

Review of Vincent Hendricks and John Symons's *Formal Philosophy* (Automatic Press, 2005).

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Formal Philosophy is a collection of interviews with twenty-one leading figures in the field. Vincent Hendricks and John Symons invited answers to five questions,

1. Why were you initially drawn to formal methods?
2. What examples from your work illustrate the role formal methods can play in philosophy?
3. What is the proper role of philosophy in relation to other disciplines?
4. What do you consider the most neglected topics and/or contributions in the late 20th century?
5. What are the most important open problems in philosophy and what are the prospects for progress?,

from Johan van Benthem, Brian Chellas, Anne Fagot-Largeault, Melvin Fitting, Dagfin Føllesdal, Haim Gaifman, Clark Glymour, Adolf Grünbaum, Susan Haack, Sven Ove Hansson, Jaakko Hintikka, H. Jerome Keisler, Isaac Levi, Ruth Barcan Marcus, Rohit Parikh, Jeff Paris, Gabriel Sandu, Krister Segerberg, Wolfgang Spohn, Patrick Suppes, and Timothy Williamson.

The breezy style and unconventional format of this collection make for delightful reading. There are fascinating conjectures, career recaps, diatribes, pointers to overlooked work, and racy memoirs, including Clark Glymour's revelation that he attended high school with Evel Knievel. *Evel Knievel!*

But there is also a thread of sound methodological advice running through this book that might be missed for the lighthearted fun. In several of these interviews there are answers to questions that we've all faced—the value of the philosophy of science, whether any philosophical problem worth worrying over cannot simply be handled with common sense and a smidgen of logic, what distinguishes insightful use of formal methods from tedium, and how to judge the fit between a formal model of a subject and the subject itself. There is remarkable agreement over how to address these core concerns, which is heartening: while there is disagreement over when to cry foul, which is human, there is nevertheless consensus over the rules of the game. This consensus means that within the pages of *Formal Philosophy* are the foundations for a discipline, even though there is some disagreement over what to call it and where to house it. I highlight here three themes.

The philosophy of science should work to advance the sciences. Clark Glymour endorses this sensible proposal, citing a passage of Michael Friedman's *The Dynamics of Reason*, which pictures philosophy as an incubator of new ideas for the sciences. But by this standard, Glymour argues, the recent philosophy of science has not performed very well. Real mathematical work with philosophical motivations is largely ignored, and a consequence is that many of what should be core concerns within contemporary philosophy of science have moved out of philosophy proper and into statistics and machine learning.

One result from this outsourcing of philosophy to other disciplines is addressed in Mel Fitting's essay. Logics and formal frameworks that were once pure philosophical logics are now rapidly moving into engineering applications and the special sciences—notably artificial intelligence, psychology, and economics. To keep these practitioners honest, Fitting argues, they must be reminded that there are philosophical positions embedded in these frameworks that bear directly upon their model building. Another way to put this is to observe that as the barrier between philosophical logics and applied logics breaks down, applied logicians, mathematical psychologists, and decision theorists must have a foot in philosophy and another in the particular special science in which his models are put in practice.

The broader point raised by Fitting and Glymour, and also addressed in Rohit Parikh's essay, is that much of philosophy of science is now occurring outside of the professional boundaries of philosophy. This development presents a direct challenge to a view held in some quarters of philosophers as all-purpose concept custodians, standing on-call to clean up the muddleheaded notions found in the sciences. But it is of little surprise that the results of generalists often are of little interest to the sciences. Ignoring the details of a science is often in effect to ignore the priorities that constrain attractive solutions, leading to results that only a philosopher could love. A clear example is the growing disconnect between how mainstream philosophy of science treats uncertainty, and the rapid development of imprecise probabilities and bounded-rationality carried on almost entirely outside of the field. It is a dumbfounding development to see the philosophical center of gravity of this field move out of philosophy and into the special sciences. Recent remarks by Cristina Bicchieri (2006) offer additional insights on this point.

Formal methods offer both training for problem solving and the tools to solve problems. This point is mentioned explicitly by Dagfinn Føllesdal in his essay, and is a theme in several others. Føllesdal reminds us that one benefit from studying mathematics is that it gives you a large repertoire of structures, training in how to take them apart and combine them, and instruction on how to apply them. This is common knowledge to those who have some mathematical training, but it is a point that is sometimes missed by those who don't, some of whom dismiss formal methods as little more than technicians' work. Certainly not all philosophical problems yield to formal methods and there are good and bad practitioners. Both of these points are stressed repeatedly throughout this collection. But the core of several philosophical problems often is a clash between

imagined properties of a subject and the bad behavior of those properties within some structure. The habit of contemporary philosophy of limiting the menu of structures to first-order logic, basic modal logic, and classical probability is akin to institutionally tying philosophers' hands behind their backs.

Following this observation is a point Krister Segerberg credits to Rich Thomason. Thomason, commenting on philosophers who view formal methods as distractions to real philosophical advancement, remarked that the only real advantages that we have on the greatest philosophers of past ages are the new tools that we have at our disposal. It is hard to imagine improving upon Aristotle without resorting to methods that simply weren't available to him. Segerberg captures this point in a slogan: "To go beyond a great philosopher, go beyond his methods!"

Abstraction cuts problems down to size. Haim Gaifman remarks on the blessings of abstraction, which offers a license to ignore information. For instance, Artificial Intelligence represents an ingenious approach to the problem of cognition: avoid getting bogged down in the philosophy of mind! In attempting to do this, researchers use a wide variety of formal methods to discover basic mechanisms that are thought to be operative in how we think or communicate, or to at least effect this type of behavior. And by shuttling between the behavior of the model and our own, we sometimes are able to penetrate deeply into the subject of cognition and, indirectly, the workings of the mind.

But are these mechanisms *really* representative of psychological processes? And do the formal frameworks have an agreed upon semantics? Often the answer to both questions is, No. The field is a lovely mess that way. Nevertheless, to paraphrase Rohit Parikh's reply, So what? It is a credit that AI struggles with models of human reasoning and communication for which we often have neither a convincing semantics, nor a compelling psychological model for actual thinking or talking. And it is a credit that it does not limit itself to a few choice formal methods, but will try almost anything as a modeling language, and study those languages *qua* languages to understand how to apply them and when. This is precisely the territory that philosophy once occupied.

These three points hardly exhaust the richest of this eclectic little book, but they are some of the most important themes it addresses. It is for this reason that *Formal Philosophy* is a terrific book. Hendricks and Symons struck upon an ingenious method for getting giants in the field to talk freely about why formal philosophy is important, and how it should be done.

References

1. Bicchieri, C. 2006. "Philosophy: What is to be done?", *Topoi*, 25:(1-2):21–23.