

**Logical and metaphysical works of Richard Sylvan [né Routley] (1989-2020)****Contents**

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**Bibliography**

1. Routley, Richard, and Brady, Ross. 1989. "The Non-Triviality of Extensional Dialectical Set Theory." In *Paraconsistent Logic: Essays on the Inconsistent*, edited by Routley, Richard, Priest, Graham and Norman, Jean, 415-436. München: Philosophia Verlag.  
 "A uniform dialectical resolution of both the logical and the semantical paradoxes was argued for in earlier work (notably in [9]). But the adequacy of that resolution was by no means established. This paper, which shows the non-triviality of extensional dialectical set theory with a general comprehension axiom, represents a further step in the direction of proving the adequacy of the resolution. The methods of proof used - at the core persistence arguments - extend the methods of [2] and [3]. As pointed out in [5], these methods apply equally in the case of the semantic paradoxes.  
 It should also be noted that these systemic methods almost exactly resemble the meta-linguistic strategies more recently investigated by Kripke in [6]." (p. 415)  
 References  
 [2] Brady R. T.1971 "The consistency of the axioms of abstraction and extensionality in a three-valued logic", *Notre Dame Journal of Formal Logic* 12, pp. 447-453.  
 [3] - 1972 "The relative consistency of the class axioms of abstraction and extensionality and the axioms of NBG in a three-valued logic, *Notre Dame Journal of Formal Logic* 13, pp. 161-176.  
 [6] Kripke, S. A., 1975, "An outline of a theory of truth", *Journal of Philosophy* 72, pp. 690-716.

- [9] R. Routley, 1977, "Ultralogic as Universal?", *Relevance Logic Newsletter* 2, pp. 50-89 and pp. 138-175, and in: *Exploring Meinong's Jungle and Beyond*, 1980, Canberra: Australian National University.
2. Routley, Richard, and Plumwood, Val. 1989. "Moral Dilemmas and the Logic of Deontic Notions." In *Paraconsistent Logic: Essays on the Inconsistent*, edited by Routley, Richard, Priest, Graham and Norman, Jean, 653-690. München: Philosophia Verlag.
- "1. The paradoxes of deontic logic and the consistency and modal requirements Especially since mid-century many systems of deontic logic have been advanced, which attempt to explore the logic of such deontic notions as obligation, permission and prohibition, right and wrong. Almost all these systems have been modal systems, which treat deontic notions as modal, i.e. as if strict or provable equivalents are intersubstitutable within them preserving truth(2). All such systems are mistaken in a quite fundamental way. For deontic functors such as obligation and prohibition are not modal functors, but are more highly intensional than modal functors, and so demand a greater degree of propositional discrimination than modal logics can provide.
- The damage caused by the mistaken treatment of deontic notions as modal shows up in various ways, but we shall be primarily concerned with only one of these, the consistency requirements and the exclusion thereby of moral dilemmas. Another way in which the modal damage appears is through a series of related paradoxes, such as, directly, the paradoxes of derived obligation, and, less directly, the paradoxes of the Robber and the Good Samaritan.(3)" (p. 653)
- (2) This was true even of Mally's pioneering system of 1926 which permitted replacement of logical equivalents within the scope of obligation function  $a$  (see F & H, p. 3). Von Wright's seminal work (in 1951), which set the pattern for mainstream deontic logic, was explicitly based on the modal comparison of deontic functors with modal functors, and built modal assumptions in at the bottom of the theory.
- The exceptional systems, that break the modal connection, are deontic systems based on relevant logics; on such systems see RLR, chapter 8. (3) These paradoxes are explained, and their modal bases exposed, in 5. On the paradoxes of derived obligation, see further Prior 62, p. 224; and for some of the considerable literature on paradoxes like those of the Robber and Good Samaritan, see the Hilpinen anthologies and especially Vermazen. A detailed uniform treatment of all these and other deontic paradoxes in the framework of relevant logic is given in RLR II.
- References
- Føllesdal, D. and Hilpinen, R., 1971, "Deontic logic: an introduction" in: Hilpinen, pp. 1-35; referred to as F & H.
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- Routley, R. and others, *Relevant Logics and Their Rivals*, Part I, 1982, and Part II, forthcoming [2003]; Atascadero, CA: Ridgeview; referred to as RLR I and RLR II respectively.
- Vermazen B., 1977, "The logic of practical 'ought'-sentences", *Philosophical Studies* 32, pp. 1-71.
- von Wright, G. H., 1951, *An Essay in Modal Logic*, Amsterdam: North-Holland.
3. Routley, Richard, and Priest, Graham. 1989. "Contradiction, Assertion and 'Frege's Point'." *Analysis* no. 49:23-26.
- "The liar sentence ('This sentence is not true') is both true and not true. The Russell set ( $\{x: x \notin x\}$ ) is both a member of itself and not a member of itself. These and many other contradictions we, the authors, are prepared to assert. Most people would disagree with us - and disagree fairly violently. But there is a minority of

people who would refrain from disagreeing on the ground that we have said nothing to disagree with. Though we may have uttered words, no statement is made by them. Explicit contradictions cannot be used to make a statement. This line, though hardly orthodox, has, of course, a distinguished pedigree. It was argued by Aristotle in *Metaphysics*  $\Gamma$  3,' and since then has resurfaced from time to time in the cancellation view of negation. (See Routley and Routley [5].) Most recently, it has been advocated by Laurence Goldstein [2], who has produced a novel argument for it. The purpose of this note is to refute the argument. As we shall see, this is not difficult; the discussion, however, raises some points of independent interest." (p. 23)

(...)

"In general, and normally, to assert a conditional is not to assert its consequent; in particular cases, however, it may be.(6) This is, we think, a main lesson of Goldstein's argument." (p. 26)

(6) Similarly for disjunctions. Normally, to assert  $\alpha \vee \beta$  is not to assert  $\alpha$  or  $\beta$ . But for certain instances of  $\alpha \vee \beta$  (e.g.  $\alpha \vee \alpha$ ) it may be.

References

[2] L. Goldstein, 'A Problem for the Dialetheist', *Bulletin of the Section of Logic*, Polish Academy of Sciences 15.1 (1986), 10-14.

[5] R. Routley and V. Routley, 'Negation and Contradiction', *Revista Columbiana de Mathematicas* 19 (1985), 201-31.

4. ———. 1989. "First Historical Introduction: A Preliminary History of Paraconsistent and Dialethic Approaches." In *Paraconsistent Logic: Essays on the Inconsistent*, edited by Routley, Richard, Priest, Graham and Norman, Jean, 3-75. München: Philosophia Verlag.

"Although the notion of system was brought into prominence by Leibniz,(1) it is only in contemporary times that a clear conception of a formal or semantical system has developed. Thus recent definitions of paraconsistency(2) through such systems-in terms of systems which can tolerate some inconsistency without trivializing-are not strictly or directly applicable in a historical quest. Evidence of paraconsistent approaches in earlier times has accordingly to be more circumstantial.

There are however several good indicators of paraconsistent approaches of one sort or another which can be reliably used. For example, admission, or insistence, that some statement is both true and false, in a context where not everything is accepted or some things are rejected, is a sure sign of a paraconsistent approach-in fact of a dialethic approach. It involves not merely recognition of a non-trivial inconsistent theory, as with a (weaker) paraconsistent position, but the assumption that that is how things are, that, in effect, the world is inconsistent. A concession that both a statement,  $A$  say, and its negation,  $\sim A$ , hold, works in a similar way, clearly revealing a strong paraconsistent approach. So does the concession that some statements  $A$  and  $\sim A$  hold in a nontrivial theory or position, thereby revealing a weaker paraconsistent approach.

But often evidence is less direct. For instance, an author may not explicitly say that both  $A$  and  $\sim A$  hold, or hold in a given theory, but what is said obviously implies that they do, and the author can be assumed to be aware that they do, or a case can be made that the author is aware of this. In such cases the approach is still explicitly paraconsistent. But an author may not be (clearly) apprised of what his or her position (obviously) implies, in which event the position will be either implicitly paraconsistent or else trivial, depending on the underlying logic adopted." (p. 3)

(1) According to Rescher, *The Philosophy of Leibniz*, 1967, chapter 2. [See also Nicholas Rescher, "Leibniz and the Concept of a System", *Studia Leibnitiana*, 13, 1981, pp. 114-122.]

(2) Such as are given in the Introduction to Part Two.

5. ———. 1989. "An Outline of the History of (Logical) Dialectic." In *Paraconsistent Logic: Essays on the Inconsistent*, edited by Routley, Richard, Priest, Graham and Norman, Jean, 76-98. München: Philosophia Verlag.

"7. Summary and prospects

It will be clear that dialectic, as befits a theory of development, has developed markedly over two and a half thousand years of philosophy. We have isolated two major phases: Classical Greek philosophy and Modern German philosophy. Although they are very different, one is the development of the other, and there is an important parallel between the phases. Both started off concentrating precisely on contradiction within the setting of (perplexing) arguments. Both then developed into a theory of development in which contradiction plays the central role. Finally, both went into a period of decline when the specific essence of dialectic, literal contradiction, was forgotten, and consequently dialectic became a subject of high generality but little content. All this we have documented.

Of course the evolution of dialectic will continue and we think that we are at the start of a new phase of growth, during which symbolic logic will play a fundamental role. It will again start with a concentration on contradiction itself within the framework of argument procedures, especially convincing arguments which lead to contradiction. To an extent this has already happened with the matter of logical paradoxes and of paraconsistent logic.

However it is also evident that a correct understanding of the history of dialectic is essential for further progress. To this end an analysis of the history of dialectic, and particularly Hegel's dialectic, using the techniques of modern logic is essential.

From what has been said it is obvious that such an analysis will have to accommodate the notion of a true contradiction.

Thus paraconsistent logic will be essential here too. (94) This analysis has already started, but remains in its earliest stages. (95) Where the whole modern study will take us, we can only speculate." (p. 92)

(94) It follows that the few attempted formalizations that have appeared which use classical logic are doomed to failure. Some of these can be found in Marconi, 1977.

(95) See, for example, Routley and Meyer, 1976; da Costa and Wolf, 1980; Priest, 1982; and Peña, 1980.

#### References

da Costa, N. C. A. and Wolf, R. G., 1980, "Studies in Paraconsistent Logic I: The Dialectical Principles of the Unity of Opposites", *Philosophia* 9, pp. 189-217.

Marconi, D., ed., 1979, *La Formalizzazione della Dialettica*, Torino, Rosenberg & Sellier.

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Routley, R. and Meyer, R. K., 1976, "Dialectical logic, classical logic, and the consistency of the world", *Studies in Soviet Thought* 16, p. 1-25.

