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sciences but are multidisciplinary, and at least some of them are nevertheless legitimate questions.

I have given only a selective indication of the book's contents and merits; there is much more here of note than I have mentioned. Kornblith's discussion is consistently clear, stimulating, witty, and well worthy of close study—the book is a pleasure to read. Kornblith successfully outlines a consistent naturalistic position on knowledge, intuition, logic, and so forth. But the defenses of these positions are on the whole brief and do not settle the deep issues—Is reliabilism correct? Is knowledge a natural kind? Can naturalism avoid self-defeat or damning circularity? and so on—that animate the naturalism/traditionalism controversy. Nevertheless, the book advances the debate in interesting ways.

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Albert Casullo, *A Priori Justification*.

New York: Oxford University Press, 2003. xiii + 249 pp.

According to Albert Casullo (3), “the major divide in contemporary epistemology is between those who embrace and those who reject the a priori.” His exploration of the literature finds the two sides at an impasse. Refreshingly enough, he aims to clear up a number of confusions that contribute to the deadlock, to identify what he calls a “minimal” conception of the a priori, and to lay out a program for articulating this conception and testing its worth, a program whose terms are intended to be acceptable to both sides.

As the title suggests, the primary topic of the work is a priori justification rather than a priori knowledge. This focus liberates Casullo to consider accounts of apriority in which false beliefs may be justified a priori and to examine various kinds of defeasibility. He suggests that those who assume that a priori justification would have to be indefeasible may be operating under the constraints of yesterday's epistemology. Accounts of the a priori “developed in a context dominated by Cartesian standards of knowledge and foundationalist assumptions about justification” (10) may carry the baggage of those broader theories. Casullo urges those who no longer accept such theories about justification in general to think twice about insisting on indefeasibility or absolute certainty for the a priori in particular, at least without some independent

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argument warranting the higher standard in that domain; he then criticizes a number of attempts to produce such arguments.

A demand for certainty is just one sort of condition that might be seen as distinctive of a priori justification. Casullo offers a detailed taxonomy of such conditions. He distinguishes attempts to characterize apriority in explicitly epistemic terms, appealing to the source or strength of such justification, from attempts to characterize it in terms of the necessity or analyticity of claims made on an a priori basis. Many accounts of apriority combine epistemic and nonepistemic conditions, analyzing it as, say, the intuitive apprehension of necessary truths. The opening third of Casullo's book is dedicated to defending the proposal that a priori justification is best identified in terms of a single epistemic criterion: it is justification whose source is nonexperiential. Casullo contends that one can at least initially leave open the question of whether some semantic or metaphysical characteristics might be exhibited by all and only propositions justified a priori; the use of epistemic terms, on the other hand, appears to be inescapable insofar as the broader concept of justification is fundamentally epistemic. In addition, Casullo defends his purely epistemic approach by attacking two popular candidates for nonepistemic conditions on the a priori, necessity and analyticity.

Casullo's remarks on necessity are particularly provocative. He notes that "it is widely held that most, if not all, a priori knowledge is of necessary truths" (124) but disputes the "traditional rationalist" conception of the a priori according to which a priori justification involves seeing a given proposition as necessarily so. Such views set an implausibly high standard, Casullo charges, in effect obliging the rationalist to withhold attributions of a priori knowledge of basic arithmetic from those who "are not conversant with the metaphysical distinction between necessary and contingent propositions" (15), or, worse, from those who are conversant with the terminology but philosophically committed to modal skepticism. Here the rationalist could grant that many are unprepared to formulate the kind of explicit theory about necessity that would qualify them as "conversant with the metaphysical distinction" without conceding that this constitutes evidence that they are unable to grasp propositions as necessary. Especially if one is taking pains to set aside Cartesian assumptions about the mental, the rationalist might urge, one can characterize the modal skeptic as grasping the necessity of  $2 + 2 = 4$  despite his philosophical misconceptions about the nature of his cognitive activity. Casullo has a number of further arguments against the rationalist view, many of which depend on controversial assumptions about the manner in which a rationalist can conceive of justification; in this section he succeeds mainly in putting pressure on the rationalist to explain what it is to grasp a proposition as necessary where this is not made manifest in explicit statements about modality.

The middle section of the book surveys a great range of arguments for and against the existence of a priori knowledge. Casullo is not convinced that

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a compelling case has been made on either side. He is critical of those who cite basic arithmetic as a clear example of nonexperientially justified knowledge on the grounds that empirical justification cannot extend to necessary propositions. Even if one grants the necessity of arithmetic, Casullo reasons, the question of the general modal status of a proposition (whether it is necessary or contingent) is distinct from the question of its truth; one might know that an arithmetical proposition is true (say, on the basis of testimony) without knowing its modal status on that basis, or indeed, without knowing its modal status at all. Apriorists might retrench to the view that testimony could at best transmit arithmetical knowledge and insist that the original knowledge must be a priori here, given the character of arithmetical propositions. But Casullo is firmly set against any attempt to draw such conclusions about the nature of a belief's justification from the character of the proposition believed. For example, although it could not be mistaken, even a belief in one's own existence might be unjustified, Casullo contends, sketching a scenario in which the cogito appears in a cult's generally unreliable training manual and is accepted by an inductee on that basis (180). One longs for clarification of the concept of "belief" at work here; rationalists could contend that the degree of understanding of a proposition required for belief would be sufficient to defuse both this and the arithmetical case. Hoping to achieve "results whose cogency does not depend on particular views about these issues," Casullo elects not to offer any account of belief beyond "the traditional view that belief is an attitude directed toward propositions" (6). However, his thought experiments make one wonder whether this neutrality can be sustained, and more generally, whether theories of justification can remain noncommittal about belief.

