result, the collection of eleven essays contained within *Socializing Epistemology* has much to offer the epistemologist as well as those interested in sociology of knowledge. However, whether Schmitt has succeeded in his intention, namely the birthing of a new subject for philosophical analysis (social epistemology) is, ironically, dependent upon social factors which are themselves the subject of study of the authors of this volume.

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The Semantic Foundations of Logic
vol. I, *Propositional Logics* vol. II, *Predicate Logic*

by Richard L. Epstein

Vol. I, New York: Oxford University Press, 1995, 480 pp.
Vol. II, New York, Oxford University Press, 1994, 412 pp.

Reviewed by Douglas Walton

This pair of books are two volumes of an ongoing research project developing a new kind of formal logic The volume on propositional logics is the second edition of the book of the same title originally published by Kluwer (1990). The book begins with an introduction to classical propositional logic, and then goes on to develop the new kind of logic. Both new volumes are presented very clearly from the ground up, in a text-book format, complete with exercises. And so both books, but especially the volume on propositional logics, could be used in a middle or upper level logic course, or a course on philosophy of logics.

The new logics are built around the idea that certain kinds of relations can be added into the requirements needed for the conditional (and for the other logical connective, where required). One kind of relation of this sort is generally called "relatedness". But what does 'relatedness' mean? Is it the same thing as 'relevance'? Epstein defines relatedness in various specific ways, many of which do seem to model kinds of relevance that would be of interest to the readers of *Informal Logic*.

For example, one way of defining relatedness is subject-matter overlap (vol. 1, p. 93). You can assign each given statement in your argument a set of subject matters, meaning a subset of a set of topics that the argument is supposedly about. So one proposition can be said to imply another in the new relatedness system if, and only if, the truth-values are the same as classical logic, and the two propositions do have subject matter overlap. For example,

if three of your topics are "bananas", "yellow", and "edible", then the statement "Bananas are yellow" is related to the statement, "Bananas are edible", because the two statements have subject-matter overlap. Both contain the topic "bananas". Thus the green cheese argument above, which was valid in classical propositional logic, fails to be valid in relatedness logic, because "2 + 2 = 4" and "The moon is made of green cheese" do not share any common subject-matters.

So, you might say, this is another type of relevance logic, is it? We are familiar enough with that. But actually it is different from relevance logic, because the motivations are much sharper, and are presented in a simple semantics that is easy to grasp, and to apply to argumentation (unlike relevance logic of the older sort). But why, you might ask, should those of us in the informal logic field be interested in another formal relevance logic? The old relevance logics didn't turn out to be much, if any help, to our efforts to study argumentation in natural language settings of argument use. Why should this new system be any better?

While this question of exactly how the new Epstein systems should be applied has still not yet been answered, I still think that the informal logic community should take a close look at them. They do present a family of concepts of relevance that are simply defined and easy to grasp, and that certainly do show excellent promise of being nicely applicable to various interesting kinds of implication relationships that figure prominently in the study of argumentation in natural language settings. And after all, the big problem in applying logic of any kind to fallacies, and other phenomena of natural language argumentation, is that relevance has never really been defined. No general theory of it that is useful for purposes of informal logic, and has been shown to be so, exists.

Relevance is the holy grail of informal logic. Where is it to be found? In my younger days, I thought it might be found in the formal system called relatedness logic. But that path (disappointingly) only went some way, as I argued in (Walton, 1982). In the intervening years, I have come to think that relevance should be sought in the pragmatic framework of how argumentation is used for some communicative purpose, rather than in the semantic framework of truth, falsity, conditionals and entailment relations. But the grail is not to be found by the faint-hearted, or those who spend their energy fighting against opposed factions and schools of thought. It seems most likely to me that getting very far along the true path will eventually require the fitting together of the semantic and the pragmatic frameworks for studying arguments.

These two volumes by Dick Epstein are the outcome of many years of work developing relatedness logic formally, and studying many other kinds of conditionals and entailment relations that model all kinds of things of intense interest to informal logicians and epistemologists, like information containment. Could those of us in argumentation theory and informal logic use these

systems in our quest to find methods of evaluating relevance, and matters like information containment of propositions? It does seem to me that they could, and so I commend the study of these two volumes to the informal logic community. But both books are formal in nature, and the formal systems they develop are those of deductive logic (even if they are not the same as the systems of classical deductive logic we are so familiar with in philosophy). Is it realistic to think that practitioners of informal logic will make the effort needed to work these two carefully reasoned and technically sophisticated books?

The very words 'informal logic' suggest an opposition to formal logic, and there has been a climate of opinion common to a majority of those working in the area of informal logic to the effect that deductive logic has been emphasized too heavily in the past. Govier (1987) has even used the term 'deductivism' to indicate (pejoratively) the view that all serious reasoning is deductive in nature. Certainly, there appears to be a widespread presumption visibly shared by many practitioners of informal logic that formalization of the kind familiar in deductive logic is neither necessary nor particularly useful to the task of evaluating everyday argumentation of the kind used in realistic natural language cases. This being so, what chances are there that anybody will take my advice to make the effort to study Epstein's work very carefully? But there are signs that the times may be changing.

