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Cameron Shelley, *Multiple Analogies in Science and Philosophy.* Amsterdam: John Benjamins, 2003, xi + 167 pages. ISBN 90 272 2363 7 (Eur.) / 1 58811 402 3 (US)

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Between the Fifties and the Seventies there was a gradual, cross-discipline discovery of a somewhat mysterious topic, namely, scientific models, analogies, and metaphors (See Hesse 1967; 1980; Granger 1967). The discovery was a typical multiple discovery, being carried out in a somewhat parallel way by Anglo-Saxon philosophers of science and by francophone philosophers and linguists. Claims to priority are still as open as with any respectable discovery: the Anglo-Saxon philosophers started repeating somewhat clumsily what well-known representatives of the Anglo-Saxon New Rhetoric such as Ivor A. Richards had already said brilliantly in the Thirties and Forties, while respectable philosophers of science such as Max Black (1962) were acclaimed as discoverers of what had been more aptly illustrated by less orthodox figures such as Stephen Pepper, Colin Turbayne, Philip Wheelwright, and after them David Schon. Besides, even if the philosophers of science – as an act of rebellion against dismal Logical Empiricist and Popperian orthodoxy from the Fifties when the warning was still circulating that "the price for the use of models is perpetual vigilance" (Braithwaite 1953: 93) – gave analogy full citizenship in all phases of scientific discovery and justification, they nevertheless believed in a neat distinction between analogy, something fully rational and treatable in formal terms, and metaphor, which was hopelessly vague and a stranger to the realm of science. For example, Mary Hesse in the Fifties was still cautioning against an "analogy" which "has *degenerated* into a metaphor" (Hesse 1954: 144-145; emphasis added). The French parallel discovery had some more interesting aspects, still ignored by Anglo scholars. The main new idea was that of making metaphor, as opposed to metonymy, not to analogy, the mark of scientific discourse, in contrast to myth and ideology (Granger 1967; 1960), and turning scientific modelling and analogical reasoning into special cases of metaphorical thinking. The fruitfulness of the choice resulted from the fact of making representing and creating conceptual networks the core of scientific discourse (Cremaschi 1987), avoiding completely the shoals of pre-theoretical analogy and similarity as 'objective' but mysterious preconditions of legitimate use of scientific analogy into which the Anglo post-empiricist skippers went stranded (Cremaschi 1988).

The subject-matter of Shelley's book is an aspect of analogical reasoning that has been overlooked until now, namely the case for multiple analogies. It was a somewhat embarrassing topic. For, granted that the starting point of the discussion had been Braithwaite's concession of a limited use of models in a preliminary phase, an unspoken premise still lingered around for a while, namely that an analogy is something slightly confused and should be admitted only provisionally, in order to turn it into some sort of clearly defined formal correspondence. Multiple analogies as such are a disturbing phenomenon for such strategies, and besides, mixed metaphor has always been despised by literary critics as an expression of a style which is baroque, in the pejorative sense of the term.

Shelley starts with a definition of analogy as a somewhat deeper comparison between different things that may "serve some purpose or purposes, of which persuasion is only one" and is "based on deep connections between things rather than

some simple surface similarities such as physical resemblance" (p. 2). A multiple analogy is one such comparison where the source analogs, or the things with which something is compared, are more than one. Such kind of analogy becomes interesting if we drop the simpler view of analogy as a kind of induction (that – I add – was the typical Logical Empiricist view from the Fifties) and begin to view analogy in general in terms of "shared structure". Theories that understand analogy in these terms, or Multi-constraint theories, take analogy to consist in a direct comparison of two conceptual structures, emphasizing the presence of "mappings or alignments of hierarchically structured, causal relationships shared between source and target analogs" (p. 7); furthermore, they provide a criterion for "good analogies", namely those that "contain mappings between richly structured, higher-order relations" (p. 7). typically causal relations.

