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0521810949 - Paradox and Paraconsistency: Conflict Resolution in the Abstract Sciences

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Paradox and Paraconsistency  
*Conflict Resolution in the Abstract Sciences*

In a world plagued by disagreement and conflict, one might expect that the exact sciences of logic and mathematics would provide a safe harbor. In fact, these disciplines are rife with internal divisions between different, often incompatible systems. Do these disagreements admit of resolution? Can such resolution be achieved without disturbing assumptions that the theorems of logic and mathematics state objective truths about the real world?

In this original and historically rich book, John Woods explores apparently intractable disagreements in logic and the foundations of mathematics and sets out conflict resolution strategies that evade or disarm these stalemates. Among the conflicts to which these strategies are applied are: the disagreement between classical and relevant logicians; Quine's attack on quantified modal logic; disagreement as to whether dialethic logic has an adequate motivation; conflicts about how to understand the paradox of sets and the Liar paradox; the vexed relationship between modern logic and theories of reasoning; and conditions under which logical laws exhibit normative force.

An important subtheme of the book is the extent to which pluralism in logic and the philosophy of mathematics undermines realist assumptions. Woods's response is an account of truth in which realism is an irresistible epiphenomenon.

This book makes an important contribution to such areas of philosophy as logic, philosophy of language, and argumentation theory, but it also will be of interest to mathematicians and computer scientists.

John Woods is Director of the Abductive Systems Group, University of British Columbia.

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# Paradox and Paraconsistency

*Conflict Resolution in the Abstract Sciences*

JOHN WOODS

*University of British Columbia*



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*In Memory of*

*Richard Sylvan (né Routley), 1936–1996.*

*Rob Grootendorst, 1944–2000.*

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## Preface

This work arises from a series of lectures on paraconsistent logic delivered at the University of Groningen in the spring term of 1988. There followed a year later a schedule of lectures on Quine's philosophy of logic. The fruits of these endeavors circulated for awhile as *The Groningen Lectures on Paraconsistent Logic*. My efforts were graced by excellent students and generous colleagues. I am especially grateful to E. M. Barth, Jeanne Peijnenberg, Erik C. W. Krabbe, and David Atkinson for sharp criticism and helpful support. In 1990, a Fellowship at the Netherlands Institute for Advanced Study made it possible for me to join the research group on Fallacies as Violations of Rules for Argumentative Discourse. I worked there on conflict resolution strategies for intractable disagreements in questions of public policy. Only toward the end of my stay in Wassenaar did it occur to me that such strategies might be extended to contentious issues in the philosophy of logic and related fields. I owe much to the stimulation and encouragement of my NIAS colleagues: project leader Frans H. van Eemeren, the late Rob Grootendorst, Sally Jackson, Scott Jacobs, Agnès van Rees, Agnes Verbeist, Douglas Walton, and Charles Willard.

Thus was born a preoccupation with conflict resolution in the abstract sciences, which became the main business of my University of Lethbridge course on Deviant Logic in 1991 and 1992. The distractions of other research projects and heavy administrative responsibilities entailed a postponement of this one until an appointment as Visiting Scholar in the Department of Philosophy at Stanford University in 1994 afforded me the stimulation and leisure to turn my mind again to conflict resolution. In this I was much helped by Michael Bratman, Chair of the Department, Johan van Benthem, Maurice Finocchiaro, David Grover, and Timothy Schroeder. Administrative duties necessitated a further pause, but the project came to life again and was completed thanks to a Visiting Professorship in the Department of Discourse Analysis, Argumentation Theory, and Rhetoric at the University of Amsterdam in the spring term of 1998 and 1999. I am indebted to the Department's Head, Frans H. van Eemeren, and to his (and my) colleagues, the late Rob Grootendorst,

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Francisca Snoeck Henkemans, Eveline Feteris, Peter Houtlooser, and Bart Garssen. For helpful correspondence I am also most grateful to Anil Gupta, Patrick Suppes, Dov Gabbay, Graham Priest, Kit Fine, and Julius Moravcsik, and the late Richard Sylvan.