At the conference *Formal and Applied Practical Reasoning,* held in Bonn, Germany in June 1996 (Gabbay and Ohlbach, 1996), during a presentation by leading argumentation theorists and representatives of current research in informal logic, given to an audience of workers in the field of AI, the anti-formal climate of opinion was observed to shift. Agreement was evident that formalization is an important aspect of the development of methods for evaluating practical reasoning in everyday argumentation. The problem became one of determining what kind of formal structure is most useful in assisting in the normative evaluation of argumentation.

The old problem is that classical deductive logic, based on the truth-functional "hook", or so-called material conditional, admits of "paradoxes" suggesting that classical deductive logic is of no practical use in modeling the concept of relevance that is so central to informal logic. For example (Epstein, 1995, p. 108), the following example of an argument is deductively valid in classical logic: *2 + 2 = 4, therefore if the moon is made of green cheese then 2 + 2 = 4.* In other words, a true statement is deductively implied by any statement you like, in classical deductive logic, even one that is not related at all to that true statement. The existence of such paradoxes has been taken by many as a good reason for concluding that classical deductive logic is not useful for evaluating argumentation of the kind used in everyday reasoning, where relevance appears to be extremely important. Many of the traditional informal fallacies, for example, appear to be fallacies primarily because they are failures

of relevance. We need to evaluate arguments as relevant or irrelevant in informal logic, and therefore, because formal, deductive logic will not do this, the conclusion accepted by many is that we should stop advocating the use of formal logic as a method for evaluating arguments used in practical reasoning.

Epstein, however, has worked out a formal approach to deductive logic that can take relevance (and many other factors of interest to argumentation theorists) into account in evaluating arguments as deductively valid to not. Moreover, it is an approach that allows relevance (and other useful ideas, like information containment) to be defined in precise, but flexible and variable ways, depending on exactly what you might mean by 'relevance' (or 'relatedness', as Epstein calls it), in a given case.

Of course, the central applicability problem with this system is that the idea of relatedness of propositions is still not adequate, by itself, to model the dynamic concept of material relevance of moves in a critical discussion, of the kind that would be required to provide an analysis of fallacies of relevance. But should we expect it to succeed in this task, all by itself? I do not think so. I think that ultimately, the quest for that grail will require combining the notion of semantic relevance with the pragmatic concept of dialectical relevance in a conversational framework (of the kind sought in Grice, 1975). But still, the semantic notion could take us part of the way.

The proposal I would like to make for a direction of future research is that Epstein's semantic models of different kinds of deductively valid inferences could be used as the "reasoning" engine that drives the line of argumentation in different pragmatic frameworks of argument use. So for example in the critical discussion type of dialogue of van Eemeren and Grootendorst (1984), relevance can be defined pragmatically in terms of whether or how a given argument used in the discussion bears on the conflict of opinions that is at issue globally in the dispute. But what does "bears on" mean? In my opinion, it should mean that there is a sequence of inferences that leads towards the conclusion to be proved in the discussion (the proponent's thesis, representing one of the opinions in conflict in the discussion). What kind of inferences are these? I think they could be valid inference of the kind modeled by Epstein's relatedness logics (and the other kinds of inferences he defines).

Such a line of research might sound futuristic, but I think that the growing interest in argumentation within the AI community means that this kind of research will be taken up soon, and is quite likely underway already. Researchers interested in studying argumentation include, more and more, workers in computer science, especially with the advent of multi-agent software systems that require agents interacting verbally with each other in negotiations, and other kinds of argumentation exchanges. Anyone working in this area should be taking a keen interest in Epstein's two new volumes, and recommend them to their graduate students.

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Beyond the Limits of Thought

by: Graham Priest

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Reviewed by Dale Jacquette

In *Philosophical Investigations* §125, Wittgenstein speaks of 'The civil status of a contradiction, or its status in civil life', about which with rare emphasis he adds, 'there is the philosophical problem'. Graham Priest's dialethic logic tolerates true (if also false) contradictions that describe as they transcend the limits of thought. Priest thereby accords contradictions a legitimate function of the type Wittgenstein imagines in the social language games people play, in a theory that might be said to have identified the one underlying or single most imprtant problem of philosophy.

Beyond the Limits of Thought is an ambitious sequel to Priest's formal exposition of dialethic logic in his (1987) *In Contradiction: A Study of the Transconsistent*, and the more encyclopedic (1988) anthology, *Paraconsistent Logic*, coedited by Priest, Richard Routley, and Jean Norman. Priest's new book offers an insightful survey of selected concepts in the history of philosophy, which he combs for evidence of dialethic contradictions at the limits of thought. Although Priest disclaims an historian's expertise, his scholarly handling of original sources in translation is exemplary—which is not to say that his conclusions will not be found historically and philosophically controversial.