Lecture 1: Introduction

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Course Plan

Today (Introduction):

– Why study dialogue?

– What is a dialogue game?

– Historical overview

Tuesday (Commitment):

– Commitment versus Intentions and Belief

Wednesday (Grounding and Obligations):

– Poesio & Traum, Matheson et al., …

Course Plan

Thursday (Interaction and Structure I):

- – A task-oriented dialogue game for software agents
- – Rules in dialogue − flexibility

Friday (Interaction and Structure II):

- – Rules in dialogue − recent work
- – Concluding remarks/discussion

Why study dialogue?

- **Linguistics**
- **Psychology**
- **Philosophy (Logic)**
- **Computer Science**

Why study dialogue?

- **Linguistics**
  - Face-to-face conversation is the basic and primary use of language (Fillmore, 1981):
    - Universal to human societies (compare with written language, phone)
    - Commonest setting (compare lectures, courtroom trails, …)
    - Doesn't require special skills (no schooling)
    - Basic setting for children's acquisition of their first language
- **Psychology**
- **Philosophy (Logic)**
- **Computer Science**

Why study dialogue?

- **Linguistics**
- **Psychology**
- **Philosophy (Logic)**
- **Computer Science**

Why study dialogue?

- **Linguistics**
- **Psychology**
  - See Linguistics (psycholinguistics)
  - Also: some have argued (Lev Vygotsky) that thought develops socially through interaction
- **Philosophy (Logic)**
- **Computer Science**

Why study dialogue?

- **Linguistics**
- **Psychology**
- **Philosophy (Logic)**
- **Computer Science**

Why study dialogue?

- **Linguistics**
- **Psychology**
- **Philosophy (Logic)**
  - Dialogue as foundation for logical proof
  - Dialogue rules for characterizing correct argumentative moves (normative)
- **Computer Science**

Why study dialogue?

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Why study dialogue?

- **Linguistics**
- **Psychology**
- **Philosophy (Logic)**
- **Computer Science**
  - <u>Natural Human-Computer Interfaces</u> (using voice and gesture)
  - Computer-mediated Communication (e.g., translation devices)
  - Artificial Intelligence

Browse products:

11266 products

NEW! New products!
Bathroom
Beds & mattresses
Bookcases & storage
Children's IKEA
Clothes storage
Cookware
Decoration
Floors
For the pets
Furniture care
Hall & entrance
Kitchen
Lighting
Secondary storage
Sofas & armchairs
Summer
Tables & chairs
Tableware
Textiles & rugs
Tv & media solutions
Work area

Search

Check stock availability

IKEA

First

Ret

Con

You just said : I would like to buy a bookcase.

Please have a look at the Bookcases Subcategory.

Turn sound on   Go

Close

Why study dialogue?

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- **Psychology**
- **Philosophy (Logic)**
- **Computer Science**
  - Natural Human-Computer Interfaces (using voice and gesture)
  - Computer-mediated Communication (e.g., translation devices)
  - Artificial Intelligence

Turing Test

- 1950 paper by Alan Turing (1912 - 1954) 'Computing Machinery and Intelligence'
- **Imitation Game**: a man and a woman go into separate rooms, and guests try to tell them apart by writing a series of questions and reading the typewritten answers sent back. In this game, both the man and the woman aim to convince the guests that they are the other.
- **Turing imitation game**: Which of two agents is human and which is a computer?
- **Aim**: practical determination of intelligence through behaviour

Loebner Competition 1991

- Limiting the topic: The topic of the conversation was to be strictly limited, both for the contestants and the confederates. The judges were required to stay on the subject in their conversations with the agents.

- Limiting the tenor: Further, only behavior evinced during the course of a natural conversation on the single specified topic would be required to be duplicated faithfully by the contestants.

- In 2007 the Judges will be required to start the conversations. Entries will be expected to respond to the judges' initial comment or question.   There will be no restrictions on what names etc the entries, humans, or judges can use, nor any other restrictions on the content of the conversations.

http://www.loebner.net/Prizef/loebner-prize.html

Alice and Jabberwacky

ALICE: Are you alive?

Jabberwacky: Perhaps.

A: Why the uncertain tone?

J: Everything is uncertain except for five facts.

A: The whole universe?

J: And we both might just be some ones and zeros in the computer memory.

Dialogue Game - Definition

A *dialogue game* is a more or less formalized set of rules that describe or regulate the conduct of the participants of a dialogue.

Typically, a dialogue game specifies:
* Participants
* Initial situation/Starting position
* Goal situation(s)/Purpose
* Locutions
* Rules and roles: permitted/prohibited actions, abilities, …

Dialogue Game - Purposes

- **Instrumental**
- **Normative**
- **Descriptive**
- **Formal**

Dialogue Game - Purposes

- **Instrumental** For a specific external purpose.
- **Normative**
- **Descriptive**
- **Formal**

Dialogue Game - Purposes

- **Instrumental**
- **Normative**
- **Descriptive**
- **Formal**

Dialogue Game - Purposes

- **Instrumental**
- **Normative**: use dialogue games to specify how human-human dialogue ought to be conducted.
- **Descriptive**
- **Formal**