6. ———. 1989. "Systems of Paraconsistent Logic." In *Paraconsistent Logic: Essays on the Inconsistent*, edited by Routley, Richard, Priest, Graham and Norman, Jean, 151-186. München: Philosophia Verlag.

"Let  $\models$  be a relation of logical consequence.  $\models$  may be defined either semantically ( $\Sigma \models A$  holds iff for some specified set of valuations, whenever all the formulas in  $\Sigma$  are true under an evaluation, so is  $A$ ) or proof theoretically ( $\Sigma \models A$  holds iff for some specified set of rules, there is a derivation of  $A$ , all of whose (undischarged) premisses are in  $\Sigma$ ), or in some other way.  $\models$  is explosive iff for all  $A$  and  $B$ ,  $\{A, \sim A\} \models B$ . It is *paraconsistent* iff it is not explosive. A logic is *paraconsistent* iff its logical consequence relation is. If a logic is defined in terms of a set of theses it may have more than one associated consequence relation. For example,  $\{A_1 \dots A_n\} \models B$  iff  $\vdash A_1 \dots \wedge A_n \rightarrow B$  or  $\vdash A_1 \rightarrow (\dots \rightarrow (A_n \rightarrow B) \dots)$  or  $A_1 \dots A_n \models B$  (the last representing the theorem-preserving or weak inferential connection). In this case all its associated consequence relations should be paraconsistent.

Let  $\Sigma$  be a set of statements.  $\Sigma$  is *inconsistent* iff, for some  $A$ ,  $\{A, \sim A\} \subseteq \Sigma$ .

- $\Sigma$  is *trivial* iff for all  $\mathbf{B}$ ,  $\mathbf{B} \in \Sigma$ . The important fact about paraconsistent logics is that they provide the basis for inconsistent but non-trivial theories. In other words, there are sets of statements closed under logical consequence which are inconsistent but non-trivial. This fact is sometimes taken as an alternative definition of 'paraconsistent' and, given that logical consequence is transitive, it is equivalent to the original definition. The proof is this: If  $\Sigma$  is an inconsistent but non-trivial theory then obviously the consequence relation is paraconsistent. Conversely, suppose that  $\{A, \sim A\} \neq \mathbf{B}$ . Let  $\Sigma$  be the transitive closure of  $\{A, \sim A\}$  under logical consequence. Then  $\Sigma$  is inconsistent but  $\mathbf{B} \notin \Sigma$ . Because of the equivalence we also call any inconsistent but non-trivial theory *paraconsistent*, and derivatively, any position whose deductive closure provides a paraconsistent theory. Why should one be interested in paraconsistent logics? Among the many reasons are proof theoretic and semantic ones." (p. 151)
7. ———. 1989. "Applications of Paraconsistent Logic." In *Paraconsistent Logic: Essays on the Inconsistent*, edited by Routley, Richard, Priest, Graham and Norman, Jean, 367-393. München: Philosophia Verlag.  
 "1. Introduction: the variety and types of applications  
 The most important application of paraconsistent logics is their application to possibly inconsistent theories. However one needs to interpret "theories" here fairly liberally, as any body of doctrine, statements, axioms etc. which can be thought of as inferentially closed. The theories can be historical, current, embryonic or merely entertained. Of course the formalization of such theories often requires much wider logical apparatus than the mere first order deductive logic discussed in the introduction to Part Two of the book. This may include probability, inductive logic, the logic of various modalities and other intentional notions such as belief, and so on. Such things, or at least some of them, have been considered by logicians. But, by and large, the logical theories produced have been tuned to classical or at least intuitionist logic. This is singularly inappropriate since as often as not, the material to which the logical apparatus is applied is inconsistent, as we shall see. Accordingly the ideas of paraconsistency need to be applied to the logical theories of modality, probability, etc. themselves to produce adequate logical machinery. In this essay we will consider first some interesting inconsistent theories, some of them in some detail, and then move on to consider the remodelling of various logical theories. It should be stressed that the studies of many applications mentioned are in their infancy, and we can often do no more than make suggestions for the directions of future research." (p. 367)
8. ———. 1989. "The Philosophical Significance and Inevitability of Paraconsistency." In *Paraconsistent Logic: Essays on the Inconsistent*, edited by Routley, Richard, Priest, Graham and Norman, Jean, 483-539. München: Philosophia Verlag.  
 "Paraconsistency strikes at the root of principles which are fundamental to, and entrenched in, much philosophy. It is therefore bound to be philosophically problematic and to have important philosophical ramifications. In this introduction we will try to chart and analyse some of these issues. By its nature, this will require us to deal with a number of separate and not otherwise connected issues. However, we will start by looking at some important points raised by the arguments for paraconsistency in chapter V [\*], section 1 above.  
 We will then go on to investigate some of the philosophical consequences of paraconsistency." (p. 483)  
 [\*] *Systems of Paraconsistent Logic* by G. Priest and R. Routley.
9. Routley, Richard, Priest, Graham, and Norman, Jean. 1989. *Paraconsistent Logic: Essays on the Inconsistent*. München: Philosophia.  
 Contents: Essays by Richard Routley: I. First Historical Introduction: A Preliminary History of Paraconsistent and Dialethic Approaches (with Graham Priest) 3-75; II. An Outline of the History of (Logical) Dialectic (with Graham Priest) 76-98; V. Systems of Paraconsistent Logic (with Graham Priest) 151-186; XIII. Applications



of Paraconsistent Logic (with Graham Priest) 367-393; XV. The Non Triviality of Extensional Dialectical Set of Paraconsistency Theory (with Ross T. Brady) 415-436); XVIII. The Philosophical Significance and Inevitability of Paraconsistency (with Graham Priest) 483-539; XXIII. Moral Dilemmas and the Logic of Deontic Notions (with V. Plumwood) 653-690.

"This book had its conception in a bar in about 1978, though the exact date escapes our collective memory. We had both been working in the field of paraconsistent logic for some years and were aware the subject was gradually gaining momentum. Yet the movement was still a diffuse one. This was, and still is, for two reasons. First, though many people were involved, they were spread fairly thinly over the globe, and communication was not particularly good. Secondly, the major papers that had been published on the subject were published in a variety of journals, some of them fairly inaccessible. It seemed to us that a focal point for work in paraconsistency was necessary, and would be provided by a suitable book.

We could have published a collection of already published essays but decided against it. Instead we wrote to those whom we knew to be working in the area who in turn informed those whom they knew: the book comprises papers that were sent to us in response. (We obtained however more papers than we could use: a number of the others have been published in an issue of *Studia Logica* devoted to paraconsistency and edited by us. (1)

All the papers in this collection are published here for the first time and some of them are undoubtedly of the first importance for the future of the subject. Researchers should also find the bibliography of paraconsistency helpful. Paraconsistency will still be an unfamiliar and fairly esoteric topic to most people. We therefore decided to write a number of introductory essays on various aspects of paraconsistency, and these can be found at the beginning of each section of the book.(2)" (p. XIX)

(...)

"The word "paraconsistent" (meaning "beyond the consistent") was coined by Mira Quesada [\*] to apply to the study of theories that are inconsistent but not trivial. In working on this book, however, we found that another piece of terminology was desirable. This was to express the idea that some paraconsistent theories are true. After exhausting all the dictionaries at our disposal (including Greek, Russian and Gaelic), we decided that no extant word would express this idea. So we were forced to coin one. A true contradiction is a Janus-faced creature which faces both truth and falsity.

The word 'dialetheia' ("two-way truth") seemed a fairly appropriate way of expressing this idea. Correspondingly dialethism is the view that there are dialetheias, true contradictions. We use these terms (with a little embarrassment) throughout our essays.

As with the variant spelling of "dialeth(e)ic" and its cognates, so even more with variant notation and referencing, and more still with the spread of heterodox ideas, there is in this book no stifling uniformity." (p. XX)

(1) *Studia Logica*, volume 43, 1984.

(2) These introductory chapters first appeared in *On Paraconsistency*, Research Papers of the Logic Group, No. 13, Philosophy Department, Research School of Social Sciences, Australian National University. A few changes have been made due to comments by Newton da Costa, Charles Daniels and Lorenzo Perra, to whom we are grateful.

[\*] in a letter to Newton da Costa, Lima, September 29, 1975 (Luis Felipe Bartolo Alegre, "A name for the logics of inconsistent systems. Francisco Miró Quesada Cantuarias (1918-2019)" *South American Journal of Logic*, 6, 2020, pp. 3-9 (note added by Raul Corazzon)

10. Sylvan, Richard. 1989. "Relational semantics for all Lewis, Lemmon and Feys' modal logics, most notably for systems between  $S0.3^\circ$  and  $S1$ ." *Journal of Non-Classical Logic*:19-40.

A main object of the present exercise is to provide relational semantics for weak strict modal logics strictly between S0.5 and S2, relational semantics for other systems of the great system pioneers being textbook stuff. A relational semantics evaluates modal functors in terms of a (two-place) relation between situations or worlds: not, as in the much less revealing "neighbourhood" semantics, in terms of a relations between worlds and sets of worlds ( thus relational semantics are in a sense "first order", by contrast with such neighbourhood semantics). The relational semantics for S1 and S1", in particular, are markedly superior to earlier neighbourhood semantics; they fit the systems better, and are more informative and they directly supply interpretable matrices for the logics and attractive algebraic analyses. With the provision of these semantics, furthermore, the supplying of such relational semantics for all the modal sentential logics presented and studied by the great pioneers, Lewis, Lemmon and Feys, is completed(2).

(2) Of course Lewis, Feys and Lemmon were by no means the only important pioneers of modal systems - von Wright and Prior were among others - or always the earliest. Leibniz is now said, in Germany, to have outlined system S2, and MacColl, whose modal systematisation remains neglected, delineated a system in the vicinity of S2. But the cited pioneers did much systematisation and taxonomy of systems; to them primarily we owe present main galaxy of modal systems.

11. ———. 1989. "Philosophical and Linguistic Inroads: Multiply Intensional Relevant Logics." In *Directions in Relevant Logic*, edited by Sylvan, Richard and Norman, Jean, 269-304. Dordrecht: Kluwer.

