Rival Logics, Disagreement and Reflective Equilibrium

GEORG BRUN, ETH Zurich and University of Zurich

The method of reflective equilibrium (henceforth "RE") has been conceived as pluralistic right from the start. In Goodman's original account, we read: "When we speak of *the* rules of inference we mean the valid rules – or better, *some* valid rules, since there may be alternative sets of equally valid rules" (Goodman 1983, 63). Later on, the method of RE was invoked in order to analyse the controversy between classical and intuitionistic logic (Prawitz 1977; Daniels 1996; Haack 1982) and in this context it seems promising to appeal to the pluralistic nature of the method of RE in order to account for the factual disagreement among logicians. This paper investigates the claim that rival logics can simultaneously be justified by the method of RE. Specifically, I analyse a dispute between Shapiro and Resnik. Against Resnik's (1985; 1996; 1997, ch. 8.3) extensive discussion of RE as the methodology for logic, Shapiro (2000) argues that the method of RE can only account for a pluralist position if we accept that there is a "core" of logical notions outside the scope of the method of RE and knowable a priori. After briefly discussing some aspects of the method of RE (sect. 1), I will analyse that dispute and suggest a defence of the possibility of reasonable disagreement between proponents of rival logics (sect. 2-4). This paper provides neither a detailed analysis and defence of the method of RE nor a comprehensive discussion of reasonable disagreement about logic; rather, it explores in what sense and to what extent the method of RE can underwrite pluralism in logics.

1. Reflective Equilibrium

At the core of the method of (so-called "wide") RE are two ideas (Goodman 1983, 63-67). Epistemic justification is a matter of whether judgements, systematic principles and background theories are in equilibrium, and this state is reached through a process of mutual adjustment of judgements, principles and in some cases also background theories. To avoid

In: Jäger, Christoph; Winfried Löffler (eds). 2012. Epistemology: Contexts, Values, Disagreement. Proceedings of the 34th International Wittgenstein Symposium. Frankfurt a.M.: Ontos.

process-result ambiguities, I will distinguish between "(reflective) equilibrium" (referring to a state), "RE-process" and "method of RE" (referring to the whole account of justification). Various accounts of the method of RE spell out the two core ideas differently and include additional elements. So far, the most elaborated general account is Elgin's (1996); Resnik (1985; 1996; 1997; 2004) has presented the most thorough discussion of the application to logic. For present purposes, we need to briefly address three points which are crucial but often overlooked in the literature.

Firstly, in the case of logic, an equilibrium is sought between judgements (or more generally, "commitments") about logical properties (e.g. validity, logical truth or consistency) of (sets of) sentences in some given language and a logical system ("a logic") which includes: a logical formalism, which is a formal language with a semantic or proof-theoretic definition of validity and further logical notions; an informal interpretation of the formalism, which relates, e.g., "$\Rightarrow$" with "follows from"; and a theory of formalization, which regulates the relation of ordinary language arguments and sentences to expressions of the formalism (cf. Haack 1982, 223; Resnik 1985, 225; 1997, 159). Without the last two elements, there is no way of deciding whether the judgements follow from the logical system (Brun 2004; 2008).

Secondly, all accounts of the method of RE refer to a contrast between principles and judgements. Although it is standardly described in terms of particular vs. general, the relevant contrast is that principles are elements of a logical system ("systematic elements" for short) whereas judgements constitute extra-systematic commitments.[1] In fact, however, there are two contrasts involved. At every stage in a process of developing a RE (abbreviated "RE-stage"), there is a contrast between the systematic elements at that stage and our judgements at that stage. A second contrast is between the resulting account and the judgements the RE-process started out with; the latter may in turn be the result of a previous development of a logical system, but this need not be so. To fix the distinction terminologically, judgements (and similarly commitments) will be characterized as "antece-

[1] Speaking of "judgements" is not meant to imply that the relevant commitments need to be stated explicitly; they may be expressed in any behaviour of treating inferences as (in)valid.

dent" in the context of the second contrast; in the context of the first contrast, I will use "current judgement" or simply "judgement".

