

# Annotated bibliography of Kit Fine (1970-2022)

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## Kit Fine: annotated bibliography. Books and Papers 1970-2022

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### Books

1. Prior, Arthur Norman, and Fine, Kit. 1977. *World, Times and Selves*. London: Duckworth.  
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 "Before he died, Prior was working on a book to be entitled 'Worlds, Times and Selves'. This book was to deal, in one way or another, with the interplay between modal or tense logic, on the one hand, and quantification theory on the other. One of its main concerns was to show that modal and tense logic could stand on their own, that talk of possible worlds or instants was to be reduced to them rather than the other way round.  
 Unfortunately, only the first chapter was completed. There were jottings for other chapters, but they were far from complete. However, it is clear that some of Prior's recently published papers would have been incorporated into the book, though probably in considerably modified form. So what I have tried to do is to collate the

published and unpublished material in such a way that the result is as close as possible to the book he had in mind.

This should explain the distribution of the unpublished material. The completed chapter appears, as it should, as the first paper of the collection. However, the other passages of unpublished material appear as supplements, in 3 and 7, to already published papers. This is because they are quite obviously expansions or elaborations of those papers. In order to avoid repetition, I have omitted some initial sections from the supplementary papers; and this accounts for their abrupt beginnings. I have also not used some other unpublished material, either because it was expository or because it was too fragmentary to be of interest.

The first paper explains in very simple terms the parallel between modal logic and quantification theory. It is a good introduction to the technical and philosophical problems that arise in the later papers.

The next three papers deal with the egocentric counterpart to ordinary tense or modal logic. They introduce the operator  $Q$  that picks out those propositions that correspond to instants, worlds or selves, as the case may be. The last sections of 2 and 4 and most of the supplement 3 are concerned with the formal development of  $Q$  or cognate notions.

The last three of Prior's papers, 5-7, deal with the problem of embedding the theory of instants or possible worlds within orthodox tense and modal logic respectively. Chapter 5 attempts to see how far the opposite view can be maintained. Chapter 6 is a particularly rich paper. It deals, among other things, with a world-calculus for the system  $Q$ , the logic of significance, and the extension of embedding results to possibilist quantifiers. The supplement elaborates further on some of these topics. In his book, Prior would certainly have said more on this question of embedding. In the postscript, I have tried to fill this gap by discussing in detail his proposal for explaining instants and possible worlds within tense or modal logic. I had intended to write on his whole philosophy of time and modality; but, for reasons of space, I decided to stick to this more limited topic.

I should like to thank the editors of *Nous*, *L'Age de la Science*, *American Philosophical Quarterly*, and *Theoria* for permission to publish papers originally published by them. I should also like to thank Mary Prior, Anthony Kenny and Hans Kamp. They all, in their own ways, helped me to produce this collection. Tom Dimas and Mike Ferejohn prepared the indexes." ( *Preface* , pp. 7-8)

2. Fine, Kit. 1985. *Reasoning with Arbitrary Objects* . Oxford: Basil Blackwell. Contents: Preface VII; Introduction 1; 1. The General Framework 5; 2. Some Standard Systems 61; 3. Systems in General 147; 4. Non-Standard Systems 177; Bibliography 210; General Index 215; Index of Symbols 219-220.  
 "This book deals with certain problems in understanding natural deduction and ordinary reasoning. As is well known, there exist certain informal procedures for arguing to a universal conclusion and from an existential premiss. We may establish that all objects of a certain kind have a given property by showing that an arbitrary object of that kind has that property; and having shown that there exists an object with a given property, we feel entitled to give it a name and declare that it has the property. So we may establish that all triangles have interior angles summing to  $180^\circ$  by showing of an arbitrary triangle that its interior angles sum to  $180^\circ$ ; and having established that there exists a bisector to an angle, we feel entitled to give it a name and declare that it is a bisector to the angle.  
 These informal procedures correspond to certain of the quantificational rules in systems of natural deduction. Corresponding to the first is the rule of universal generalization, which allows us to infer  $\forall x \phi(x)$  from  $\phi(a)$  under suitable restrictions. Corresponding to the second is the rule of existential instantiation, which allows us to infer  $\exists(a)$  from  $\exists x \phi(x)$ , again under suitable restrictions.  
 In these inferences, certain terms play a crucial role; and it is natural to ask how they are to be understood. What role is to be attributed to the term  $a$  in the inferences from natural deduction? What is to be made of our talk of arbitrary triangles or indefinite bisectors in ordinary reasoning?

