

## TOWARDS A FEMINIST LOGIC: VAL PLUMWOOD'S LEGACY AND BEYOND

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Val Plumwood's 1993 paper, "The politics of reason: towards a feminist logic" (henceforth [POR](#)) attempted to set the stage for what she hoped would begin serious feminist exploration into formal logic – not merely its historical abuses, but, more importantly, its potential uses. This work offers us: (1) a case for there *being* feminist logic; and (2) a sketch of what it should resemble. The former goal of Plumwood's paper encourages feminist theorists to reject anti-logic feminist views. The paper's latter aim is even more challenging. Plumwood's critique of classical negation (and classical logic) as a *logic of domination* asks us to recognize that particular logical systems are weapons of oppression. Against anti-logic feminist theorists, Plumwood argues that there are other logics besides classical logic, such as relevant logics, which are suited for feminist theorizing. Some logics may oppress while others may liberate. We provide details about the sources and context for her rejection of classical logic and motivation for promoting relevant logics as feminist.

We begin with a discussion of various senses of "feminist logic" in order to position Plumwood's understanding of it with precision. Next, we examine Plumwood's motivation for promoting non-classical logic and connecting it with political ideology, contextualizing her ideas within the work of the Canberra Logic Group working in Australia. Unpacking what Plumwood means when she claims that classical logic is a *logic of domination* and her critique of classical negation requires examination of an overlooked, earlier publication, "Negation and contradiction" ([NAC](#)), co-authored with Richard Routley. This paper provides a much fuller account of classical negation and the liberation offered by relevant logics. We attempt to clarify their views through a perspective of "relevant

default” and also present a discussion of the “liberation of falsity” (falsity-preservation outside of classical logic). Returning to [POR](#), we enhance Plumwood’s desiderata for future feminist logic/s with discussion of the “debate model” of negation from her earlier work with Sylvan. Projects by contemporary logicians, such as Caterina Dutilh Novaes, and advocates of radical feminist methodology, such as Alice Craray, have developed independently from Plumwood’s vision. It may be the case that decentralized and independent pursuits of feminist logics are perfectly in keeping with any version of it.

### *What We Talk About When We Talk About Feminist Logic*

Understanding what could be categorized as feminist logic is an important step in framing Plumwood’s understanding of it. Logic is commonly and historically conceived of as purely formal and empty of particular content. It is a tool – an *organon*, going back to Aristotle’s account – through which basic operators are used to arrange syntactically abstract content represented symbolically. As an area of inquiry, logic examines validity, truth preservation or “what follows from what”, depending on various definitions, none of which introduce particular content or modes of reasoning pertaining to worldly circumstances. The idea that logic itself or any type of logic could be feminist, socialist, politically conservative or fall within the domain of any social interest might seem puzzling if not counter-intuitive on account of its formality. Logic, in this sense, is conceived of as neutral with respect to any content and political interests. People produce arguments in natural languages, test them for formal validity and soundness or fail to do so, and deploy their arguments in non-neutral, worldly contexts for political purposes. In this respect, logic can be viewed as a tool that can provide critical ammunition for evaluating pernicious anti-feminist political claims and debunking oppressive viewpoints. When logic is understood as neutral, it appears that, to the extent that logic is normative to some degree, it can be among the tools to dismantle an oppressor’s position.

Moving to the level of disciplinary practice, the field of philosophy and subfield of logic can be critiqued with respect to historical-political matters. As a field of professional inquiry, logic has been no different than other academic fields in term of having a history of restricting and denying access to women and other minority groups. Diversifying philosophy and logic as practices has been made a priority for international professional

philosophical associations.<sup>1</sup> In an uncontroversial sense with respect to maintaining the *neutrality of logic*, there are important *feminist approaches* to logic that have emerged.

Historical recovery projects that trace and reconstruct women logicians' accomplishments in the field would be an example of this approach. This type of scholarship critically examines gatekeeping in the field so that the absence of women logicians is not taken for granted. Historical approaches to the accomplishments of women logicians in the history of early analytic philosophy question the evaluation and appreciation they received during their careers, and provide insights into their accomplishments in retrospect, taking onto account the biases these logicians faced.<sup>2</sup> These types of recovery projects are in accord with Feminist History of Philosophy, a field investigating multiple historical eras and source material to correct the historical record and reconstruct excluded voices.

Intervention projects at the undergraduate level regarding improving students' access to and empowerment with in the academic study of logic are compatible with a neutral approach to logic. Programs such as *Philosophy in an Inclusive Key: Logic* and *MCMP Summer School on Mathematical Philosophy for Female Students* provide training and mentoring to women and underrepresented minorities in the field. These types of programs familiarize undergraduate students with scholarly positions in the field, providing them with the skills they need to understand the current state of the field. In so far as feminists (and philosophers in general) might agree about the benefits of opening up the historical canon and increasing the number and presence of professional women and minorities in the field of logic, at the same time, they also may all have differing views about the nature of logic. Supporting and participating in these types of historical research projects and diversity initiatives do not require anyone to have any further commitments about logic than logic neutrality. Feminist approaches to logic aimed at historical diversification, recovery and recognition as well as initiatives for increasing diversity and support and mentoring in the profession are not grounded in any particular view about the nature of logic.

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<sup>1</sup> The American Philosophical Association maintains extensive diversity resources, initiatives, and grants found on its website. Likewise, the Australasian Philosophical Association has committees, The Status of Women in the Profession and Diversity in the Profession. The Society for Phenomenological and Existential Philosophy has established committees: The Status of Women, LGBTQI Advocacy and Racial and Ethnic Diversity.

<sup>2</sup> Frederique Jannsen-Laurent, for example, has been presenting research on early analytic female logicians, including Emily Elizabeth Constance Jones, with a goal of establishing their under-appreciated contributions.