Thirdly, as Elgin made clear, justification by RE involves several criteria. Judgements, logical system and background theories must be in equilibrium. This is usually characterized in terms of coherence. For present purposes, it suffices to note that coherence requires at least that judgements, logical system and background theories are consistent, and that the judgements follow from the logical system.[2] Moreover, the resulting logical system must do justice to relevant epistemic desiderata in order to ensure that it provides a systematization, not merely a list of our commitments. We expect a logic to be a system of formal and general principles that is well-organized, exact, comprehensive and as simple as possible. In particular, we aspire for a logical system which permits transparent representations of logical forms and allows for rigorous proofs of validity which should be sound complete and maybe even decidable. Finally, the resulting account (i.e. the ordered pair ⟨judgements, logical system⟩) must respect antecedent judgements adequately. Otherwise, there is no guarantee that the RE-process does not change the subject by effecting revisions of judgements which are so drastic that the resulting system will not count as a *logical* system anymore. To simplify, I will often leave implicit that a RE includes background theories and that being in RE is relative to antecedent commitments and to desiderata.

2. The Plausibility of Pluralism

The method of RE has been claimed to be pluralistic in the following sense (e.g. Resnik 1997, 160, 162): It is not uniquely determined what logic results if the method of RE is applied to a given set of antecedent judgements. Different RE-processes may lead to different logical systems, each in equilibrium with the respective (current) judgements. Hence rival logics – for example classical, intuitionistic and paraconsistent logics – may be

[2] The requirement that the judgements follow from the logical system has to be understood in a sense that permits developing partial theories, which cover only part of a range of commitments. A system *L* of zero-order logic, for example, is expected to sanction only valid inferences as valid, but not to cover all valid inferences. Consequently, if a RE is reached, only those judgements of validity which follow from *L* will be justified.

simultaneously justified according to the method of RE. This is plausible because there are several reasons why different states of RE may be reached from the same antecedent judgements. The process of mutual adjustments not only involves creative moves but it also permits that conflicts be dealt with in more than one way because judgements, systematic elements, background theories or desiderata may be weighed differently, or because the various conflicts are addressed in a different order.

Typical examples of conflicts which allow multiple resolutions can be found in debates about conditionals. At least three strategies are available for resolving the conflict between the classical account of material conditionals and the judgement that "If I put sugar in this cup of tea it will taste fine" is true while "If I put sugar and diesel oil in this cup of tea it will taste fine" is false (Harper 1981, 6; cf. Resnik 1985, 228). One can either keep to classical logic and revise the judgement, or modify the logical system so that it no longer includes $\phi \rightarrow \psi \Rightarrow (\phi \wedge \chi) \rightarrow \psi$, or formalize the "if-then" sentences in question with a different type of conditional. In other cases, there is a conflict which involves background theories. According the Prawitz's (1977) and Daniels's (1996) analysis, Dummett's arguments for intuitionistic logic rely on a theory of meaning to argue against accepting classical logic, which includes such theorems as $\phi \vee \neg\phi$ and inference rules such as $\neg\neg\, \phi \Rightarrow \phi$.

A more precise formulation of pluralism is the following:

(P1) Given a set of antecedent judgements A, it is possible that two RE-processes lead to rival logics L1 and L2 and to sets of judgements J1 and J2, such that (relative to A): L1 and J1 are in RE, and L2 and J2 are in RE.

Two qualifications are needed. First, I limit the discussion to rival logics that are developed from the same set of antecedent judgements. Second, I will not try to give a definition of "rival"; it suffices to say that rival logical systems have the same scope yet yield different sets of judgements (which are not merely the result of an equivocal use of logical vocabulary; cf. Haack 1996, ch. I.1-2; Resnik 1996, 497-498). Examples of rival logics are classical, intuitionistic and paraconsistent logics; or the different modal logics such as S5 and T. They are non-equivalent, in contrast to, for example, mere notational variants, different axiomatizations and systems with truth-tables vs. systems with semantic tableaux. Also, more and less com-

prehensive logical systems (such as zero- vs. first-order logic, or logics with and without modal operators) and systems designed for application to different languages do not count as rival logics (this excludes pluralism in the vein of Carnap's principle of tolerance; Carnap 2002, § 17).

