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DOGMATIC THEORIES AND AXIOMATIC MODELS in the light of the ERN logic

Foundations and definitions

Epistemological impact of the ERN logic concerns mainly

- foundations of logic,
- definitions and distinction of "Theory" and "Model",
- definitions and distinction of "Axiom" and "Dogma".

Foundations of logic.

We have postulated that Logical Systems may be evaluated and justified exclusively by their capacity to simulate Mind's intrinsic, ER based Logic. ERN is the first Logical System founded in Mind's intrinsic Logic, rather than in noumenal linguistic expressions. It seems to simulate it efficiently, which has been verified by its several practical applications.

Theory and Model.

Contemporary Epistemology sees falsifiability as a necessary quality of scientific structures.

ERN embodies it rigorously in its two complementary aspects:

1. Conceptual, deductive Theory,
2. Experimental, inductively falsifiable Model.

Axiom.

Full-fledged model structure supporting both, necessary deduction and fuzzy factual induction will be called "axiomatic" and its top arbitrary presumptions - "Axioms". Axioms and thence deduced Theory are falsifiable and refutable by inconclusive induction from factual experiences.

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Dogma.

A Theory lacking bottom factual Theorems and thus unable to support the falsifiable induction will be called "Dogmatic" and its top arbitrary presumptions - "Dogma". Unlike Axioms, Dogma are not falsifiable, cannot be refuted and repose in unshakable faith in transcendental "Truth".

LOCAL AND EXTERNAL FOUNDATIONS

Besides being founded in their own, "local" axioms, models may be founded in other "founding" models. By definition, a model or a discipline is "founded" in a "founding" one, when it accepts the latter's axioms and theorems as its own axioms.

Thus, physics is founded in mathematics and does not derive the principles of calculus, of vectors, tensors, etc. but considers their mathematical formulations as axioms of its own models.

This foundation hierarchies culminate in the ontological intuition of continuum, the primary aspect of the Polarity Continuum/Discreteness (CD), the fundamental construct of the physical and human reality ("NATURAL MODEL"). Hence, rational axiomatic models are ultimately founded in continuum.

In "SET THEORY" we saw the fallacies resulting from attempting to found mathematics in discreteness. In Tome 2 "FOUNDATIONS OF QUANTUM PHYSICS" we discuss the controversy between quantizing the fundamental continuum of field and attempts to found quantum physics in sheer discreteness without considering SPACE or field continuum.

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POSSIBLE AMBIGUITIES

Of all branches of Science Physics has been most perniciously afflicted by the dogmatic reaction to the rationality of the First Enlightenment, namely by the Dogma of Aether. Aether is discussed in some detail in "SECOND SCIENTIFIC REVOLUTION". Here we shall concentrate on its interest for Epistemology, as illustration of the conflict of dogmatic and axiomatic attitude.

The question indeed arises if Aether was Dogma or Axiom. Before attempting to answer, let's recall its context and essential features. It has been founded in the mechanistic, "billiard ball" view of the underlying "reality" plus the additional postulate that light is a wave and, by analogy with known wave phenomena such as sound, must be supported by oscillating particles of some fluid, some cosmic gas or liquid: the Aether.

So far so good, at the outset Aether looked like an Axiom. True, from the very beginning it raised unusual amount of exceptionally tough empiric problems: it had to behave like a solid with respect to light, like no-interaction vacuum with respect to "matter" of stellar bodies, while interacting with "matter" which it permeates like glass or water. Yet, for each new problem falsifying a current version of Aether a new, pertinent version was duly created, at the expenditure of effort and ingenuity hardly ever matched in the history of Science. Physicists were certainly not lazy, but if they were less busy adjusting Aether, they might have heard Ockham whispering that its exceptional complexity called for some simpler Postulate.

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Still, Aether could pass so far for a particularly complex Axiom.