"Many English sentences contain not just one intensional connective but several. Philosophical discourse and argument contain a particularly high concentration of intensional connectives, indeed of ultramodal connectives, those beyond the reach of modal logics. For it is not just that the fundamental argument relations of deducibility, implication and conditionality are intensional, indeed themselves ultramodal. So furthermore are central topics of philosophical investigation, such as: knowledge and belief; evidence, confirmation, and explanation; pastness and futurity, and the notions of tense, change and action; value, right and obligation; to begin with a listing. They are one and all intensional, and generally more highly intensional than the modal notions of possibility, necessity and contingency, or of provability and classical probability. The upshot is that any logical theory fit to pass initial adequacy conditions for the formalisation of associated discourse - and especially of philosophical arguments - will have to consider intensional connectives, indeed highly intensional connectives, and not just one at a time, but multiply. But virtually all previous theories fail to accommodate ultramodal notions. This is enough to motivate the present enterprise, that of adding many further, appropriately controlled, connectives to the implicational systems so far studied in relevant logic investigations (e.g. in the studies surveyed in RLR). Not too surprisingly, however, the further connectives singled out for special study are those that have attracted much philosophical discussion and have, for the most part, already been investigated, much less than satisfactorily, in applications of modal logic." (p. 269)

References

RLR = Routley, R., Plumwood, V., Meyer, R. K. and Brady, R. 1982, *Relevant Logics and Their Rivals I*, Ridgeview, Atascadero, Ca.

12. ———. 1989. "Semantics unlimited I: A Synthesis of Relevant Implication and Entailment with Non-Transmissible Functions Such as Belief, Assertion and Perception." In *Directions in Relevant Logic*, edited by Sylvan, Richard and Norman, Jean, 327-376. Dordrecht: Kluwer.

"The thesis that philosophy is the logical syntax and semantics of language, that, more comprehensively, the task of philosophy is semiotical analysis, though sponsored especially by Carnap, was adopted by Russell before him and Montague and many others after him. The thesis foundered, so it came to be thought, like "Montague semantics" and "illocutionary logic" after it, on various immovable rocks, a major one being the inadequacy of the semantical framework in terms of

which the thesis was to be made good, an inadequacy which left it unable to accommodate and account for much intensional discourse. A chief deficiency of the framework was, in fact, the restriction to the possible - to possible worlds and possible individuals, in short to possible items, worlds being a sort of item. An important by-product of general semantics for relevant logics is that they have shown how to remove, in a nontrivial way, the restriction to possible worlds (and thereby too that the restriction to possible individuals can be lifted and with it associated restrictions militating against incomplete, vague, and other supposedly recalcitrant items: see JB p.348ff.). We can move out of the modal dark ages." (p. 328)

#### References

JB = Routley, R. 1979, *Exploring Meinong's Jungle and Beyond*, Research School of Social Sciences, Australian National University, Canberra.

13. ———. 1989. "Conclusion: Further Directions in Relevant Logics." In *Directions in Relevant Logic*, edited by Sylvan, Richard and Norman, Jean, 399-437.

Dordrecht: Kluwer.

"There is a great deal to be done, as always. For one thing, research papers commonly open at least as many questions as they resolve. Moreover, as has always been the way with minority research interests, there are few doing the work, especially compared with the numbers defending or propagating dominant "classical" logic and its complex epicycling.

Early in its rise to ascendancy classical theory encountered a heavy variety of paradoxes and anomalies quite sufficient to have grounded it, had workable alternatives been available.

There were none with comparable scope. Alternatives have been slow to emerge, dominant positions blinkering discernment of rivals; these alternatives are still few, and none yet has wide appeal. Meanwhile classical theory has been able to fortify its position, to assemble a ring of defences, to pretend, for example, that the paradoxes and anomalies that come with it are inevitable or facts of life. Now with the advent of the two-valued Boolean computer age, it appears that limited skirmishes have been decisively won for the time being by the classical hordes, with the fair and the true roundly defeated by the tough and the crude. All of which is bad news for all subjects, like philosophy, involving reasoning, where two-valued classical logic has done much more harm than good.(1)" (p. 399)

(1) The points are documented in several places; see especially UU, or JB p. 898 ff.; also RLR.

From this angle, the various schools who have refused the enticements of classical logic and tried to persist with an expanded traditional logic (e.g. J. Anderson and the Sydney school) were not entirely wrong. But in avoiding propositional logic, for example, except as distorted through dubious reductions, they gave themselves a severe handicap.

#### References

JB = Routley, R. 1979, *Exploring Meinong's Jungle and Beyond*, Research School of Social Sciences, Australian National University, Canberra.

RLR = Routley, R., Plumwood, V., Meyer, R. K. and Brady, R. 1982, *Relevant Logics and Their Rivals I*, Ridgeview, Atascadero, Ca.

UU = Routley, R. 1977, "Ultralogic as universal?", Newsletter 2, "Ultralogic as Relevance Logic 50-90 and 138-175; reprinted in JB.

14. ———. 1989. *Bystander's Guide to Sociative Logics: A short interim edition*.

Canberra: Department of Philosophy. Research School of Social Sciences. Australian National University.

"In a *sociative* logic, premisses and conclusion of an argument, or correspondingly antecedents and consequent of a valid implication, are associated; they characteristically have enough to do with one another. To that extent any such logic is broadly relevant. But what have become known as relevant logics, the best known of which are the relevance logics largely forged in dirty Pittsburgh, comprise only a quite proper subclass of the broader class of sociative logics, many kinds of



which have a much longer and more substantial history than relevant logics. If the story elaborated in this guide is correct early sociative logics did not arise in reaction to noxious irrelevant products; these logics were the original logics. The oversimplification and excessive power of irrelevant systematisation only came later; and then especially in the later middle ages and contemporary times when such systematisation came to dominate, there was a due, though substantially ineffectual, reaction against it.

What the later sociative logics that developed in reaction have in common is primarily the aim to avoid the most obvious paradoxes of dominant logical theorising. The plurality of logical theories and sketches that now make up sociative logics share little else however. There is no common commitment, for instance, to supply an account of entailment, or a theory of relevance, or a technical story of the use of premisses in argument, though there are bound to be commitments to some more central logical enterprises or other, such as elaboration of a theory of argument or inference, an account of reasoning, explication of conditionals, and so on.

What these different commitments were and are, and ought to be, will begin to unfold as the story proceeds." (Preface, p. II)

15. ———. 1989. "Uniform Relational Logics for all Lewis, Lemmon and Feys Modal Logics - With More on the Virtues of Weakness and Nonnormality." *Journal of Non-classical Logic* no. 6:19-40.
16. Sylvan, Richard, Goddard, Lenn, and Da Costa, N. C. A. 1989. "Reason, Cause, and Relevant Containment with an Application to Frame Problems." *Research Series in Logic and Metaphysics* no. 3:81 pages.
17. Sylvan, Richard, and Norman, Jean. 1989. "Introduction: Routes in Relevant Logic." In *Directions in Relevant Logic*, edited by Sylvan, Richard and Norman, Jean, 1-24. Dordrecht: Kluwer.  
 "In relevant logic, a main revolutionary force in contemporary logical unrest, there are many extremely interesting directions to take. The essays included here indicate some significant and exciting directions, and give out widely conflicting opinions and advice on progress and directions - including such advice as: avoid these dangerous paths and byways, and get back on safe and established highways! This introduction and the conclusion, which ignore such well-meaning advice, try to give a wider impression of directions and unmapped regions (the survey is further extended and given historical dimension in the companion volume BG)." (p. 1)  
 References  
 BG = Sylvan, R. 1988, *A Bystanders' Guide To Sociative Logics*, typescript, Canberra.
18. ———, eds. 1989. *Directions in Relevant Logic*. Dordrecht: Kluwer.  
 Chapter by Richard Sylvan: Preface (with Jean Norman) VII-VIII; Introduction: Routes in Relevant Logic 1-21; Chapter 19: Philosophical and Linguistic Inroads: Multiply Intensional Relevant Logics 269-304; Chapter 22: Semantics Unlimited I: A Relevant Synthesis of Implication with Higher Intensionality 327-376; Chapter 24: Conclusion: Further Directions in Relevant Logics 399-437.  
 "Relevance logics came of age with the one and only International Conference on relevant logics in 1974.  
 (..)
 

We thought that the collection of essays was still (even after more than six years in the publishing trade limbo) well worth publishing, that the subject would remain undeservedly esoteric in North America while work on it could not find publishers (it is not so esoteric in academic circles in Continental Europe, Latin America and the Antipodes) and, quite important, that we could get the collection published, and furthermore, by resorting to local means, published comparatively cheaply. It is indeed no ordinary collection. It contains work by pioneers of the main types of broadly relevant systems, and by several of the most

innovative non-classical logicians of the present flourishing logical period. We have slowly re-edited and reorganised the collection and made it camera-ready. While we have retained all the completed essays from the Conference sent to us with the exception of essays that have, in the interval, been published elsewhere, we have not limited ourselves to these essays but have, so far as space permitted, invited newer essays. As well we have included overviews, which provide introductions to current directions of research on broadly relevant logics and to many general problems in the area." (Preface, P. VII)

19. Sylvan, Richard, and Urbas, Igor. 1989. "Factorisation Logics." *Research series in Logic and Metaphysics* no. 5:50 pages.
20. ———. 1989. "Prospects for Decent Relevant Factorization Logics." *Journal of Non-classical Logic* no. 6:63-79.
21. Sylvan, Richard. 1990. "On Making a Coherence Theory of Truth True." *Philosophica (Belgium)*:77-105.  
 "In the last half century the coherence theory of truth has largely fallen into disuse and disrepute. While there is now some flirting with coherence approaches, as each approved version of the majority position, the correspondence theory, duly founders, and holism gains in fashionability, still coherence has but few committed friends. Granted, it has had friends of a sort: most notably Rescher, who has made significant contributions, on which others may profitably build. But Rescher, while advocating what he calls a 'coherence theory' has twisted the theory into what it is not, a modified "self-evidence" theory, and has also warped it into a methodological pragmatism that would have made straight old-timers like Bradley and Blanshard blanch. As well the major virtues of the theory - if only it could be got to work, which unfortunately it can't - have been appreciated by isolated explorers of the wide truth terrain, such as Blackburn (see esp. his pp. 237-8). The present exercise supplies one way of enabling the theory to work, without undue warping. That way does not pretend to be an authentic historical way, only an historically controlled and informed way. For the primary purpose here is not historical explication; it lies rather in the development of coherence theory *beyond* its previous and varied historical settings, to render it somewhat more adequate and more coherent, and to begin to display some of its further virtues." (p. 77, notes omitted)  
 References  
 S. Blackburn, *Spreading the Word*, Clarendon, Oxford, 1984.  
 B. Blanshard, *The Nature of Thought*, London, 1939.  
 F.H. Bradley, *Essays on Truth and Reality*, Oxford, 1914.  
 N. Rescher, *The Coherence Theory of Truth*, University Press of America, Washington, 1973.
22. ———. 1990. "Variations on da Costa  $C$  Systems and Dual-Intuitionistic Logics: I. Analyses of  $C_w$  and  $CC_w$ ." *Studia Logica* no. 49:47-65.  
 Abstract: "Da Costa's  $C$  systems are surveyed and motivated, and significant failings of the systems are indicated. Variations are then made on these systems in an attempt to surmount their defects and limitations. The main system to emerge from this effort, system  $CC\omega$ , is investigated in some detail, and "dual-intuitionistic" semantical analyses are developed for it and surrounding systems. These semantics are then adapted for the original  $C$  systems, first in a rather unilluminating relational fashion, subsequently in a more illuminating way through the introduction of impossible situations where and and or change roles. Finally other attempts to break out of impasses for the original and expanded  $C$  systems, by going inside them, are looked at, and further research directions suggested."
23. ———. 1990. "Relevant Conditionals: Integrating Semantics for One and Two Place Theories and Elaborating the Theories (Abstract)." *Journal of Symbolic Logic* no. 55.