A different understanding of feminist logic is at play in Plumwood's position. She devotes much of [POR](#) to critical examination of feminist positions on logic, evaluating the *non-neutral* positions on logic she finds among feminist theorists. As mentioned, a non-neutral position is one that views logic as a *political tool*. Its formal character, in virtue of abstracting from particular, socially grounded content, is an objectionable political act. Logic is not above the fray of politics simply on account of being formal. Formalization, in this perspective, is intellectually akin to the violence of strip-mining the earth, colonizing indigenous cultures and other acts of oppression. Feminist theorists that are wary of or outright reject formal reasoning have to make choices about how *theorizing* must proceed. Logic, so understood, must be mistrusted and ultimately rejected. Audre Lorde famously expresses political suspicion regarding activist reliance on mechanisms for social change within an already oppressive political system: "For the master's tools will never dismantle the master's house. They may allow us to temporarily beat him at his own game, but they will never enable us to bring about genuine change" ([Lorde 2015](#)). Nye alludes to Lorde's expression, appropriating a version of it for her position on feminist logic, stating, "the feminist logician speaks from a script in which the master always wins."<sup>1</sup> The formal (logical) features of arguments opposing oppressive systems might serve to take them down, but these tools must be resigned to the dustbin of history in due course. For Nye, there is and can be no such thing as feminist logic, properly speaking. Radical theoretical methodologies that arise afterwards must not use the formal tools of logic – understood as *non-neutral* by theorists such as Nye.

Plumwood argues that anti-logic feminists reproduce the very binaries they seek to overthrow in their understanding of logic. In rejecting logic, and eliding it with formal reasoning, they reinforce a dichotomy of reason versus emotion, form versus content, giving up reason much too readily. Plumwood's main target is Andrea Nye, whose work accounts for the strongest scholarship and argument for rejecting logic as a tool of the patriarchy. [Nye 2019](#) provides a full account regarding how feminists should approach logic. In some ways, Nye is just as radical as Plumwood in arguing for and developing *an alternative methodology* to formal logic. Their disagreement has to do with an understanding of what logic is. Plumwood sees the history of logic and its development as *having been restricted from full expressive power*. Rules accepted as "laws" that predate

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<sup>1</sup> Plumwood points out this statement by Nye in [POR](#), p. 438, but without mentioning that the source is from Audre Lorde.

the development of classical logic, such as the Law of Non-Contradiction, Law of the Excluded Middle, Principle of Bivalence, and *Ex Falso Quidlibet*, restricted what logics were deemed acceptable and the character of logical space. Plumwood's understanding of the history of logic is nuanced, given her own contributions to that history as it unfolded over the course of her career. Importantly, her understanding of the history of logic is shaped by efforts to overcome the pervasive (and dominating) acceptance of classical logic as "the one true logic", established by Frege and Russell. For Plumwood, the history of logic involves confrontation with a classical status quo, overcoming resistance and advocating for revolution in logic. In contrast, Nye, an outsider to the history she critiques, sees a general problem behind formalization and its attractions in the first place. For Nye, alternative uses of language are necessary for theorists so that they avoid the oppressive paths that are set out through *formal* reasoning. Formal reasoning, is, itself, oppressive. As Plumwood's feminist position requires the rejection of what she terms "dualisms", such as that between reason and emotion, it might misleadingly appear that, *qua* feminists, Nye and Plumwood share an anti-logic philosophical commitment, however this is not the case.<sup>1</sup>

As a logician, Plumwood's involvement in the development of relevant logics informs her non-neutral view of logic. She understands that there are important challengers to classical logic and that it would be a mistake to elide the total practice of logic and classical logic as if they refer to the same thing. For Plumwood, some logics, such as classical logic, are tools of the patriarchy and oppressors, but this does not mean that logic itself has nothing to offer feminist theorists. Her non-neutral view of logic is selective among logics.

For feminists unfamiliar with logic at Plumwood's level and the insider view of the battles fought between logicians, this selectivity among logics may not make a great deal of sense, if any. For outsiders, the formal characteristic of logic itself renders it a tool of the patriarchy. How can any kind of logic be an exception? The burden is on Plumwood to show that there are specific formal features *not shared by every logic* that

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<sup>1</sup> Schnee n.d. correctly sees that Plumwood and Nye share a commitment to the notion that logic is not neutral. However, Schnee elides the two thinkers on account of Plumwood's view of dualisms and the appearance that she must reject the logic (as masculine, reasoning and dominant) as does Nye. This is incorrect, as Plumwood does not equate logic with classical logic, giving up logic and reasoning as a whole. Plumwood's work on non-classical negation and relevance logics informs her disagreement with Nye on a technical level and requires separating the two thinkers.

do the real damage that feminists oppose. Ideally, there should also be formal features only some logics possess that enhance the methodologies of feminist theorizing. In [POR](#) Plumwood provides a sketch of a feature of classical logic, classical negation, that she claims reproduces the kind of damage feminist theorists oppose. She does not provide much information about what some non-classical logics can offer methodologically to feminist theorizing. We will show such a feature at the end of this paper.

### *The Politics of Reason in Context*

Plumwood has not been widely recognized as a logician outside of the community of logicians. Her work as a pioneering ecofeminist overshadows this dimension of her research. A majority of her publications in logic (besides [POR](#) and the later companion “Feminism and the logic of alterity” – [Plumwood 2002](#)) were co-authored with her partner Richard Sylvan (called “Routley” at the time). The “Richard and Val” duo published at least 10 logic pieces in a variety of journals and books ranging from *Noûs* (twice) to less visible journals including *Revista Columbiana de Mathematicas*. She was among the co-authors for volumes 1 and 2 of *Relevant Logics and Their Rivals*. She also co-authored three chapters in Sylvan’s *Exploring Meinong’s Jungle and Beyond* (1980), which had not been credited to her until its recent republication.<sup>1</sup> Plumwood’s legacy in logic, while visible to specialists in logic, was not very significant for the feminist and environmentalist audiences for whom she published accessible works.<sup>2</sup> The reception of non-classical logics in the dominant Anglo-American philosophical scene was fraught in ways that have been well rehearsed at this point. Susan Haack’s 1974 *Deviant Logic* began chipping away at large scale resistance, yet [POR](#) arrived too soon to inspire an immediate uptake of Plumwood’s vision of a feminist logic project.

A major portion of [POR](#) is devoted to clearing the air with respect to why there can be such a thing as feminist logic. Feminist thinkers, such as Andrea Nye, have bundled logic and reason together, such that their critique of patriarchal reasoning entails that logic needs also to be rejected. This view incorrectly identifies logic overall with classical logic, overlooking decades of research beyond classical confines. As a participant in such research herself, Plumwood draws attention to this error. There is no reason for feminists

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<sup>1</sup> See [Routley and Routley 2019](#) and this volume.

