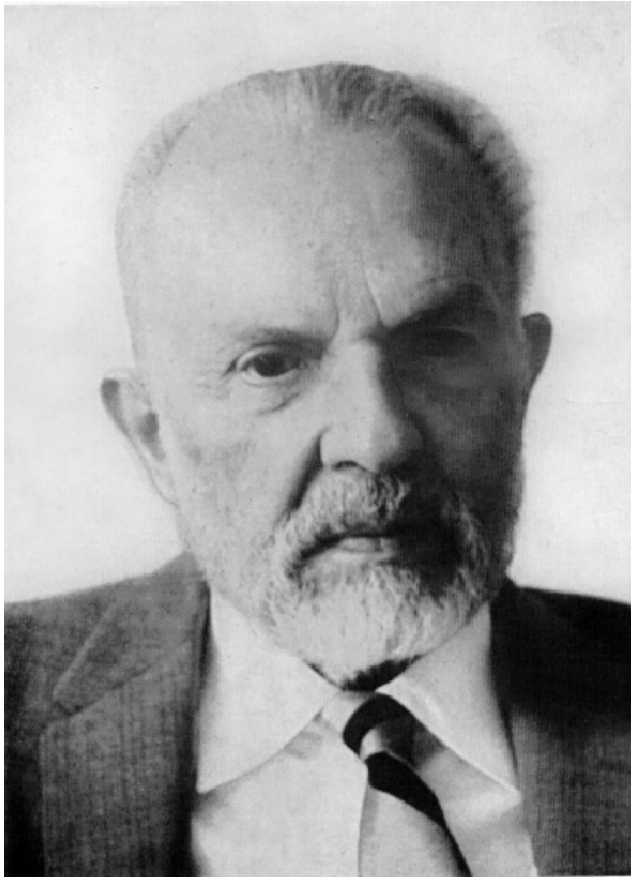
On the Notion of 'Empirical Fact' in Carnap's *The Logical Syntax of Language*

Emerson P. Doyle

The University of Western Ontario
Department of Philosophy
edoyle8@uwo.ca

May 29, 2011

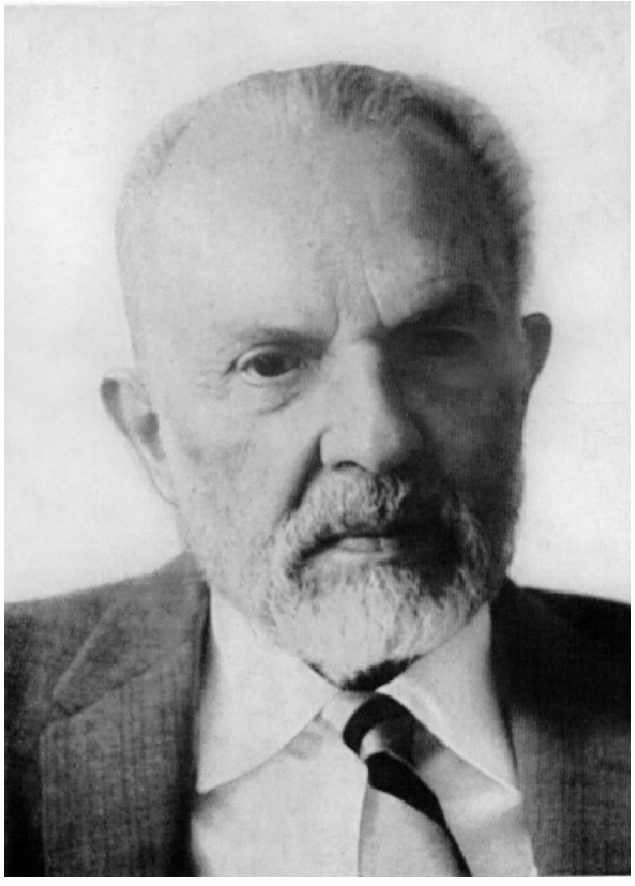


Voted:

Most Significant Philosopher of Science of the 20th Century

(Completely scientific poll)

Three Things About Carnap:



1. Rejected metaphysics.
2. Linguistic Frameworks.
3. Principle of Tolerance.

Logical Empiricism

Empiricism:

Sense experience or observation is our only source of substantive knowledge, and this is exclusively empirical facts.

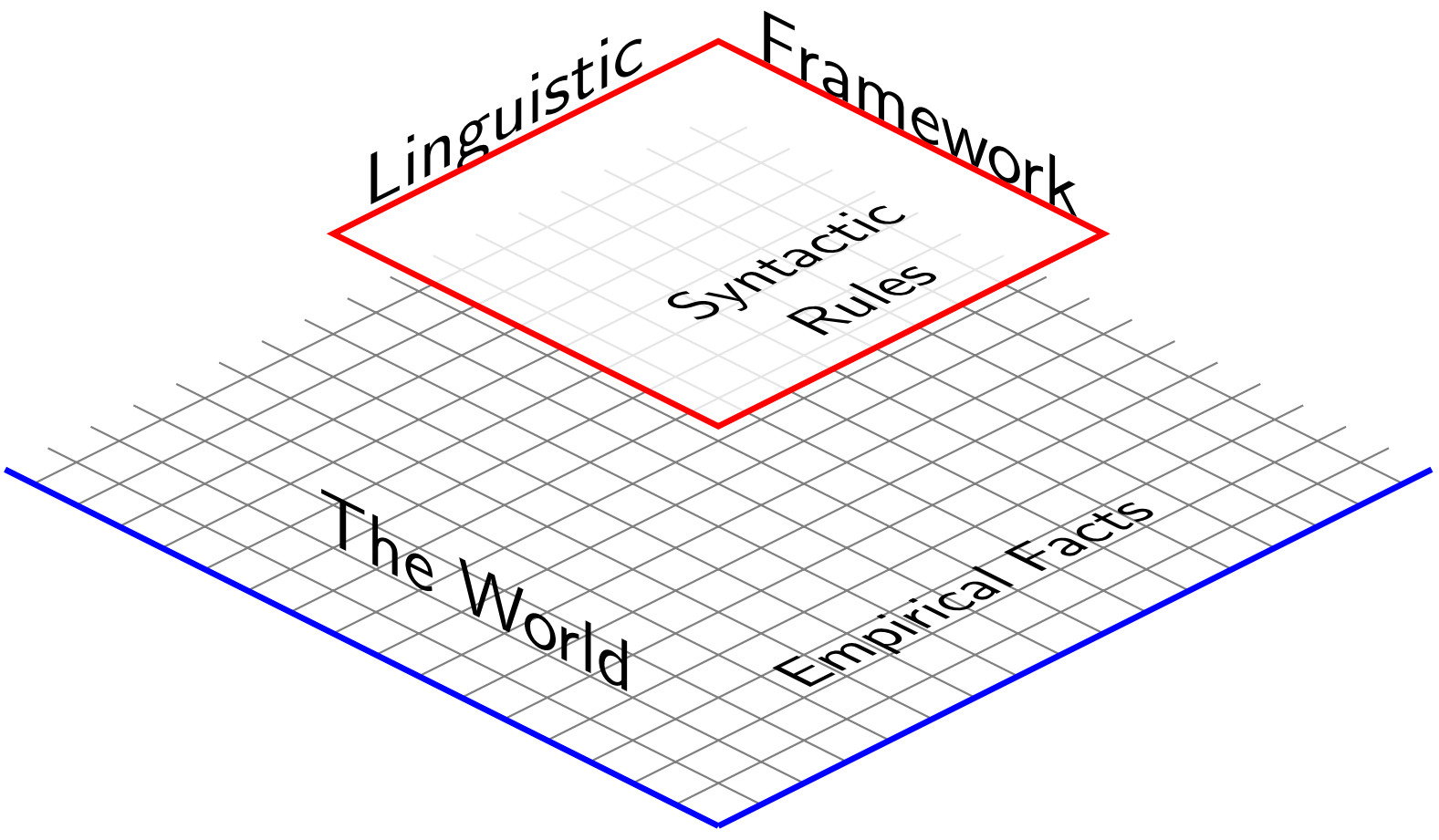
Problem:

What about logico-mathematical knowledge? Seems substantive, but not empirical.

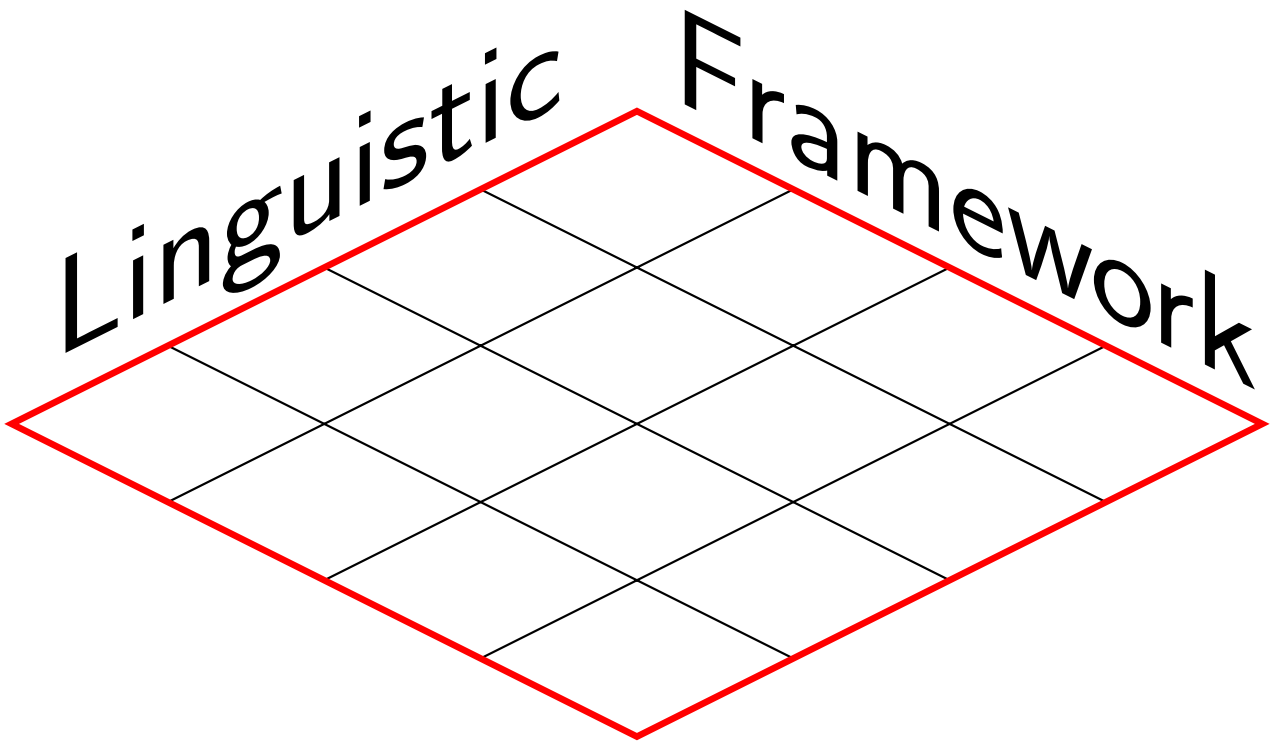
Solution:

Logico-mathematical knowledge is *not* substantive knowledge, it's Conventional: the inferential residue of the tacit (or explicit) syntactical rules of our language.