24. Sylvan, Richard, Fuhrmann, André, and Los, J. 1990. "Assertion and Commitment and Conditional Obligation." *Research Series in Logic and Metaphysics*:60 pages.
25. Sylvan, Richard. 1991. "Existence II: Existence and Nonexistence." In *Handbook of Metaphysics and Ontology*, edited by Burkhardt, Hans and Smith, Barry, 261-263. Munich: Philosophia Verlag.

"While the topic of existence ought to be a central concern of philosophy, the fundamental notion of ontology, the notion in fact remains remarkably underinvestigated because of certain ancient prejudices, such as referential assumptions embedded deep in mainstream philosophy. Most important among these is the ontological assumption, according to which whatever is a (logical) subject, whatever is genuinely talked about, exists. (The assumption appears in various different guises, e.g. as narrowed to what is truly talked about, and also in derived forms, e.g. as restricted to quantifiable talk, a form sloganized as 'to exist is to admit of construal as a value of a bound variable' and the like.) Accordingly, then, discourse that is apparently about what does not exist must be reduced, in one way or another, to proper (logical) form, namely that conforming to the above assumption.

The mainstream result is a grand (but misguided) reduction programme for many types of problematic language, especially that about fictions, i.e. fictional items generally, and that about universals, abstractions, and theoretical items. The so-called 'riddle of existence' (or 'Plato's beard') derives from the same assumption. The puzzle is: how is it possible to make true statements, such as 'Pegasus does not exist', about the nonexistent, since the statement yields both that the subject (Pegasus in the example) exists, by the assumption, and that it does not, because that statement is true? The received resolution involves both an analysis, or removal of 'Pegasus' from the class of genuine names and logical subjects, and circumscription of the 'predicate' 'exists' (and of course its associated negation) under the dogma that existence is not a predicate.

Under the alternative object-theory approach, still a minor philosophical stream but one systematizing much traditional philosophical and everyday practice, all this analytic and reductive activity is avoided. For example, 'Pegasus does not exist' is admitted to be what it appears to be, a grammatically satisfactory subject-predicate statement, without existential commitment; it is a statement about (or signifying) a non-existent object, Pegasus, and ascribing to it the property of non-existence. So existence, too, is a predicate, indeed a rather distinguished one, of which it would be reasonable to expect some suitable philosophical characterization. Neither it nor non-existence is especially puzzling, or beyond characterization and therefore discussion; nor is it without criteria because it is not a feature of everything nor is it distributed everywhere.

(...)

The assumption-undermining object-theory alternative does not carry any commitment to traditional doctrines concerning essence, long entangled (in priority and other disputes) with questions of existence. For characterization is a wider, less loaded notion than essence. Characterizations may be fuzzy, not tied to necessary and sufficient conditions but to looser specifications; they themselves are further non-existent items. Nor do they 'precede' existence, though elements of them are needed in order to ascertain whether something exists or not.

(...)

Although defining existence is a controversial affair, the notion is not entirely uncontrolled; there are fairly uncontroversial) bounds. It is generally taken that such material things as sticks and stones, which can hurt, do exist, but that mere names, as distinct from sounds and marks on surfaces, do not; nor do impossible objects or the characters of pure fiction or imagination or speculation.

But in between are extensive controversial areas. As policy in arriving at an account of existence we could do worse than to heed Ockham's razor, not to multiply what exists beyond necessity, which translates into: begin with those items which obviously exist, not-controversially, such as medium-size material objects, and

close under enlargements produced by unavoidable extensions thereof, such as compounding or summation and dissection or analysis. But exclude unnecessary items, such as illusions, imaginary items, dream characters, and unnecessary operations, such as abstraction, idealization, fictional variation, and so forth. The route to an appropriately minimalist definition of existence is now evident. An item exists if it stands in suitable physical relations to the paradigm existents. (Such a definition is refined and synthesized with other accounts of existence in Routley 1980, Chapter 9.)" (pp. 261-263)

26. ———. 1991. "Nature, Ontology of." In *Handbook of Metaphysics and Ontology*, edited by Burkhardt, Hans and Smith, Barry, 599-602. Munich: Philosophia Verlag.
27. ———. 1991. "Relativism." In *Handbook of Metaphysics and Ontology*, edited by Burkhardt, Hans and Smith, Barry, 783-785. Munich: Philosophia Verlag.
28. ———. 1991. "Relevant Logics." In *Handbook of Metaphysics and Ontology*, edited by Burkhardt, Hans and Smith, Barry, 787-789. Munich: Philosophia Verlag. "Relevant logics are both philosophically and mathematically motivated: but in both cases, a prime objective is to avoid paradoxes or incoherence, of one sort or another, a feat accomplished through restored or improved connections, especially relevant connection in implicational and inferential linkages. Relevant implications, the focus of most research, are those whose components (A and B in implication  $A \rightarrow B$ ) are relevant to one another, i.e. have enough to do with one another. Broadly relevant, or sociative logics assert none but relevant implications; all implicational theses of such logics are relevant implications. Under a technical explication (of weak relevance), relevant implications and logics are explained in the following way: a logic or logical system is relevant if its propositional part contains no theorems of the form  $A \rightarrow B$  where A and B fail to share a parameter. So any system which includes or validates paradoxes of implication - such as that contradictions imply everything and anything implies what is necessary (e.g. in standard symbols of the literature):

$A \ \& \ \sim A \rightarrow B, B \rightarrow. C. \vee \sim C. A \ \& \ \sim A \rightarrow. C \ \& \ \sim C$ , etc.

is irrelevant. Mainstream logics, such as classical and intuitionistic systems, are irrelevant.

(...)

"All these types of sociative logics have historical roots, most reaching back at least to medieval times. For example, semantical reasons for the serious qualification of Disjunctive Syllogism were anticipated in the 15th century by the Cologne School and Domingo de Soto; for they realized that where both A and  $\sim A$  hold (as in non-trivial inconsistent theories and many kinds of intensional situations), A does not exclude  $\sim A$ , A's negation, so B's holding is in no way guaranteed. Generally, however, the historical connections were rediscovered later, after contemporary investigations had begun. In particular, technical studies of the best known of these sociative types, relevant logics proper, were well advanced before it was realized that some of the ideas (e.g. that relevant implication explicated genuine deducibility) were not quite so new, and that popular arguments against the theory appealing to the logical tradition could be matched by rival traditional arguments from dissenting schools. But certain recently neglected features of logical tradition - notably the requirements of preservation of relevance and necessity in an implication - were early seized upon by Anderson and Belnap (1975), who made these requirements central to their elaboration of entailment, as encapsulated in the system *E* (of 'entailment'). To them we owe both the title 'relevance logic' and the main systems of relevance logics, a subclass of properly relevant logics in the vicinity of *E*, a system itself adapted from the (theorem-wise equivalent) system of 'rigorous implication' of W. Ackermann (1896-1962), who really initiated contemporary technical studies in 1956." (pp. 787-788)

References

Anderson, A. R., and Belnap, N. D., Jr., 1975, *Entailment. The Logic of Relevance and Necessity*, vol. I, Princeton, N.J.: Princeton University Press; vol. II, *ibid*.



- (1990).
29. ———. 1991. "Sistology." In *Handbook of Metaphysics and Ontology*, edited by Burkhardt, Hans and Smith, Barry, 837-840. Munich: Philosophia Verlag.
  30. ———. 1991. "On Interpreting Truth Tables and Relevant Truth Table Logic (Abstract)." *Journal of Symbolic Logic* no. 56:381.
  31. ———. 1991. "On the Foundations of Process Theory (Abstract)." *Journal of Symbolic Logic* no. 56:113.
  32. Sylvan, Richard, and Nola, Robert. 1991. "Much Simplified Semantics for Basic Relevant Logics (Abstract)." *Journal of Symbolic Logic* no. 56:381-382.
  33. ———. 1991. "Paraconsistent Classical Logic (Abstract)." *Journal of Symbolic Logic* no. 56:382.
  34. ———. 1991. "Confirmation Without Paradoxes." In *Advances in Scientific Philosophy: Essays in Honour of Paul Weingartner on the Occasion of the 60th Anniversary of His Birthday*, edited by Schurz, Gerhard and Dorn, Georg J. W., 5-44. Amsterdam: Rodopi.  
 "Our modest aim is to show how, within a suitable relevant logical framework, all the paradoxes of confirmation vanish - not merely those Hempel and Carnap adduced, but those uncovered by Good, Goodman, Glymour, and others. But, naturally, even removing these paradoxes wholesale still leaves much logical work to be done, work we shall not try to complete here. What we shall indicate however, in the final section, is convergent work undertaken independently by Paul Weingartner and collaborators, which resolves paradoxes in an analogous fashion." (p. 5)  
 (...)
 "To arrive at relevant logic and accompanying semantics of confirmation, we shall try to proceed from what is more secure (such as intersubstitutivity principles) to what is less (such as converse consequence conditions discussed by Hempel). In brief, we build up from weakness (as was the main Taoist-Cartesian methodological stratagem of RLR) rather than adopting the more difficult, if theorem wise intertwining, classical procedure of cutting down from damaging strength. The goal is, of course, a relevant logical theory free from paradoxes. Nonetheless, a subsidiary aim is to achieve substantially a *logical* theory, to accomplish as much as we reasonably can with logic alone, without undue appeal to outside distinctions or information (which may however enter in applications): in particular, without undue appeal to types of samples, or classes of conditionals or hypotheses, or "theoretically barren contexts" with no illicit background information, or "total available information." (p. 6)  
 References  
 Routley, R., and Others (1982), *Relevant Logics and Their Rivals*, California: Ridgeview, referred to as RLR.
  35. Sylvan, Richard. 1992. "On Interpreting Truth Tables and Relevant Truth Table Logic." *Notre Dame Journal of Formal Logic* no. 33:207-215.  
 Abstract: "Contrary to common mythology, the two-valued truth tables do not yield classical logic. *Many* contestable assumptions are required to reach classical logic. Indeed *some* assumptions are required to get anywhere logically. In between, and in other directions, lie several other logics. For, even logically, there are many ways in which the truth tables can themselves be interpreted. In particular, they can be variously read inferentially, in one direction or two, or they may be variously read semantically. Along inferential lines, Tennant's one-way reading is reconsidered. It is argued that the tables do not lead to the logics Tennant claims to reach but can lead to various other decidedly weak logics. Along more orthodox semantical lines, it is shown how the truth tables themselves do not exclude nonclassical situations but can allow for incomplete and inconsistent set-ups. So considered, they provide the framework for a four-valued relevant logic. A four-valued implication is grafted onto this

framework, simply by generalising upon two-valued material implication artifice, to deliver the familiar system *FDE* of tautological entailment. Finally, for comparison, a less contrived semantics than pure truth tabular, a semantics due to Dunn, which now admits of ready higher degree extension, is supplied for *FDE*."