<sup>2</sup> See the Appendix to this paper for a list of Plumwood’s publications in logic.

to reject logic once we understand that logic is more than classical logic. In Plumwood's view, it is classical logic that is the culprit. Classical logic is tied to a larger hegemonic way of reasoning, which Plumwood terms "Rationalism" (not to be confused with the descriptive designation of Rationalism we typically attribute to Descartes, Leibniz and Plato). Plumwood sees Rationalism throughout the history of Western Philosophy. In this rationalist tradition, which assumes and operationalizes "dualisms", sexism, colonialism and racism are expressed and perpetuated through it. Plumwood's understanding of "dualism" is very specific. When she speaks of the dualisms of "public/private, male/female, master/slave, self/other, reason/emotion, active/passive, true/false", for example, these are not merely dichotomies which she conceives as neutral separations or divisions (POR, p. 443). Dualisms do the conceptual heavy lifting in ways of reasoning that privilege man over woman, human over nature, active over passive, and so on. She states:

Dualism then imposes a conceptual framework which polarizes into two orders of being what can [otherwise] be conceptualized and treated in more unified ways. These features of dualism provide a basis for various kinds of centeredness, the rendering of the world in terms of the interests of the upperside, the center. (POR, p. 453)

Dualisms could be said to be ideological (in the Marxian sense) as they render the actual dependencies between the polarized halves opaque, while presenting and articulating the subordination of one half to the other (POR, p. 442). For example, with the human/nature dualism we find the expression of the centrality of human concerns over the natural world. While human life is actually thoroughly dependent upon the natural world, the dependency of humans on the natural world is erased whenever reasoning is constructed utilizing this dualism. Plumwood's celebrated and re-printed article "Human vulnerability and the experience of being prey" (Plumwood 1995) describes her experience of becoming prey for a crocodile on a canoe trip into the bush. The shock of becoming prey shreds any sense of being discontinuous with nature or anything resembling "mastery" over it. The crocodile attack is a shock that reveals and unseats anthropocentrism. Deep-seated biases may require shocks that reveal their systematic and individual entrenchment. There are alternatives to dualistic forms of reasoning. For Plumwood, *dichotomies* are non-hierarchical and non-othering separations, and she provides five non-hierarchical concepts of difference (to be discussed later in this paper)

to replace dualistic reasoning. The task of feminist logic is to root out dualisms and develop logical systems that do not rely on them.

While Plumwood makes the case for feminist logic, at the same time, and in agreement with anti-logic feminists such as Nye, she raises an unsettling question regarding the supposed purity of logic. Early in the Western tradition, Aristotle's classification of logic in his system as an *Organon* (tool) presented logic as apart from areas of inquiry. It is the tool kit we use to construct arguments and treatises in language; the rulebook that optimally allows us to referee claims. The notion that logic does not have a completely neutral status; that the rules/tools themselves effect how claims are assessed is a challenging one. How do we work with classical logic if classical negation perpetuates dualistic reasoning, as Plumwood argues? Even worse, we would need to be taking positions about logic actively once we accept that it is no longer a neutral philosophical tool. The formal logics we accept and use matter politically and are a choice not only for feminists, but also for anyone committed to philosophies of liberation.

Plumwood's critique of feminist views of formal logic in [POR](#) corrects the identification of formal logic with classical logic. This move is of a piece with a much larger revolution in logic – a revolt against classical logic. She is not the sole Australian logician taking aim at classical logic. Her work with Routley/Sylvan on relevant logics places her in the center of this revolution. The philosophers and logicians of the Canberra Logic Group, at their height during the 1970s, are described as “for the most part unbending in their dismissal in all things classical” ([Goddard 1992](#), p. 182). Their dismissal of classical logic is often couched in assessments that are politically charged. From the conclusion of *On Paraconsistency*:

There are, we have argued, no insuperable philosophical problems in supposing that there are true contradictions and, moreover, there are substantial benefits attached to doing so. What mainly prevents the acceptance of this view is the ideology of consistency: the deep-seated and irrational view that the world is consistent. ([Priest and Routley 1984](#), p. 221)

Plumwood's view of feminist logic brewed in the same distillery (pun intended) as Australian paraconsistency. She advocates non-classical logics in the manner of other members of the Canberra Logic Group, integrating her scholarship with her political com-



mitments. Graham Priest, for example, an advocate of dialetheism, similarly found dialetheism a fruitful position for aligning Western Philosophy with Asian philosophical traditions and reevaluating Marxist thought. Val Plumwood and Richard Sylvan were philosophers interested in “walking the walk” (cf. [Hyde 2014](#)). Each had extensive publications besides their collaborative work in logic and collaborations in ecological philosophy. The edginess of her call for a feminist logic coupled with her rejection of classical logic can be recognized as of a piece with the overall political intensity of the Canberra Logic Group. In a sense, with the publication of [POR](#), Plumwood adds a feminist dimension to the legacy of Australian logic, which has been dominated by men. It would be an extremely interesting development in the reception of non-classical logics if we were to have an additional *political motivation* to embrace it, as Plumwood believes that we have.

### *What’s So Bad about Classical Negation?*

Plumwood designates classical logic as the “logic of domination” in [POR](#) based on her interpretation of classical negation, so it would seem her notion of feminist logic succeeds or fails with her critique. This type of negation expresses the basic structure of dualisms that inform philosophy (the Rationalist Tradition, in her specialized way of understanding this history). Likewise, her view that our choices of logics are political choices (not choices among neutral tools) may be less convincing if she cannot specify instances in which a feature of a given logic expresses or structures domination and subordination.<sup>1</sup> Feminist logic can, of course, proceed with an understanding that logics can be employed in reasoning that subjugates people and nature, yet in Plumwood’s vision of feminist logic the stakes are greater. Logical systems themselves encode domination, so it is not just careful applications that are required, but the rejection of systems themselves as they are unsalvageable. Plumwood states:

Classical logic provides an account of otherness which has key features of dualistic otherness. The negation of classical logic is a specific