The present work is based upon the hypothesis that these critical terms refer to arbitrary or representative objects. The term  $a$  in the inferences from natural deduction functions as a name of a suitable arbitrary object. And our talk of arbitrary triangles or of indefinite bisectors is to be taken at its face value as also evincing reference to arbitrary objects.

The core of the work will be taken up with applying this hypothesis to two main systems of natural deduction: the one of Quine's *Methods of Logic* [52]; and the other of Copi [54], as amended by Kalish [67] and Prawitz [67]. In the case of each of these systems, we shall propose a generic semantics and then, by reference to that semantics, both establish soundness and motivate the restrictions on the rules. We shall also be concerned to cover certain other topics. We develop the pure theory of arbitrary objects somewhat beyond the needs of the present application, partly because of its intrinsic interest and partly with a view to other applications. We embark on a general study of systems containing a rule of existential instantiation and prove some general results on what form satisfactory systems of this sort can take. Finally, on the basis of an alternative generic semantics, we develop certain presuppositional systems and relate them to existing systems in the literature. The book is divided into parts according to the topic treated, with the first part dealing with the pure theory, the second with the application to the systems of Copi and Quine, the third with systems in general that contain a rule of existential instantiation, and the last with the presuppositional systems.

The work here is part of a much larger project, one in which the theory of arbitrary objects is to be applied to the use of pronouns in natural language and to the use of variables in informal mathematics and programming languages. These other topics have been altogether ignored, although the perceptive reader may pick up on certain intended points of contact. The closely related topic of developing a generic semantics for the  $\varepsilon$ - and  $\eta$ -calculi of Hilbert and Bernays [34] and Hailperin [57] has also not been considered; and my hope is that I shall be able to deal with it thoroughly elsewhere.

The book does not need to be read from beginning to end and the first part, in particular, may be consulted according to the demands from the other parts. The reader who is having difficulties may find my 'Natural Deduction and Arbitrary Objects' [85] helpful as a somewhat gentler introduction to the subject." (*Introduction*, pp. 1-2)

#### References

Copi, I. 1954 *Symbolic Logic*, Macmillan: New York, First Edition.

Hailperin, T. 1957 'A Theory of Restricted Quantification', Part I, *Journal of Symbolic Logic* vol. 22, pp. 19-35, Part II, *Journal of Symbolic Logic* vol. 27, pp. 113-129.

Hilbert, D. and Bernays, P. 1934 *Grundlagen der Mathematik* Volume I, Berlin: Springer.

Kalish, D. 1967 Review, *Journal of Symbolic Logic* vol. 32, p. 254.

Prawitz, D. 1967 'A Note on Existential Instantiation', *Journal of Symbolic Logic* vol. 32, pp. 81-2.

Quine, W.V.O. 1952 *Methods of Logic*, Routledge & Kegan Paul: London.

3. ———. 2002. *The Limits of Abstraction*. New York: Oxford University Press. Contents: Preface V-VI; Introduction IX-X; 1. Philosophical introduction 1; 2. The Context Principle 55; 3. The analysis of acceptability 101; 4. The general theory of abstraction 165, References 193; Main Index 197; Index of first occurrences of formal symbols and definitions 200-203.