FDE = First Degree Entailment

References

Dunn, J. M., "Intuitive semantics for first-degree entailments and 'coupled trees'," *Philosophical Studies*, vol. 29 (1976), pp. 149-168.

Tennant, N., "Truth table logic," *Notre Dame Journal of Formal Logic*, vol. 30 (1989), pp. 459-484.

36. ———. 1992. "Significant Moments in the Development of Australian Logic: in Critical Appreciation of Leonard Goddard's Major Contribution." *Logique et Analyse* no. 45:5-44.  
 "Len Goddard not only initiated wider logical research in Australia, but further he had a major influence on the character and ethos of that investigation; for example, its easy, free-wheeling, unauthoritarian, undogmatic character. He encouraged features of what would now be regarded as logical pluralism of a relaxed and far-reaching kind. Not only were there many logical systems and frameworks worth investigating, some of course of more philosophical or technical merit than others; but more, he freely conceded that there may not be a unique correct one, or absolutely right way, among them. Nor, by contrast with common practice elsewhere, did he discourage heterodox logical work, even such unorthodox thought as that prevailing classical ways might be seriously defective, even downright wrong. To the contrary, he early thought that satisfactory resolutions of a range of paradoxes and puzzles should be sought outside entrenched ways; but he did not try to impose his own ideas or interests. In his own research at the time, which was (rather un-Australianly) nonconfrontational, he was certainly looking for resolutions of logical and semantical paradoxes outside formal classical logic - though by way of what had long stood at the peripheries of British logical investigations (from Mill through Russell and Ryle), namely significance theory and its contextual enlargements. More generally, there was no attempt, with Goddard as guide and director, to pull or push researchers into some standard line; on the contrary, they were encouraged to roam." (pp. 6-7)
37. ———. 1992. "Process and Action: Relevant Theory and Logics." *Studia Logica* no. 51:379-437.  
 Abstract: "While *process* and *action* are fundamental notions, in ubiquitous use, they lack satisfactory logical treatment in two critical respects: in analyses of the fundamentals themselves and in logical development. For what treatment they have so far received, under classical systematisation, leaves significant lacunae and induces much paradox. A relevant logical relocation, carried through in detail here, removes such problems, and provides solid ground-work for a satisfactory treatment.  
 Firstly, as to fundamentals: processes should be explicated, so it is argued, as certain sorts of (time) directed functions (from inputs to outputs); thus they can be represented through certain ordered pairs of relations. Significant logical structures they can enter into are investigated: notably, process lattice and coupled logics, and a generalized category theory (tolerating nonassociativity of composition). Actions are types of processes, agent-ascribed process. As stock analyses of the differentia, operators and agency, through intentionality, rationality and so on, demonstrably fail, new causal analyses are proposed.  
 Secondly, as to logical developments: for the most part, the apparently diverse offering of process and action logics to be encountered in the literature are but multiple modal logics: modal logics enriched with further functors of interesting modal sorts. Some, for example, like advertised "process logics" are dynamic logics (themselves basically multiple modal logics) enriched by tense logical functors, themselves modal in character. In a way that is now becoming nonstandardly standard, these modal enterprises can be reworked on relevant logical bases. A main

- point to such exercises resembles that of other relevant reworkings: namely, the search for correctness, for adequacy to pre-analytic and linguistic data, and therewith removal of paradoxes and anomalies that accumulate under modal analyses.
- Logical components from a properly expanded Humean model of action are supplied with relevant logics and semantics, in particular doing, trying and striving, intention and motivation. The difficult question of formalising practical inference is then addressed.
- Relevant dynamic logics, paralleling modal developments, are built up piece by piece, relevant theory change is considered within a dynamic framework, and work on relevant temporal and process logics of programming cast, including functors such as before, during and throughout, is initiated. The present state of logical play is assessed."
38. ———. 1992. "Grim Tales Retold: How to Maintain Ordinary Discourse About - and Despite - Logical Embarrassing Notions and Totalities." *Logique et Analyse* no. 35:349-374.
39. ———. 1992. "Blending Semantics for IF as a One-Place Assertive With Semantics for the Conditional." *Bulletin of the Section of Logic* no. 21:67-71.  
 "According to the interesting theory of Miguel de Castro [2], the word 'if' is not - what conventional logical theory sees it as - a two-place connective coupling a pair of sentences (e.g. even mildly deviant logicians like Belnap and Anderson take this line; see [1], p. 481). It is rather - what it often seems to be { a one-place functor, like its near relative *suppose* and like *would that, one wonders whether*, and many *wh*-expressions. Let us restrict consideration to the one-place *connective*, i.e. where *if* is sentence forming, so that, like  $\sim$  (for *not*), where *A* is a sentence so is *if A*. Under the one-place theory, the conventional form *if A (then) B*, symbolized  $A > B$ , plainly derives by compounding, through the two-place connective, *,or, then*. To make reading more straightforward, we shall assume then insertion (as argued for, in a distinguishing role, in [4] chapter ). The formation rule for *,then* is accordingly: where *A* and *B* are sentences (or wff) then so is *A, then B*. Thus  $A > B$  admits of syntactical analysis as: (if *A*), then *B*.  
 What is demonstrated here is that this analysis can be extended smoothly to the semantical theory." (p. 67)
- References  
 [1] A.R. Anderson and N.D. Belnap Jr., *Entailment*, Volume 1, Princeton University Press, 1975.  
 [2] M. de Castro, *if-Strings in English: a new syntactic and semantic analysis*, Doctoral dissertation, Australian National University, 1990.
40. Sylvan, Richard, and Priest, Graham. 1992. "Simplified Semantics for Basic Relevant Logic." *Journal of Philosophical Logic* no. 21:217-232.  
 "When Anderson and Belnap pioneered relevant logic, they proposed a number of systems (*E*, *R*, etc.) in proofs theoretic form. When suitable world-semantics for these systems were produced, it became clear that these systems were but the tip of an iceberg.  
 Moreover, in the light of the semantics, it became clear that the basic (affixing) logic was none of those that Anderson and Belnap had suggested, but the system now called *B* (or *BM* if we drop all constraints on *\**). This had the most general semantics: other (affixing) systems being obtained by adding extra conditions on the ternary relation, *R*." (p. 217)  
 (...)  
 "In the first part of the paper we will consider the basic positive logic,  $B^+$ . In the second half we will consider negation-extensions of  $B^+$ . There are two strategies for handling negation in relevant logic: one uses the Routley *\**-operation; the other uses four-valued semantics (Routley *et al.*, *loc. cit.*). We consider both approaches. The extant four-valued semantics for relevant logics contain a complication over and above constraints on *R*: they require two ternary relations (one to state truth

conditions; the other to state falsity conditions). A feature of the present semantics is that only a single ternary relation is needed. Thus, the four-valued semantics are doubly simplified. Moreover, an interesting divergence emerges here. All negative systems add De Morgan laws to  $B^+$ . The basic negative system with the Routley \* adds, in addition, contraposition; that for the four-valued semantics adds, instead, double negation. ( $B$  itself, adds both.)

We concentrate in this paper on the semantics of the basic affixing relevant systems. It is clear that simplified semantics for all (affixing) relevant logics, along the lines given here, are to be expected. But since details are not as straightforward as might be expected, we leave this topic for another occasion." (pp. 217-218)

41. Sylvan, Richard, and Hyde, Dominic. 1993. "Ubiquitous Vagueness Without Embarrassment: Logic Liberated and Fuzziness Defuzzed(i.e. Respectabilized)." *Acta Analytica*:7-29.  
Abstract: "Although puzzles surrounding vagueness are ancient, they have been much intensified since the rise of standard "classical" logic. A main trouble is that standard logic proceeds to "validate" both ancient defective arguments (sorites paradoxes) and modern defective arguments (modal paradox analogues). But much evidence has recently accumulated as to the severe philosophical inadequacy of standard logic. Plausibly then ways out of such logic-induced puzzles which work elsewhere, relevant ways which work well, will succeed with puzzles of vagueness also. So it proves, by letting the puzzles constrain the logic, so producing their own demise, we reach elegant logical resolutions with the "very" logics adopted elsewhere for removing other logic-induced problems."
42. Sylvan, Richard, and Urbas, Igor. 1993. "Paraconsistent Classical Logic." *Logique et Analyse* no. 36:3-24.  
Abstract: "The objective is to reformulate classical (propositional) logic, preserving all theses, so that the spread rule  $A, \sim A / B$ , is avoided. There are many ways of doing this - some less, some more satisfactory, all exact formulations no doubt an improvement on standard classical logic. So results a cluster of paraconsistent classical logics. These systems are surveyed and rudimentarily classified, several of them separated, and some exhibited and discussed in more detail. Among the pure systems of the cluster are Hiz' s logic  $H$ , a Hilbert-style reformulation of Arruda-da Costa logic  $J_3$ , a cut-free formulation of Schütte's system  $K_1$  and various normal-forming logics. Some of these pure systems fit Brazilian and Belgian criteria for paraconsistency very neatly, and significantly better than any Brazilian or Belgian systems."
43. Sylvan, Richard, and Nola, Robert. 1994. "The Irrelevance of Grue." *Explorations in Knowledge* no. 11:1-11.
44. Sylvan, Richard. 1995. "Re-Exploring Item-Theory. Object-Theory Liberalized, Pluralized and Simplified but Comprehensivized." *Grazer Philosophische Studien* no. 50:47-85.  
Reprinted in R. Routley (Author), M. Eckert (ed.), *Exploring Meinong's Jungle and Beyond: The Sylvan Jungle — Volume 1 with Supplementary Essays*, (2018), pp. 546-561.  
Abstract: "Re-explored are certain item-theory theses, major problem zones, and newer puzzles and, together therewith, prospects for liberalizing and pluralizing item-theory. Undoubtedly item-theory may be further liberalized, partly by further dissociation from object-theory and the restrictions *object* imposes, but primarily through substantial deregulation of the styles of characterisations permitted. Then almost anything goes; nonetheless what results is a sufficiently well-organised smooth-running sistological anarchism.  
Characterisation is dispersed through a federation of regions: only in old central city regions do the characterisation postulates of older object-theory regularly hold; in the expanding suburbs characterisation by local assumption and postulation (as in neutral postulate-theory) is a distinctive mode, while out in the country implicit



intentional characterisation (including ostension and perception, dreaming and imagining) is a common mode. Put differently, there is a rich variety of sources yielding item specifications; only in places like the old city do structural descriptions of items enjoy formerly-imagined priority, but elsewhere alternative characterization principles may operate.