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<sup>1</sup>The assumption that features of logic could express or structure domination and subordination presupposes that logic is normative (guides reasoning, distinguishes good from bad reasoning, provides rules for proper argumentation, etc.). Although logic is commonly held to be normative in some sense, this assumption has challengers and understanding how logic is normative is a complicated subject – see [MacFarlane 2004](#). Catarina Dutilh Novaes’ project on a dialogical account of the normativity of logic would be a direction for feminist logic (discussed later in this paper).

concept of negation which forces us to consider otherness in terms of a single universe consisting of everything. In classical logic, negation ( $\neg p$ ), is interpreted as the universe without  $p$ , everything in the universe other than what  $p$  covers ... (POR, p. 454)

Plumwood mentions that this account of negation leads us into the relevance paradoxes, indicating where we might seek better logics. ‘ $p$ ’ in the classically negated ‘ $\neg p$ ’ plays the centering role, the role that obscures any inter-relationship between itself and what is negated. Thus, for example, we get the dualisms of male and female, not-male. While in Plumwood’s view a male/female *dichotomy* can be cast in a non-hierarchical, non-centered way, Plumwood would point out that this has not been how things have operated in philosophy and the world at large.<sup>1</sup>

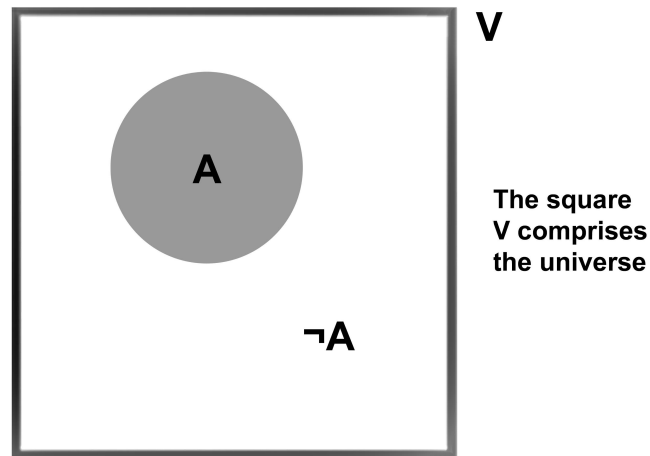
Plumwood’s view of classical negation sketched in POR can be found much earlier in the co-authored paper with Richard Routley, “Negation and contradiction” (NAC), an extensive work on the topic of negation in the history of logic. The paper presents three basic models of negation in terms of different relations of  $A$  to  $\neg A$ : the cancellation model, the classical (explosive) model and the debate model (a final extension of relevant negation). Here we find a fuller discussion of classical negation and an even more ambitious critique of it. Presumptions regarding classical negation are questioned, especially with respect to the notion that it reflects natural negation. They write:

Quine and many others (e.g. D. Lewis, Copeland) think that classical negation is “our ordinary” negation and that there is no alternative to it, for any alternative would “change the subject” from negation. Of course they never *argue* that it is our ordinary negation; they simply *assume* that it is. (NAC, p. 207)

We can also find Plumwood’s understanding of the centering and *othering* features of classical negation diagrammed and described.

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<sup>1</sup> Considering current intersectional critiques of gender and sex binaries, it seems we are moving increasingly (though not quickly enough) towards rejecting Plumwood’s dualisms, as she theorized them, altogether.



*Figure 1: Original Diagram of Classical Negation*

Their explanation of the classical model includes reference to Simone de Beauvoir:

The universe can be interpreted as the sum of propositions. Thus where atomic wff  $p$  is interpreted, naturally enough, as the proposition it expresses,  $\neg p$  amounts to every proposition in the universe other than the proposition that  $p$ .

Relevance problems come straight out of this; for irrelevance is written in at the bottom. All contradictions have the same interpretation, namely  $V$ : hence each entails all others and indeed everything. Paradoxes are inevitable.

It is corollary that  $\neg p$  cannot be independently identified, it is entirely dependent on  $p$ . This relates, more than coincidentally, to alienation (compare what Simone de Beauvoir has to say to alienation of women where “woman” is identified as “other than man”; and is not positively identified, only introduced as alien to the primary notion, “man”).

The negation  $\neg A$  of  $A$  is (so to say) alien to  $A$ . (NAC, p. 217)

Passages such as these provide us with more details about how early Plumwood (with Sylvan) had drawn a connection between feminism and a critical concern with classical negation. In 1993, POR draws upon this source. Thus, with classical negation playing

such a pivotal role tying together Plumwood's feminist theory and her understanding of feminist logic, we need to understand if classical negation behaves as claimed.

### *Responses to Critics*

Our discussion of critical responses to [POR](#) is complicated by Plumwood's absence. It is hard to know exactly how she might have shaped her ideas in dialogue with her critics. Where she, herself, might have dug in her heels, where she might have adjusted her account is unknowable. The length of time it took for any scholarly uptake at all makes us somewhat uncomfortable. Her view has a freshness about it that is compatible with the urgency with which contemporary philosophy now addresses issues of social justice. To the extent that there has been critical engagement with her view, it is her account of classical negation that is the focus – rightly so, as so much appears to hinge upon it. [MacPherson 1999](#), pp. 190–3, does not find that relevant logics avoid the problems Plumwood associates with classical negation, among other issues he takes up with her account of classical negation. [Garavaso 2015](#) finds that Frege's account of negation does not operate as Plumwood claims. Our responses to these critics draw heavily upon her work with Sylvan in [NAC](#). Since it is the most detailed source for Plumwood's view in [POR](#), we attempt generate our responses from it.

[MacPherson 1999](#) finds that Plumwood misrepresents classical negation: “with respect to any proposition  $p$ , classical negation divides the universe of propositions into  $p$ ,  $\neg p$ , and anything not equivalent to either. There are multitudes of propositions that are not logically equivalent to it and also are not false iff  $p$  is true” (p. 191). MacPherson, in this instance, is *pointing out the problem that relevance logics are intended to address*, namely that of irrelevance. To the extent that  $\neg p$  fails to be sorted in any way suggests what inspired Plumwood and Routley/Sylvan (and others) to begin with. Plumwood might point out that  $\neg p$  is what she notes as the “backgrounding” and “homogenization” against which the centering of  $p$  occurs. “Homogenization involves binarism, interpreting the other as “the rest,” she states. “These homogenizing properties of classical negation are associated with the failure of classical logic to make any finer discriminations in propositional identity other than truth-functionality” ([POR](#), p. 31). MacPherson re-describes the classical situation of backgrounding and homogenization *instead* of finding a critical issue. Likewise, his objection based on the reversibility of classical negation

doesn't avoid the issue of irrelevance. The structure of classical negation is what's at issue. MacPherson has not challenged the *structural* problem upon which Plumwood rests her case.