"The present monograph has been written more from a sense of curiosity than commitment. I was fortunate enough to attend the Munich Conference on the Philosophy of Mathematics in the summer of 94 and to overhear a discussion of recent work on Frege's approach to the foundations of mathematics. This led me to investigate certain technical problems connected with the approach; and these led me, in their turn, to reflect on certain philosophical aspects of the subject. I was concerned to see to what extent a Fregean theory of abstraction could be developed

and used as a foundation for mathematics and to place the development of such a theory within a general framework for dealing with questions of abstraction. To my surprise, I discovered that there was a very natural way to develop a Fregean theory of abstraction and that such a theory could be used: to provide a basis for both arithmetic and analysis. Given the context principle, the logicist might then arguing that the theory was capable of yielding a philosophical foundation for mathematics, one that could account both for our reference to various mathematical objects and for our knowledge of various mathematical truths. I myself am doubtful whether the theory can legitimately be put to this use. But, all the same, there is surely considerable intrinsic interest in seeing how the theory of abstraction might be developed and whether it might be capable of embedding a significant portion of mathematics, even if the theory itself is in need of further foundation.

The monograph is in four parts. The first is devoted to philosophical matters and serves to explain the motivation for the technical work and its significance. It is centred on three main questions: What are the correct principles of abstraction? In what sense do they serve to define the abstract with which they deal? To what extent can they provide a foundation for mathematics? The second part (omitted from the original paper) discusses the context principle, both as a general basis for setting up contextual definitions and in its particular application to numbers. The third part proposes and investigates a set of necessary and sufficient conditions for an abstraction principle to be acceptable. The acceptable principles, according to this criterion, are precisely determined and it is shown, in particular, that there is a strongest such principle. The fourth and final part attempts to develop a general theory of abstraction within the technical limitations set out by the third part; the theory is equipped with a natural class of models; and it is shown to provide a foundation for both arithmetic and analysis." ( *Introduction* , pp. IX-X)

4. ———. 2005. *Modality and Tense: Philosophical Papers* . New York: Oxford University Press.  
 Contents: Preface; Introduction 1;  
 I. Issues in the Philosophy of Language.  
 1. Reference, Essence, and Identity (previously unpublished) 19; 2. The Problem of *De Re* Modality (1989) 40; 3. Quine on Quantifying In (1990) 105;  
 II. Issues in Ontology.  
 4. Prior on the Construction of Possible Worlds and Instants (1977) 133; 5. Plantinga on the Reduction of Possibilist Discourse (1985) 176; 6. The Problem of Possibilia (2002) 214;  
 III. Issues in Metaphysics.  
 7. The Varieties of Necessity (2002) 235; 8. Tense and Reality (2005) 261; 9. Necessity and Non-Existence (previously unpublished) 321;  
 IV. Reviews.  
 10. Review of *Conterfactuals* by David Lewis (1975) 357; 11. Review of *The Nature of Necessity* by Alvin Plantinga (1976) 366; References 371; Index 379-387.  
 "This volume collects together my published papers on tense and modality up to the present time. It contains two reviews, since the issues they discuss are still of interest; and it also contains a much expanded version of my paper, 'The Reality of Tense', now under the title 'Tense and Reality', and two previously unpublished papers. I have not included my technical papers on modal logic, even when they have contained philosophical material or have had an obvious bearing on philosophical questions; and nor have I included any of my philosophical or technical papers on essence, even when they have dealt with the connection between essence and modality. I have added an introduction to the volume, outlining the central content of each paper and bringing out certain issues and themes that may not be evident from the papers themselves." (From the *Preface* )
5. ———. 2007. *Semantic Relationism* . Oxford: Blackwell.  
 Contents: Preface VII; Introduction 1; 1. Coordination among variables 6; 2. Coordination within language 33; 3. Coordination within thought 66; 4.

Coordination between speakers 86; Postscript: further work 122; Notes 133; References 141; Index 143.

"The ideas behind these lectures had their origin in the early 1980s.

There was then a great deal of excitement over the "new" theory of direct reference, but many of those who were attracted to the theory were also worried about the challenge posed by Frege's puzzle. How could they claim, as the theory seemed to require, that the meaning of "Cicero = Tully" was the same as "Cicero = Cicero," when the one was plainly informative and the other not?

