Indian Philosophical Quarterly, Vol, X, No. 3, April (1983)

POPPER, GÖDEL'S THEOREM AND THE ESSENTIAL INCOMPLETENESS OF ALL SCIENCE

In Popper's most detailed discussion of the maze of philosophical issues involved in the theoretical reduction research programme[1], an argument occurs which I believe merits attention. My reason is that Popper considers this argument to be on especially heavy logical " armament", giving a stronger result than the other arguments developed in his paper. I believe Popper's argument, based upon Gödel's Theorem will not trouble the theoretical reductionist in the slightest.

The argument can be stated most clearly as Popper in fact states if :—

(1) All physical sciences use arithmetic.

(2) Gödel's incompleteness theorem demonstrates the incompleteness of arithmetic.

Therefore

(3) Gödel's incompleteness theorem renders all science incomplete.

This is a simple argument which has two true premises : (1) and (2). (1) seems in fact beyond question for any who have done any science at all. Issue could perhaps be taken with what is actually meant by the term 'use', but it seems unlikely that any conceptual unpacking of this term would render this premise false. Indeed statements such as (1) are made constantly in our discourse and it would seem that if by some unknown argument (1) was false, the impact of this argument would be quite radical.

Premise (2) also seems to be accepted as true by almost all researchers in metamathematics. Let us note, for reference in the immediate future what Gödel's Theorem in fact is :

(GT_1) For elementary formalized number theory N, if N is consistent then N is negation complete (Rosser's form of Gödel's first theorem)

(GT_2) If N is consistent, then there is no proof of the consistency of N by metamathematical methods formalizable within N.

Popper's arguments seems dependent upon (GT_1).

Now, if Popper's argument is unsound, premise (3) must ber contested. This premise is infact false if one does not equivocate on the term 'completeness'. In a metamathematical sense, to a formalized system to be is for the following condition to hold (at least for the predicate calculus PC):

(4) If A is a valid formula of PC, then $\vdash A$

Now from GT_1 it is true that N is incomplete if consistent. However the so-called Gödel sentence G which is undecidable in N (i.e. $\sim \vdash G$ and $\sim \vdash \sim G$) makes no explicit reference to phenomena in the world at all. Consequently, if S is any formalization of science itself (performed by a Laplacian super-logician) and MS is the metalanguage of S, then MS will be incomplete. However nothing follows from this about the completeness of S. So Popper's argument seems to involve an implicit confusion between the language of science, and the metalanguage of science.

Second, the sense of 'completeness' of interest to Scientific Unification is explanatory completeness. Roughly what is involved here is the claim that all aspects of the world are in principle capable of scientific-naturalistic explanation : that there is infact no phenomena which escape the science's net. Usually "science" has been taken, in the spirit of Logical Empiricism to refer exclusively to the natural seiences the social sciences being either eliminable or theoretically reducible to the natural sciences. But a Scientific Unificationist need not be a reductionist, and could maintain that mentation and culture, whilst escaping the claws of the natural sciences, are at least fit phenomena for socio-cultural explanation. Popper's considerations from Gödel's theorem do not establish, and cannot establish that there are any such phenomena which are explanatory incongruent.

Sehool of Social Sciences **JOSEPH WAYNE SMITH**
Flinders University of South
Australia, Bedford Park, 5042
Australia

NOTES

1. K. R. Popper "Scientific Reduction and the Essential incompleteness of All Science" in F. I. Ayala and T. Dobzhansky (eds.) *Studies in the Philosophy of Biology* (MacMillan, London, 1974) pp 259-284. of pp 280-281.