Decisive blow came with the MM (Michelson-Morley) experiment. Galilean additive Transformation assumed CE, speed of light measured at the earth, as the sum of speeds C of light and V of earth both with respect to Aether: $CE = C+V$ (similarly to somebody walking within a moving train). Yet, MM experiment has shown that C was invariant, independent of the speed of source and Observer. Aether got falsified beyond repair and from this moment the superhuman efforts to save it at any price and at the expense of facts glaringly reveal its dogmatic nature.

HISTORIC OVERVIEW

In the chapter "NATURAL MODEL" we asserted that the intuition of continuous and infinite space stems from the imaginary, quasi rigid continuation of a relation body B_0 . In pre-scientific thinking, the solid earth's crust played the role of B_0 . The very name geometry indicates that the idea of space is mentally connected with the earth considered as the relation body.

Science, to wit the Euclidean geometry, based its axiomatics upon this natural, intuitive view and considered it as "self-evident". However, Euclidean geometry or "art of earth measuring" was indeed a natural science and its axioms were factually falsifiable, even if Euclid did not state it explicitly.

Self-evidence stayed as the official characteristic of axioms until the 19th Century.

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Yet, the factual falsifiability was always implied and allowed to distinguish rational models from dogmatic theories. Galileo founded his Relativity in the deductive/inductive method implying an axiomatic model in our sense, emerging from the background of traditional purely deductive, speculative methods, misrepresented as "axiomatic", whose "self-evident axioms" were indeed camouflaged dogma, a case in point being the famous Spinoza's "axiomatic" Ethics.

At the end of the 19th Century, epistemology has officially adapted the principle of factual falsifiability as the cornerstone of axiomatic models.

It appears incredible, but the common "wisdom" did not notice it and stays 2300 years behind concurrent rationality, as can be seen in English dictionaries defining axiom as:

- generally accepted truth.
- a statement or proposition that needs no proof because its truth is obvious, or one that is accepted as true without proof.
- an obvious or generally accepted principle.
- self-evident or universally recognized truth.
- self-evident and necessary truth, or a proposition whose truth is so evident as first sight that no reasoning or demonstration can make it plainer; a proposition which it is necessary to take for granted.
- self evident truth, or a proposition whose truth is so evident at first sight, that no process of reasoning or demonstration can make it plainer.
- necessary and accepted truth; basic and universal principle.

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None would even hint that axiom is not "axiomatic" by itself, but by virtue of the role it plays in a theory, viz. the deductively founding and inductively falsifiable presumption; that the same assumption may be an axiom in one theory and a dogma or a theorem in another.

ONE OF CONCURRENT FALLACIES

In "Goedel's Proof" by Peter Suber, Philosophy Department, Earlham College, we read:

Suppose we added G to the axiom set of S. Then G would become provable, since all axioms are provable by definition.

The mind boggles. Since 2300 years all scientific theories are axiomatic and their founding axioms are unanimously considered as "by definition" true and unprovable. So Suber's "definition" barring the whole scientific history seems a bit exotic and one would associate it rather with some exclusive loony bin than with science, mathematics, logic or anything rational.

And Mr Suber continues:

Goedel proved that if we do this (add G to the axiom set of S), creating S', then we could always construct another undecidable wff, G', which asserted that it could not be proved in S'. Of course we could then add G' to S', creating S'', but then we could construct G'', and so on ad infinitum.

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Very exclusive must indeed be the loony bin where Peter Suber may venerate his co-certified master Goedel confusing mathematics with russian dolls.

This Goedel's betise may be added to all those shown in the chapter "PREDICATE LOGIC".

POSTFACE

We have defined axiom and dogma as deductively founding presumptions of a theory. The difference consists in axiom being in addition inductively and factually falsifiable.

Now, mathematical axioms seem to lack factual falsifiability. Would therefore mathematics be dogmatic?

We shall examine it in the chapter "FOUNDATIONS OF MATHEMATICS".