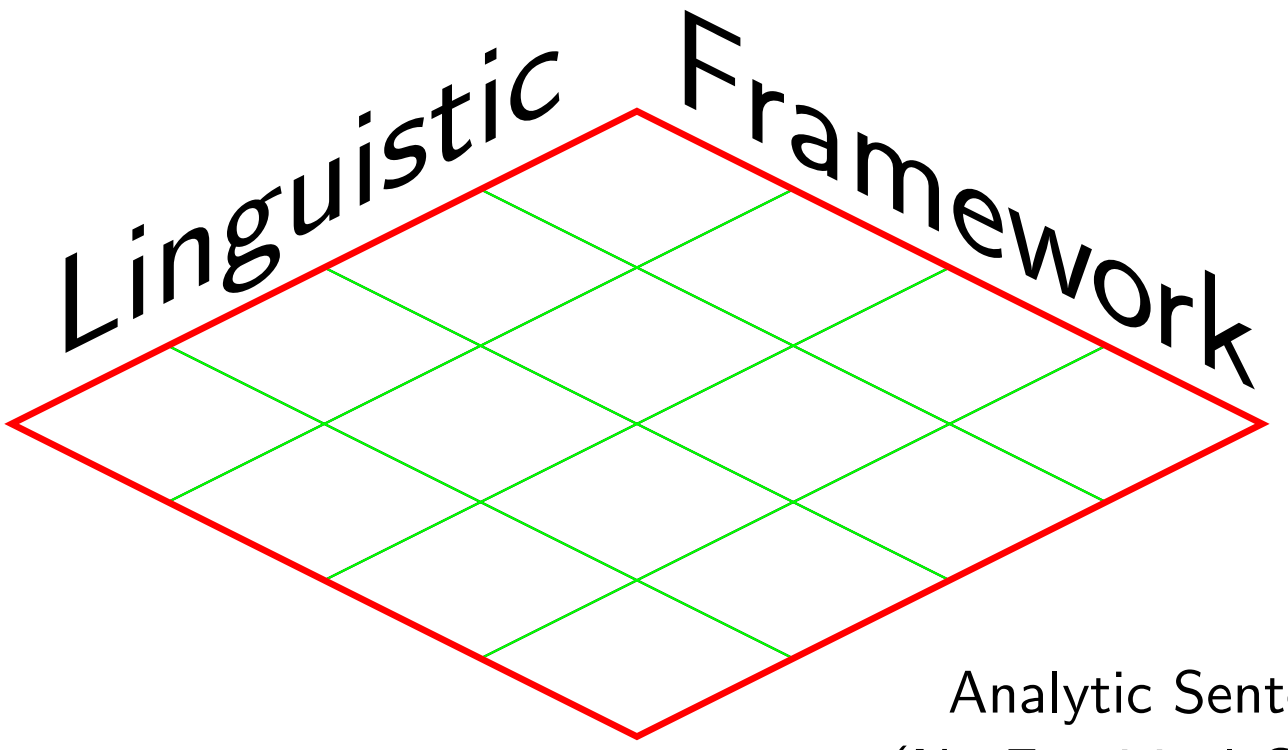
Linguistic Frameworks



Linguistic Frameworks (Zoomed-In)

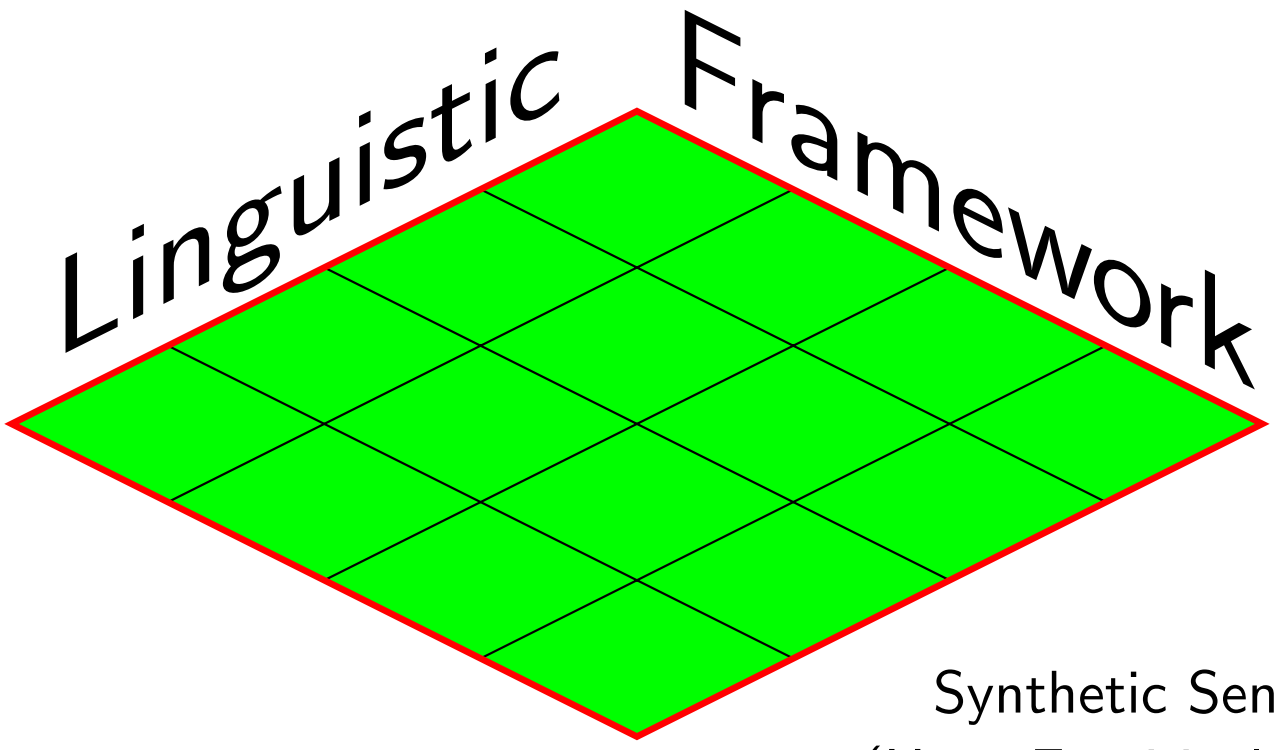


Linguistic Frameworks (Zoomed-In)



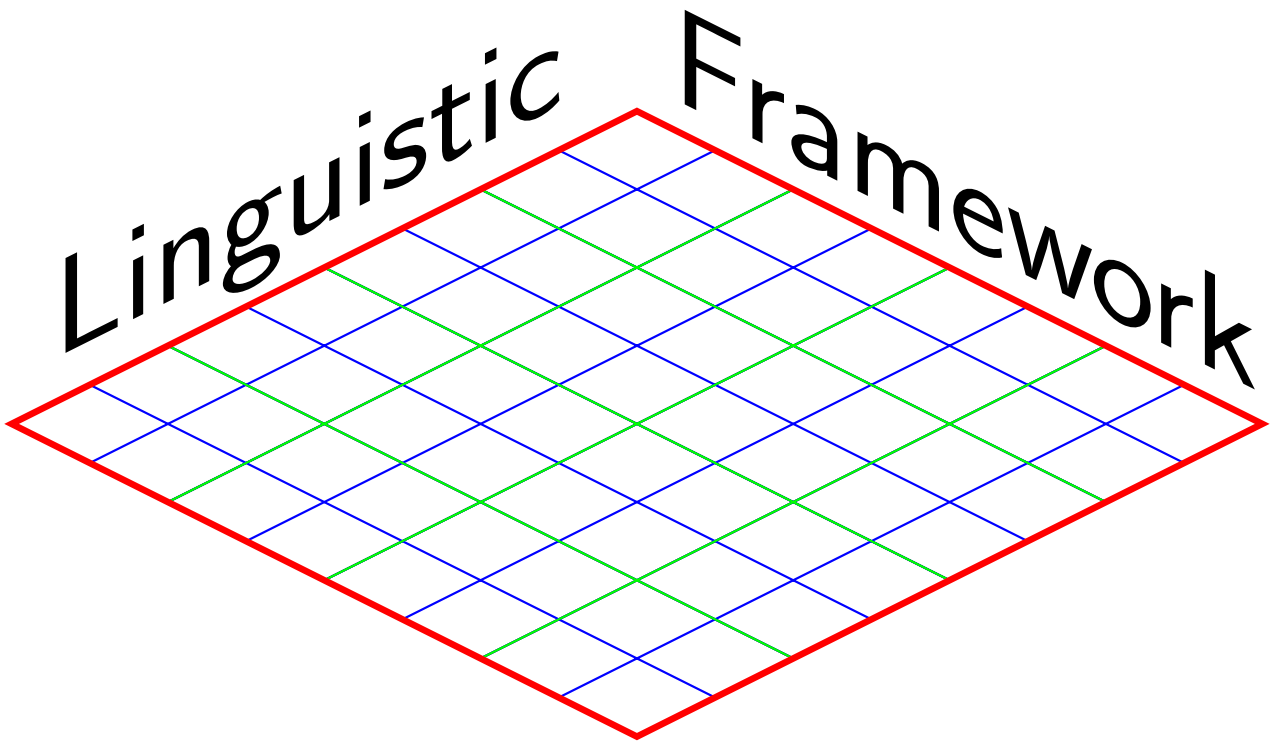
Analytic Sentences
(No Empirical Content)