3. The Own-Lights Principle

We are now in a position to analyse the arguments about the pluralistic nature of RE which can be found in the debate between Resnik (1996, 493-494, 502-504; 1997, 160-162) and Shapiro (2000, 349-351) (which primarily revolves around cognitivism and realism and not pluralism).

The claim (P1) can be challenged by pointing out that a proponent of, say, classical logic will find that intuitionistic and paraconsistent logics are not in RE because they are incomplete and inconsistent. As long as an epistemic subject is committed to a particular logic, she will find that at least one of two rival accounts is not in RE and hence that (P1) is false.

Against this charge, one can argue that the notion of RE has logical components and therefore the criteria for being in RE are not independent of the account they are applied to. As Resnik points out, RE requires that a logical system be consistent by its own lights and the judgements follow from the logical system in the sense of "follow" defined in the logic under consideration. Hence, we cannot argue against rival logics that they are not in RE according to our standards. The question is rather whether they are in RE according to their own standards.

For an analysis of this argument, we need to distinguish four ways of using expressions with a logical meaning, such as "follows from" and "is consistent":

(1) In current and antecedent judgements, "follows from", for example, is used extra-systematically as a relation between sentences.

(2) In a logical formalism, there is typically a symbol such as "$\Rightarrow$", which expresses a relation between formulas. It is read "follows from" because it is – according to the informal interpretation of the formalism – intended to be a systematic counter-part to the extra-systematically used "follows from".

As long as RE has not been reached, we cannot assume that the extra-systematic use of, say, "follows from" and the systematic use of the corresponding symbol agree (cf. the sugar-and-diesel-oil example mentioned

above).[3] Furthermore, use (1) and (2) typically change during a RE-process as a result of revisions which affect the judgements or the logical system.

(3) In applying the method of RE, an epistemic subject may use logical expressions extra-systematically with reference to judgements and logical systems (not as in (1) and (2) as parts of judgements or expressions of a logical formalism). For example, "is consistent" may be used to express a property of the logical system or of a set of judgements; "follows from" may be used to express a relation between the logical system and a judgement.

(4) Logical expressions are also used extra-systematically when the method of RE or one of its particular applications is discussed in philosophy of logic or epistemology, as in this paper.

With respect to use (3), Resnik argues that an epistemic subject must use at every RE-stage the logical notions developed up to that point. In determining whether a set of judgements and a logical system are in RE, "the logic contained in one's own evolving logical theory" determines whether the required coherence has been achieved (Resnik 1997, 160). Thus, Resnik's remark that an account needs to be coherent by its own lights amounts to the claim that type-(3) uses of "is consistent" and "follows from" must agree with their corresponding type-(2) uses. Consequently, these type-(3) uses will change together with the respective type-(2) uses in the course of a RE-process.

Resnik's position leads to two difficulties. First, the relation of agreement between the systematic use (2) and the extra-systematic uses (1) and (3) is not at all straightforward. We cannot use "follows from" and "$\Rightarrow$" in exactly the same way because the two expressions do not belong to the same language; "$\Rightarrow$" is meaningless when flanked by expressions that are not formulas in the language of the formalism in question. It would thus be more straightforward if use (3) was tied to use (1) instead of use (2).