Thanks, too, for the support of the Social Sciences and Humanities Research Council of Canada, the University of Lethbridge Research Fund, and the Dean of Arts and Science of the University of Lethbridge, Professor Bhagwan Dua. Through his efforts, it was possible to appoint as research assistants Jasmin Berteotti, Dawn Collins, Ethan Toombs, and David Graham, whose talent and interest were of considerable help. For technical assistance, I am indebted to Randa Stone and Dawn Collins in Lethbridge, and Willy van der Pol in Amsterdam. I would also like to thank my editor, Terence Moore, and my copy editor, Laura Lawrie.

My special thanks are reserved for my students in Deviant Logic over the years, but especially David Grover, Augustus Butterfield, Kevin Gaudet, James Hormoth, James Brown, Maurice Lam, James King, Brian Hepburn, and Jack Kwong.

The Prologue of this book is an expansion of my “Just How Stupid Is Postmodernism?” in D. M. Gabbay et al. (eds.), *Springer Lecture Notes in Artificial Intelligence: Quantitative and Qualitative Practical Reasoning*, Berlin: Springer-Verlag, 1997, 154–8. Small parts of my “Pluralism About Logical Consequence,” in John Woods and Bryson Brown (eds.), *Logical Consequence: Rival Approaches*, Oxford: Hermes Science Publishers, 2001, show up in Chapters 1, 2, 3, and 4. A small portion of Chapter 1 is adapted from my article “Aristotle” in the File of Fallacies section of *Argumentation*, 13 (1999), 203–20. Chapter 2 absorbs four pages from Chapter 6 of my *Aristotle’s Earlier Logic*, Oxford: Hermes Science, 2001. Brief parts of Chapter 3 are taken from my “Ideals of Rationality in Dialogues,” *Argumentation*, 2 (1980), 395–408 and “The Relevance of Relevant Logic,” in J. Norman and R. Sylvan (eds.), *Directions in Relevant Logics*, Dordrecht: Kluwer Academic Publishers, 1989, 77–86. Chapter 4, “Semantic Intuitions,” is an extensive revision of a paper of the same name in Johan van Benthem, Frans H. van Eemeren, Rob Grootendorst, and Frank Veltman (eds.), *Logic and Argumentation*, Amsterdam: North Holland, 1996, 177–208. Chapter 6 adapts some material from my “Fortress Fiction,” in C. Mihailescu et al. (eds.), *Fiction Updated: The Theory of Fictionality and Contemporary Humanities*, Toronto: University of Toronto Press, 1996, 39–47. I am grateful to all concerned for permission to use this material.

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## Prologue

### *Postmodern Logic*

Your discovery of the contradiction caused me the greatest surprise and, I would say, consternation. . . . It is all the more serious since, with the loss of my Rule V, not only the foundations of my arithmetic, but also the sole possible foundations of arithmetic, seem to vanish.

Gottlob Frege, "Letter to Russell," 1902.

The abstract sciences are those that cannot, and have no need to, negotiate the empirical check. This anyhow is a widely received view of the matter. An abiding question for such theories is this: What sorts of check *can* they negotiate, and does doing so preserve intuitive presumptions of objectivity and realism? There is a particularly vivid context for posing this question and reflecting on how it might be answered. The context is that of *conflict resolution* strategies for rival theories.

In a broadly accepted use, with which I concur, objectivity attaches to things when they exist apart from and antecedently to anyone's thought of them; and objectivity attaches to statements or beliefs when they are true, or false, apart from and antecedently to anyone's conceiving of them as so. Realism in turn is always realism about something – about abstract objects, about universals, about material things, and so on. The realisms that absorb us in this book are those that attribute this twofold objectivity to what I am calling abstract theories when they meet certain properly understood conditions of adequacy.

