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A brief survey of Adams' contributions to philosophy

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Before making comments on Ernest Adams' theory of conditionals, I am going to exercise a prerogative reserved at least for his thesis adviser – Ernie was my first Ph D. student – to give a survey of Adams' contributions to a wide range of topics in philosophy.

I have divided his work under five headings. The divisions may be somewhat arbitrary, but still they show well the range of his interests. The five divisions are as follows: the foundations of physics; utility theory and game theory; general measurement theory; the foundations of geometry; and language and logic, especially conditionals.

1. FOUNDATIONS OF PHYSICS

Adams made a significant contribution to axiomatic work in the foundations of physics with his thesis, giving a representation theorem for rigid bodies in terms of finite systems of particles. In spite of the naturalness of the basic result, it had not previously been proved in the literature in general form. He also began there an important aspect of his thinking, namely, a series of critical reflections on the problem of characterizing the empirical interpretations of any particular axiomatic system of physics. The thesis was completed in 1955 and published in 1959.

2. UTILITY THEORY AND GAME THEORY

Although Adams' dissertation was on the foundations of physics, his first publication was a paper on game theory written jointly with Duncan Luce (1956). He had some work many years ago that he didn't publish that I found extremely interesting on the game of nim, and his interest in utility theory and game theory has continued over a long period. There was an important paper on riskless choice written with Bob Fagot in 1959. In

1960 he published a detailed survey of Bernoullian utility theory. There was also an early paper in 1961, in two parts, on rational betting systems in the more general Bayesian setting. A good many years later, in 1980, he published a detailed application of Dick Jeffrey's decision model to rational betting and information acquisition. That paper was published jointly with Roger Rosenkrantz.

It is obvious that Adams' interest in and knowledge about the literature on utility theory and subjective probability extend over many years and several contributions. Moreover, a number of the papers to be discussed under other headings bear on problems of measuring utility or subjective probability.

3. General measurement theory

As in the case of many of us, Adams' work on utility theory was very much intertwined with work on measurement theory. There is, however, an important special flavor to his work on measurement theory to be found already in the first article in 1965, written with Bob Fagot and Dick Robinson, on a theory of appropriate statistics. This same theme is to be found in a 1970 article written jointly with the same two authors entitled "On the Empirical Status of Axioms in Theories of Fundamental Measurement." These two papers made an important contribution to detailed discussions of the concept of meaningfulness in the theory of measurement, a topic of continued and controversial interest. At the same time, Adams published his own skeptical views of the representational theory of measurement in a 1965 article, "Elements of a Theory of Inexact Measurement," and in a 1966 article, "On the Nature and Purpose of Measurement." He has played the role of a skeptical critic, but a constructive one, for much of the standard work in the theory of measurement over many years. This line of work is represented in a paper in 1974, given at the Tarski symposium, another paper with Bob Fagot in 1975 on biassed bisection operations, a 1979 general paper on measurement theory, and a 1979 paper with I. F. Carlstrom on representing approximate ordering and equivalence relations.

These many articles amply demonstrate that Adams is one of the few philosophers of his generation with a thorough technical knowledge of the literature on measurement and an original philosophical viewpoint about the developments in the subject. In all likelihood, this work is little known to many philosophers familiar with his work on the logic of conditionals.

Finally, I should mention a recent surprising book, written with his brother William Adams, entitled *Archeological Typology and Practical*

Reality (1992). The problems of classification in archeology, as both Ernie and his brother have persuaded me, are subtle and complex, as is the theory of classification applied to almost any developed empirical subject. This work is characteristic of Adams' other work, in the sense of not being content with generalities, for it features thorough pursuit of important and critical details.

4. Foundations of geometry

Although he has not published as much on this topic, it is evident from conversations with Adams that his interest in the foundations of geometry is as serious and as deep as for any subject in which he has been involved. Furthermore, this work began early, with an article on the empirical foundations of elementary geometry in 1961. That article takes up a theme already begun in his dissertation: the problem of giving empirical interpretations of physical or geometrical axioms. It was some years before he published another article on geometry, but all during that time he was continuing to think deeply about the subject, and he published one of the ideas for which he is best known by those involved in the foundations of geometry, namely, how topological ideas can be connected to naive conceptions of surface. The article appeared in 1973. In my judgment, it is one of the most interesting things written on this fundamental perceptual problem. The only recent thing he has published about geometry is a review of Avrum Stroll's book *Surfaces* (1989), but he has a substantial body of work in preparation.

In my opinion, the unpublished manuscripts I have read constitute the most significant body of work on the foundations of geometry by any philosopher in the past several decades. What is especially important about this work is the detailed development of a theme that runs through Adams' work, namely, how to make actual practice rigorous - whether it be a matter of using conditionals in speech, or using geometrical concepts in ordinary talk.

This keen eye for the detailed analysis of the discrepancy between too simple theories and complex practice is a dominant aspect of his work on geometry. I mention especially his recent unpublished work on superposition and his continued emphasis over many years on the epistemic priority of topology. His earlier ideas, critical of general theories of measurement, can also be seen at work in his remarks on classical theories of geometry, from Hilbert to Tarski, insofar as they are systems to be applied to the world.

There is a lot more that I would like to say about his geometry, but this is not really the appropriate occasion. I do personally look forward

to the appearance of several substantial manuscripts that are just about to surface.

5. Language and logic, especially conditionals

Adams' work on conditionals is well known and does not need a general review by me. I do want to note that the work began early, with the appearance of the article "On the Reasonableness of the Inferences Involving Conditionals" in 1964. Although the probabilistic interpretation of conditionals is not unique with him, it is certainly the case that he has been one of the most prominent exponents, and he has exploited well his thorough knowledge of the work over the same period in the foundations of probability to make important connections.

Note

The references to Adams' papers here are their dates of publication. The complete list of his publications is given at the end of this volume.