Linguistic Frameworks (Zoomed-In)



Synthetic Sentences
(Have Empirical Content)

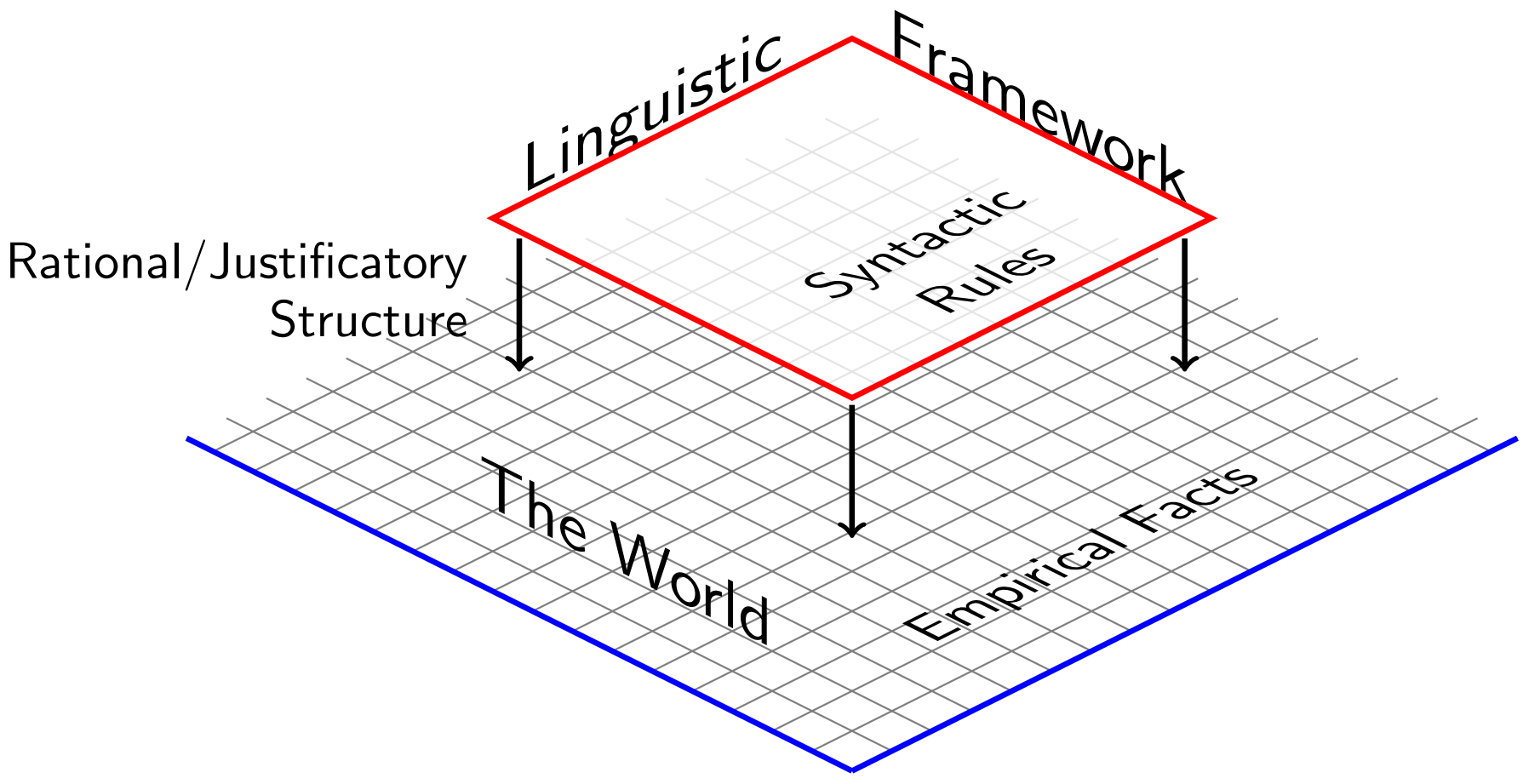
Linguistic Frameworks (Zoomed-In)



Logical-Rules $\rightarrow$ Logic & Mathematics

Physical-Rules $\rightarrow$ Scientific Theories

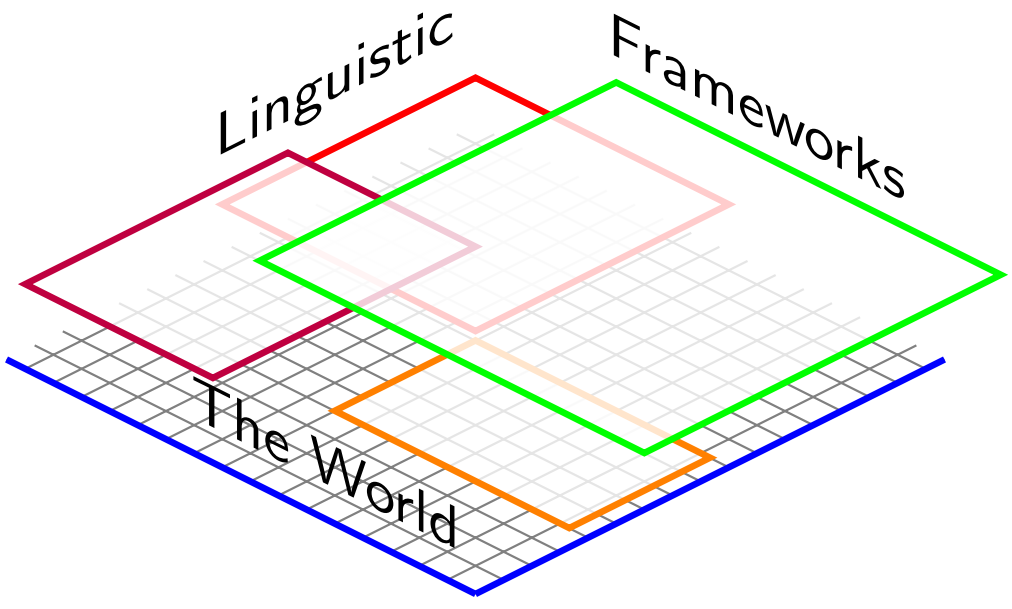
Logocentrism



The Principle of Tolerance

It is not our business to set up prohibitions, but to arrive at conventions. [. . .]