Two historical developments in the last century suggest a not always tacit acquiescence to the suggestions that objectivity and realism are unrealizable and unrealistic targets for even our most methodologically austere and successful abstract theories. One of these developments is a tolerant and substantial *pluralism* that has taken root and flourished in logical theory. This pluralism relates significantly to the toleration of it. The greater the latter, the more the former does damage to presumptions of objectivity and realism. The greater the latter, the greater the likelihood that theoretical rivalries will be interpreted in such ways that conflict resolution does not matter – or even that



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it would somehow be a misplaced thing to try to bring off. The other historical development is what could be called the *received view* of the significance of the paradoxes of sets and of truth. The received view concurs widely on the diagnosis of the paradoxes, on estimates of the damage done by them, and on the general character of strategies for set theoretic and semantic recovery. This, too – or so I shall say – puts in a false light objectivity and realism in mathematics and formal semantics.

If we wished to draw dramatic attention to these developments, we could first remind ourselves of the buoyant confidence of 1879, and for a time thereafter, in the imperiousness and canonicity of the new logic, the new mathematics, and what came to be known as “analytic” philosophy. We could then reflect upon their subsequent apparent collapse into the unedifying embrace of *postmodernism*.

Postmodern logic? The very idea! Yes, the very idea; we should not shirk it. As Hintikka sees it, “the main post-Gödelian, not to say *postmodern*, foundation problem is to look for new deductive methods and to analyze them ([Hintikka, 1996, p. 99] emphasis added). And, “[a]mong other features of this [= Hintikka’s] concept of negation that have to be *deconstructed*, is the so-called law of excluded middle” ([Hintikka, 1996, p. 161] emphasis added).

The paradoxes play on our reflections in ways that are decidedly queer. Seen in Russell’s way, they drive us towards a kind of idealism, a detested thing in twentieth-century English-speaking philosophy; and no wonder inasmuch as it appears to land us in the swamps of postmodernism. I see postmodernism in Eagleton’s way; as

a style of thought which is suspicious of classical notions of truth, reason, identity and objectivity, of the idea of universal progress or emancipation or single frameworks, grand narratives or ultimate grounds of explanation. (Eagleton, 1996, p. viii)

Indeed,

[a]gainst these Enlightenment norms, it sees the world as contingent, ungrounded, diverse, unstable, indeterminate, a set of disunified cultures or interpretations which breed a degree of scepticism about the objectivity of truth, history and norms, the givenness of nature and the coherence of identities. (Eagleton, 1996, p. vii)

It will occur to some people that what used to be called the “moral sciences” are in a state that is tailor-made for postmodern summing up, although the very word for it is historically careless (there is not a trait in the postmodern catalog that was not abundantly evidenced in antiquity, with periodic recurrence ever since). Perhaps we should not find it so striking if there was no fact of the matter about Ophelia’s acquiescent sexuality, or about what final moral interpretation a given body of data calls for, or about whether or not the Id exists. Postmodern latitude is, if anything else, recognition of the slack that attends our softly scientific judgments. This is postmodernism cheaply bought, and I for one do not think much of it. Should it indeed be the case that the soft sciences have

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nowhere to go but postmodern, the harder sciences are a harder sell; and it is to them we should turn our attention. It would be a discovery worth making a fuss over if we could show that postmodernism reposes in the very coils of the hard, which is to say not in the history of science (which is soft), but in science's essential methods and settled practice.

Cases in point are the mathematical theory of sets and truth conditional semantics for constative discourse. Each is beset with paradox. With sets, it was the paradox that Russell communicated to Frege in 1902. In truth conditional semantics, it was the Tarski Paradox. Russell, and Frege, too, thought that his paradox destroyed the concept of set (Russell, 1967, pp. 127–8); and Tarski thought that his paradox destroyed the concept of the statement, that is to say, of bivalent sentence (Tarski, 1983, pp. 152–4, 165). However, let me put it on the record early rather than late that Tarski made much too light of these damaging consequences. We shall return to this oddity in Chapters 5 and 7.