Granting Plumwood her view on classical negation, MacPherson claims that relevance logics are “guilty” of the same dualism involved in classical negation. “Nonetheless”, he states, “it remains the case that propositions can only take on one of two values relative to a set-up, viz. true or false” (MacPherson 1999, p. 193). Hence, relevance logics must also “encourage oppression”. He notes the way in which relevance logics may tolerate inconsistencies with respect to any given set-up  $w$ , but not tolerate them with respect to the entire logical space of set-ups. If  $p$  is true somewhere,  $\neg p$  must be false somewhere else (*ibid.*). MacPherson overlooks the way in which logical space itself has been reorganized in relevance logics such that  $\neg p$  can be true somewhere within the universe without being homogenized and becoming the background to  $p$ . Our Figure 2 illustrates the four quadrants available, no one quadrant is centered and dominant relative to other quadrants. Bear in mind that Plumwood does not altogether reject dichotomies or differences; she takes issue with a particular way *differences are managed*. Thus we find a full account of the contrast between classical and relevant negation in NAC. There we find one of the clearest and most creative discussions of relevant and classical negation via the “record cabinet model”. We provide their description at length because of the unique creativity of the passages:

The debate model leads directly to the *record cabinet model*. The cabinet, which can represent the files of the universe, is full of records, each record is an *issue*, or question, with  $p$  on one side and  $\neg p$  on the other side, for every atomic  $p$  (at least). From this point of view classical negation takes  $p$  as one side of one record, and  $\neg p$  as everything else in the cabinet (classical theory fails to duly separate issues). Relevant negation takes  $p$  as one side of the record and  $\neg p$  as the other side of the *same* record, there being many, many records in the cabinet. Note well that intensional functions select a program from the cabinet. Such a program may include *both* sides of a record, and may include neither side of various records – in contrast to the published classical picture (the classical picture can be suped-up to avoid the latter defect but not the former).

The cabinet model may be differently oriented. Each record, or tape, represents, e.g. it may just *describe*, a world, a two-sided world. Then where  $a$  is one side of a world record, or a world, the opposite side is again  $a^*$ , where  $*$  is the *reversal*, or *flip*, function which gives, whichever side one is in on, the other side. Obviously  $a^{**} = a$ , since turning the record over twice takes one back to the initial position. The semantical rule for evaluating negated statements is, as for the debate model, the star rule,  $\neg p$  holds at  $a$  iff  $p$  does not hold at  $a^*$ . By contrast, the classical rule quite erroneously identifies a side with its opposite. (NAC, p. 219)

For Plumwood, relevance logics avoid the error MacPherson attributes to them with respect to negation. They are very different models of the extent and function of negation. Plumwood promotes relevant negation because it provides for the *relational identities* for whatever is and is not negated while it avoids *backgrounding*, *excluding*, *homogenizing* and *instrumentalising* what is negated. These five desiderata from the next to last section of POR, “Non-Hierarchical Concepts of Difference” (pp. 455–58), draw extensively from the record cabinet model used to contrast classical and relevant negation.

Garavaso’s criticism of Plumwood’s view of classical negation is fairly recent and she suspects a deeper investigation into negation is needed. She writes:

Plumwood seems to be suggesting that when we call one area non- $p$  as opposed to  $p$ , then we make the former dependent on the latter in the sense that the former is specified only in relation to the latter. But this view of dependency, even if granted, would concern only the expression, i.e., the signifier, and would not automatically apply to what is symbolized by “ $p$ ”, or the signified. To understand non- $p$  requires a prior understanding of  $p$ , but that relation of dependence does not translate into the areas signified by  $p$  and non- $p$  . . . (Garavaso 2015, p. 191)

Garavaso illustrates the way conversion, obversion and contraposition, remove the sense of co-dependency between  $p$  and  $\neg p$ . She has students in a class raise their hands to answer for a  $p$  and for a  $\neg p$  statement. They discover that “the class of students who are parents” is not any more or less important or dominant than “the class of students who are

not parents” (*ibid.*). It doesn’t seem to us that Garavaso has fully considered the way in which classical negation draws the distinction between these two classes of student in her example. In the classroom, students raise their hands representing one side or the other and neither group feels more or less important or dominant. However, this isn’t classical negation that is being described in this situation. Instead, Garavaso’s students have demonstrated that our ordinary, contextual sense of negation is non-classical. Plumwood would respond that the assumption that classical logic is natural negation might be what’s confusing the issue. In [NAC](#), natural negation is discussed (and relevant logics promoted<sup>1</sup>):

It is also important to inquire what natural negation, negation of natural language, is like, because part at least of the logical enterprise concerning negation is to reflect key features of that negation. Again it has been assumed, with precious little evidence, that classical negation fulfills this role. Many considerations tell against this assumption (see [*Relevant Logics and Their Rivals, Vol. II*]). It is important to see through classical negation’s pretensions to be the ordinary normal intuitive notion of natural language and logical thought -compared with which alternative negations such as relevant negation must be seen as “deviant”, “peculiar”, “queer”, abnormal, contrived, or purely formalistic. For seeing through its pretensions is an essential part of seeing through classical (implication) theory and seeing why relevant (implication) theory should replace it. (*op. cit.*, p. 213)

Plumwood also might respond that Garavaso has neglected the way in which dualisms are dependence relations in which the *dependence is suppressed*. That latter suppression or obscuring of the dependence relationship is what makes dualism pernicious. An open or obvious dependence between the complements of a *dichotomy* is not dualistic on Plumwood’s account.

Ultimately, these two critical objections to Plumwood’s view of classical negation do not bring her project to an end, nor do our two responses necessarily vindicate it.