In logic, there are no morals. Everyone is at liberty to build up his own logic, i.e., his own form of language, as he wishes. All that is required of him is that, if he wishes to discuss it, he must state his methods clearly, and give syntactical rules instead of philosophical arguments.



Gödel's Objection

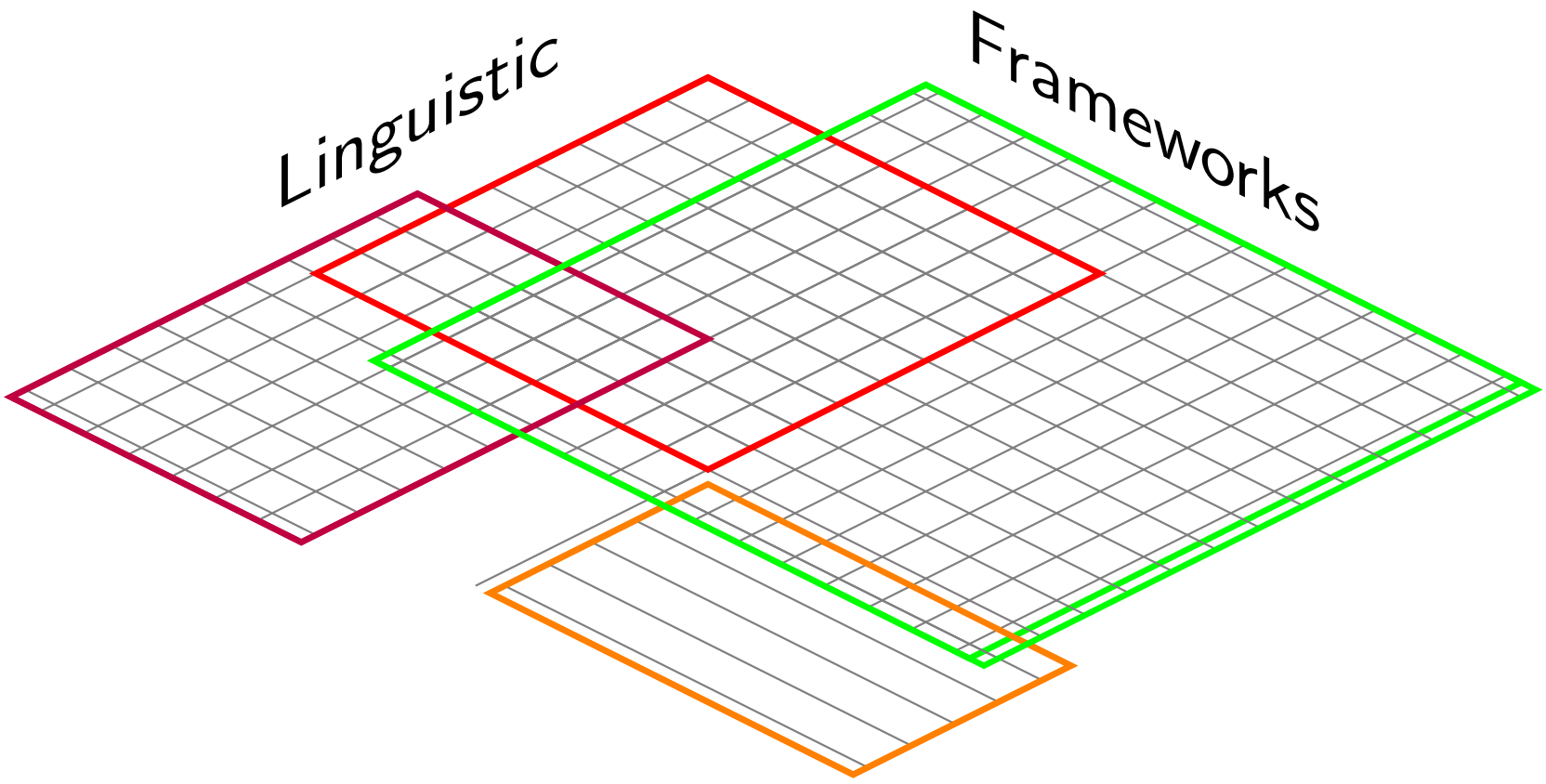
Carnap, how can we be sure that a given syntactical rule has no empirical content?

A rule needs to be demonstrably consistent in order to ensure it does not imply any factual sentences, and so is properly logical.

My Second Incompleteness Theorem entails that any proposed syntactical rule cannot prove its own consistency.

Therefore you cannot justify the thesis that mathematics is syntax of language.

Goldfarb & Ricketts' Response



Goldfarb & Ricketts' Response

Ricketts (1994)

This notion of empirical fact imposes morals in logic on the conventionalist. Carnap, in adopting the Principle of Tolerance, rejects any such language-transcendent notions. (p. 180)

Goldfarb (1996)

However, as the Principle of Tolerance indicates, it is central to the metaphysics of *Logical Syntax* that any such language transcendence be rejected. Rather, the notion of empirical fact is given by way of the distinction between what follows from the rules of a particular language and what does not, *so that different languages establish different domains of fact*. In this way, Carnap undercuts the very formulation of Gödel's argument. (p. 227)

Problem 1—Disagrees with Carnap

Logical Syntax, §86

Our thesis that the logic of science is syntax must therefore not be misunderstood to mean that the task of the logic of science could be carried out independently of empirical science and without regard to empirical results. The syntactical investigation of a system which is already given is indeed a purely mathematical task. But the language of science is not given to us in a syntactically established form; whoever desires to investigate it *must accordingly take into consideration the language which is used in practice in the special sciences, and only lay down rules on the basis of this*. In principle, certainly, a proposed new syntactical formulation of any particular point of the language of science is a convention, i.e. a matter of free choice. *But such a convention can only be useful and productive in practice if it has regard to the available empirical findings of scientific investigation.*

The Logical Syntax of Language (1934)

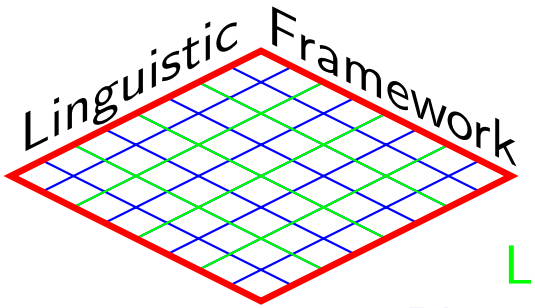
Purpose:

The book itself makes an attempt to provide, in the form of an exact syntactical method, the necessary tools for working out the problems of the logic of science.

Conclusion:

Philosophy is to be replaced by the logic of science—that is to say, by the logical analysis of the concepts and sentences of the sciences, for *the logic of science is nothing other than the logical syntax of the language of science*.