Dialogue Game - Purposes

- **Instrumental**
- **Normative**
- **Descriptive**
- **Formal**

Dialogue Game - Purposes

- **Instrumental**
- **Normative**
- **Descriptive** use dialogue games to model naturally occurring human-human dialogue.
- **Formal**

Dialogue Game - Purposes

- **Instrumental**
- **Normative**
- **Descriptive**
- **Formal**

Dialogue Game - Purposes

- **Instrumental**

- **Normative**

- **Descriptive**

- **Formal**: "A formal approach, […] consists in the setting up of simple systems of precise but not necessarily realistic rules, and the plotting of the properties of the dialogues that might be played out in accordance with them." (Hamblin, 1970:256)

Dialogue Game - Participants

- **Human – Machine** dialogue games

- **Human – Human** dialogue games

- **Machine – Machine** dialogue games

Dialogue Game - Chronology
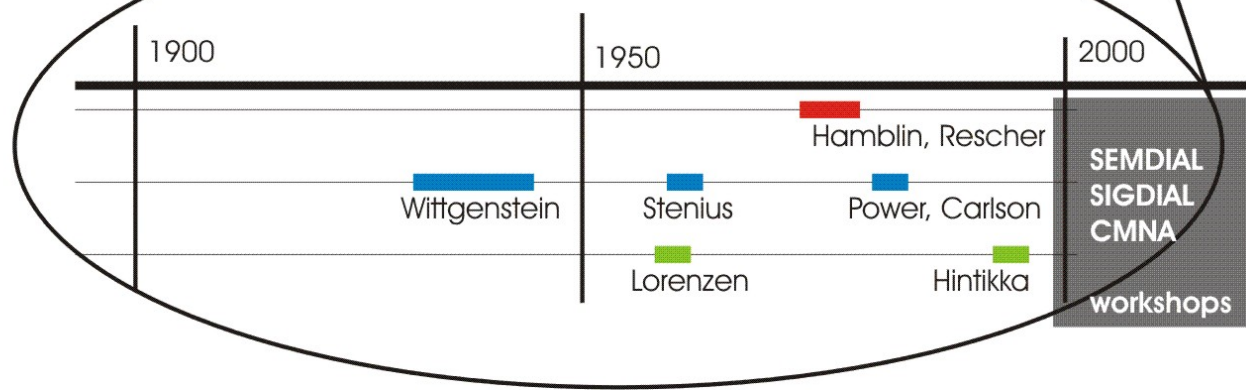
Greek Public Debate

- **Ancients Greeks: 800 – 300 BC**
- **Plato's (earlier) dialogues**
- **Aim: search for philosophical truth; discovering the essence of some concept: virtue, the State, number, ...**

Greek Public Debate

- **Ryle (1966): staged and improvised dialogues were common; some of Plato's dialogue were written for performance at the Olympic games**

Greek Public Debate

- **Participants:**
  - **Questioner: no commitments (but <u>leading questions</u>)**
  - **Answerer**
  - **Onlookers: ultimate arbiters (majority opinion)**

Greek Public Debate

- **Leading questions**
  - "Then Thrasymachus, do you actually think that the unjust are wise and good?"
  - "But on recovery of knowledge from within ourselves, is this not what we call reminiscence?"

Greek Public Debate

- **Participants:**
  - **Questioner: no commitments (but leading questions)**
  - **Answerer**
  - **Onlookers: ultimate arbiters (majority opinion)**