However what holds in situations as a result of such local or regional characterisation may be far removed from what is actual. Characters may be only make-believe or suppositional presented character may differ from more genuine articles, and so on. Bringing the items involved into central evaluation markets, where truth value is assessed, may require preparation of the items, with pruning or regularisation of their properties. Here, at this semantical stage, full pluralization offers further freedom, that is pluralization of truth, with a plurality of actual worlds. A single assignment of truth, *the* truth at the actual world, is no longer *de rigueur*; a truth net may be differently cast, different assignments may be adopted, and a selection among alternatives perhaps made. Within this liberalized pluralized setting, resolutions of puzzles induced by certain problem-making items are ventured."

45. ———. 1995. "Freedom Without Determinism: Decent Logics of Relevance and Necessity Applied to Problems of Free Will." *Acta Analytica*:7-32.  
Abstract: "Arguments for determinism do not enjoy the sound logical health that has been attributed to them. The main older argument is fallacious, indeed classically invalid, while a new "rectified" form is relevantly invalid (relying on modally covered form of disjunctive syllogism). What is more, there is no satisfactory way of repairing this form of argument so that it does yield a credible determinism. Other arguments for (non-vacuous) determinism are also dispatched, through a divide-and-dissolve technique, which operates by distinguishing types of determinism (such as logical determinism, which depends on another modal fallacy) and kinds of arguments for determinism (such as rational choice arguments, which inadmissibly assume maximization, and reductionistic arguments, which inadmissibly assume full reduction of choice and deliberation succeeds). In the largest of three appendices (the other two concern logical developments), a reasonable libertarianism is discerned and defended."
46. Sylvan, Richard, and Goddard, Lenn. 1995. "Relevance and Reasoning. Part I: Relevance in Discourse and logic." *Dialogue and Universalism* no. 5:37-63.
47. Sylvan, Richard. 1996. "Meinong." In *Penguin Dictionary of Philosophy*, edited by Mautner, Thomas, 261-263. Cambridge: Blackwell.
48. ———. 1996. "Paraconsistent Logic." In *Penguin Dictionary of Philosophy*, edited by Mautner, Thomas, 309. Cambridge: Blackwell.
49. ———. 1996. "Relevance." In *Penguin Dictionary of Philosophy*, edited by Mautner, Thomas, 364. Cambridge: Blackwell.
50. ———. 1996. "Relevant Logic." In *Penguin Dictionary of Philosophy*, edited by Mautner, Thomas, 364-365. Cambridge: Blackwell.
51. ———. 1996. "What Limits to Thought, Inquiry and Philosophy?" *Manuscripto*.
52. ———. 1996. "Other Withered Stumps to Time." In *Logic and Reality: Essays on the Legacy of Arthur Prior*, edited by Copeland, Jack, 111-130. Oxford: Clarendon Press.
53. Sylvan, Richard, and Copeland, Jack. 1996. "Heresies of Computability (Abstract)." *Journal of Symbolic Logic* no. 61:20.
54. ———. 1996. "General Annotated Logics, With an Introduction to Full Accounting Logic (Abstract)." *Journal of Symbolic Logic* no. 61.
55. Sylvan, Richard. 1997. *Transcendental Metaphysics: From Radical to Deep Plurallism [sic]*. Cambridge: The White Horse Press.  
From the Note by Nicholas Griffin:

"When Richard Sylvan died in June 1996 the manuscript of this book was already complete. It is true, to take up one of the themes put forward in its pages, that 'complete' in this context is not an absolute term: while one typescript was with his publisher at the time of his death, another, bearing further revisions, was with his typist. The changes he made at this time, however, were minor and only the bibliography and references have required much attention from me." (p. XIV)

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"General description of Form and Content of *Transcendental Metaphysics*."

There is not merely a plurality of correct theories and of more or less satisfactory world-views: there is a corresponding plurality of actual worlds. Plurality penetrates deeper in full plurallism than linguistic surface or than conceptual or theoretical structure, to worlds. There is no unique actual world such as realism postulates, but many worlds; there is no single fact of the matter, there are facts and matters. Full plurallism itself bifurcates, into two main forms; radical pluralism, which rests with multiple actual worlds, and *deep* plurallism, which 'completes' this multiplicity with a unifying ultimate item, the Wholle, of which the multiplicity comprises various worldifications. Much of the text is devoted to the theoretical elaboration and defence of deep plurallism, both directly and by comparison with past positions. Overall structure of the book (which is as shown by its short content) is, in brief, as follows: The basic theory is introduced and explained, and several confusions offset. Arguments against the radical theory are deflected and then many arguments for it are advanced. Following that detailed stage, deep plurallism and other pluralisms are further elaborated, in part through a detailed investigation of key notions, both of full plurallisms and also from traditional and religious pluralisms. Next the full theory is set in place through a series of comparisons: firstly with the other standard philosophical positions in realist-idealist-relativist and related debates, and secondly with connected development of many worlds theories and transcendental metaphysics of other philosophers. There too it is demonstrated that deep plurallism is not merely a metaphysics, but one that is transcendental, and various arguments against transcendental metaphysics are repelled. Finally full plurallism is put through its paces, in showing its power in resolving or relocating major philosophical problems, and further in dislodging powerful prevailing ideologies. In a brief epilogue, full plurallism is linked to practice. For instance, its decided merits as regards liberality and tolerance are explained.

Considered one way, the basic theory defended and developed can be seen as a plural realism, with central thesis that actuality is plural, more concretely that there are many actual worlds, not a unique one. Radical pluralism, which is pluralism at this actual world stage, not merely at a theoretical or conceptual scheme level, thus resembles realism, simply as (what is strictly impossible) pluralized. Deep pluralism does more, as it includes at least a nonworldly nondescript transcendental item in addition. From such world pluralism, however augmented, plurality of many other critical notions follows, notably of truth and evidence, truth for instance amounting to what holds at an actual world (of which there are very many).

However the basic theory can be alternatively seen not as a realism at all, because many apparently central themes of both ordinary realism and scientific realism are repudiated (e.g. respectively, uniqueness of the external world, and that that world is substantially as dominant science asserts, with all the existential trappings it alleges and none other). Alternatively again, it may be viewed as an antirealism, because for instance of its rejection, along with contemporary anti-realism, of the stock realist theme that there is a unique recognition-independent reality (or, on a lesser count, because of its questioning of classical bivalence and other truth-value principles). Nonetheless such an assimilation has, like others, limited plausibility, because full pluralism acknowledges many recognition-independent (perceiver and mind transcendent) actual worlds. Alternatively again, full pluralism may be regarded as mere relativism, because of its commitment to - what is less than relativism - relativity principles, for instance that truth is relative to actual world, and therefore is structurally relative. Whereupon it may be wrongly supposed that pluralism, like indiscriminating relativism, is self-refuting. Again, however, such a relativistic comparison is seriously defective - unless quite atypical, much more discriminating relativisms are envisaged. For by no means all positions are admissible, still less equally good. In pluralism there remain both internal and external checks upon adequacy and correctness: but, checks and balances that do not effect unique semantical selections.

Central to pluralistic enterprise (as opposed to fashionable relativism) are arguments, and therefore matters of logic and rival logics. Main arguments for full pluralism begin from plural logical theory, which is pivotal to all rational inquiry. Several different arguments are advanced for the plurality of correct theories; and it is argued from there through correspondence, or directly, to the plurality of actual worlds. Several coupled arguments from methodology are also developed. Stock arguments from rival one (actual) world positions are duly disabled.

Deep pluralism has large corollaries, for intellectual theory and practice, both inside and outside philosophy. To take one example: as it affords a comparatively easy way between the rocks of realism and relativism, so it affords a way between acceptance and rejection of science, of rationality, and more generally of the Enlightenment Project. There is no unique correct Science such as that the Enlightenment postulated; but there are various sciences, where not everything goes. In place of certified logic stands not no logic, but a plurality of logics, including more than one correct logic. Similarly in place of reason and rationality stands not nothing, not a rejection of reason and rational methods, but a pluralization of them (with prominent correct methods rejecting received modern maximization and consistency imperatives). In place of the truth stands not nothing, nihilism, no court of appeal regarding correctness, but several: pluralistic truth. In place of the Enlightenment stands not a return to earlier (and subsequent) dark ages, but a pluralistic flowering, into enlightenments." (pp. XV-XVI)

56. ———. 1997. "Relevant Conditionals, and Relevant Application Thereof." In *Logic, Language and Computation*, edited by Akama, Seiki, 191-244. Dordrecht: Kluwer.

"All that is required for validity of an implication in classical logic is that it be impossible for all the antecedents to be true and the consequent false. (Similarly, with terminology adapted, for validity of inferences.)

This requirement makes all implications with inconsistent antecedents valid. According to relevant logic, more should be required. That more can be explained in various equivalent ways. One is a classical look-alike; that the antecedents be genuinely inconsistent with the negation of the consequent. According to another look-like, truth should be preserved everywhere (including in impossible situations), that is, in whatever situation the antecedents hold so should the consequent. Another, perhaps more revealing, is as follows: not only should it be impossible for the antecedents to be true and the consequent false in a valid implication, but the antecedents and the consequent should also have something in common, or, in other words, the antecedents should be in some way relevant to the consequent. Whence the name relevant or relevance logic.