Analogies such as that between the Maltusian struggle for survival among newly born humans and the Darwinian struggle for survival among species have three traits: structural consistency, i.e., the extent to which the analogy constitutes an isomorphism; semantic similarity, i.e., the extent to which mappings connect elements that are perceptually or semantically similar to each other; and purpose, i.e., the extent to which information built up in the target conceptual structures contributes to the solution of the problem at hand. It is important to note that the two former requirements are soft ones, that is their fulfilment is required as much as possible, not in absolute terms, whereas the third is a kind of a touchstone, since – as Wartofsky (1979) noted – everything is similar to everything else, given a suitable viewpoint and purpose. Let me add that introducing "purpose" as one of the three requirements clears the field from idle talk about pre-theoretical similarity, which drove the discussion of the Fifties and Sixties into a deadlock:

> Predicates from multiple source analogs may simply be placed into many-to-one mappings with the target analog where those sources are independent of each other. In cases where all the source analogs are coherent, this situation simply increases confidence that the target conceptual structure is well-founded. In cases where some source analogs lead to incoherencies, this situation may be described as an attempt to repair the problem by supplementation. These situations may be accounted for in the MT [= Multiconstraint Theory] by allowing multiple mappings to be put in place in the appropriate way (pp. 32-33).

Shelley argues that multiple analogies have been widely used by philosophers in the course of history without realizing or admitting what they were actually doing, and are a widespread procedure in everyday scientific research. These claims are illustrated by case studies in two 'soft' sciences – evolutionary biology and archaeology – and in philosophy. These studies seem indeed to "make important contributions to the conduct of evolutionary biology, archaeology and philosophy", thus allowing to conclude that the improvement of "our understanding of multiple analogies allows us to improve our understating of the aims and methods of sophisticated thinkers in these fields of inquiry" (p. 135).

Coming to more specific claims, the first is that a theory of analogy should take multiple analogies as the default case and treat single analogies as special cases. Another is that, starting with multiple analogies, a number of cognitive issues arise that were not previously under focus, namely: confidence in the analogy that the procedure adopted is meant to produce; independence of the analogs, i.e., the requirement that knowledge of one analog does not immediately entail knowledge of any others; supplementation, i.e., the process of using one source analog to override others, or a constrained application of composition and completion; and specificity, i.e., a way in which purpose and target

interact, or the way in which source analogs and target predicates are selected in order to best serve the purpose of the analogy.

A third claim is that kinds of representation do influence the cognitive power of analogies, and verbal representation is apt for performing some cognitive tasks while visual and narrative representation better fit other tasks. A fourth claim is that the purpose or the specific reasons why an analogy is drawn contribute in determining its meaning and cognitive content.

The book has six chapters. The first describes the general theoretical framework. The second and third discuss one of the three case studies: that of evolutionary biology; the fourth deals with archaeology; the fifth with philosophy or, better, one of the seminal texts of the western philosophical tradition, Plato's *Republic*. The sixth takes over the general theoretical discussion and concludes with a number of suggestions that have already been summarized.

In order to give the reader a bit of the tenor of the case studies, let me start with the apparently more obvious one – Plato. Scholars have investigated Plato's analogies, but they have been looking for something less than what was there to be found. In other words, what historians of ancient philosophy had learned about analogy made it consist in the scholastic analogy of proportion, as contrasted with analogy of attribution. Note that the Logical Empiricists too believed that analogy is proportion, and this is why they overlooked most analogies as *vague qualitative similarities*, to be condoned only in some preliminary, pre-scientific phase, and dismissed any relationship between analogy and metaphor. Plato scholars underemphasized the significance of most of the analogies used by Plato. For example, Plato compared the soul to eyes, ear, and pruning knives, and justice to bodily health. However, according to Shelley, he proper framework within which such comparisons are to be understood is Plato's myth of the cave, where he explicitly admits that his own method is to make the truth arise out of interaction between two different ideas so that one idea clarifies the other and vice versa. "Constructing and understanding the multiple analogy between health, sickness, virtue and vice, then, is a miniature version of the philosophical method expounded in the analogy of the cave. Both involve bringing about a direct confrontation with a fire representing the concept of justice or the Good" (p. 112).