I myself faced a similar problem over the role of variables. I had previously attempted to develop a theory of variable or arbitrary objects. According to this theory, a variable should be taken to signify a variable object, something which we might loosely identify with the variable's meaning or abstract role. However, even though the variables  $x$  and  $y$ , when considered on their own, should be taken to signify the same variable object, they should not be taken to signify the same variable object when considered together, since otherwise we would lose the relevant distinction between  $x = y$  and  $x = x$ . It seemed clear to me that the two problems were essentially the same and that there should be a common solution to them both, even though it was not then clear to me what the solution should be.

I worried about this issue on and off for the next 15 years until it dawned on me that it could only adequately be solved by making a fundamental break with semantics as it is usually conceived. One must take account of the meaning that expressions have, not only when considered on their own but also when they are considered together; the meaning relation between them is not simply to be regarded as a product of their individual meanings. Once we embrace this liberating thought, we can then see how the usual referential view of the meaning of variables and names can be retained and yet the difficulties over Frege-type puzzles avoided.

It was, therefore, opportune when Ernie Sosa asked me to give the first Blackwell/Brown lecture for the Fall of 2002, since this provided me with an opportunity to develop these ideas, which were still in a very inchoate form, and to discuss them with a wonderful group of philosophers.

(...)

The present book is loosely based upon the lectures I gave at Brown and I have tried to keep to something like the original lecture format. This has meant that a number of topics have not been pursued, though I have given a brief account of some of the more important of these topics in the final chapter. It has also meant that scholarly allusions have been kept to a minimum. I have, in particular, made no attempt to compare my own work with the loosely related work of Almog (2006), Fiengo and May (2005), Lawlor (2005), and Lieb (1983). This is a "bare-bones" account, simply intended to convey the essential ideas; and I hope later to provide a fuller account that is both broader in its scope and much more thorough in its treatment of particular topics." ( *Preface* pp. VII-VIII)

References

Almog, J. (2006) "Is A Unified Treatment of Language-and-Thought Possible?," *Journal of Philosophy* , vol. CII, no. 10, pp. 493–531.

Fiengo, R. and May, R. (2005) *De Lingua Belief*, Cambridge: MIT Press.

Lawlor, K. (2005) "Confused Thoughts and Modes of Presentation," *Philosophical Quarterly* , vol. 55, no. 218, pp. 137–48.

Lieb, H.-H. (1983) "*Integrational Linguistics, vol. 1: General Outline*", Amsterdam; Philadelphia: Benjamins (= Current Issues in Linguistic Theory, 17).

6. ———. 2020. *Vagueness. A Global Approach* . New York: Oxford University Press.

"The material for the lectures has been extracted from a much longer booklength manuscript, which I hope to publish separately. I therefore hope that the reader will bear in mind that many topics that are discussed perfunctorily or not at all in this monograph will be discussed at much greater length in the book. This is a bare bones account, without the usual qualifications or consideration of objections or discussion of alternative points of view.

The first lecture (Chapter 1) was intended as an introduction to a general audience with no special expertise in the topic. It is, for this reason, very sketchy and, except for the last part, not at all original. The subsequent two lectures are more substantive. The first of these (Chapter 2) presents my general account of vagueness and the second (Chapter 3) discusses its application to three topics: the sorites argument (or paradox of the "heap"); the question of luminosity (or whether we can know our own minds); and the problem of personal identity, especially in its connection to the possibility of fission." (from the Preface)