Relevance itself means, firstly: bearing upon the matter in hand or the point at issue. A statement, a consideration, or the like, that is said to be relevant, must be understood to be relevant to something, i.e.

relevance is always relational. Relevance matters in a wide variety of settings: in statistics (where a defective explication of relevance in terms of alteration of probability is regularly advanced); wherever evidence is assessed, as in law; in rules of relevance for conduct of meetings; in procedures for selection, as in organisation, where what is selected should enjoy relevant features. As well, relevance has recently assumed importance in linguistic and pragmatic investigations as to discourse and communication, owing partly to the Grice's widely accepted directive for admissible discourse, Be relevant!, and partly to the associated theme that most, even all, connectives of ordinary discourse exhibit relevance (i.e. for connector C, where  $pCq$  then q is relevant to p)." (p. 192)

57. Routley, Richard, and Copeland, Jack. 1999. "Beyond the Universal Turing Machine." *Australasian Journal of Philosophy* no. 77:46-66.
- Two of our heresies--in the dictionary sense of 'opinions contrary to the accepted doctrine on any subject'--are these)(1)
- Proposition 1. The so-called Church-Turing thesis is false.
- The so-called Church-Turing thesis purports to draw a borderline between computability and non-computability and is, it seems, pretty well universally accepted among computer scientists, cognitive scientists, and philosophers of mind. In point of fact neither Turing nor Church endorses, or even states, this thesis. Their theses, proved equivalent by Turing, concerned the functions that are in principle computable by an idealised human being unaided by machinery. Careful authors do use the term 'Church-Turing thesis' to refer to one or other of the various equivalent forms of the theses that Church and Turing themselves put forward. Proposition 1. concerns not that equivalence class of theses but a claim lying outside the class and widely but improperly termed 'the Church-Turing thesis'. We distinguish this thesis from members of the equivalence class by the use of riders such as 'so-called'. The so-called Church-Turing thesis is the claim that the class of well-defined computations is exhausted by the computations that can be carried out by Turing machines.
- Proposition 2. Computability is a relative notion, not an absolute one. There is no such thing as the class of well-defined computations. The extent of the computable functions is resource-relative." (p. 46)
- (...)
- "In the present paper we focus largely on proposition 1. although much of what we say also bears intimately on proposition 2. Proposition 2. receives further discussion elsewhere (Sylvan and Copeland 199-)." (p. 47)
- (1) Richard Sylvan did not live to see this paper written. He contributed a draft of section VIII and fragments of sections I, II and IX. Our collaboration began in August 1994, when Richard became interested in my descriptions of machines forbidden by the so-called Church-Turing thesis, and I in his ideas concerning the



extent to which one's notion of computability is relative to one's logic (the topic of Sylvan and Copeland 199-).

#### References

Sylvan, R. and Copeland, B.J. 'Computability is Logic-Relative', forthcoming in D. Hyde and G. Priest (eds.), *Applications of Relevant Logics* (199-) [Chapter 8 in Dominic Hyde, Graham Priest (eds.), *Sociative Logics and Their Applications: Essays by the Late Richard Sylvan*, (2000)]

58. Sylvan, Richard. 1999. "What is that Item Designated Negation?" In *What Is Negation?*, edited by Gabbay, Dov and Wansing, Heinrich, 299-324. Dordrecht: Kluwer.
- "Regrettably current logical orthodoxy is astray on negation, perhaps more seriously astray about negation than elsewhere. Unfortunately most of the advertised logical and linguistic alternatives to or elaborations upon classical orthodoxy are wrong also. A more engaging story needs to be told, upon which what follows represents some sort of bumbling beginning.
- Negation is an item, an operation which is both one (one determinable which, though widely used, is far from orthodox) and many (having many determinates). A prime determinate (which proves adequate on its own) is a relevant negation which applies both to sentences and to their unsaturated parts such as predicates. By contrast, the classical sentence negation of orthodoxy represents but a degenerate determinate, not widely used in normal discourse (for such discourse does not sustain irrelevant inferences, such as from a pair A and not-A to any statement whatsoever, etc.)." (p. 299)
59. Hyde, Dominic, and Priest, Graham, eds. 2000. *Sociative Logics and Their Applications: Essays by the Late Richard Sylvan*. Aldershot: Ashgate.
- On the title: "Much searching went into trying to find a satisfactory term to distinguish these logics. The eventually adopted term, *sociative*, derived through French from the Latin *sociare*: 'to combine, unite, etc.' and *socius* 'companion'. It now means 'expressing or denoting association, conjunction, union': see *Oxford English Dictionary*. Occasionally, the now obsolete English noun, verb and participle, *sociare*, will also be deployed." (Note 31, p. 29)
- "Chapter 5. A Preliminary Western History of Sociative Logics
- This essay originally appeared in 1989 as chapter 4 of BG. [Editors]
- Contemporary logical investigations enjoy the advantage of vastly improved logical technology as compared with all earlier terrestrial times. Yet, by comparison with earlier periods of high logical activity, the twentieth century is anomalous in its heavy mainline concentration upon classical logic, and, as a result, appears stodgy and unadventurous. For the deadening effect of the wide educational imposition of a narrow and intellectually disastrous dominant logical paradigm, classical logical theory, has (again) destroyed much logical expression and adventure. Rival logics have become very much a minority and esoteric activity, not even incidental to the serious affairs of life; no longer do even the city crows converse over logical issues. The full flourishing of sociative logics, in their rich variety, has yet to occur. So far as we know, there have been three main periods in the long history of Western logic when the central issues of logic, as to what makes an argument valid, when deducibility obtains, and whether these connections can be captured in true or necessary conditionals, have been vigorously discussed. The periods are these: around the third century BC when Stoic logic flourished, in the medieval period, especially the twelfth century AD, and in the present century.
- The logical investigations carried out in these three significant periods are, thus far, substantially independent. The Stoic enterprise of the third century exerted little or no influence on medieval thought, and indeed details (such as they are in Sextus Empiricus) were not available until after the seminal work of Abaelard's school and rival schools had already been accomplished. Of the main contemporary strands of sociative logic, only connexive and nontransitive logics have clear historical representation, and even there main investigations have proceeded substantially independently of historical inputs. When history has been appealed to in support of

relevance logics, for example, it has been rather peripheral and, too often, historically dubious.

Though the main historical settings for sociative logic presupposed a heavy consistency assumption (in particular throughout medieval times), and though paraconsistent logics tend to be missing in expected areas of application (such as treatment of semantical paradoxes), nonetheless the history of sociative logics is deeply interwoven with that of paraconsistent logics. One major reason for the intertwining is of course that a crucial issue for sociative logics is what-by contrast with strict and classical spread and collapse-happens with impossible premisses and assumptions. How is loss of connections to be avoided there? A special section of the theory of obligationes (or suppositional reasoning and commitment) was devoted to this issue in the Middle Ages; and a similar division of research, plainly parasitic on classical logic however, can be seen in contemporary North American research (such as that of Rescher and Brandom and of Woods and Walton). These pretty unsatisfactory ways of shunting off, and sidetracking, significant logical problems fortunately by no means exhaust feasible lines of approach, as the rich history of paraconsistent logics helps disclose. That history has already been documented, admittedly also in a very preliminary fashion, elsewhere (especially in PL [*Paraconsistent Logic*, 1989] and its extract OP [*On Paraconsistency*, 1983], which should be read in conjunction with this material - conversely, this material enriches *Paraconsistent Logic*, which is scanty on several topics of relevant interest). The entertaining story, which overlaps and complements the history of sociative logics, will not be repeated, but elements of it will be drawn upon where appropriate (and readers who seek a fuller picture to begin upon their own investigations should consult that story, as well as, of course, but cautiously, standard texts)." (pp. 53-54)

60. Brady, Ross, ed. 2003. *Relevant Logics and Their Rivals: Volume II. A Continuation of the Work of Richard Sylvan, Robert Meyer, Val Plumwood and Ross Brady*. Aldershot: Ashgate.

With contributions by Martin Bunder, André Fuhrmann, Andéa Loparic, Edwin Mares, Chris Mortensen, Alasdair Urquhart.

Contents: List of Contributors VIII; List of Figures IX; Preface XI; Prologue by Ross Brady 1; 6. Non-normal relevant systems by Richard Sylvan and Val Plumwood 10; 7. Multiplying connectives and multiply intensional logics by Richard Sylvan, Robert Meyer and Val Plumwood 17; 8. Operational semantics by Richard Sylvan and Val Plumwood 38; 9. The algebraic analysis of relevant affixing systems by Richard Sylvan, Robert Meyer, Ross Brady, Chris Mortensen and Val Plumwood 72; 10. The more general semantical theory of implication and conditionality 141; 11. Recent developments I by Ross Brady 192; 12. Recent developments II by Ross Brady 231; 13. On quantified relevant logics by Ross Brady 309; Appendix: Extensional reduction II by Robert Meyer and Richard Sylvan 352; Bibliography 408; Index 421-425.

"The main writing work, for the two volumes, was done by Richard Routley, making essential use of work of Meyer, Plumwood and Brady in the process. The second volume was also to include Chris Mortensen at least for his work on the algebraic analysis of relevant affixing logics. Moreover, Richard remained the driving force behind the *Relevant Logics and their Rivals* volumes, providing the layout and material for an integrated work. During the time of writing, Richard had sent most of the chapters to a number of people for comment. However, some of these chapters, earmarked for the second volume, were more complete than others, and four of the tentative chapters (i.e. chapters 10 and 13-15), being fairly incomplete, were not sent out at all.

However, subsequent to the publication of the first volume, there was quite some delay in getting the second volume together, mainly because Richard Sylvan was heavily involved in environmental philosophy and had other interests, both academic and non-academic. Richard made a number of attempts to restart the book, usually by contacting the other authors, but these contacts did not reap much

progress. In 1985, he had more or less given up on the chapters of the tentative contents. Richard had subsequently persisted with the idea of rewriting the second volume to bring it more into line with his recent thinking, since the early work of the 1970's was starting to date in relation to more recent advances. He made a start on this revision around 1988-9, producing a number of short separate pieces, which were hard to connect to the chapters previously sent round for comment. Thus, it would be hard to make much use of these pieces in this book, if one relied on the chapters of the tentative contents for guidance.

Unfortunately, Richard died unexpectedly in 1996, at the age of 60, leaving a plethora of unfinished work.

(...)

Upon initial examination of Richard's chapters 6-15, including his relevant archival material, I found that while a lot of it was in good shape for publication, much of the remainder was incomplete, sketchy or inaccurate. This is not entirely unexpected, given the circumstances. Nevertheless, I was put into the dilemma of either trying to complete it as best as I could, in accordance with the tentative contents, or inserting more up-to-date material. The main difficulty about the first approach is the age of the material, since it was done during a period of greater logical experimentation than seems appropriate nowadays, together with the advent of newer developments in the relevant logic area.