Secondly, Resnik claims that type-(3) use of, say, "follows from" should agree with use (2) of a corresponding systematic expression. However, this seems odd. Unless a RE has been reached, use (2) can differ from use (1),

[3] To be fully explicit, we would need to index occurrences of "follows from" and "$\Rightarrow$" with the RE-stage they belong to, and occurrences of "$\Rightarrow$" additionally with the logical system they are part of.

but use (2) is just the systematic use, whereas use (1) is the use the epistemic subject is actually committed to. This commitment gives us reason to insist that the extra-systematic uses (3) and (1) agree. This move also dovetails with the reason why one should accept an "own-lights principle" in the first place. If an epistemic subject sincerely wants to appeal to considerations of consistency or valid inference in arguments about the justification of a logical system she is considering adopting, she must rely not on just any notions of consistency and validity, but on those she is actually committed to. The general picture driving this line of argument is the following: When an epistemic subject develops a logical system, she simultaneously makes her logic explicit and adapts it according to her epistemic desiderata; she reconstructs the logic she already has and during this process she uses at every stage the logical commitments she has at that stage.

These considerations motivate the following own-lights principle, which ties use (3) to use (1):

(OL) At every RE-stage, the logical notions used in criteria for being in RE must agree with the logical notions used extra-systematically in the current account.

This principle gives us reason to rewrite thesis (P1) about pluralism in a way that incorporates the fact that the notion of being in RE can vary with the account it is applied to:

(P2) Given a set of antecedent judgements A, it is possible that two RE-processes lead to rival logics L_1 and L_2 and to sets of judgements J_1 and J_2, such that (relative to A): L_1 and J_1 are in RE_1 (but not in RE_2), and L_2 and J_2 are in RE_2 (but not in RE_1).

According to (OL), "in RE_i" in (P2) must be understood in agreement with the logical notions as used in J_i.

(P2) now evades the objection to (P1). If an epistemic subject S_1 argues against a proponent S_2 of a rival logic that S_2's logic is not in RE by S_1's standards, this is beside the point. S_2's logic must be in RE by standards according with S_2's account.

As an aside, it may be worth noting that the element of self-application captured in (OL) is peculiar to the application of the method of RE to logical systems. The situation is different if we deal with, for example, moral theories. Whether a theory, moral or otherwise, is in equilibrium with the

relevant judgements is not a moral issue. When an epistemic subject assesses whether her moral theory is in equilibrium with her moral judgements, she must use logical notions – ones she is actually committed to. But this assessment will not use her moral commitments. It will rather apply to them.

In what follows, I want to defend the claim that (P2) opens up the possibility of reasonable disagreement:

(RD) Given two rival logics as described in (P2), then two epistemic subjects S_1 and S_2 who adopt the accounts $\langle J_1, L_1\rangle$ and $\langle J_2, L_2\rangle$ respectively are in reasonable disagreement because both accounts are in RE.

The two subjects S_1 and S_2 are in disagreement because they adopt *rival* logics and hence their respective sets of judgements J_1 and J_2 are different. The disagreement is reasonable because the method of RE gives both subjects a justification for their commitments (cf. Goldman 2010, 189-190 on the notion of reasonable disagreement).

4. Transcendent and Immanent Logical Notions

Against (RD), one may argue that the expression "in RE" is problematic since it is not tied to a particular account. Resnik and Shapiro insist that such a use is incompatible with the immanence of logical notions, which can be used only in the context of a particular account, in contrast to transcendent notions, which can be used in the context of various (or even all) accounts. They consequently hold that also the notion *reflective equilibrium* is immanent to an account because it is partly constituted by logical notions such as *is consistent* and *follows from.*

On the background of the discussion in the preceding section, this objection may be elaborated as follows: (RD) quite obviously raises the question of whether using the expression "in RE" without an index is legitimate. Do the arguments for replacing (P1) by (P2) not apply equally well to (RD)? Maybe the plausibility of (RD) merely rests on using "in RE" ambiguously. However, (OL) does not straightforwardly apply to the use of "in RE" in (RD) since (RD) as well as (OL), (P2) and the comments made in section 3 are not put forward from the point of view of an epistemic subject who is actually developing a logical system. Rather, we are engaged in investigat-

