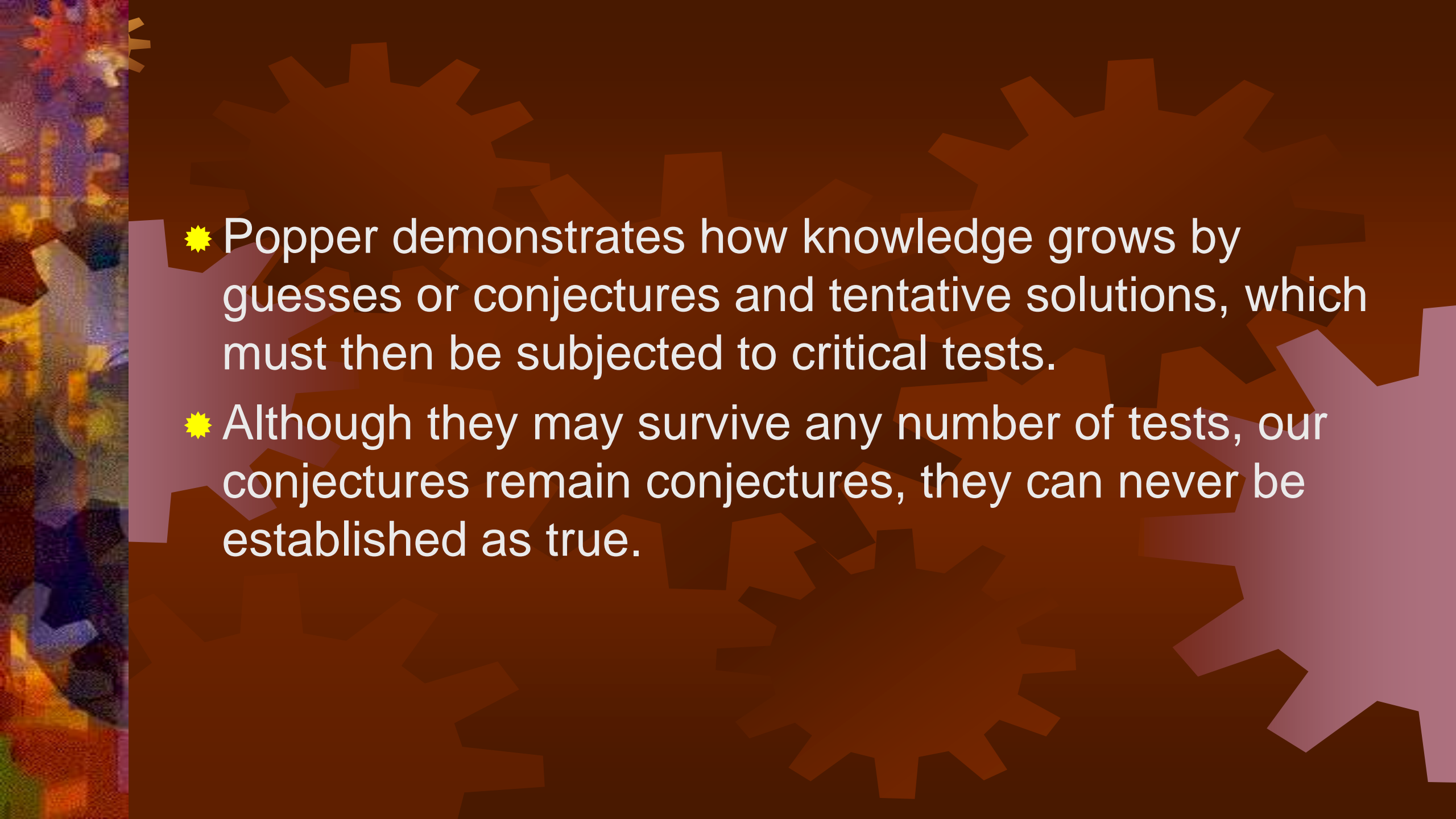


☀ Popper goes on to apply this bold theory of the growth of knowledge to a fascinating range of important problems, including