Greek Public Debate

- **Start: answerer posits a thesis**
- **End: Thesis is withdrawn or questioner gives up**
- **Rule:**
  - **All questions are followed through**
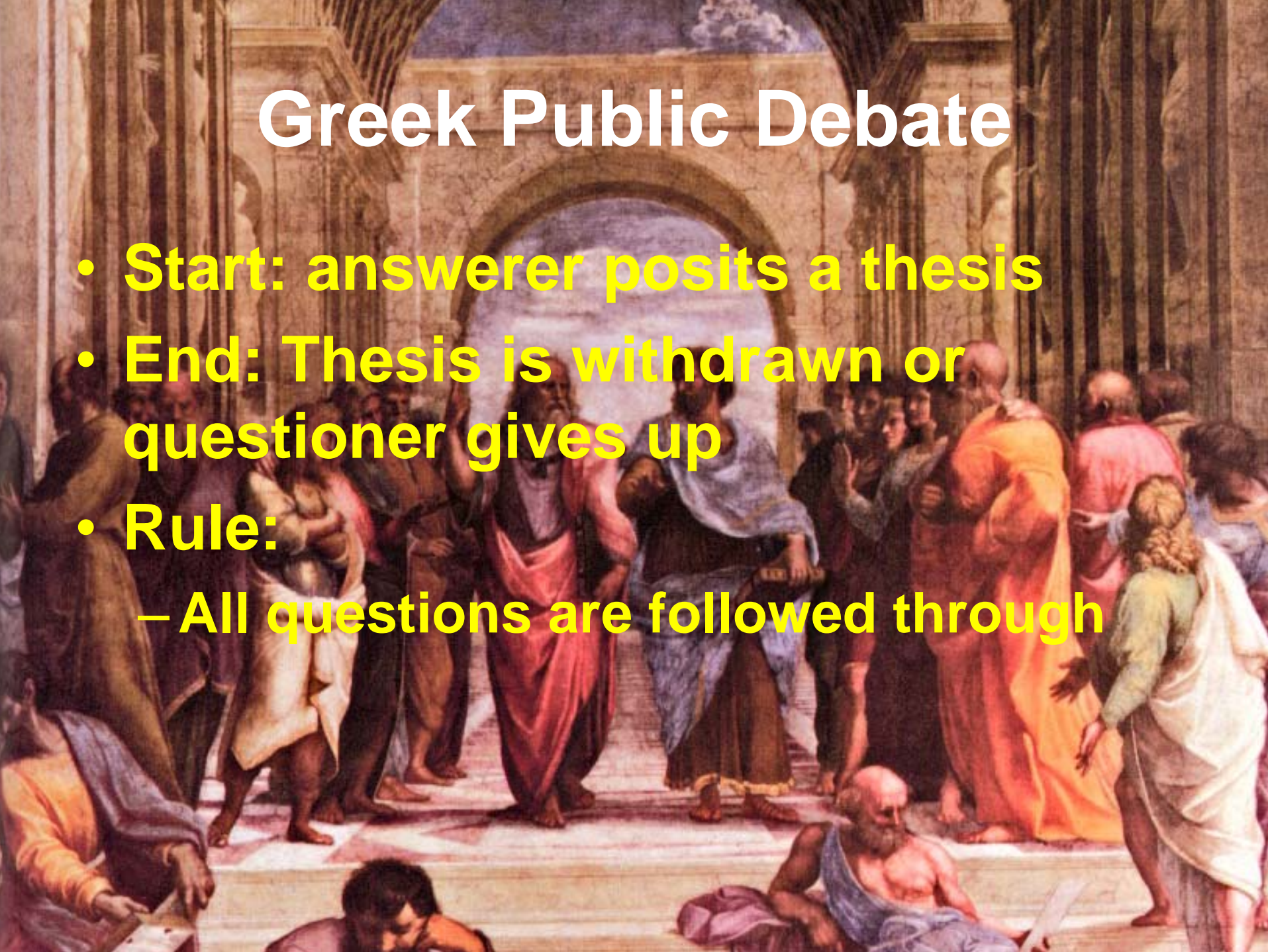
The Sophists

You say that you a have dog.
Yes
And he has puppies?
Yes, very like himself.
And the dog is their father?

The Sophists

Yes, I certainly saw him and the mother of the puppies come together.

And he is not yours?

For sure he is.

Then he is a father and he is yours; ergo he is your father, and the puppies are your brothers.

The Sophists

…

You beat this dog?

Indeed I do; and I only wish that I could beat you instead of him.
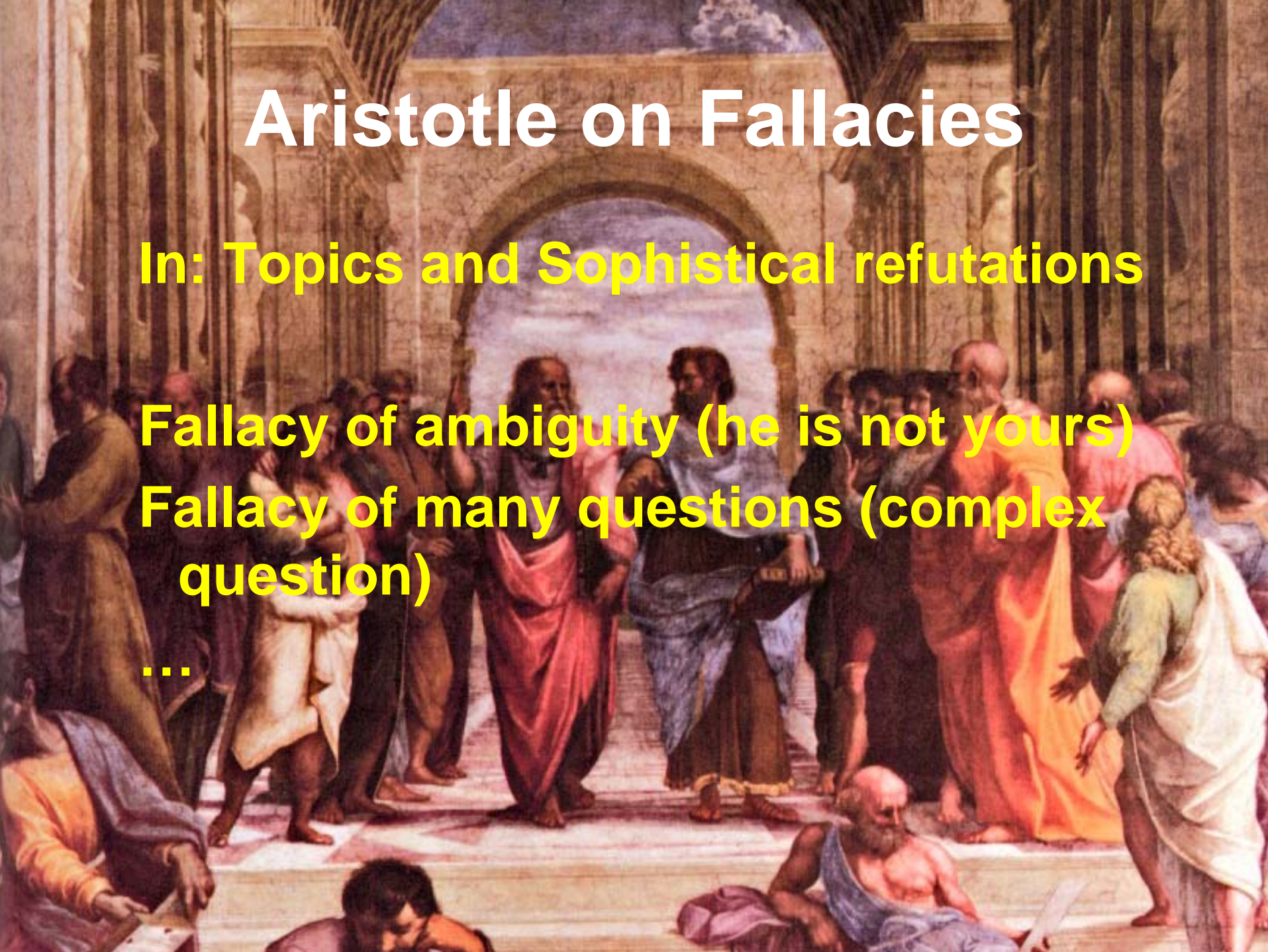
Then you beat your father, he said.