On the view that it destroyed the concept of truth or the concept of bivalent sentence, the Tarski Paradox *is* a devastation. If it destroys the concept of statement, then there is no concept of statement, and *there can be no statements*. Even if Tarski were to reconsider his commitment to the nonexistence of the concept of statement, his logical classicism binds him to absolute inconsistency – every statement of any natural language is true. The first alternative sounds the death-knell of constative discourse; we lack the means even to *try* to say what is the case. The second alternative guarantees an alethic libertinism that amounts to nihilism – all that is is precisely what is not, provided that Convention T is true, provided, that is, that truth is disquotational. Even if T did not obtain, statement-making discourse, while not impossible, would be dispossessed of any rationale, since everything anyone ever says is always both true and not.

The first is the greater problem. If the Tarski Paradox demonstrates the impossibility of statements, of constative discourse as such, then it cannot be the case that beliefs have propositional contents. It cannot be that my belief that the cat is on the mat bears any relation at all to anything identifiable as what is stated by the sentence “The cat is on the mat,” since neither that sentence nor any other states *anything*. This problem about belief comes to the fore in a rather pressing way when we consider Tarski's method of recovery from the Paradox. If, as I am assuming, Tarski understood his strategy in the same way that Russell understood his own as regards the paradox of sets, then we run into vexations of considerable significance. Russell began his work in the foundations of mathematics as an idealist. It is a commonplace of Russell's way of being an idealist that our ordinary concepts – the concept of space, for example – are inconsistent. The job of the theorist therefore is to repair the concept, to refine the inconsistency out of it. Doing so is subject to what we might call “the principle of consistent similarity,” which bids the theorist to make his new concept as similar to the original as consistency allows.

By 1903, with the publication of *Principles of Mathematics*, Russell had abandoned his idealism for something called “analysis,” to which he was drawn by the forceful ministrations of G. E. Moore. It is on this analytical perspective that inconsistent concepts do not exist, and, since nonexistent, nothing whatever falls under them. It becomes quickly evident that the idealist strategy for repairing inconsistent concepts cannot be applied when concepts are understood in the analytic way. The idealist strategy requires that the new concept resemble the old as much as consistency allows. But on the analytic approach to concepts, there *is* no original concept. Anything proposed as the successor concept must, on the principle of consistent similarity, resemble – as much as consistency allows – *nothing whatever*. From which we have it either no successor concept satisfies the principle, or that every consistent concept whatever satisfies it, and satisfies it equally.

After much dissembling, Russell did the only thing he could do short of giving up, which is what Frege eventually did. *He stipulated*. Sets were now introduced by nominal definitions, which Russell dressed up as “*mathematical analyses*.” Russell knew as well as anyone ever did that whereas one is free to stipulate as one pleases, no one else is required to bear it any mind. So he imposed a condition governing what would count as acceptable stipulations in mathematics. A stipulation is acceptable to the extent that the right people are disposed to believe it. Thus, someone stipulates that *p*, and perhaps in time the community of *p*-enquirers come to believe it. If so, the stipulation is acceptable.

I need hardly dwell on the postmodernist skeins with which Russell’s recovery of set theory is shot through: There are no facts of the matter about sets; sets are a human construct; how sets are is relative to what people are prepared to believe about them; sets are patches of consensus in the mathematical conversation of mankind; and so on.

Can Russell’s strategy for recovery be applied to the devastation of the Tarski Paradox? Recall that Russell’s strategy is stipulation supported by elite communal belief. If Tarski’s Paradox establishes the impossibility of statements, and beliefs are propositional attitudes – psychological states in some kind of apposition to statements – *then there are no beliefs either*, and Russell’s strategy fails for sets and statements alike. If it shows anything, Tarski’s Paradox establishes that the cost of persisting with the analyst’s conception of concepts is the death of discourse, belief, and desire (since it, too, is a propositional attitude).

It is a striking peculiarity of the received view that the utterly radical thrust of the consequences of the Tarski paradox are not much noticed, and certainly not much bothered with. Tarski himself just got on with the business of finding a formalized language suitable for rigging a successor to the demolished concept of truth. In this respect, the received view in semantics resembles the received (pre-Bohmian) view in quantum mechanics with regard to nonlocality. It, too, was not much bothered with by working physicists. If considered at

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all, it was considered at most as a fit thing for philosophers, who, as is widely believed by scientists, have nothing *scientifically* consequential to say about physics.

