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PHILOSOPHY CONFERENCE



in

CONTEMPORARY
PHILOSOPHY OF SCIENCE

Keynote Address by

JAMES F. WOODWARD

*California Institute of Technology
President-elect of the Philosophy of Science Association*

"Causation in Biology: Stability, Specificity,
and the Choice of Levels of Explanation"



NOVEMBER 6-7, 2009
TORGENSEN HALL 3100 AT VIRGINIA TECH
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FRIDAY EVENING SESSION – BETH HUPFER, CHAIR

- 4 pm **"Some Problems with Kind-Splitting Arguments"**
speaker: BRYAN MILLER (Johns Hopkins) commentator: CRISTIN CHALL
- 5 pm **"Roush's Theory of Evidence: The Best of Both Worlds?"**
speaker: BENGT AUTZEN (LSE) commentator: ANDREW GARLAND
- 6 pm **"CAUSATION IN BIOLOGY: STABILITY, SPECIFICITY, AND THE CHOICE OF LEVELS OF EXPLANATION"**

Keynote Speaker: JAMES F. WOODWARD

California Institute of Technology; President-elect of the Philosophy of Science Association

SATURDAY MORNING SESSION – ELC ESTRERA, CHAIR

- 10 am **"The Demise of Scientific Explanation?"**
speaker: JOHN SALADINO (Biola University) commentator: TANYA HALL
- 11 am **"Scientific Naturalism, Synthetic Identification, and the Normative"**
speaker: THOMAS METCALF (UC Boulder) commentator: JORDAN BUSSE

12 PM – LUNCH

SATURDAY AFTERNOON SESSION – JONATHAN DIXON, CHAIR

- 2 pm **"Epistemic Representation and Contessa's Interpretational Account"**
speaker: AGNES BOLINSKA (Toronto HPS) commentator: ERIC HODGES
- 3 pm **"Mathematical Explanation in Science: Arguments for Mathematical Realism"**
speaker: ALEX KOO (Toronto HPS) commentator: ANDY CREIGHTON

4 PM – COFFEE BREAK

- 4:30 pm **"Is Quantum Entanglement Really an Example of Ontological Emergence?"**
speaker: EMERSON P. DOYLE (Western Ontario) commentator: JAMES SMITH
- 5:30 pm **"Interventionism Defended"**
speaker: KEVIN MCCAIN (Rochester) commentator: MICHAEL MAZZA

SESSION ABSTRACTS

SOME PROBLEMS WITH KIND-SPLITTING ARGUMENTS *Bryan Miller*

In recent years, a number of philosophers (Griffiths, 1997; Zachar, 2000; Machery, 2005) have argued that certain classes of entities assumed to be natural kinds are unfit as objects of scientific investigation since they do not actually constitute natural kinds. These kind-splitting arguments (i.e., arguments meant to show that a class does not constitute a natural kind) generally hinge on at least one of two often implicit assumptions: the first assumption holds that a class is a natural kind only if its members share properties that are not used to identify members of the class and the second assumption maintains that natural kinds cannot be nested within other natural kinds. In this paper, I criticize kind-splitting arguments in general by attacking these two assumptions. The first assumption, I argue, is misguided since the properties employed to identify the members of a class vary with the advancement of the research program. The second assumption is misguided, I maintain, since the theory of natural kinds that these arguments employ namely, Richard Boyd's homeostatic property cluster account seems committed to positing nested natural kinds. Insofar as these two assumptions are shown to be misguided, the conclusions of kind-splitting arguments (i.e., that certain classes do not constitute natural kinds) are called into question.

ROUSH'S THEORY OF EVIDENCE: THE BEST OF BOTH WORLDS? *Bengt Autzen*

In this paper I will discuss Sherrilyn Roush's theory of evidence. I will illustrate the problem of calculating the objective probabilities required for Roush's account of evidence by means of an example from phylogenetics. I will argue that as it stands we have no epistemic access to the objective probabilities needed in order to apply Roush's theory in that scientific domain. Finally, I will draw some general conclusions regarding Roush's theory.