### **Published Papers (1970-2022)**

1. Fine, Kit. 1970. "Propositional Quantifiers in Modal Logic." *Theoria* no. 36:336-346.  
 "In this paper I shall present some of the results I have obtained on modal theories which contain quantifiers for propositions. The paper is in two parts: in the first part I consider theories whose non-quantificational part is S5; in the second part I consider theories whose non-quantificational part is weaker than or not contained in S5. Unless otherwise stated, each theory has the same language L. This consists of a countable set V of propositional variables  $p_1, p_2, \dots$ , the operators  $\vee$  (or),  $\sim$  (not) and  $\Box$  (necessarily), the universal quantifier ( $\forall$ ),  $p$  a propositional variable, and brackets ( and ), The formulas of L are then defined in the usual way." (p. 336)
2. ———. 1971. "The Logics Containing S4.3." *Zeitschrift für Mathematische Logik und Grundlagen der Mathematik* no. 17:371-376.  
 "In this paper I prove some general results on logics containing S 4.3. In section 2 I prove that they all have the finite model property. Bull [1] has already proved this result; but his proof is algebraic, whereas mine is semantic. In sections 3 and 4, I prove that they are all finitely axiomatizable. It follows from these results that they are all decidable. Finally, in section 5, I show that the lattice of S 4.3 logics is isomorphic to one on finite set of finite sequences of natural numbers. Needless to say, these results carry over to the extensions of the intermediate logic LC.  
 In a paper on logics containing K4, I shall present another semantic proof that S4.3 logics have the finite model property and thereby also establish some results on compactness." (p. 371)  
 (1) R. A. Bull, "That All Normal Extensions of S4.3 Have the Finite Model Property", *Zeitschrift für Mathematische Logik und Grundlagen der Mathematik*, 12, 1966, pp. 341-344.
3. ———. 1971. "Counting, Choice and Undecidability." *Manifold* no. 11:17-22.  
 Abbreviations: Continuum Hypothesis = CH; Axiom of Choice = AC.  
 "In 1900 Hilbert stated 23 problems which he considered to be of crucial importance. The first of these was 'prove Cantor's Continuum Hypothesis'. Gödel (1939) and Cohen (1963) have shown that the hypothesis can neither be proved nor disproved. Their proofs are expounded in:  
 P. J. Cohen, *Set Theory and the Continuum Hypothesis*, Benjamin 1966.  
 P. J. Cohen, "Independence results in set theory", in *Studies In Logic and the Foundations of Mathematics*, North-Holland 1965, pp. 39-54.  
 K. Gödel, "The Consistency of the Axiom of Choice and of the Generalized Continuum Hypothesis with the axiom of set theory", 1939, 4th printing, Princeton 1966." (p. 71)  
 (...)  
 "The question now remains: what attitude should the working mathematician take towards CH? It is important to leave AC on one side at this point because it possesses a degree of self-evidence that CH certainly lacks.  
 There are, I think, two main attitudes. On the one hand, one could say there is no sense in which CH is true or false and give up looking for ways of settling the

question. Instead, one would develop different set theories, with or without CH, somewhat in analogy to the alternative geometries of the 19th century. On the other hand, one could say that CH is either true or false and look for new ways of determining which.

Two main ways suggest themselves. The first is to dispense with proof and to accept that hypothesis concerning transfinite cardinals which is most fruitful in consequences. The second is to search for new self-evident axioms that might settle CH.

These new axioms might be formulated in terms of set-theoretic notions or in terms of a new notion or new notions altogether.

The adoption of non-deductive procedures or the discovery of non-set-theoretic notions would conflict with two common views about mathematics, viz. that all mathematical knowledge is based upon proof and that all mathematical notions can be given a set-theoretic definition. Although it is too early to talk of feasibility, it is worth noting that these common views are based upon an analysis of extant mathematics. There seems to be no reason, in principle, why they should be true." (p. 82)