Like realism, idealism is always idealism about something. Like any philosophically big notion, it ranges from the commonplace to the theoretically extreme, and is interesting to the extent that it purports to displace a realism antecedently thought secure. Thus, idealism is comparatively uninteresting, but not uncontested, when it is acknowledgment of the mental dependency of ordinary mental events, and it is interesting and important in, for example, Berkeley's celebrated displacement of the external world. In its use here, idealism is a less radical affair. It sees in knowledge something of the knower's creative contribution; it sees truth as comparative and partial; it sees all thinking, except "metaphysical" thinking, as defective and all concepts save "metaphysically" repaired ones as inconsistent; and it sees knowledge as something less than objective.

Even so, I take it without further ado that the death of discourse, belief, and desire is too much to bear even for "the brilliant young zombies who know all about Foucault..." (Eagleton, 1996, p. 23). What is to be done? One option, obviously enough, is to revert to this "minimal" idealism and fess up about it. It is well to attend to what the reversion buys us. It buys a way of recovering from paradox. Costs are another thing. Human knowledge, whether in politics or in the foundations of mathematics, is now, in part at least, a human artifact; and knowledge is wrought, one way rather than another, for what it is wanted for. Collectively, the cost of the idealist strategy is the abandonment of realism, of the view that how the world is is independent of what we think of it, and that our beliefs are objectively true or objectively false depending on how the world is apart from what we think of it.

Naturalism offers another way of proceeding, and a more attractive one on its face for those who dislike the postmodern cachet of idealism, if the anachronism may be forgiven. Naturalism offers promise of the recovery of realism. For, unlike the old epistemology, naturalism seeks "no firmer basis for science than science itself" (Quine, 1995, p. 16). The naturalist "is free to use the very fruits to science in investigating its roots" (Quine, 1995, p. 16). It is a self-referential process, as is postmodernism itself, but no mind, since it is "a matter, as always in science, of tackling one problem with the help of our answers to others" (Quine, 1995, p. 16). In the case of sets, the naturalist rejigs not to preserve as much as he can of the old concept but, rather, with a view to facilitating the broader aims of mathematics, broadly indispensable in turn, to science. Similarly, our theory of the external world will be a rational reconstruction from modest beginnings – sets of triggered neural receptors at a specious present; and before long bodies will be sets of quadruples of real numbers in arbitrary coordinate systems. Those liking the naturalist option could do no better than to turn to Quine for instruction, for it is he, more than anyone else, who has given the project a commanding and detailed articulation.

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But *caveat emptor*; the raw recruit to naturalism may be unprepared for what awaits him there:

Even the notion of a cat, let alone a class or number, is a human artifact, rooted in innate disposition and cultural tradition. The very notion of an object at all, concrete or abstract, is a human contribution, a feature of our inherited apparatus for organizing the amorphous welter of neural input. (Quine, 1992, pp. 687–725)

And,

if we transform the range of objects of our science in *any* one-to-one fashion, by reinterpreting our terms and predicates as applying to new objects instead of the old ones, the entire evidential support of our science will remain undisturbed. (Quine, 1992, p. 8, emphasis added)

Quine, of all our philosophers, is the most French. Consider what he tells us of theories. Theories are pieces of text, sets of sentences having a complex structure, inherently topic neutral, but susceptible to interpretations that are imposed in accordance with what we find it interesting to suppose. They are exercises in our conceptual sovereignty, and stand in complex and convoluted – and dominantly notional – relations to sensory turbulence.<sup>1</sup>