ing this epistemic practice, taking the point of view of epistemology. So the incriminated uses of "in RE" involve type-(4) uses of logical notions, which, in contrast to type-(3) uses, are not covered by (OL) (similar considerations apply to other expressions such as "agree with" in (OL) and "it is possible" in (P2); cf. Shapiro 2000, 349-350). Nonetheless, the arguments that spoke in favour of the own lights principle could still be put forward against using "in RE" in (RD) as applicable to two rival accounts of logic. After all, an epistemologist or philosopher of logic will have logical commitments just like any other epistemic subject (and there is also no reason why the same person could not take both the perspective of the epistemic subject developing a logical system and that of the epistemologist reflecting on the possibility of reasonable disagreement). If we accept these points, (RD) has to be given up and we are back with (P2). But (P2) is not a claim of reasonable disagreement because it merely asserts that an account may have some property and lack another, whereas it is the other way around for its rival.

For Resnik, considerations in this vein are a reason to be sceptical about the possibility of reasonable disagreement. (RD) and other claims invoking transcendent logical notions are in danger of making no sense. Shapiro turns the argument against Resnik by pointing out that transcendent logical notions are needed if we want to acknowledge for the intuitively plausible possibility of reasonable disagreement. Moreover, he argues, without transcendent logical notions, speaking of *the* method of RE is meaningless.[4]

To thwart the argument from immanence against (RD), one could attack the distinction between immanent and transcendent notions, dispute the need for transcendent notions, or argue in favour of transcendent logical notions. For present purposes, I shall adopt the last strategy. The basic idea is that distinguishing two contrasts between judgements and systematic elements (sect. 1) allows us to defend the possibility of reasonable disagreement while acknowledging what is convincing about Resnik's and Shapiro's arguments. To begin with, we distinguish, within the extra-

[4] In response to Shapiro's critique, Resnik explicitly withdraw an important aspect of his position and switched to an interpretation of the notion of RE according to which RE is a state of "triples consisting of LOGICIANS [i.e. practitioners of the discipline of logic in contrast to practitioners of inference], logical theories, and considered judgements of so-called facts of logic" (Resnik 2004, 192-193). Analysing this move is outside the scope of this paper.

systematic use, between antecedent and current logical notions. Current notions result from a RE-process and are immanent to the current account. But some antecedent notions are transcendent, namely the pre-systematic notions. These are not the product of some previous development of a logical system, but the notions we use "before" we start doing logic. Paradigmatically, they are informally used as part of ordinary language, without any basis in an explicit account in the form of, for example, necessary and sufficient conditions. More often, pre-systematic logical notions remain implicit when specific arguments and (sets of) sentences are treated as valid, consistent and so on. Even if expressed explicitly, antecedent commitments involving pre-systematic logical notions need not include terms such as "is logically valid" expressing some formal, "thin" logical notion. Frequently, they will employ "thick" notions such as *agrees with* or *is coherent* which have a logical aspect but are not reducible to a formal logical notion.[5] However, there is still room for explicitly explaining pre-systematic logical notions and for regulating the use of terms expressing them (as, for example, in the discussion of validity in Beall / Restall 2006, ch. 2)[6].

In contrast to current extra-systematic notions, pre-systematic logical notions are "open"; that is, they are not precisely defined and cannot be classified as, say, classical or intuitionistic because such distinctions are simply not available without recourse to more or less developed logical systems. Hence, pre-systematic logical notions are not tied to a particular logical system. Rather, they are the common starting point for developing logical systems. In the course of developing a logic, more precise extra-systematic notions are developed, which then are tied to the respective system and hence no longer transcendent. Pre-systematic notions are therefore not only transcendent because they can be used with reference to different logical accounts, but they can also be made precise in different ways in different accounts. All in all, the relation between transcendent, pre-systematic logical notions and immanent, current extra-systematic logical

---

5 Thanks to Catherine Elgin for drawing my attention to these points.

6 In the approach of Beall and Restall, current logical notions of validity are not only explications of the pre-systematic notion of validity and hence less vague, but the pre-systematic notion of validity is also a generic notion of which the current notions are more specific instances (see Beall / Restall 2006, 29). According to my explanation of "pre-systematic" this need not be the case, but it is not excluded either.

notions is a relation of explication in Carnap's sense (Carnap 1962, §§ 2-3). Similarly, the informal characterization of the method of RE can be explicated in various ways in the context of different logical systems.