Logical Syntax, §51



Logical-Rules → Logic & Mathematics
Physical-Rules → Scientific Theories

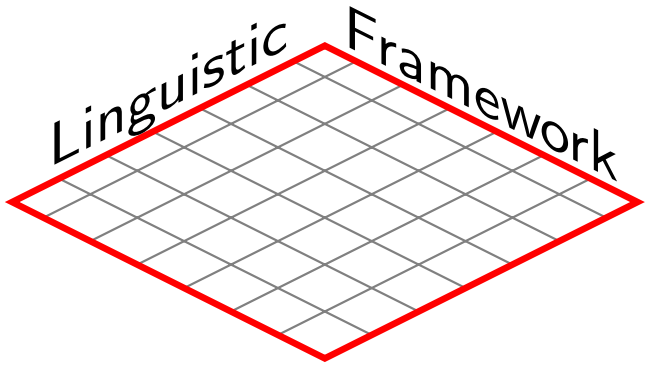
$$Q(3) \supset (\sim Q(3) \supset Q(5)) \qquad (1)$$

Then (1) is a [descriptive sentence]. But (1) is obviously true in a purely logical way, and we must arrange the further definitions so that (1) is counted amongst the L-rules and is called, not P-valid, but analytic (L-valid). (p. 181)

Problem 2—Relativism

On Protocol Sentences (1932) (same in Logical Syntax)

Protocols: Capture or encode basic observation statements.