THE DEMISE OF SCIENTIFIC EXPLANATION? *John Saladino*

Many or most philosophers of science have wondered (in print) about the plausibility of belief in a single "form" of scientific explanation, something in virtue of which particular explanations are regarded as "scientific." In this paper I draw on four key bits of data to bolster these intuitions, using them to develop an inductive argument for the conclusion that there (probably) is no one "form" of scientific explanation. I augment this conclusion with the further claim that arguments in the neighborhood of my own (which, I believe, is the first of its kind) place a burden of proof on philosophers of science who want to include such an entity in their ontology. I end by recommending that either the burden be met or that the direction of our philosophical energies be modified accordingly.

SCIENTIFIC NATURALISM, SYNTHETIC IDENTIFICATION, AND THE NORMATIVE *Thomas Metcalf*

Scientific naturalists hold that the methods and instruments of science are sufficient to detect every real property and fact. To respond to a pair of influential criticisms, recent scientific naturalists must (and do) argue that (1) ostensibly irreducibly normative properties are actually identical (rather than eliminatively reducible) to descriptive properties, and that (2) this identification is 'synthetic' rather than 'analytic.' This paper argues that to maintain the ultimate requirements of scientific naturalism, naturalists must reject either the 'synthetic' or the 'identificationist' parts of synthetic identificationism. The result is that the aforementioned criticisms remain potent after all.

SESSION ABSTRACTS

EPISTEMIC REPRESENTATION AND CONTESSA'S INTERPRETATIONAL ACCOUNT *Agnes Bolinska*

Gabriele Contessa (2007) argues that a scientific model represents an aspect of a system in the world because it allows a user to perform surrogative reasoning; reasoning to conclusions about this target system from premises in the model. That is, a scientific model acts as an epistemic representation of its target, performing the same function as maps, diagrams, pictures and other objects that permit their users to draw inferences about the targets they represent. Contessa develops an interpretational conception of epistemic representation, according to which a vehicle represents a certain target in virtue of its user's adopting an interpretation of the vehicle in terms of this target. He argues that this conception is adequate and substantial because it picks out the most fundamental feature of epistemic representation, a feature that is both necessary and sufficient for this kind of representation. In this paper, I will argue that the interpretational conception is neither adequate nor substantial. While interpretation is certainly involved in epistemic representation, it is not a fundamental feature of this kind of representation. Moreover, regarding interpretation as a sufficient condition for epistemic representation makes the concept of epistemic representation vacuous.

EXPLANATION IN SCIENCE: ARGUMENTS FOR MATHEMATICAL REALISM *Alex Koo*

The use of mathematics in scientific explanation has motivated a new enhanced indispensability argument (EIA) for mathematical realism. Proponents of the EIA depend on the claim that mathematical objects are indispensable in scientific explanations. However, this claim relies on an unjustified and naive view of the role of mathematics in scientific explanation. Without developing a rigorous account of the actual role that mathematics plays in these explanations the conclusion of mathematical realism cannot be had. All is not lost for supporters of the EIA as I will argue that the exact same problem faces those who are critical of the argument; they too depend on an unjustified theory of explanation. In conclusion I will suggest ways forward that will break the stalemate between mathematical realists and nominalists.

IS QUANTUM ENTANGLEMENT REALLY AN EXAMPLE OF ONTOLOGICAL EMERGENCE? *Emerson P. Doyle*

The title question is answered in the negative, on the condition that we take a particular and plausible notion known as fusion to be an adequate framework to describe ontological emergence.

INTERVENTIONISM DEFENDED *Kevin McCain*

In a recent review of James Woodward's (2003) *Making Things Happen*, Michael Strevens (2007) argues that Woodward's interventionist account of causation renders facts about causation relative to an individual's perspective. In response to this charge, Woodward (2008) attempts to provide a de-relativized notion of contributing causation. Woodward claims that although X is a relativized cause of Y relative to a particular variable set, it does not lead to the relativity that Strevens claims. Roughly, Woodward argues this is so because if X is a relativized cause of Y with respect to some variable set V, then X is a contributing cause of Y simpliciter. Strevens (2008) argues that Woodward's response fails because relativized causation is not monotonic. That is, Strevens argues that there are instances where X is a relativized cause of Y relative to variable set V and it is the case that adding variables to V will lead to X's no longer being a contributing cause of Y. In this paper, I argue that Strevens' argument that relativized causation is not monotonic is unsound. Given the unsoundness of Strevens' argument, I conclude that it is reasonable to believe that Woodward has produced a de-relativized notion of contributing causation.