In any event, Casullo presents an independent argument against using the necessity of mathematics as evidence for the existence of a priori justification: he contends that empirical justification could suffice to underwrite claims about what is necessarily the case. Those who claim that empirical justification will be restricted to telling us what is actual fail to see that "a good deal of our ordinary practical knowledge and the bulk of our scientific knowledge provide clear counterexamples to the claim. . . . Scientific laws are not mere descriptions of the actual world. They support counterfactual conditionals and, hence, provide information beyond what is true of the actual world" (93). This move can be resisted both by apriorists who maintain that it is partly in virtue of an a priori grasp of something like the uniformity of nature that we know those conditionals and by empiricists like Bas van Fraassen who are reluctant to claim scientific knowledge of other possible worlds.

Casullo is equally critical of radical empiricist arguments against the existence of a priori knowledge. One antiapriorist tactic is to advance radical empiricist accounts of knowledge of mathematics, logic, or other domains widely considered a priori; here Casullo contends that even if these accounts were to succeed in showing how experience could justify all such claims, they

would not thereby rule out a priori justification. The target claims could be “epistemically overdetermined” or justified by other sources as well, Casullo suggests; and for the empiricist, the question of whether we have such redundant cognitive resources should be an empirical one. Having characterized radical empiricism as “the view that denies the existence of a priori knowledge” (81), Casullo concludes that radical empiricists need to produce empirical support for this denial. Empiricists who eschew first philosophy might prefer to characterize empiricism as “the view that avoids positing a priori knowledge.” Such empiricists might aim to escape Casullo’s challenge by claiming that their avoidance of the a priori is a resolution rather than an empirical claim.

Because empirical investigation is recognized as legitimate by both apriorists and radical empiricists, however, Casullo remains hopeful that it could be used to articulate the concept of nonexperiential justification and to check whether there is any. Although they dispute its source, apriorists and empiricists have substantial common ground on the scope of what is known. Agreeing that we have justified beliefs in logic, mathematics, and the sciences, both sides can investigate the cognitive processes that actually produce and sustain these beliefs (160–61). Casullo (148) proposes “viewing ‘experience’ as a putative natural kind term whose extension is fixed by reference to the cognitive processes associated with the five senses.” Empirical investigation is needed to see what features these processes have in common and “whether dividing cognitive processes into two categories based on the presence or absence of those features is fruitful for theorizing about human cognition” (181–82). This valiant proposal is open to challenge from both sides. Some empiricists need not fear the discovery that some of our beliefs, say, the mathematical ones, are produced by cognitive processes that differ in scientifically interesting ways from those involved in vision and hearing. Under Quinean holism, for example, what makes the output of these processes count as justified arises not from any intrinsic similarity between these processes and sensation but from the extent to which their output aids in predicting sensation. It is not obvious how empirical results could settle the question of whether the prediction of sensation should be the lone criterion of justification.

Meanwhile apriorists will have worries of their own. Casullo argues that many propositions known a priori might also be known empirically, but apriorists who hold out for some class of propositions knowable only a priori have no reason to accept that empirical investigation will explain how this is possible or what is distinctive about the nonexperiential. Some apriorists might also have reservations about the basic terms of Casullo’s analysis, in particular, the conception of sources of justification as biologically individuated cognitive processes whose reliability is always a contingent matter. The very project of sorting such processes into experiential and nonexperiential categories is problematic for apriorists who believe that even basic empirical judgments call upon a priori capacities as well as on the senses. In addition,

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apriorists who maintain that they already differ from empiricists in their conception of experience may resist the suggestion that the two sides can have a neutral starting point in Casullo's "natural kind" approach.

Even if Casullo's approach to apriority provokes resistance on both sides, there is no denying that this book is a great contribution to the debate. It delivers clear and detailed criticisms of a very wide range of positions on apriority, including those of Kant, Butchvarov, Bealer, Bonjour, Chisholm, Frege, Hale, Kitcher, Quine, and Kripke. Casullo generously maps out a wide range of alternatives for both advocates and critics of apriority and offers a bold and original treatment of such topics as defeasibility, analyticity, and the role of introspection and phenomenology in an account of the a priori. *A Priori Justification* is required reading for anyone interested in these issues.

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Jan von Plato and Sara Negri, *Structural Proof Theory*.

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In this book, the authors investigate a variety of sequent calculi (hereafter SCs) formalizing both various "logics" (intuitionistic, classical, and several intermediaries between the two) for propositional and predicate languages (of the standard sort, based on  $\&$ ,  $\vee$ ,  $\supset$ ,  $\perp$ ,  $\forall$ , and  $\exists$ ) and some "theories" that go beyond logic in the narrowest sense (theories of identity, apartness, partial order, lattice algebras, and affine geometry). At the beginning (chapter 1) and the end (chapter 8), they consider natural deduction (hereafter ND) and its relation to SCs. There are two appendices on type-theory and a third appendix (by Arne Ranta) on a "proof editor" and an automatic theorem prover (PESCA, available online, I gather) that "helps in the construction of proofs in sequent calculus." Most of the presentation presupposes no background in proof theory. The first four chapters (and, time permitting, some later sections) would serve well as an introductory text on the subject. Comparison to the second edition of *Basic Proof Theory* (hereafter *BPT*), by A. Troelstra and H. Schwichtenberg (2000), already the standard text on proof theory, is apt. *BPT* strives for breadth, covering a huge amount of material in a condensed way, and comes with exercises. *Structural Proof Theory* (hereafter *SPT*) covers a much narrower range of the proof-theoretic terrain (not going much beyond