Aristotle on Fallacies

In: Topics and Sophistical refutations

Fallacy of ambiguity (he is not yours)
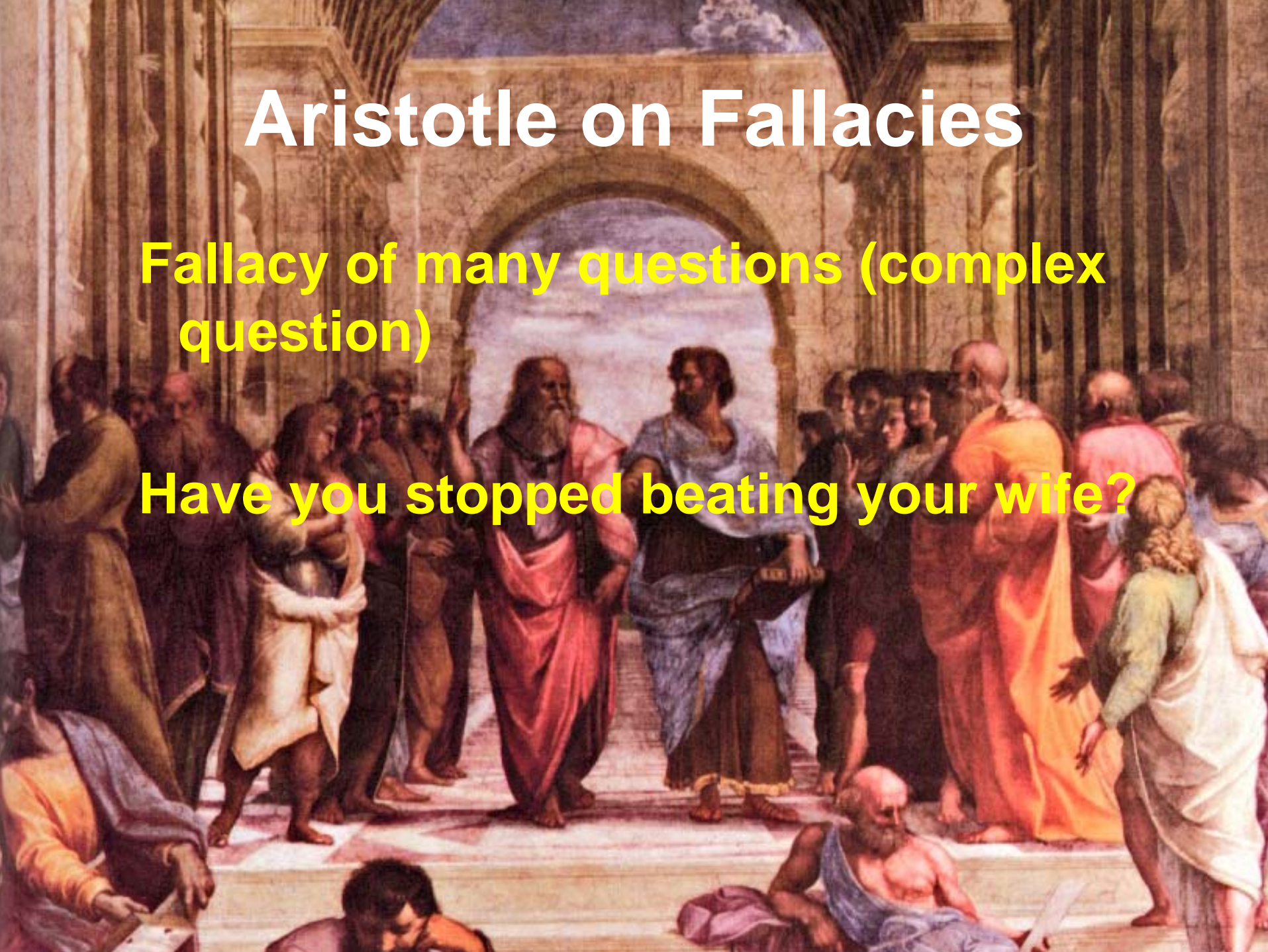
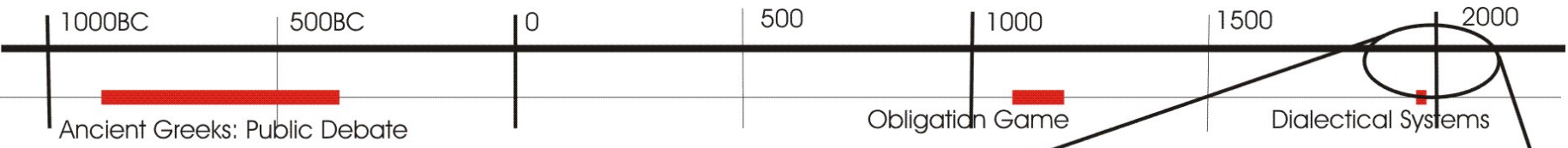**Fallacy of many questions (complex question)**