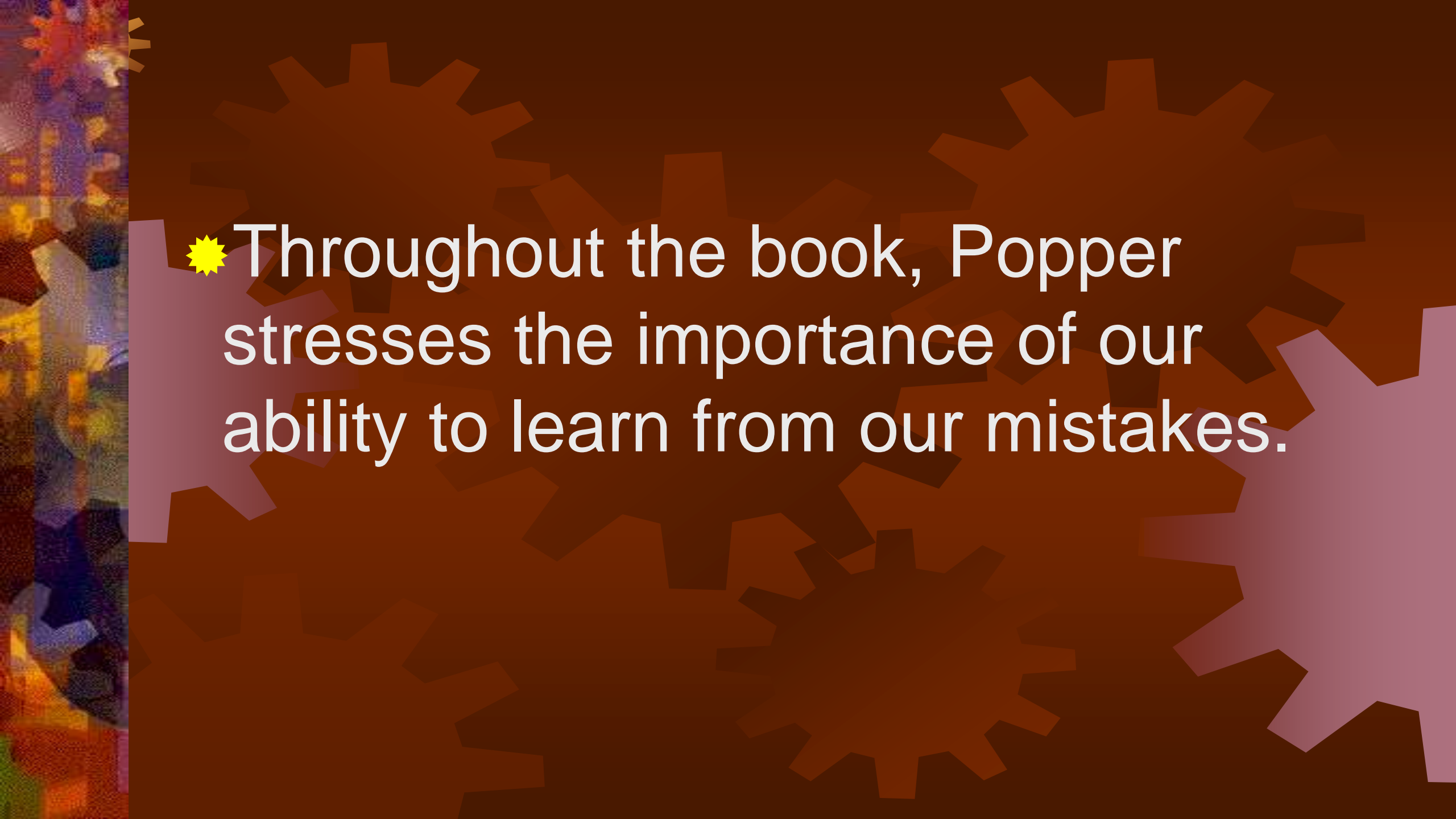
- the role of tradition,
- the origin of the scientific method,
- the demarcation between science and metaphysics,
- the body-mind problem,
- the way we use language,
- how we understand history, and
- the dangers of public opinion.

The background features a dark brown field filled with various sizes of semi-transparent gears in shades of brown and purple. On the left side, there is a vertical strip with a colorful, abstract, and textured appearance, possibly representing a book cover or a collage. A small yellow starburst icon is positioned at the top left of the text area.