How did the naturalist come to this sorry pass? And why should we not say that the strongest case ever made for the truth of postmodernism in the hard sciences has been made by him? We can say it if we like, but the irony of it all should not be lost on us (more postmodernism still). The naturalist, like the rest of us, begins his scientific account of our access to the world rooted in the *realist stance*. He assumes that the world is objectively there no thanks to us, and that what we come to know of it is objectively so. Once up and running, whether in the precincts of neurological theories of perception, or in theories of the interior of the atom, or in the foundations of transfinite arithmetic, naturalism makes it clear, over and over again, that our best scientific accounts of how beings like us know the world show that we do so in ways that fulfill the canons of idealism. This is our *anomalous realism*. It provides that when we bring to bear the presumptions of realism on our scientific enquiries into how we know the world, it emerges that enquiry itself is idealist. In this, it seems that we cannot help ourselves. The realist stance delivers the goods for idealism every time, but we cannot make ourselves reject the stance. We cannot help *being* idealists while *thinking* that we are realists. This is what Sartre made much of under the heading of *mauvaise fois* – bad faith. Reactivating the realist stance so as to bring it to bear on the persistent and pervasive phenomenon of *mauvaise fois*, there is little to conclude but that it is naturally selected for, that it is needed for survival.

One of the most recalcitrant travails of postmodernism in the arts and letters, and in the soft sciences, is postmodernism's own bad track record with the question, "What now?" What work is there to do in history or in literary studies if postmodernism is true and faithfully concurred with? If there are no

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Archimedian points, it is hard to see what the research program could be. Not seeing where the research program should go is like not knowing where you are. It is the kind of lostness that promotes abandonment – for example, the rejection of literature in some departments of English; or it invites intellectual rubbish, exchanged under hostile dialectical conditions of a kind that Aristotle called “babbling.” And it invites – it positively begs for – Sokal’s hoax.<sup>2</sup>

On this score, naturalism has the edge, not because it evades postmodern commitments but precisely because it abounds in them. The advantage given to naturalism is that it seizes on its own postmodern consequences and lets them shape a coherent research program.

What is the program? It is to employ the best of what naturalism can offer to explain the persistence of the realist stance even in the face of the pervasive endorsement it gives to antirealism. The project, in short, is a naturalistic explanation of the epistemic *mauvaise fois* of the human condition. And that, anyhow, is something.

With theories, says Quine, ideology is everything and ontology hardly counts (Quine, 1983). What matters is what we make the text *say* and that it be made, in the end, to negotiate the empirical checks, however convolutedly. Anomalous realism is the most fruitful way of proceeding. It is constructive make-believe *par excellence*. If we think realistically about what we make theories say, there is a greater chance that we will think up better theories than otherwise. They are better not because they reveal better what is really so, but because they negotiate the empirical checks more smoothly and efficiently, and as structural consequences of how the text itself was contrived. There are two things, then, to be said for the realist stance. It is a tried and true theoretical heuristic, and it is an economical way of paying attention to what happens around us. It discourages our taking the onrushing bus for a phantom. It is an efficient way of staying alive. Such a view is pure *Boul. Mich.*, although with an Ohio accent.

It lies in the nature of our anomalous realism to dislike anomalous realism, indeed to disbelieve it utterly at the level of practice and as a way in which we find it necessary and natural to experience the world. Even if it is our best option, it is not an option we want. It is therefore appropriate to wonder whether there might be a way out of it. I mean to look for a way in the very precincts in which historically it has grown deep roots. So we shall examine in this book the complex dynamics of conflict resolution in the abstract sciences. To this end, I reassume the realist stance, and shall persist with it until and unless our looming reflections knock me from this perch.

In examining the dialectical structure of conflict resolution in the abstract sciences, I have thought it prudent to select as test cases contentions that are comparatively well known, concerning which readers of this book may already have taken a position. One test of the resolution devices developed here is the extent to which they incline readers to alter their positions, or at least to retain them more reflectively. These, then, are the test cases: the rivalry between

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relevant and classical logic; the rivalry between paraconsistent logic and classical logic; Quine's attack on quantified modal logic; contentions against the received view of the Russell paradox and the Liar paradox; the realist-antirealist controversy; contentions against the intuitions methodology in philosophy and other abstract sciences; and contentions against the normative presumptions of such theories.