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<sup>1</sup> Although promoting relevant logics, Plumwood makes no claim that relevant logics are the “one true logics”, and the variety of relevance logics she refers to and has explored in her other works in logic (work in deontic logic, for example) shows no commitment to logical monism. There very well may be more than one road to achieve the same thing – and Plumwood would likely be glad for that.

Garavaso states, “Of course, this may be just one unconvincing critique and there may be a lot more punch in a feminist analysis of the limits of negation in classical logic” (*op. cit.*, p. 191). In a similar manner, MacPherson suggests that Plumwood’s project might be better served through a multi-valued system like LP (*op. cit.*, p. 193). Even critics unconvinced by Plumwood’s account of classical negation and without interest in rejecting classical logic, appear to find there’s something to her vision.

### *Classical Negation and the Liberation of Falsity*

In this section of our paper, we present a different way to understand problematic features of classical negation. Plumwood eloquently anticipated the need to go beyond classical negation and she saw the classical program as repressive in ways that went underappreciated by audiences that stood to benefit from a more precise and current understanding of advances in logic. We think her insights can be further developed. Although Plumwood was not part of the development of the American Plan, thus supporting what we here call “the liberation of falsity”, we see these as allied viewpoints in the struggle. While it is not hard to understand how classical negation is exclusive and exhaustive (if  $\neg A$  is true,  $A$  is not true and there are no other truth-values available in classical logic, so what is not true must be false) there is nothing about these two exclusive and exhaustive designations that inform us in some obvious way about how  $A$  takes the centering role Plumwood claims it has.

The above diagram (Figure 1) of classical logical space may not be helpful enough in clarifying Plumwood and Sylvan’s view of centering, and we find that there may be better ways to approach and explicate this controversial aspect of classical negation. Being conceptually comfortable with the original diagram requires something like a “relevant default” instead of classical default. We switch here from the Australian Plan, that interprets contradictions as saying that a proposition and its negation might both be true only, to the American plan, which, instead, claims that Bivalence fails, and there are four possible semantic values. We should start assuming the richest logical and maximal expressive power. We start out with a relevant logic, such as First Degree Entailment, as the starting point or default (Figure 2 below), overlaying classical logic ends up restricting logical space and expressive power (Figure 2). Falsity becomes subordinated (and homogenized) from a broader relevant perspective (Figure 3 below). While truth



and falsity are classically exhaustive, two of the default quadrants,  $\{\}$  and  $\{1,0\}$  are now absorbed into it.

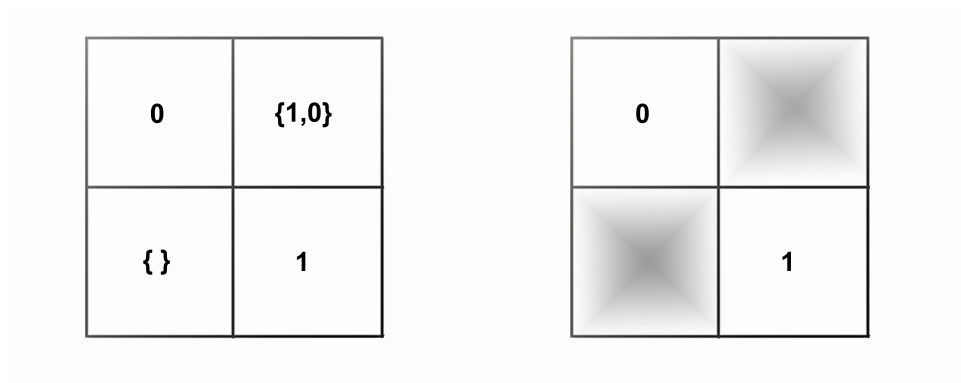


Figure 2

Figure 3

The backgrounding of  $\neg A$  to  $A$  that was presented in the original [NAC](#) diagram (Figure 1) is here represented in the two grayed out quadrants, where values  $\{\}$  and  $\{1,0\}$  had been.

This situation with respect to the dominance of truth can also be explained via classical truth preservation.

1. Classical truth preservation moves forwards.

An argument is valid just in case: If the premises are true, then the conclusion must be true. This criterion is sometimes referred to as “truth preservation”. To be more exact, truth preservation has a direction – it is forward looking. The preserving goes from premises to conclusion.

2. Classical falsity preservation moves backwards.

Consider a point that has been overlooked in the account above, (1). In the classical account there is *another preservation* – backward falsity preservation. With a valid argument: if the conclusion is false then at least one of the premises must be false. This second point is uncontroversial (no classical logician will deny it). But then, why is it never mentioned in logic textbooks? The answer is that within (but only within) a classical framework, backwards falsity preservation gives us no new information – the distinction collapses. And, thus, precious logical space, that is disclosed when falsity is given parity, is denied to us.

The distinction between truth and falsity preservation need not collapse. If it does not, we get a wider logical space with greater expressive power. The classical assumption that falsity can mean nothing more than ‘not true’ conceals conceptual possibilities.

3. A more expressive falsity exists.

There are two ways of looking at giving falsity parity with truth:

a) Non-truth need not be exhausted by falsity. There could be other ways of being non-true, such as ‘neither true nor false’

b) Truth and falsity need not be both exhaustive and exclusive.

4. A system with *liberated falsity* (illustration)

The most obvious incorporation of a more autonomous falsity is with the ‘gap’ system called K3. Here is the table for this very simple three-valued logic (K3 or *strong Kleene*) where *i* stands for ‘indeterminate’ (or, perhaps, ‘intermediate’).<sup>1</sup>

	$\neg$	$\rightarrow$	$t \quad i \quad f$	$\wedge$	$t \quad i \quad f$	$\vee$	$t \quad i \quad f$
$t$	$f$	$t$	$t \quad i \quad f$	$t$	$t \quad i \quad f$	$t$	$t \quad t \quad t$
$i$	$i$	$i$	$t \quad i \quad i$	$i$	$i \quad i \quad f$	$i$	$t \quad i \quad i$
$f$	$t$	$f$	$t \quad t \quad t$	$f$	$f \quad f \quad f$	$f$	$t \quad i \quad f$

We can think of ‘*i*’ as ‘indeterminate’ or one reading is ‘neither true nor false’. Note that wherever we have just classical input we get the classical output.<sup>2,3</sup>

This system allows for two ways an argument can be invalid:

- By going from true to false.