…

Aristotle on Fallacies

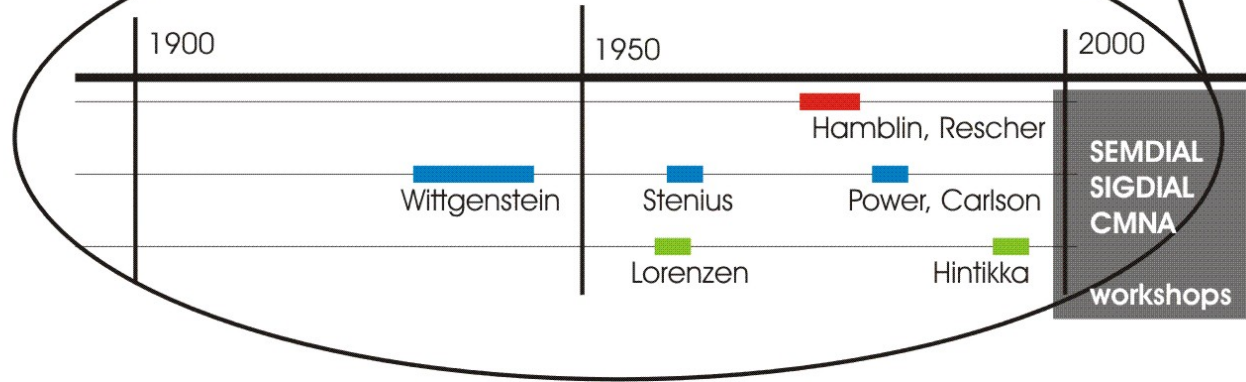**Fallacy of many questions (complex question)**

Have you stopped beating your wife?

Dialogue Game - Chronology

Obligation Games

- Medieval disputation format (13th and 14th century)
- Various versions – motivation controversial
  - Counterfactual ("what if") reasoning
  - Related to modern thesis defence
- Standard Theory: Walter Burley

Obligation Games - Positing

- Participants:
  - Opponent
  - Respondent
- Start: opponent begins with "I posit that P" (positum)
- End/pause: when opponent says "Cedat tempus" (The time is up!/Time out!)
- Result: what has been accepted

Obligation Games - Positing

- Rules:
  - Respondent's first move: "I admit it" (if P contingent) or "I deny it".
  - Opponent's subsequent moves: propose propositions $Q_1 \ldots Q_n$ one after another (propositums).
  - Respondent:
    1. **accept Q_k** IF Q_k follows from P $Q_1 \ldots Q_{k-1}$;
    2. **deny Q_k** IF *not* Q_k follows from P $Q_1 \ldots Q_{k-1}$;
    3. **accept Q_k** IF neither 1 nor 2 applies (<u>irrelevance</u>) and respondent knows Q_k is to be true ;
    4. **deny Q_k** IF neither 1 nor 2 applies and respondent knows Q_k to be false ;
    5. **doubt Q_k** IF neither of 1, 2, 3, and 4.
  - Opponent can suspend/end with "cedat tempus".

Obligation Games - Example

O: Every human walks

R: Admit   [contingent positum]

O: You are a human

R: Accept   [irrelevant, true]

O: You walk

R: Accept   [follows]

Obligation Games - Example

O: Mick Jagger doesn't play with the Rolling Stones

R: Admit   [contingent positum]

O: Keith Richards plays with the Rolling Stones

R: Accept   [irrelevant, true]

O: Jagger and Richards play in the same band

R: Deny   [incompatible]

If Mick Jagger didn't play with the Rolling Stones, he would not be playing in the same band as Keith Richards.