4. ———. 1972. "In So Many Possible Worlds." *Notre Dame Journal of Formal Logic* no. 13:516-520.  
 "Ordinary modal logic deals with the notion of a proposition being true at least one possible world. This makes it natural to consider the notion of a proposition being true in  $k$  possible worlds for any non-negative integer  $k$ . Such a notion would stand to Tarski's numerical quantifiers as ordinary possibility stands to the existential quantifier.  
 In this paper (1) I present several logics for numerical possibility. First I give the syntax and semantics for a minimal such logic (sections 1 and 2); then I prove its completeness (sections 3 and 4); and finally I show how to extend this result to other logics (section 5)." (p. 516)  
 (1) The results of this paper are contained in my doctorate thesis, submitted to the University of Warwick in 1969. I am greatly indebted to my supervisor, the late Arthur Prior. Without his help and encouragement this paper would never have been written.
5. ———. 1972. "For So Many Individuals." *Notre Dame Journal of Formal Logic* no. 13:569-572.  
 "In [2], Tarski introduces the numerical quantifiers.  
 (...) Because of their definability, the numerical quantifiers have rarely been considered on their own account. However, in this paper I consider a predicate logic without identity which is enriched with numerical quantifiers as primitive. In section 1, I present the syntax and semantics for this logic; and in sections 2 and 3, I establish its completeness." (p. 569)  
 [2] Tarski, A., *Introduction to Logic*, Oxford University Press (1946).
6. ———. 1972. "Logics Containing S4 Without the Finite Model Property." In *Conference in Mathematical Logic, London '70*, edited by Hodges, Wilfrid, 98-102. Berlin: Springer Verlag.  
 "In [1], Harrop asked whether there were logics containing the intuitionistic logic IL which lack the finite model property [=fmp]. Jankov gave examples of such logics, but they were not finitely axiomatizable. By the Tarski-McKInsey translation, Harrop's problem relates to the question of whether there exist extensions of the modal logic S4 without fmp. Makinson [2] showed that there are extensions of the modal logic M without fmp, but he could not extend his results to S4. In this paper, I shall exhibit logics containing both IL and S4 which lack fmp, but are finitely axiomatized and decidable." (p. 98)  
 (...) "Finally, it should be noted that we can add axioms to the logics described above so as to obtain logics which are decidable, finitely axiomatized, complete for their

- intended interpretation, and yet without fmp." (p. 101)
- [1] Harrop, R., On the existence of finite models and decision procedures, *Proceedings of the Cambridge Philosophical Society*, vol. 54 (1958), 1-16.
- [2] Makinson, D., A Normal Modal Calculus Between T and S4 Without the Finite Model Property, *Journal of Symbolic Logic*, vol. 34, Number 1 (1969), 35-38.
7. ———. 1972. "Some Necessary and Sufficient Conditions for Representative Decision on Two Alternatives." *Econometrica* no. 40:1083-1090.
- "A social decision rule is one that produces a social decision for each configuration of individuals' decisions. Such a rule is representative if it produces a social decision that is the result of repeatedly applying the rule of simple majority decision to decisions obtained by that rule. We give necessary and sufficient conditions for a social decision rule for two alternatives to be representative." (p. 1083)
- (...)
- "The central problem of this paper is to find an alternative characterization of the representative functions. May in [1] gave an alternative characterization of the simple majority decision functions, and Murakami in [2 and 3] established that monotonicity and self-duality are necessary conditions for being a representative or indirect majority decision function. (In fact, Murakami deals with what he calls democratic functions, i.e., representative functions which are non-dictatorial; but this latter condition may be added or left out at will.) However, he was not able to establish any sufficient conditions. In this paper, I establish his conjecture that strong monotonicity with self-duality is a sufficient condition. I use this result and a new property of not being "zigzag" to prove that monotonicity, self-duality, and not being zigzag are necessary and sufficient conditions. (2)
- Finally, I show that the monotonic, self-dual, and positive functions are exactly those definable in terms of the voting and jury operators." (p. 1084)
- (2) P. C. Fishburn independently solved this problem in his paper "The Theory of Representative Majority Decision," *Econometrica*, 39 (1971), pp. 273-284. However, he uses a completely different method of proof and a slightly different condition in place of "not zigzag".
- References
- [1] MAY, K. O.: "A Set of Independent, Necessary and Sufficient Conditions for Simple Majority Decision," *Econometrica*, 20 (1952), 680-684.
- [2] MURAKAMI, Y.: "Formal Structure of Majority Decisions," *Econometrica*, 34 (1966), 709-718.
- [3] MURAKAMI, Y.: *Logic and Social Choice*. London: Macmillan, and New York: Dover, 1968.
8. ———. 1973. "Conditions for the Existence of Cycles under Majority and Non-Minority Rules." *Econometrica* no. 41:889-899.
- "This paper provides type I necessary and sufficient conditions for transitivity and quasi-transitivity under simple majority rule. (2) For type II conditions, a master list of orderings is acceptable if the social rule generates a "rational" (e.g., transitive) social ordering whenever the individuals select their preference orderings from the list. A list ordering may be selected any number of times, and, in particular, it may not be selected at all. For type I conditions, on the other hand, each list ordering must be selected at least once, so that the list and the configuration of individual orderings must exactly match in the kind of orderings they contain. Thus for type II conditions it is the absence of certain kinds of orderings that blocks irrational social choice, whereas for type I conditions the presence of certain kinds of orderings may also contribute toward blockage.
- Type II conditions have been determined for a wide variety of rules and under several definitions of rationality. Our main interest in this paper is in type I conditions for simple majority rule with rationality defined in terms of transitivity or quasi-transitivity. However, our method of argument will yield simple alternative