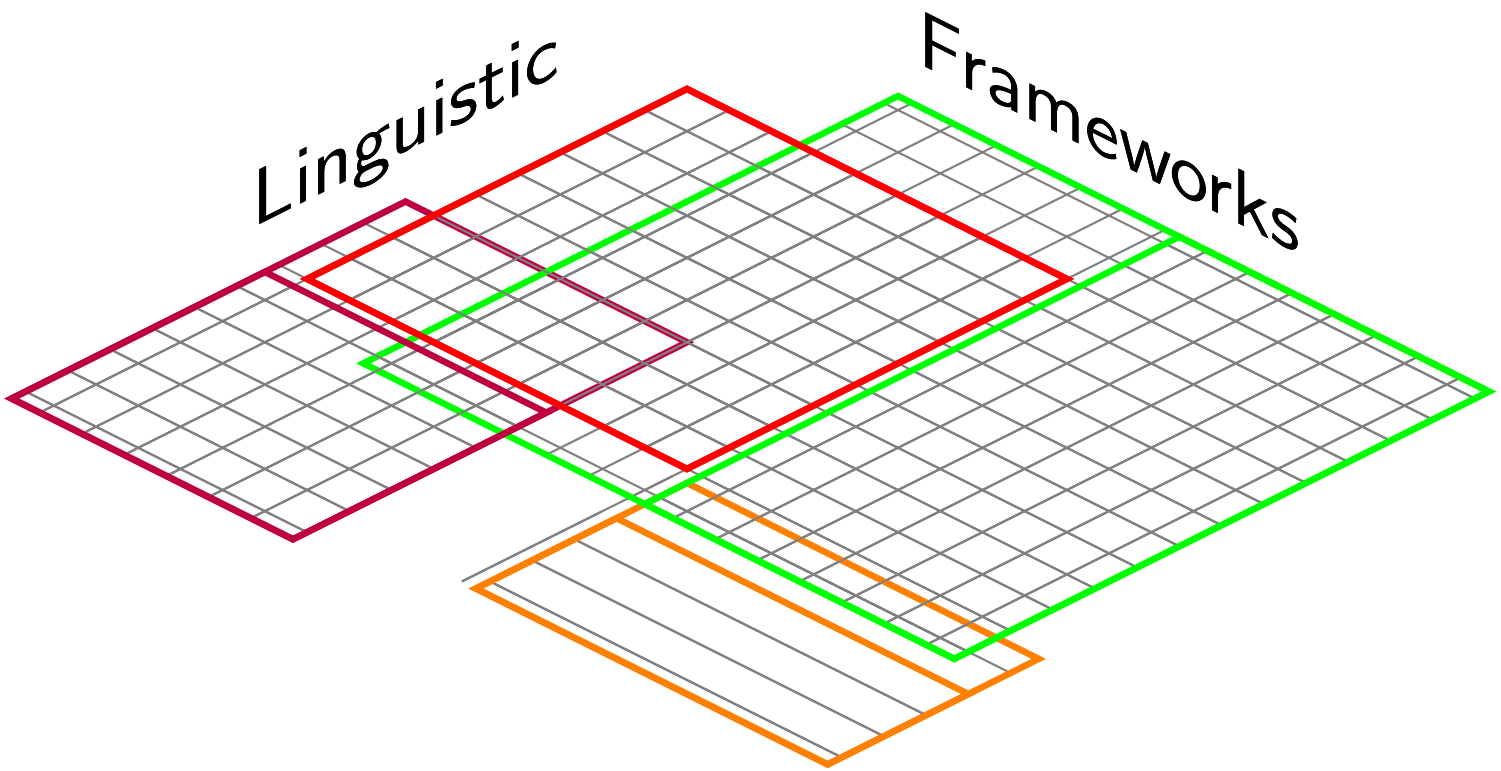
Observation

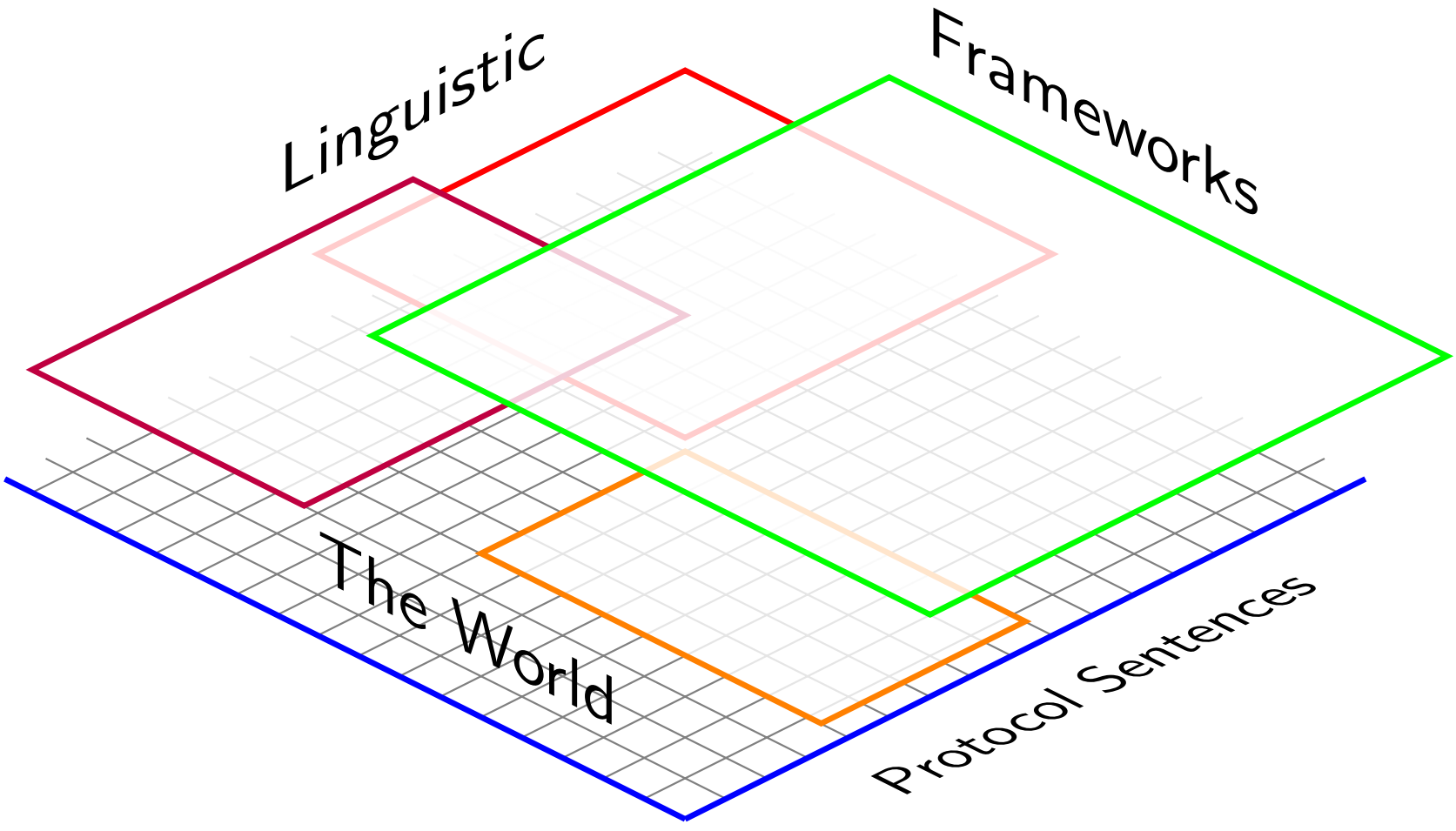
Deduction

Synthetic Protocol Sentence ⟷ Synthetic Protocol Sentence

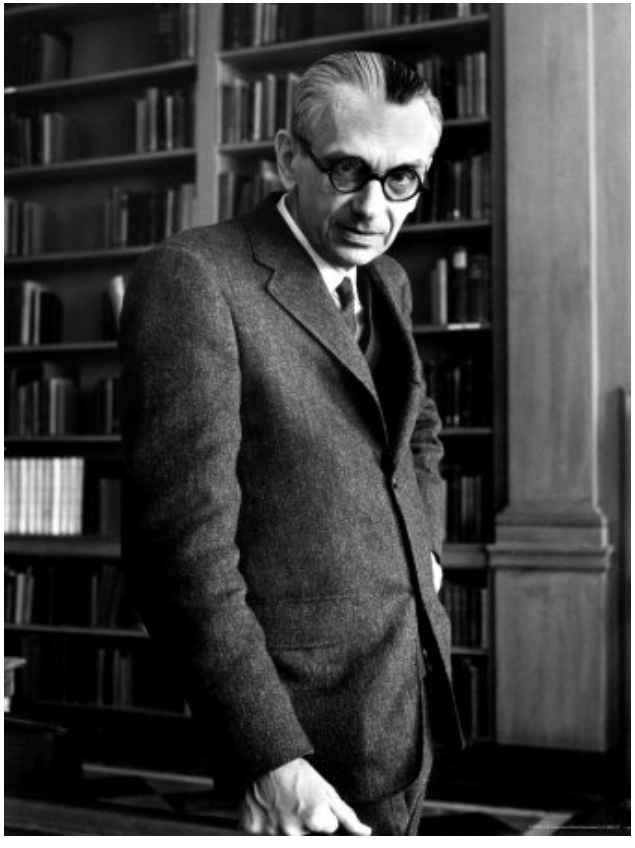
Logical Syntax, §82

The choice of [the syntactical rules] is influenced, in the first place, by certain practical methodological considerations (for instance, whether they make for simplicity, expedience, and fruitfulness in certain tasks).




Linguistic
Frameworks
The World
Protocol Sentences

Problem 3—Response to Gödel



Does a given syntactical rule have empirical content? Consistency Requirement

Goldfarb & Ricketts: We cannot evaluate individual syntactical rules against some constant and external domain of facts.

Fails to address the main concern:
Whether or not a rule has factual content!

The Second Incompleteness Theorem still applies from within a framework.

Explicitness in Linguistic Frameworks

Goldfarb & Ricketts (1992)

[I]f the metalanguage is a strong one, then there is something left implicit when that metalanguage is used in providing a description of the object language. What is being taken for granted seems to be no less in need of laying out, if the sort of clarity which Carnap seeks is to be attained. (p. 71–72)

Carnapian Slips?

Logical Syntax, §14

In material interpretation, an analytic sentence is absolutely true whatever the empirical facts may be. Hence it does not state anything about facts. [. . .] A synthetic sentence is sometimes true—namely, when certain facts exist—and sometimes false; hence it says something as to what facts exist. *Synthetic sentences are the genuine statements about reality*.

Goldfarb & Ricketts (1992)

There is a fundamental problem with Carnap's remarks if it is taken as an intuitive basis of the analytic-synthetic distinction. If put in that role, it must rely on a framework-transcendent notion of fact or possible fact [. . .] this is inconcordant with the Principle of Tolerance. [. . .] Hence, this intuitive way of drawing the distinction should be discarded. (p. 73–74)