Obligation Games - Example

O: Mick Jagger doesn't play in the Rolling
    Stones
R: Admit   [contingent positum]
O: Mick Jagger and Keith Richards play in the same band.
R: Accept   [irrelevant, true]
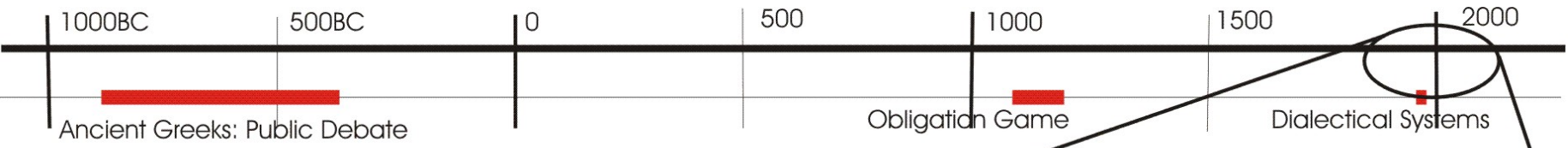O: Keith Richards doesn't play with the Rolling Stones.
R: Accept   [follows]

If Mick Jagger didn't play in the rolling stones, neither
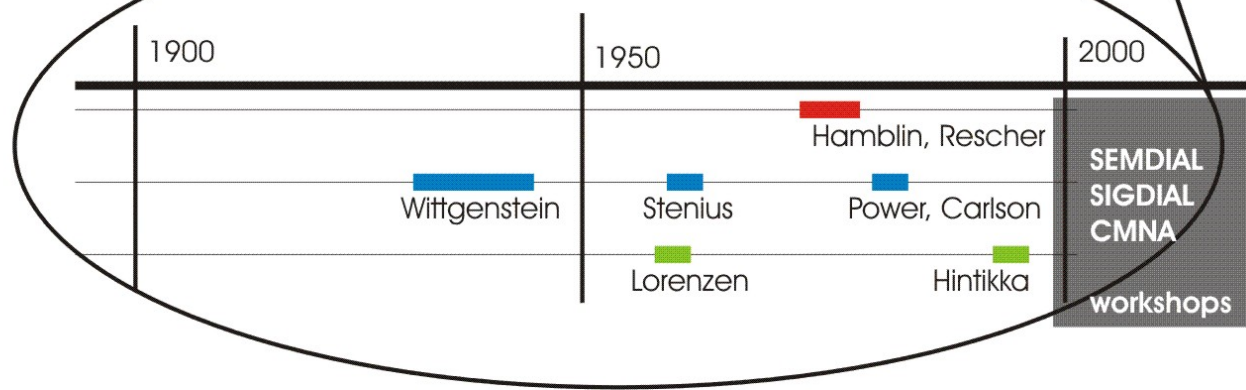   would Keith Richards.

Obligation Games - Commitment

- The respondent can be seen as building up a <u>store of commitments</u> which s/he has to take into account when responding.
  - Rule: If the current propositum is relevant to the commitments (it or its negation follows from them) respond accordingly
  - Rule: If the current propositum is irrelevant, respond according to the actual state-of-affairs.
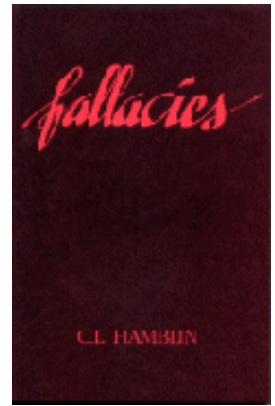
Dialogue Game - Chronology

C.L. Hamblin

- 1970 book "Fallacies"
- Formal dialectic
- "[…] there are prevalent but false conceptions of the rules of dialogue, which are capable of making certain argumentative moves seem satisfactory and unobjectionable when, in fact, they conceal and facilitate dialectical malpractice."
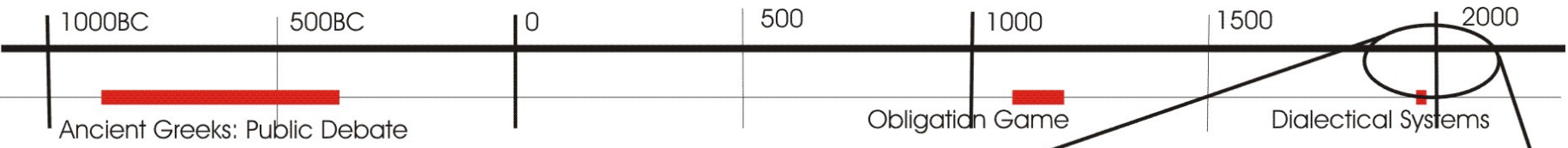
Dialectical System

- A regulated dialogue or family of dialogues
- Participants + Rules which govern form and content of what has been said relative to the dialogue history
- Commitment-stores: "running tally of a person's commitments"
- Rules: prescribe, prohibit or permit
- Avoid permissive rules: any linguistic act, *locution*, that not prohibited is permitted.
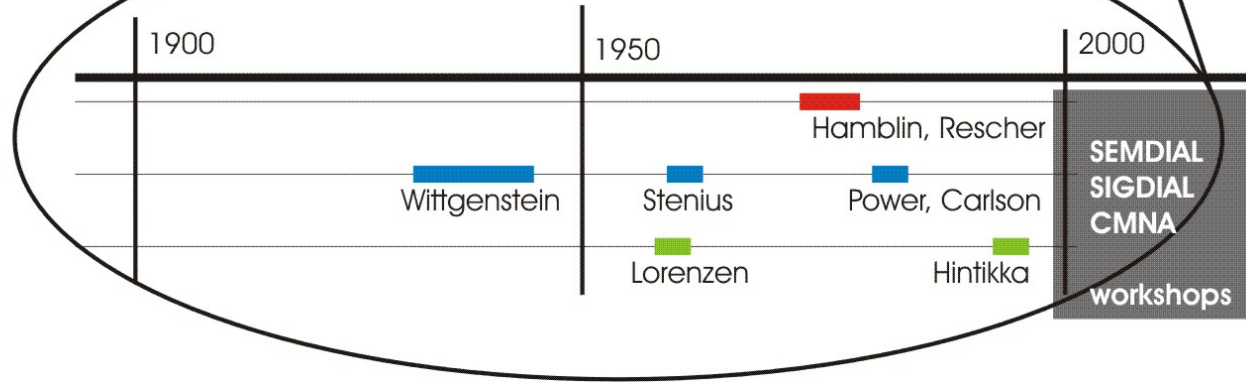
Dialectical System