Transcendent notions are the basis for giving an account of *the* method of RE. Framed in pre-systematic terms, such an account is not tied to a particular logic. Precise but immanent notions of *being in RE* (and *being consistent, following from* etc.) become available to an epistemic subject if she develops a logic, and they will be subject to the arguments of Resnik and Shapiro. Such immanent uses of logical expressions are covered by (OL), in contrast to the general account of the method of RE which is given in type-(4) uses of logical terms. Furthermore, an account of the method of RE is also a basis for defending the possibility of reasonable disagreement. The arguments about immanence can be avoided if we interpret "both accounts are in RE" in (RD) as follows: each of the two accounts falls under some specific (current extra-systematic, not pre-systematic) notion of being in RE. The method of RE settles what counts as a specific RE-notion by specifying how such notions are developed from pre-systematic logical notions. Once a RE has been reached for an account of logic, there are two ways of discussing the justification of rival logics. On the background of the commitments an epistemic subject has in the context of a particular account of logic, rival logics are unjustified, because they are not in RE in terms of these commitments. But in terms of pre-systematic notions, there can be reasonable disagreement because rival logics can be justified as the result of applying the method of RE to the same antecedent judgements. Proponents of rival logics can take this point of view as well and reasonably discuss their differences on the basis of shared pre-systematic notions.

Let us now look briefly at two objections. Firstly, when Quine introduced the relevant distinction between immanent and transcendent notions, he wanted to cast doubt on whether there are any transcendent logical notions rather than just "a loosely related family of mutually more or less analogous immanent notions" (Quine 1986, 60; cf. 87) which create the mere appearance of a transcendent notion where in fact there is only "some felt family resemblance whereof no capital need be made." (Quine 1986, 19; cf. 20, 21). It is not clear to me whether Quine's attack is directed at pre-systematic or current extra-systematic logical notions (or both). If the latter, there simply results no challenge to the view I have proposed here, which takes current extra-systematic logical notions to be immanent any-

way. Furthermore, the claim that there is at best a family resemblance between rival (current extra-systematic) logical notions is clearly compatible with the view that they are different explicata for the same pre-systematic explicandum. If the former, the worry is that the pre-systematic logical notions exhibit a family-resemblance structure. This claim is not only compatible with the view that they are explicanda which admit for various explications, it provides in fact a neat explanation for it.

Secondly, there is the worry that pre-systematic notions are more transcendent the more vague they are. However, even if such a correlation should prove unavoidable, it would not necessarily trivialize the method of RE, which can and should be made more precise. This will lead to disagreement about the exact nature of the method and pre-systematic logical notions will play the important role of providing the background against which such disagreement can be understood as reasonable and be discussed.

5. Concluding Remarks

In sum, the arguments of Resnik and Shapiro show that in terms of a particular account of logic in RE, we can argue that rival logics are unjustified. Furthermore, differences between rival accounts of logic may also lead to differences with respect to the exact conditions which determine whether an account of logic or some other field of inquiry is in RE. On the other hand, we can defend the claim that the method of RE permits reasonable disagreement about rival logics if we rely on pre-systematic logical notions. These serve as a common starting point for developing various logical systems and they provide the resources for a meaningful characterization of the method of RE.