Let me come to the most unquestionably 'scientific' field studied in the book – evolutionary biology. Besides the classical examples of the discovery of blood circulation by Harvey and of natural selection by Darwin, there are less known examples such as that of colecanth – the living fossil discovered in the twentieth century. Questions about the place where it lives and how it reproduces were answered through analogical argument by comparison with other species, and all the arguments that have been actually employed satisfy fairly well the requirements of MT. A similar case is made for 'real' fossils such as Archaeopterix.

In archaeology issues such as the explanation of the nature of marks on prehistoric pots from Peru, or the significance of figurine legs from Greece, or the discussion of the hypothesis that North Americans did hunt mammoths have also been resolved by using of multiple analogies.

A few concluding remarks. The choice of two typically non-hard sciences as a source of case studies is peculiar and yet stimulating. The *standard view* of the Fifties was grounded in a commonplace view of physics, that now – after the sociology of scientific knowledge – looks, to say the least, obsolete. The model of scientific theorizing built on such ground was used after that in order to colonize other fields. One the favourite targets were psychoanalysis and other pseudo-sciences and, while nobody ever doubted that biology was a serious enterprise, it somehow had no appeal to philosophers of science. Archaeology used to enjoy an even more uncertain status: was it a science or a discipline from the humanities, and if the former, then should it adopt a deductive form

of argumentation? (p. 67). Shelley's useful explorations of fields such as these may prove enlightening in order to come back to what were labelled the hard sciences with some more wisdom.

A remark is in order also about analogy and metaphor. The commonplace identification of analogy with analogy of proportion is, curiously enough, a shared trait of both Logical Empiricism and the last phase of Scholasticism. Analogy of attribution or metaphor may prove a more fruitful alternative as an umbrella concept, under which we could group together several kinds of analogies: multiple, individual, "pre-theoretical", or entrenched in full-blooded theories.

A third remark, or sympathetic criticism, is that literature from fields that have been apparently ignored in the book may provide useful suggestions in order to expand and strengthen the book's main line of argument. I mean French epistemologists such as Gaston Bachelard, Gilles-Gaston Granger, Michel Serres, American authors associated with the New Rhetoric, American Post-empiricist philosophers of science such as Thomas Kuhn and Marx Wartofsky.

Another remark concerns pragmatics. The claim made in the book that the purpose of an analogy contributes in determining its meaning and cognitive content is tantamount to the claim that no purely semantic theory of metaphor is available and the very distinction between literal and non literal meaning presupposes the pragmatic dimension of language (see Searle 1979: 92-123; Dascal 1984: 154-158). Several suggestions made in the book to the effect that the sociology of science is important for determining the expansion of single analogies into multiple ones may be further expanded in the light of the idea that practitioners of a scientific discipline too do things with words, e.g., they help their friends and fight their enemies, or, in other words, they are constantly engaged in controversies. And controversies do change theories, concepts, and descriptions of phenomena (see Cremaschi and Dascal 1998).

Last but not least, pragmatism. The claim that the purpose of an analogy contributes in determining meaning and cognitive content seems to me to amount to the old lesson of pragmatism applied to analogy And perhaps an exploration of suggestions on the role of analogy by Peirce could prove a way of enriching the path of inquiry pointed at in this book. The multiple constraints model probably summarizes an idea of Peirce himself: that there is no pure – empirical or rational – starting-point of inquiry, since facts are always already coated into an interpretation; and what we do is moving around through interpretations; however, this is not vicious circularity, since (and here I am paraphrasing Richard Bernstein paraphrasing Peirce) the bigger a circle is the less vicious it is. The MT model of analogy is big enough to wish it a few more round trips.

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