An Epistemological Synthesis

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Chapter 1

The Evolution of Intelligence

This monograph makes an epistemological point in the context of a narrative about the evolution of intelligence.

The making of that point belongs to what I term *synthetic epistemology*. The point is, that a particular family of logical systems is a specially good representation system for knowledge, the general adoption of which would be advantageous, and may even be inevitable. My *making* of that point, beyond mere description of the system, falls into two main parts, an evolutionary account of its origin and a foundational philosophical kernel providind a context in which the supporting rationale can be undestood.

The kernel is an indivisible whole integrating metaphysics, language, logic and epistemology, motivated by the role it may play in the advancement of mathematics, science, technology and engineering and their use in the proliferation of intelligence.

The evolutionary story describes key aspects of that part of the origin of intelligence which began here on Earth a few billion years ago, progressing through this present moment of supposed epistemological insight into a future in which the progeny of earthly intelligent life spreads across the galaxy and beyond. In this story, the past trajectory is intended to inform the readers understand-

ing of how these logical systems arose and their nature, while the present and future trajectories say something about the significance of them in facilitating the advance of intelligence across the galaxy.

An introduction here to that story addresses two phases of the progess, the biological evolution of life on earth up to the point at which intelligent life in the form of *homo sapiens* emerged, marking also the beginning of a period of cultural evolution which culminates in that intelligent life realising inorganic intelligent systems by a process involving both cultural evolution and collaborative design.

There are two closely related divisions of the idea of knowledge which are important here. They are, the distinction between knowing *that* and knowing *how*, and that beween *declarative* and *procedural* knowledge.

The classical characterisation of knowledge as *justified true belief*, relates most clearly to declarative knowledge, but the idea of procedural knowledge embraces a much broader range of phenomenon in which some kind of learning process yeilds subsequent behavoural advantage. The kinds of knowledge which consist in true beliefs depend upon beliefs having *truth conditions*. Such conditions are normally associated with meaningful notations, since the idea of truth conditions arose (very recently) in the analysis of the meaning of declarative sentences.

So we might expect that declarative knowledge goes back only as far as declarative language, while procedural knowledge goes back as far as behavioural adaptation. Behavioural adaptation goes back to some of the most primitive organisms, and beyond them is found in the process of biological evolution, which may be said to code into the DNA of each species knowledge of proteins advantageous to that species.

Declarative language is much more recent, not known outside the genus homo and probably exclusive to homo sapiens, dating back no more than 300,000 years.

Chapter 2

A Philosophical Kernel

The word 'philosophy' derives from a greek word meaning 'love of knowledge', and in the time of Aristotle embraced what were then known as the sciences. The sciences as we now know them are no longer considered part of philosophy. One alternative conception of philosophy has been that of providing an intellectual context or foundation in which the sciences might be conducted. This is related to Aristotle's undertaking in the volume which became known as his *metaphysics*, describing it as 'first philosophy', or 'the study of being *qua* being'. By that he meant the study of those aspects of all that exists (substance) before considering the particular characteristics which qualify something to be addressed under one of the sciences, i.e. those characteristics which are *prior* to or more general than science in some way.

The term 'first philosophy' has been used more recently by philosophers deprecating approaches to philosophy predicated upon philosophy having something to say which is relevant to and prior to science. Nevertheless, historically, in the Western tradition which has descended from the philosophy of Classical Greece, once philosophy was distinct from science, it has been common for the theory of knowledge, 'epistemology' to be considered its home ground.

Other contenders for that pivotal status in modern philosophy have been:

- *Metaphysics*, both because of its status in Aristotle's philosophy and because this is a persuit which can be set apart from empirical science and studied in its own right by deductive rather than empirical methods.

  Perhaps because the ambitions of metaphysicians have often greatly outstripped the capabilities of their tools (pure reason), the idea that philosophers are not concerned with the concrete world so much as with the analysis of language, has resulted in periods in which the analysis of or

- *philosophy of language* has seemed to be philosopher's most central concern. Though what philosophers call 'ordinary' language is substantially an accident the study demands empirical methods, and perhaps even an unfortunate accident which for the sake of rigour in both philosophy and science we should discard in favour of the logical notations which emerged after the rigorisation of mathematical analysis in the 19th Century, leading to the conception that philosophy is most fundamentally concerned with

- *logical analysis* which sometimes means little different to the analysis of ordinary language

I am myself with those who regard philosophy's most vital role in making possible the accumulation of knowledge and its application to the benefit of mankind by sometimes elaborate predictions about the behaviour of the material world mediated by complex deductive reasoning from our shared body of knowledge. Alongside that, I see the practical effectiveness of foundational thinking in elaborating and applying such methods.

The philosophical kernel which I introduce here is *foundational* in seeking to provide a general concept of, and abstract representation for, knowledge suitable for use in the sciences and elsewhere, a very general way in which knowledge can be represented which is semantically precise and coherent, and the means to engage in extended deductive reasoning in the application of scientific knowledge to the furtherance of human purposes.

The foundations upon which this rests are *logical*, supporting reasoning in any domain suitable for coherent deduction (arguably,

any coherently well-definable domain) upon the general notion of *logical truth* (as here defined).

Bibliography