<sup>1</sup> We keep truth-functionality. Also classical input yields classical output. But we add a new truth-value and expand on our tables – and get a more subtle notion of logical consequence.

<sup>2</sup> This continues for other many-valued systems. If you take some many-valued logic as basic, classical can be seen as *its specification*.

<sup>3</sup> There are different variants of K3. For example, Łukasiewicz’s original system was changed by Kleene in that, in the former,  $p \rightarrow q$  gets the value *t* when both *p* and *q* get the value *i*. For Kleene the conditional gets the value *i*. Thus for Kleene the system has stability – not so for Łukasiewicz. Stability: If a complex statement has a determinate truth-value, then the change of one of its component statements from *i* to a determinate value cannot change the truth-value of the complex statement.

- By going from true to  $i$ , which is non-true (but not false).

This clearly generates an increase in expressive power and leads to mature, many valued logics. In a sense, classical logic builds in a bias towards truth by not allowing the two preservations – truth and falsity preservations – to be distinguished. [Belnap 2019](#) argues that we need at least four semantic values True, False, Neither, and Both (true and false).<sup>1</sup> [Shramko, Dunn and Takenka 2001](#) generalize Belnap’s results further by taking the power set of his four values – yielding a 16-valued system. Belnap’s system works for a single computer – but it does not cover values that naturally emerge when various computers are interacting – that is, for a computer network. The truth order in a Belnap system is a truth-and-falsity order. In contrast, the truth and falsity orderings in the 16-valued system are independent of one another.<sup>2</sup>

While we’ve presented what we think are enhanced ways to understand Plumwood’s position on classical negation, we admit that these formal observations nevertheless seem to remain distant from real world contexts. For Plumwood, classical logic structurally expresses and, arguably, entrenches dualisms that we ought to resist. In LGBTQI theory and activism, we might discern the kind of problem that illustrates her position. Her particular understanding of “dualisms” of male/female, man/woman are, instead, termed *gender binaries*. The extent to which LGBTQI activism has been necessary *at all* to achieve the degrees of political liberation and social acceptance found today (often precariously) speaks to an entrenched understanding of the space of possibilities that have been suppressed under the assumption that there are two exclusive and

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<sup>1</sup> We are not suggesting that Belnap supports anything like Plumwood’s position on the non-neutrality of logic. He begins this paper specifying that his conception of logic in this paper is as an *organon*/tool.

<sup>2</sup> We find it useful to point out that multivalued, relevant logics developed and defended outside the Australian Plan, take a strong view with respect truth’s dominance in classical logic. In their discussion of geometrical dimensions of lattice theory, they write:

Under the multivaluational approach, classical logic can be viewed as based exactly on one initial truth value, namely on truth. That is, classical logic presupposes the monism of truth. Indeed, all the (classical) logical concepts can be formulated by using only the notion of truth (together with metalanguage connectives) with no mention of falsity. However, to have a logic, we need something opposite to truth, i.e. non-truth, and the multivaluational function produces such an element, this is again  $\emptyset$ . We can call this new element ‘falsity’, although this classical falsity is not an autonomous notion by itself, but completely depends on the notion of truth, having also one (negative) feature – not to be true. ([Shramko, Dunn and Takenka 2001](#), p. 785)

exhaustive genders. Sexism, the centering of men, goes hand in glove with essentializing and “naturalizing” gender binaries. For Plumwood, these binaries (dualisms) obscure the actual parity between the dichotomy of men/women and the space of alternative possibilities as illustrated in Figure 3. In this respect, classical logic may not be an ideal logic for LGBTQI theorizing, since we want to take seriously people’s claims about their gender identity, which combine, adjust or altogether deny the gender binary. If debate and discussion of gender identity takes classical logic as default, the structure of argumentative space ends up (already) binary in character. Activists should be especially wary to give up their home ground of relevant default, as we think Plumwood would claim. We are reminded of one of our logic students, whom, when encountering the failure of disjunctive syllogism in non-classical logics, noted, “Well, it’s only useful if you just have two options”.<sup>1</sup>

### *Towards a Feminist Logic*

For Plumwood, developing a feminist logic involves the rejection of classical logic and the embrace of non-classical logics. The dualisms supported by classical negation are not a necessary feature of logic, she advises. “Fully worked out logical systems which do not have these features are available and in use,” she states, “and these can point in directions which might be promising for alternative conceptions of otherness and rationality” (POR, p. 458). In relevant logics contradictions do not crash the system. Negation does not result in  $\neg A$  being homogenized with “the rest”. The “debate model” described in NAC shows the way in which *dialectic* and relevant negation are connected:

In sum, reversal and opposition have the right properties in leading respects for (the semantics of) relevant negation. Thus the opposite side of something is not the removal of the first side or, for example, everything other than the first side; it is *another* and *further* side,

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<sup>1</sup> We believe this was Jessica Latta, UMASS Dartmouth class of 2015. We are grateful for the cohorts of students we have taught and the members of the Deviant Logic Posse, an ongoing study group dedicated to discussion of contemporary logic research. DLP members have proven to us that undergraduate students benefit from learning non-classical logics. Teaching logic as a lively area of debate inspires students to work through much harder material than might be expected. We are also grateful for years of support from international logicians whom have visited our campus in person and electronically, inspiring all of us.

which is relatively independent of its reverse but which is related to it in a certain way. Both sides can co-occur (occur simultaneously) in a framework (e.g. controversy) and one can perfectly well consider both of them. The important point, to say it yet again, is that one side does not somehow *obliterate* or wipe out or entirely exclude or exhaust its opposite. Nor is the reverse, or opposite, just defined negatively. (*op. cit.*, p. 220)

This focus on dialogue and dialectic is present in Catarina Dutilh Novaes' project on Dialogical Reasoning<sup>1</sup> – an example of a project along the lines of what Plumwood envisioned. Dutilh Novaes works with the idea that deductive logic is a multi-agent, *dialectical procedure* not the static, solitary procedure it has come to be thought to be. This changes how we understand the relationship between logic and how it can improve reasoning. Interrogating and improving philosophical discourse and methodology are the crucial tasks for feminist theorists. Alice Craray's critique of analytic feminism, [Craray 2018](#) bears this admonition. According to Craray's analysis, contemporary analytic feminist projects that theorize "with a conception of the neutrality of reasoning" is at odds with radical feminist methodologies required for "liberating and sound social thought". She states:

[S]uch thought will involve refining and mobilizing cultural perspectives that are essential for bringing aspects of gendered social life into focus; something we can see if we follow up on the work of those great feminist critics mentioned earlier. This is what it comes to, to say that feminism's political radicalism requires a radicalism of method. Or, alternately, what it comes to say that the methodological is political. (final para.)