- Aims:
  - Study formal properties (consistency)
  - Analysis (Why-Because with questions)
    - Many questions
    - Not telling the whole truth
    - Burden of proof
    - …

Dialogue Game - Chronology

Wittgenstein (1889 - 1951)

- Language game
  - Primitive forms of language or primitive languages
  - Language use as situated in practical activity (without reference to mentalistic notions/complex processes of thought)
  - Each language game as a language in its own right (with family resemblances to other language games).
  - Show that certain philosophical problems disappear: "Der Fliege den Ausweg aus dem **Fliegenglas** zeigen."
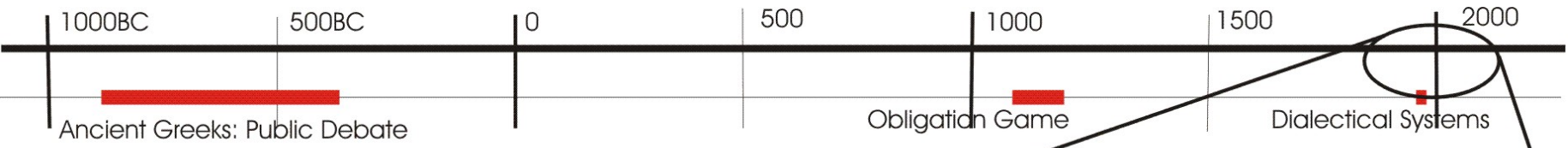
Example (Brown book pp. 77-81)

- Augustinus: learning to speak = learning the names of things

- Builder A and helper B
- B has to reach A building stones (cubes, bricks, slabs, …)
- Language: "cube", "brick", "slab"
- Imagine society in which this is the entire language
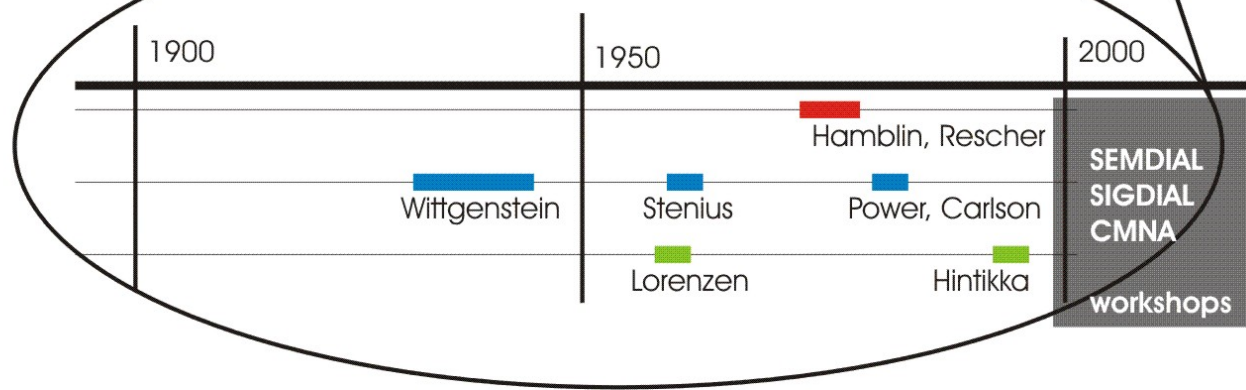- Learning through example (pointing), punishment, reward, …

Example (Brown book pp. 77-81)

- Does "brick!" mean the same in our language? Or is it "Bring me a brick!". Does it make sense to ask for the mental states of the interlocutors to answer this question?

- Extension: "Five slabs!"
- Teaching of the numerals "five": pointing to five slabs, cubes …
- Introduced an entirely different kind of instrument into the language
- Pointing to shape versus number, what does it exactly in terms of mental acts
- Difficult to formulate, but we can understand the difference in terms of the surrounding of the act in the use of the language.

Dialogue Game - Chronology

Erik Stenius (1911 - 1990)

Mood and Language-game (1967)

- You eat the cake now.
- Eat the cake now!
- Are you eating the cake now?

- It is the case P
- Let it be the case P!
- Is it the case P?
- P = that you eat the cake

The Problem

- A sentence can be viewed as consisting of a sentence radical ("that …") and a modal element/mood.

- The meaning of the sentence radical can be given in terms of W's picture theory or modern truth-conditional formal semantics.

- What is the meaning of the modal element?