To put things into perspective, I would like to mention three points. Firstly, the arguments discussed are specific to the application of the method of RE to logic and do not bear in the same way on its application in other contexts. In moral philosophy, for example, pluralism and reasonable disagreement do not raise the issues discussed here because the method of RE can be explained without (explicitly or implicitly) appealing to moral notions. On the other hand, any reasonably ambitious justification of a moral theory by RE will need to rely on more or less precise logical notions (for example, when evaluating whether the judgements follow from the principles) and hence draw on some particular account of logic. It may

well be that the choice of a logical system makes a difference with respect to the question of whether a given set of moral commitments counts as being in RE with some given moral theory. Secondly, the possibility of reasonable disagreement raises further issues which cannot be dealt with here. For example, should the fact that epistemic peers endorse rival logics lower the epistemic standing of one's logical system? Should an epistemic subject accept that rival logics are promoted? (Cf. Resnik 1997, 162.) What is the relation between reasonable disagreement and pluralism in the sense of Beall and Restall? And in what sense can or should we accept more than one logic? (Cf. Resnik 1996; Beall / Restall 2006) Thirdly, defending pre-systematic logical notions as transcendent does not amount to claiming that the pre-systematic background is immune to criticism. On the contrary, the method of RE calls for critically reworking pre-systematically used logic.[7]

References

Beall, J.C., and G. Restall, 2006: *Logical Pluralism*, Oxford: Clarendon Press

Brun, G., 2004: *Die richtige Formel. Philosophische Probleme der logischen Formalisierung*, 2nd ed., Frankfurt a. M.: Ontos

Brun, G., 2008: Formalization and the Objects of Logic, *Erkenntnis* 69, 1-30

Carnap, R., 1962: *Logical Foundations of Probability*, 2nd ed., Chicago: University of Chicago Press

Carnap, R., 2002: *The Logical Syntax of Language,* Chicago: Open Court

Daniels, N., 1996: On Some Methods of Ethics and Linguistics, in: *Justice and Justification. Reflective Equilibrium in Theory and Practice,* Cambridge: Cambridge University Press, 66-80

Elgin, C.Z., 1996: *Considered Judgment,* Princeton: Princeton University Press

Goodman, N., 1983: *Fact, Fiction, and Forecast*, 4th ed., Cambridge, Mass.: Harvard University Press

Goldman, A.I., 2010: Epistemic Relativism and Reasonable Disagreement, in: *Disagreement,* ed. R. Feldman and T.A. Warfield, Oxford: Oxford University Press, 187-215

Haack, S., 1982: Dummett's Justification of Deduction, *Mind* 91, 216-239

[7] I am grateful to Christoph Baumberger, Dale Jacquette and Timm Lampert for helpful comments.

Haack, S., 1996: *Deviant Logic, Fuzzy Logic. Beyond the Formalism,* Chicago: University of Chicago Press

Harper, W.L., 1981: A Sketch of Some Recent Developments in the Theory of Conditionals, in: *Ifs. Conditionals, Belief, Decision, Chance, and Time,* ed. W.L. Harper, R. Stalnaker, and G. Pearce, Dordrecht: Kluwer, 3-38

Prawitz, D., 1977: Meaning and Proofs. On the Conflict Between Classical and Intuitionistic Logic, *Theoria* 43, 2-40

Quine, W.V.O., 1986: *Philosophy of Logic*, 2nd ed., Cambridge, Mass.: Harvard University Press

Resnik, M.D., 1985: Logic: Normative or Descriptive? The Ethics of Belief or a Branch of Psychology? *Philosophy of Science* 52, 221-238

Resnik, M.D., 1996: Ought There to be but One Logic? In: *Logic and Reality. Essays on the Legacy of Arthur Prior,* ed. B.J. Copeland, Oxford: Clarendon Press, 489-517

Resnik, M.D., 1997: *Mathematics as a Science of Patterns,* Oxford: Clarendon Press

Resnik, M.D., 2004: Revising Logic, in: *The Law of Non-Contradiction. New Philosophical Essays,* ed. G. Priest, J.C. Beall and B. Armour-Garb, Oxford: Clarendon Press, 178-194

Shapiro, S., 2000: The Status of Logic, in: *New Essays on the A Priori,* ed. P. Boghossian and Ch. Peacocke, Oxford: Clarendon Press, 333-366