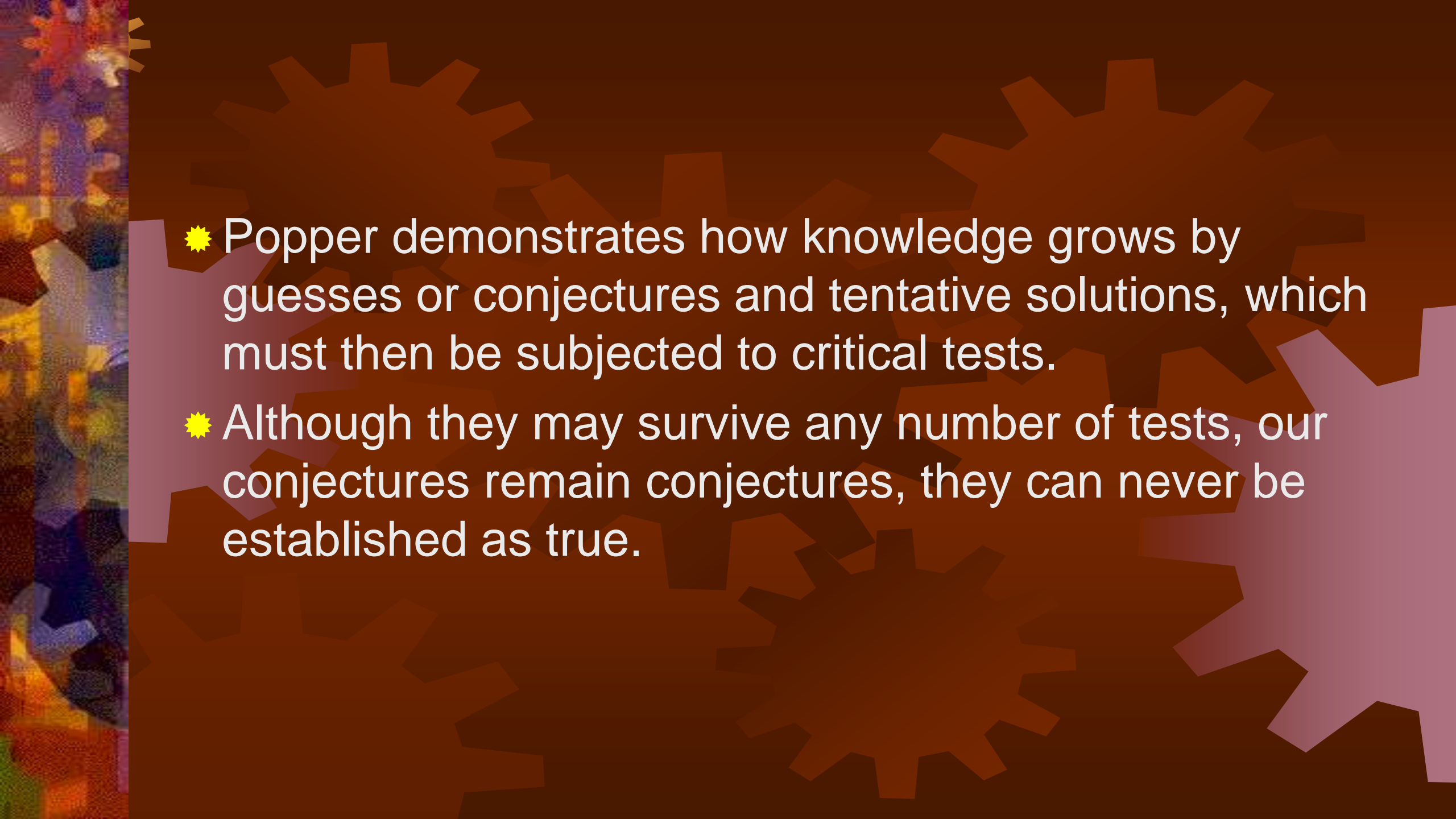
★ Throughout the book, Popper stresses the importance of our ability to learn from our mistakes.

- 
- ✦ Popper demonstrates how knowledge grows by guesses or conjectures and tentative solutions, which must then be subjected to critical tests.
  - ✦ Although they may survive any number of tests, our conjectures remain conjectures, they can never be established as true.



The background features a dark brown field filled with various shades of brown and purple gears of different sizes, some overlapping. On the left side, there is a vertical strip with a colorful, abstract, textured pattern in shades of purple, blue, yellow, and orange. A small yellow starburst icon is positioned at the top left of the text area.

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