ABSTRACTS

B3.7 Metaphysical Issues in the Philosophy of Science

The Multi-Storey Humean Mosaic and the Emergence of Objective Probability

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David Lewis provides an account of physical law which avoids appeal to modal notions. This account is based on systematising the regularities found in the Humean mosaic (set of events associated to all space-time points). It thus lends itself to a reductive picture of the physical world. I will argue, however, that we have good reason to believe that there are facts about composite objects (e.g. biological facts) which cannot be straightforwardly reduced to facts about fundamental physics, chiefly due to the multiple realisability thesis. As such, the Lewisian analysis of law needs revision.

I will suggest that acknowledgement of these higher level facts (where the lowest level describes fundamental physics) should lead us to posit a multi-level Humean mosaic and carry out the Lewisian analysis distinctly at each level. This will lead to the conclusion that there are more laws than we might previously have expected. In particular there may be laws which directly entail facts about artefact regularities at the higher levels.

At this point, I will turn to probability. The insights gleaned thus far will be relevant to the literature debate surrounding deterministic chance. Distinct laws at various levels implies the compatibility of fundamental determinism with higher level objective probabilities. Following Glynn (2010) I will argue that these probability assignations can satisfy Schaffer’s platitudes about chance (Schaffer 2007). Drawing distinctions between the levels allows for a unified view of physical law and probability which invokes minimal metaphysics.

Randomness and coincidences: a strong overlap between them

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It is a widespread view that to say something happens by chance is near enough to say it happens randomly. Even though this idea – an idea we find in ordinary usage and in scientific usage as well – is quite misleading, there seems to be a kind of overlap between at least some notion of chance and randomness. Investigations along this line will be the object of the present work. More precisely, the present survey takes in consideration chance intended as “coincidences” – where coincidences are chance events that come from the concurrence between independent causal chains – and its relation with randomness.
As well known, in a series of similar accidents, there is a complicated and unpredictable variation of fluctuation in the details of the various accidents, and the events of interest fluctuate in a way they seem to have a variation which is usually called “random”. But which is the origin of this random variation? According to David Bohm and Walther Schützer (1955) a proper criterion for randomness is the statistical independence between all of the causal factors involved in the production of the accidents.

Starting from this criterion, I will show that there seems to be a kind of strong overlap between the coincidental notion of chance and the notion of randomness. First of all, I will illustrate that both notions, the notion of randomness and the coincidental notion of chance, need to be understood in terms of the independence of the causal factors involved. Secondly, and probably most importantly, I will point out that randomness may come from a series of similar coincidental events, and then that the independence of the intersecting causal processes which originate the accidents (coincidences) is also the origin of the random variations.

Intelligent Design, Methodological Naturalism and Scientific Reasoning

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Today, one of the most controversial phenomena in the philosophy of religion is the theory of intelligent design (ID). According to ID, chance, necessity and design are the three mutually exclusive and exhaustive modes of explanation of all events. Proponents of ID maintain that certain features of the universe are too improbable to have come about merely by natural causes, i.e., chance and necessity, and are thus best explained by an intelligent supernatural cause. Consequently, they claim that since methodological naturalism, which only accepts natural causes, is incapable of explaining design, it must be abandoned as a basis for science and be replaced by ID. I argue, contrary to ID, that chance, necessity and design are not mutually exclusive, and that we do not need to set natural causes and (possible) divine design against each other. Furthermore, I claim that, since ID does not make any testable predictions whatsoever, methodological naturalism continues to provide the only reliable basis for doing empirical science. I maintain, however, that ID’s argument against methodological naturalism could be refined in a way that would – in theory – require methodological naturalism to be complemented with further explanations.
Against a monistic view of information – Information in biological and physical contexts

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At present, information is everywhere. In its everyday sense, the concept of information involves semantic and epistemic notions, such as meaning, representation and knowledge. In a technical sense, the concept is related with notions as probability, statistical correlations and algorithmic complexity. In the last half century, the scientific discourse has been permeated by an informational language that is becoming increasingly extended and fundamental. For instance, in biological sciences, the term ‘information’ was introduced to describe the production of proteins from genes, and has been since then a key concept in the field of molecular biology, giving rise to the familiar expression of genetic information. The concept of information has also spread into many other subdisciplines, such as ecology, cell biology, behavioral biology and evolutionary biology. In turn, the notion of information has become also central in physical sciences. In particular, quantum information promises to alter dramatically the field of communication. Moreover, it is argued that quantum mechanics itself may be entirely reconstructed in an informational language. Be that as it may, the concept of information is here to stay in the scientific discourse.

But, what is information? The philosophical discussion on the matter has been focused on the search for a single answer to the question, as if ‘information’ had a univocal meaning, regardless of the scientific and epistemic context. This fact has led to a generalized monistic view about the nature of information. We think that this is a misguided starting point. Our aim in this presentation is to argue that the nature of information is context-dependent and definable by the rules of each scientific field. Our position leads to a pluralistic view about information that, despite giving up a unified concept, it becomes more accurate as well as more useful in the scientific practice.