The concept of strength of belief, or degree of confidence, is central to a considerable amount of contemporary work in epistemology, decision theory, statistics, economics and artificial intelligence. This timely and impressive collection of essays brings together a number of important contributions to its philosophical study, authored by some of the most influential figures in the field.

Co-editor Huber's introduction situates the various subsequent contributions within a useful, concise overview of some of the main issues at stake, an overview that covers similar ground to his excellent recent 'Formal Representations of Belief' (*Stanford Encyclopaedia of Philosophy* 2008). Like the remainder of the book, the scope of this chapter extends beyond coverage of the probabilist paradigm that is so ubiquitous in the mainstream philosophical literature. We find here a clear summary of various alternative models, such as Dempster-Shafer theory (DST) belief functions, possibility/necessity measures and ranking functions. Huber's enthusiasm for the latter is fairly clear, although the claims made regarding its theoretical advantages will no doubt prove to be contentious.

The remainder of the book is divided into three parts — 'Plain Belief and Degrees of Belief', 'What Laws Should Degrees of Belief Obey?' and 'Logical Approaches' — with Part 2 collecting the bulk of the contributions (seven of twelve articles).

Although the issue is also touched upon later in the volume, Part 1 is devoted to the relation between reports of degrees of confidence (e.g. 'I am pretty certain that I locked the car') and reports of plain belief or disbelief (e.g. 'I believe I locked the car'). All three papers in this section seem to share a (possibly somewhat uncritical) commitment to the view that, to the extent that one's degrees of confidence ought to determine the beliefs that one holds, the only plausible mapping is given by the so-called 'Lockean Thesis' (LT). LT states that it is rational to believe that P iff one's rational degree of confidence in P exceeds some appropriate threshold t, which may fall short of absolute certainty. This view, of course, is subject to notorious difficulties. The Lottery Paradox, for instance, brings home the fact that the right-to-left direction of LT is incompatible with either (i) the closure of rational belief under conjunction or (ii) the irrationality of belief in a logical contradiction, which both appear to be intuitive constraints. The Preface Paradox, in turn, highlights the incompatibility of (i) and the left-to-right direction of the principle.

Richard Foley attempts to salvage LT by casting doubt on various possible motivations for endorsing (i). He aims to provide a story as to why, contrary

to what one might think, failure of closure of rational belief under conjunction does not undermine the force of traditional inference rules such as conjunction-introduction and *reductio ad absurdum*. James Hawthorne offers us a further development and refinement of the work that he initiated in his co-authored (with Luc Bovens) 'The Preface, the Lottery and the Logic of Belief' (*Mind* 108 [1999]: 241-64). He shows us how a pair $<\mathrm{Pr}, t>$, consisting of a probabilistically coherent credence function Pr and a Lockean threshold t, can be represented in purely qualitative terms, by a pair $< \geq, \ B >$, consisting of a binary relation $\geq$ of comparative confidence and a set B of fully believed formulae. In particular, Hawthorne establishes a correspondence between the value of t and the kinds of Lottery- / Preface- paradoxical belief states that can figure in B. Finally, philosopher of mind Keith Frankish usefully reviews various possibilities regarding the plain belief / degree of belief connection and their associated difficulties. The view that rational belief supervenes on rational degrees of confidence, in particular, is quickly rejected on the basis of LT's difficulties with the Lottery and the Preface. Frankish then moves on to offer his own (admittedly rather opaque) positive account.

The second part of the book is devoted to the specification and justification of the constraints, both synchronic and diachronic, to which rational degrees of belief are subject. Four of the essays focus on probabilism; three others expound various alternatives.

The opening article sees Colin Howson offer us a clear and elegant exposition of his views on such vexed issues as the requirement of countable additivity of degrees of belief, which he ultimately rejects, and the relation between probabilistic coherence and deductive consistency, both of which he takes to be special cases of solvability of a system of equations under a set of constraints.

The following three chapters provide extremely useful points of entry to various frameworks that have yet to gain common currency in the philosophical world. The bulk of Rolf Haenni's contribution (sections 1 and 2) is a self-contained introduction to Dempster-Shafer theory, that could constitute a valuable teaching resource. The exposition is clear, amply illustrated by very helpful diagrams and examples and dotted with references to the literature. The final section briefly outlines Haenni's 'probabilistic argumentation' framework, which purports to provide a unified model of both logical and probabilistic reasoning. Next up are computer scientists Didier Dubois and Henri Prade, with a comprehensive, if at times somewhat terse, tour of their 'possibilistic' framework. Topics covered notably include possibility and necessity measures, relative confidence and full belief, and non-monotonic reasoning. It is then Wolfgang Spohn's turn to introduce the reader to a close cousin of possibility and necessity measures: negative/positive ranking functions. Spohn's paper is extremely clear and rich, spanning a wide range of applications of ranking theory and discussing points of contact with both the philosophical and the computer science literatures. Of particular interest were the discussion of the intended interpretation of numerical ranks (Section 2.3), drawing on a recent paper co-authored with Matthias Hild, as

well as Spohn's musings on the connection between ranking and probability theory (Section 3).

We then return to probabilism with a characteristically neat article from Alan Hajek. This reprint from a recent issue of the *British Journal for the Philosophy of Science* critically reviews the standard battery of arguments in favor of the view. The unifying theme of many of the criticisms is that proponents of these arguments do not convincingly establish that parallel arguments cannot be given for alternatives to probabilism. Next up is an interesting piece by Brian Skyrms, again a reprint of a recent article ('Diachronic Coherence and Radical Probabilism', *Philosophy of Science* 73 [2006]: 959-68), in which he attempts to derive the synchronic constraint of probabilistic coherence from diachronic considerations. Finally, James Joyce offers us a sequel to his widely discussed 'A Non-Pragmatic Vindication of Probabilism' (*Philosophy of Science* 65 [1998]: 575-603), in which he attempted to ground probabilism in the view that degrees of belief are to be evaluated in terms of their accuracy as estimates of truth values. We find here a more cautious treatment of the topic, with an admission that several crucial premises in the original argument are in need of further support. Joyce reviews various inaccuracy measures and potential general constraints thereon, before outlining two further accuracy-based arguments for probabilism, judged to be less controversial than the one offered in his 1998 paper (although see section 5 of Hajek's chapter for dissent).

The final part of the book gathers the contributions of two distinguished authors, best known for their contributions to the literatures on belief revision and non-monotonic reasoning. In his elegant 'Degrees all the Way Down', Hans Rott sets out to enrich the possibilistic/ranking theoretic frameworks by equipping them with a means of distinguishing between levels of confidence in different propositions with respect to which an agent suspends judgment. These distinctions were not catered for in the original models: a Spohnian two-sided ranking function, for instance, would have mapped all such propositions onto 0 (although see p. 192 of Spohn's paper in this volume). Finally, David Makinson offers a highly accessible and informal introduction to the connection between degree of belief and non-monotonic consequence. This student-friendly piece would constitute a great addition to the reading list of any course dealing with either of these topics.

Setting aside the rather surreal price tag for the cloth edition (though a reasonably-priced paperback appeared in October 2009), it is hard to find much to grumble about here. This is an incredibly rich collection that strikes a good balance between cutting-edge research articles and introductory overviews. From AI researcher to philosopher, from newbie to seasoned vet, this book will prove to be a rewarding read to all of those interested in the topic.

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