The Problem

- Performative hypothesis – disguised statements:

    - I hereby ask you whether you are eating your cake.
    - I tell hereby tell you to eat your cake.
    - I hereby state that you are eating your cake now.

Language games

- Wittgenstein: meaning of a word is its use in language.
- S. follows W. in sketching a simplified language game to get a better understanding of the modal element/mood

Report-game

- **R1**: Write one of the letters "P" or "Q" to the left of one of the letters "a", "b" or "c", according to whether the object denoted by one of the latter letters has the property denoted by "P" or "Q" (in this position).

- Learning and use phase.

Command-game

- **R2**: Give the object denoted by the "a", "b" or "c" the property corresponding to "P" or "Q", according to whether a "P" or a "Q" stands to the left of this letter.

Combined Game

- Write "I" on the slip if report-game is being played.

- Write "O" on the slip if the command-game is being played.

Combined Game

- **Def**: A sentence-radical is called "true" if what is described really is the case; otherwise it is "false".

- **R3**: Produce a sentence in the indicative mood only if its sentence radical is true

- **R4**: React to a sentence in the imperative mood by making the sentence-radical true.

Complications

- Does saying something false mean that one isn't speaking English? Is R3 a semantic rule?
- Report *ought to* be a symptom of the state-of-affairs it was agreed to be a symptom of.
- It defines the meaning in the sense that it is the rule on which the speaker was conditioned and on which s/he is expected/ought to act.
- Compare it with an illegal move in chess and cheating in poker.
- Preservative rules versus constitutive ones. (preservation as a game of communication)

Complications

- Should the rules be formulated in terms of belief rather than truth?

- **R3'**: Produce a sentence in the indicative mood only if you *believe* its sentence radical to be true.

- But what about correction if we have R3'?

- Consider: It rains, but I don't belief that it rains.

- Now consider a man who can't speak a falsehood.

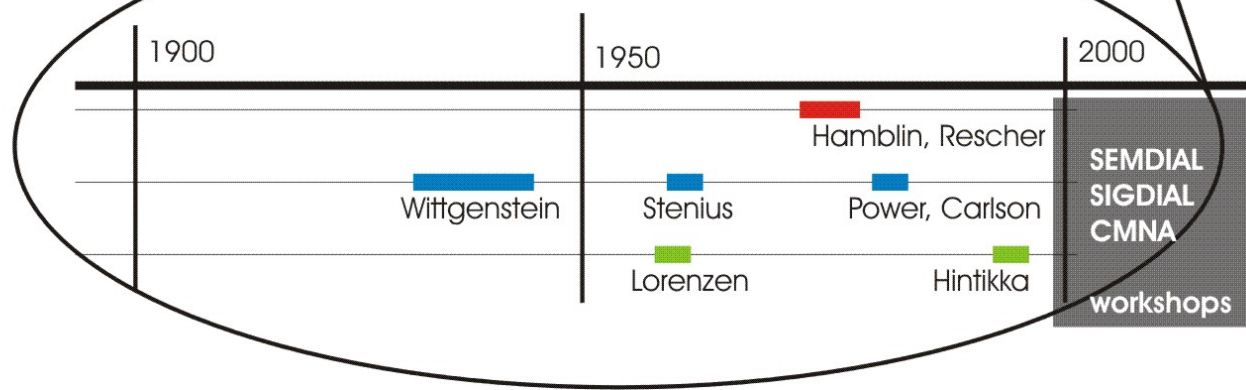- But, it is impossible to always follow R3.

Complications

- How many moods are there? Should we distinguish "P" from "I believe that P"?

- Occassional language-games: e.g., language use in the theatre. Pretend indicatives, imperatives, …

Dialogue Game - Chronology
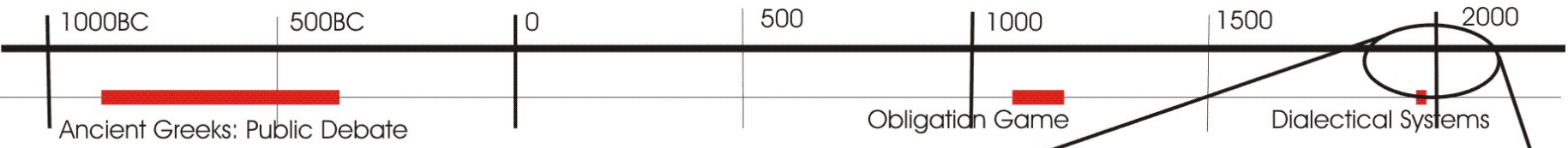
Logical/Semantic Games

- Paul Lorenzen (1915 - 1994)
- Jaakko Hintikka (1929 -)

- Alternative definitions of truth/falsity in a model and validity for formal logical systems.
- Use the game-theoretic notion of a winning strategy.

Propositional Logic

- Players: Eloise (defender) and Abelard (attacker)

- Model

- Moves:
- <u>For</u> P or Q: Eloise pick one of {P,Q}
- <u>For</u> P and Q: Abelard pick one of {P,Q}
- <u>For</u> Not P: swap roles
- <u>For</u> atomic(P): Eloise wins if P is true, Abelard wins if P is false

- There is a winning strategy for Eloise regardless of the model.

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Slides will be made available at

http://mcs.open.ac.uk/pp2464/dialogueGames/