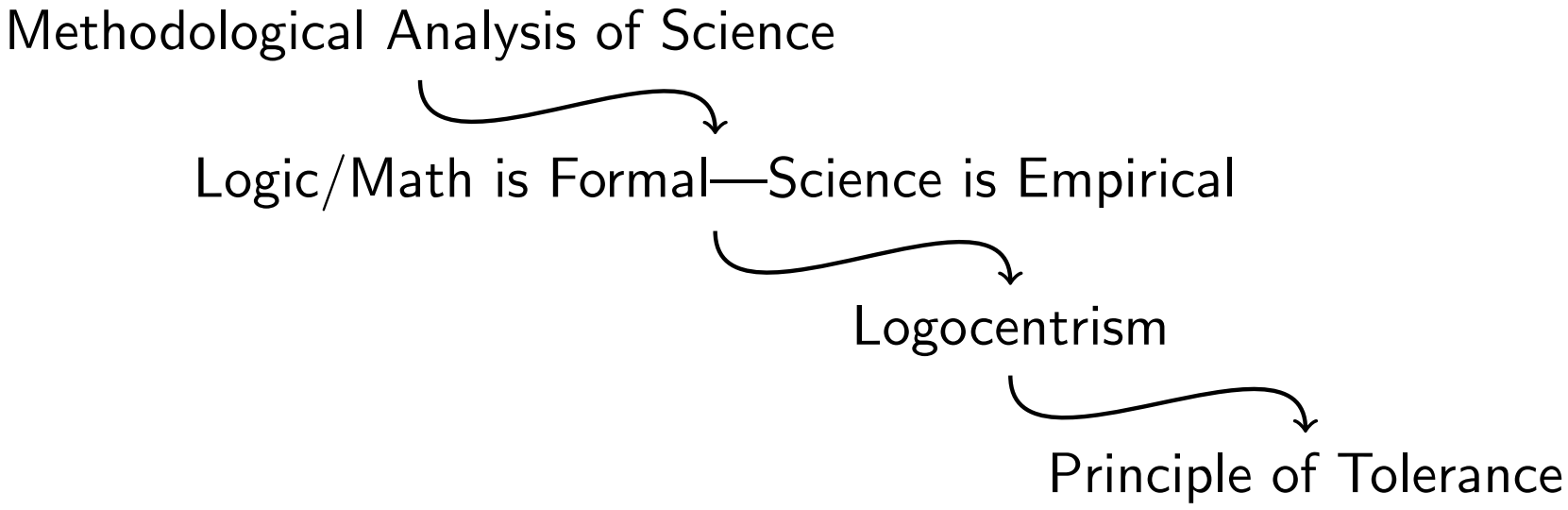
Another Response to Gödel

Does a given syntactical rule have empirical content? Consistency Requirement

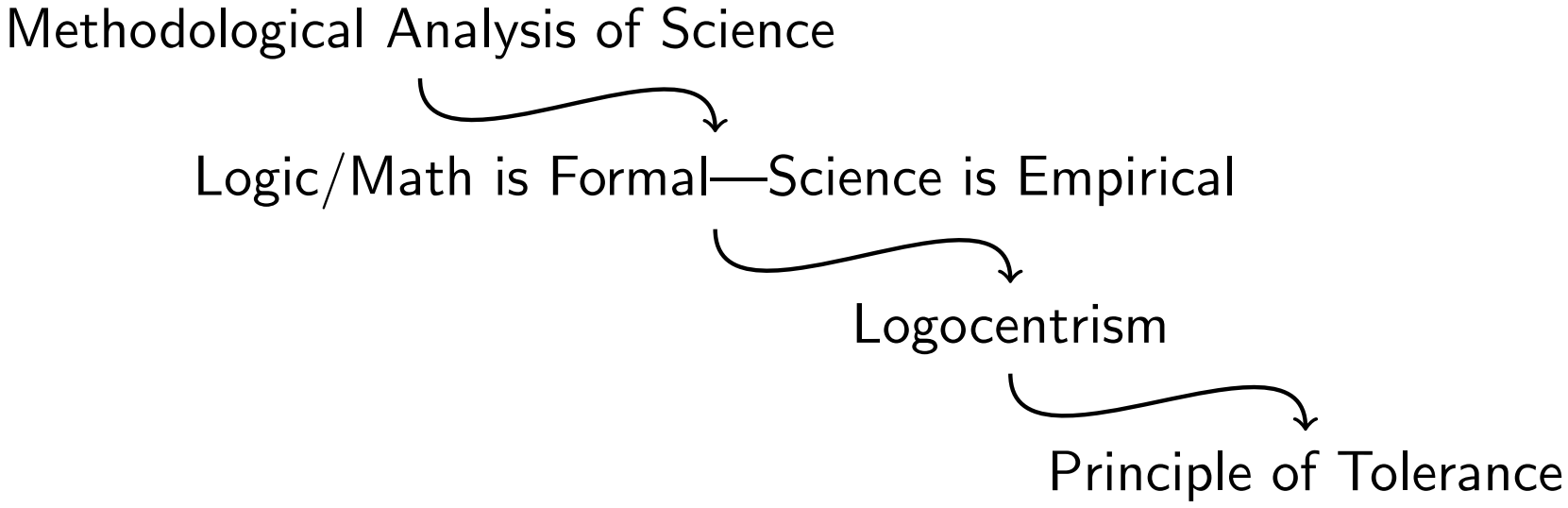
Carnap: A contentful sentence is *empirically informative*, i.e. factual.

Inconsistent sentences are *not* empirically informative, they imply all sentences, they are non-factual (like analytic sentences).

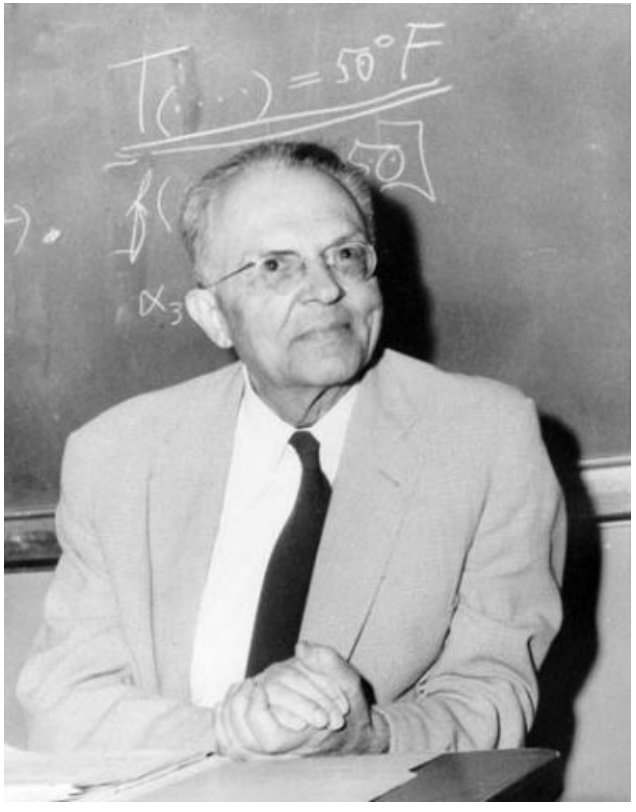
So we should reject Gödel's requirement because it excludes certain non-factual sentences.



Carnap's methodological analysis of the formal sciences is what *motivates* and *licenses* the application of Tolerance to questions involving the form of a language. Carnap's analysis of philosophy shows it to be likewise formal, hence Tolerance is applicable to philosophical disputes: they're about language.



Carnap's logocentrism means that the rational and justificatory structures of a linguistic framework are determined by the syntactical rules we choose in setting up the framework. But these are antecedently informed by the practices of science, including a minimal domain of empirical facts that guides the empirical component of our framework.



Thanks!