Plumwood's construal of dualisms and the need to remove them and restructure our theorizing and practices without them is not restricted to women's liberation, but to an intersectional understanding of identity and liberation.<sup>2</sup>

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<sup>1</sup> See [Dutilh Novaes 2015](#) and [Dutilh Novaes 2013](#).

<sup>2</sup> Intersectional Feminism is a conception of feminism developed by Kimberlé Crenshaw, a law professor, leader in the development of Critical Race Theory and founder of the African American Policy Forum. Intersectional Feminism addresses the interconnected nature of social categorizations such as race, class, and gender as they apply to a given individual or group, which are regarded as creating overlapping and interdependent systems of discrimination or disadvantage. Her work on Intersectional Feminism dates from the mid 1980s. It is unlikely that Australasian feminists were familiar with Crenshaw's work – it took decades in the United States for Intersectionality to become well known.

When four tectonic plates of liberation theory – those concerned with the oppressions of gender, race, class and nature – finally come together, the resulting tremors could shake the conceptual structures of oppression to their foundations. (Plumwood 1993, p. 1)

It remains to be explored whether or not this is the case, although the debate/dialogical models might prove useful in developing radical intersectional methodologies.

Plumwood may still have ideas to offer for feminist logicians unconvinced by her account of classical negation and not moved to embrace non-classical logics. In *POR* (p. 456), her desiderata for feminist logics include the rejection of five features that she attributes to dualism: backgrounding, radical exclusion, non-relational identity, instrumentalism, and homogenization.

1. Backgrounding: A non-hierarchical concept of difference requires a move to systems of thought, accounting, perception, decision-making which recognise the contribution of what has been backgrounded, and which acknowledge the denied relationships of dependency.
2. Radical Exclusion: A non-hierarchical concept of difference will affirm continuity (for example common humanity), reconceive *relata* in more integrated ways, and reclaim the denied area of overlap.
3. Relational Identity: A non-hierarchical concept of difference must review the identities of both underside and upperside. It can aim to critically affirm the difference of the oppressed, to rediscover their language and story, and to reclaim positive independent sources of identity.
4. Instrumentalism: A non-hierarchical concept of difference implies recognising the other as a centre of needs, value and striving on its own account, a being whose ends and needs are independent of the centre and to be respected in their own right.
5. Homogenisation: A non-hierarchical concept of difference involves recognising the different concerns and diversity of the “other nations” which have been homogenised and marginalised in their constitution as excluded other, as “the rest”.

These desiderata make good sense even if we were to view logic as neutral but are able to be *weaponized* (a less radical view than Plumwood’s). “Backgrounding” must

be rejected, for example. She states, "...Systems of thought, accounting, perception, decision making must recognize the contribution of what has been backgrounded, and acknowledge the denied relationships of dependency" (*ibid.*). The examination of white privilege, for example, brings to the foreground the background of racism against which white privilege operates for white people in a racialized social system. When it comes to identity she states: "A non-hierarchical concept of difference must review the identities of both the underside and the upperside. It can aim to critically affirm the difference of the oppressed, to rediscover their language and story, and to reclaim positive independent sources of identity" (*ibid.*). Projects in which indigenous peoples reclaim their identities lost in the colonization of their lands might be examples of relational identity that Plumwood found increasingly important as her career progressed (cf. [Hyde 2014](#)). Each of her desiderata can be useful for ongoing intersectional feminist scholarship and political engagement.

It would be a mistake to think that Plumwood held that a change in logic would be anywhere near sufficient for changing the world. She states:

I am not of course arguing that classical logic itself is the cause of women's oppression, and that if we just change the logical theory, all will be well. Challenging dualistic otherness at the level of formal logical theory is only part of what needs to be done to problematise the naturalness of domination, and this conceptual and cultural challenge in turn is only part of a wider strategy for change. ([POR](#), pp. 455–56)

Plumwood understood that political action is required and that our ways of living need reform. She was not someone that cleaved theory from practice. Her political commitments informed her life and her writings. Ultimately, she challenges us to question the supposed neutrality of logic and resistance to this idea cannot take the form of question begging. "Logic cannot be political, because it is ... *logic*", cannot be the response to her challenge.

***Appendix: Val Plumwood's Logic Publications***

(chronological order)

- Routley, R. and Routley, V., “The semantics of first degree entailment”, *Noûs* **6** (1972) 335–359.
- Routley, R. and Routley, V., “Rehabilitating Meinong’s theory of objects”, *Revue Internationale de Philosophie* **27** (1973) 224–254.
- Routley, R., *Exploring Meinong’s Jungle and Beyond*, Research Series in Logic and Metaphysics, RSSH, Australian National University, 1980. Chapters 4, 8, 9 co-authored with Plumwood. (Co-authored material reprinted in: Routley, R. and Routley, V., *Noneist Explorations I: The Sylvan Jungle, Vol. 2*, edited by D. Hyde, Springer, 2019; and this volume.)
- Routley, R., Plumwood, V., Meyer, R. K. and Brady, R., *Relevant Logics and Their Rivals*, Volume 1, Ridgeview (1982); and Volume 2 Ashgate (2003).
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- Plumwood, V., “The politics of reason: towards a feminist logic”, *Australasian Journal of Philosophy* **71** (1993) 436–462. (Reprinted in: *Representing Reason: Feminist Theory and Formal Logic*, edited by R.J. Falmagne and M. Hass, Rowman and Littlefield, 2002, 11–44.)
- Plumwood, V., “Feminism and the logic of alterity”, in *Representing Reason: Feminist Theory and Formal Logic*, edited by R.J. Falmagne and M. Hass, Rowman and Littlefield, 2002, 45–70.



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