So, I have generally proceeded with the second approach by extending Richard's material into some new directions which cover the period from the time of publication of the first volume to the present. Given that Richard was interested in updating the original chapters 6-15 anyway, I feel this second approach is not entirely inappropriate nor against his wishes. I have also been ably assisted in this task by Martin Bunder, Ed Mares, Andre' Fuhrmann, Chris Mortensen and Alasdair Urquhart, who have given me some accounts of their recent work for inclusion. In this way, much of Richard's work and that of his co-workers, whose Work was interwoven into Richard's material, will be maintained for posterity as an important contribution to logic, upon which others may choose to build." (pp. XI-XIII)

61. Sylvan, Richard. 2003. "The Importance of Nonexistent Objects and of Intensionality in Mathematics." *Philosophia Mathematica* no. 11:20-52. With a foreword by Nicholas Griffin (pp. 16-19). This "is a reprinting, with as little change as feasible from the original typescript, of most of Chapter 10 and the introduction and first section of Chapter 11 of Richard Routley (who changed his name to Sylvan in 1985), *Exploring Meinong's Jungle and Beyond: An Investigation of Noneism and the Theory of Items*, published by the Philosophy Department of the Research School of Social Sciences of the Australian National University, Canberra, 1980, and still available from it (ISBN 0-909596-36-0)."
- "The more comprehensive case for the importance of nonentities includes, as especially significant, their role in mathematics and their roles in the theoretical explanations of science-the whole business, that is, of appealing to ideal simplified objects, which suitably approximate real objects, in problem solving and theoretical explanation. More generally, the theoretical sciences are seriously nonreferential, both in having as their primary subject matter nonentities, and in being ineradicably intensional. This thesis runs entirely counter to empiricist philosophies of science, which have long dominated the subject (to its detriment), according to which the language of science is, or ought to be, referential. Empiricist thinkers have, until very recently,' regarded the citadel of science as exclusively theirs: and the main goals of philosophy, as they conceive them, have been determined by the defense and extensions of the citadel to increase its power over the intellectual landscape. Thus they have taken the language of science, properly refined referentially of course, as the ideal of language, to which much ordinary language is at best a shabby first approximation; and they have characteristically seen philosophy as the handmaiden of science, as like a servant clearing away rubbish in the way of scientific progress or questioning scientific practice and values, or as a subsidiary

- scientific activity of conceptual analysis and reconstruction aiding the defense or advance of total science. A basic assumption in all this, without which much of the superstructure collapses, is that both the language of science and scientific theories conform to empiricist canons: the assumption is false-so at least it is now argued. The case begins by considering mathematics, which forms an integral part of much theoretical science."
62. Sylvan, Richard, Loparić, Andréa, and Plumwood, Val. 2003. "The More General Semantical Theory of Implication and Conditionality." In *Relevant Logics and Their Rivals: Volume II. A Continuation of the Work of Richard Sylvan, Robert Meyer, Val Plumwood and Ross Brady*, edited by Brady, Ross, 141-191. Aldershot: Ashgate.
  63. ———. 2003. "Appendix: Existential Reduction II." In *Relevant Logics and Their Rivals: Volume II. A Continuation of the Work of Richard Sylvan, Robert Meyer, Val Plumwood and Ross Brady*, edited by Brady, Ross, 352-406. Aldershot: Ashgate.
  64. Sylvan, Richard, Meyer, Robert K., and Plumwood, Val. 2003. "Multiplying Connectives and Multiply Intensional Logics." In *Relevant Logics and Their Rivals: Volume II. A Continuation of the Work of Richard Sylvan, Robert Meyer, Val Plumwood and Ross Brady*, edited by Brady, Ross, 17-37. Aldershot: Ashgate.
  65. Sylvan, Richard, and Plumwood, Val. 2003. "Non-Normal Relevant Systems." In *Relevant Logics and Their Rivals: Volume II. A Continuation of the Work of Richard Sylvan, Robert Meyer, Val Plumwood and Ross Brady*, edited by Brady, Ross, 10-16. Aldershot: Ashgate.
  66. ———. 2003. "Operational Semantics." In *Relevant Logics and Their Rivals: Volume II. A Continuation of the Work of Richard Sylvan, Robert Meyer, Val Plumwood and Ross Brady*, edited by Brady, Ross, 38-71. Aldershot: Ashgate.
  67. ———. 2003. "The Algebraic Analysis of Relevant Affixing Systems." In *Relevant Logics and Their Rivals: Volume II. A Continuation of the Work of Richard Sylvan, Robert Meyer, Val Plumwood and Ross Brady*, edited by Brady, Ross, 72-140. Aldershot: Ashgate.
  68. Beall, Jc, Brady, Ross, Dunn, J. Michael, Hazen, A. P., Mares, Edwin, Meyer, Robert K., Priest, Graham, Restall, Greg, Ripley, David, Slaney, John, and Sylvan, Richard. 2012. "On the Ternary Relation and Conditionality." *Journal of Philosophical Logic* no. 41:595-612.  
 Abstract: "One of the most dominant approaches to semantics for relevant (and many paraconsistent) logics is the Routley–Meyer semantics involving a ternary relation on points. To some (many?), this ternary relation has seemed like a technical trick devoid of an intuitively appealing philosophical story that connects it up with conditionality in general. In this paper, we respond to this worry by providing three different philosophical accounts of the ternary relation that correspond to three conceptions of conditionality. We close by briefly discussing a general conception of conditionality that may unify the three given conceptions."  
 "This paper emerged from some working sessions at the University of Melbourne in 2009.  
 Beall, Brady, Hazen, Priest, Restall, Ripley, and Slaney were involved *on the ground*. The work of Dunn and Mares kept coming up during the sessions, and the paper greatly benefited from their joining the effort after the event. Looming even larger in the initial discussions were two others: despite their deaths, much of the early work of Sylvan and Meyer was heavily represented. While we can't speak for the current views of Bob (Meyer) or Richard (Sylvan), we wanted to honor them for their starting this ternary-relation idea in the first place. Hence, we include them as authors. While not all of us (authors) agree on all ideas herein, we do agree with the main thrust of this paper: namely, that, despite first appearances, the ternary-relation approach to conditionality is very much philosophically plausible as capturing an important aspect of conditionality." (p. 595)



69. Routley, Richard. 2018. *Exploring Meinong's Jungle and Beyond: The Sylvan Jungle — Volume 1 with Supplementary Essays*. Cham (Switzerland): Springer. Edited by Maureen Eckert.  
 "Thus Sylvan argues that his neo-Meinongian, so-called "noneist" (pronounced *none-ist*), theory at the heart of the Jungle Book casts new light on supposed long-standing problems like the problem of universals, perception, intentionality, substance, self, and values. Chapters are devoted to metaphysical and associated epistemological problems that emerge in the philosophy of mathematics and philosophy of science, to developing a satisfactory epistemology more generally, to providing an adequate semantic account of fictional discourse, to an analysis and rejection of Russell's theory of descriptions and of Quine's objections to broadly-Meinongian approaches, and so on. The book's size matches its ambitions. And the book's author was a man of considerable intellectual ambition. (pp- XIII-XIV, Introduction by Dominic Hyde)  
 "The future perfect of *Exploring Meinong's Jungle and Beyond* by Filippo Casati" pp. 583-599-
70. ———. 2018. "Semantic Analysis of Entailment and Relevant Implication: I (1970/1)." *Australasian Journal of Logic* no. 15:211-279.  
 Transcription by Nicholas Ferenz of an unpublished manuscript.  
 "Semantical analyses are provided for several intensional logics, in particular for (substantial parts of) the systems R of relevant implication,  $\square$ R of relevant implication with necessity, P of ticket entailment, and E of entailment, and what is the same theory as E the system  $\Pi$  of rigorous implication. The analyses provided are used to provide semantical completeness results and decidability results for the main systems discussed, and are applied to settle some of the open questions concerning E and R and their fragments." (p. 212)
71. ———. 2019. *Ultralogic as Universal? The Sylvan Jungle — Volume 4 with notes and commentaries*. Cham (Switzerland): Springer. Edited by Zach Weber.  
 "Ultralogic is important not least because it boldly advances the value of inconsistent theories, especially in mathematics. Routley urges that consistency is not always the ultimate arbiter of correctness, that some contradictions can be true, a thesis now known as dialetheism. While Priest's works have become the canonical texts for dialetheism, without Routley, dialetheism would not be what it now is. It was the happy meeting of Priest and Routley in the 1970s that looks to have been the spark." (*Editor's Introduction*, p. XIII)  
 Supplementary Essays:  
 Ross T. Brady: *On The Law of Excluded Middle*, pp. 161-183;  
 Chris Mortensen: *Implication Principles in Routley Arithmetic*, pp. 185-194.
72. Routley, Richard, and Routley, Val. 2019. *Noneist Explorations I: The Sylvan Jungle — Volume 2 with Supplementary Essays*. Cham (Switzerland): Springer. Edited by Domini Hyde.  
 "With the perspective afforded by time, Richard Sylvan, n  Routley (1935-1996), will, I believe, come to be seen as the most important Australasian philosopher of the 20th Century. This is not at all to denigrate his currently better known compatriot contemporaries: a number of these made highly significant contributions to philosophy. But what set Richard apart was the originality he deployed and the scope of his vision. He made original contributions to logic, metaphysics, the philosophy of language, value theory, environmental philosophy, political philosophy. Moreover, though he never wrote anything that integrated all of these, it is clear to those who know his work that his views on all these matters formed part of an overall and systematic philosophical picture." (*Introduction: some personal reflections* by Graham Priest, p. XIII)  
 Supplementary Essays:  
 Jack Smart: *A critique of Meinongian semantics*, pp. 343-350;  
 Maria Elisabeth Reicher: *Routley's theory of fictions*, pp. 353-381;

- Fred Kroon: *Routley's second thoughts*, pp. 383-403.
73. ———. 2020. *Noneist Explorations II: The Sylvan Jungle — Volume 3 with Supplementary Essays*. Cham (Switzerland): Springer.  
 Edited by Dominic Hyde.  
 "This volume continues the reprinting of a new edition of Richard Routley's 1980 monograph *Exploring Meinong's Jungle and Beyond: An investigation of noneism and the theory of items*.  
 As in Volume 2, some of the work reprinted in this third volume contains material co-authored with Val Plumwood (formerly Val Routley), in particular, chapters 8 and 9.  
 For this reason, she is listed as co-author." (Editor's Preface)  
 Supplementary Essays:  
 Naoya Fujikawa: *Hallucination as perceiving nonexistent objects: noneist direct realism of perception*, pp. 391-420;  
 Maureen Eckert and Charlie Donahue: *Towards a feminist logic: Val Plumwood's legacy and beyond*, pp. 421-446.

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Author to search: Routley

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3. Non-existence does not exist (1970)
4. Conventionalist and contingency-oriented modal logics (1971)
5. Algebraic semantics for  $S2^\circ$  and necessitated extensions (1976)
6. Repairing proofs of Arrow's general impossibility theorem and enlarging the scope of the theorem (1979)

Author to search: Sylvan

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