- proofs of some standard results on type I conditions and it will also yield the type I and type II conditions for transitivity under non-minority rule.
- Section 1 lays down some relevant definitions. Section 2 proves the "min-midmax" theorem, which is the basis for all that follows. Sections 3 and 4, respectively, establish the conditions for transitivity and quasi-transitivity under majority rule. Finally, Section 5 proves the min-mid-max theorem for the non-minority rule and establishes the condition for transitivity under that rule." (p. 889)
- (2) The terminology of type I and II conditions is Pattanaik's [6]. Type II conditions were first proposed by Inada [3] and type I conditions by Pattanaik [5].
- References
- [3] INADA, K.: "On the Simple Majority Decision Rule," *Econometrica* , 36 (1969), 490-506.
- [5] PATTANAIAK, P. K.: "Sufficient Conditions for the Existence of a Choice Set under Majority Voting," *Econometrica* , 38 (1970), 165-170.
- [6] PATTANAIAK, P. K.: *Voting and Collective Choice* . Cambridge: Cambridge University Press, 1971.
9. ———. 1973. "Surveys on Deontic Logic, Mathematical Logic and the Philosophy of Mathematics." In *UNESCO Survey of the Social Sciences* .
10. ———. 1974. "An Ascending Chain of S4 Logics." *Theoria* no. 40:110-116.  
 "This paper shows that there exists a continuum of logics containing the modal logic S4. (1) §1 contains preliminary definitions and results; §2 introduces the key notion of a frame formula; §3 establishes the main result and some consequences; and §4 establishes some further results." (p. 110)  
 (1) Jankov [5] has independently, and previously, proved the analogous result for intuitionistic sentential logic. His method of proof is algebraic, whereas mine is semantic.
- References
- [5] V. A. Jankov, On the Extension of the Intuitionist Propositional Calculus to the Classical Calculus, and the Minimal Calculus to the Intuitionist Calculus, *Journal of Symbolic Logic* 38, 1973, pp. 331-332.
11. ———. 1974. "Models for Entailment." *Journal of Philosophical Logic* no. 3:347-372.  
 Reprinted in: Alan Ross Anderson, Nuel D. Belnap, Jr., with contributions by J. Michael Dunn ... [et al.], *Entailment: The Logic of Relevance and Necessity*, Princeton: Princeton University Press, 1992 vol. II, pp. 208-231.  
 "This paper gives a modelling for Ackermann's systems  $II'$  and  $II''$  , Anderson's and Belnap's system  $E$  and  $R$  , and several of their subsystems. The distinctive feature of this modelling is a point-shift in the evaluation of negation and entailment: the negation of a formula holds at a point if the formula itself fails to hold at a complementary point; and an entailment holds at a point if whenever its antecedent holds at a point its consequent holds at an appropriately associated point. These rules enable negations of valid formulas to hold at a point and valid formulas themselves to fail to hold at a point. They also provide a grip on certain axioms involving negation or nested entailment." (p. 347, notes omitted)  
 (...)  
 The first two sections present the deductive-semantic framework; §51.1 specifies the models, and §51.2 the logics. The following two sections establish completeness; §51.3 for a minimal logic B, and §51.4 for  $II'$ ,  $II''$ , E and the several subsystems. §51.5 outlines various alternative versions of the modeling. The last two sections contain applications of the modeling: §51.6 to the admissibility of modus ponens; and §51.7 to the finite model property and decidability. Many of the systems considered are shown to have these properties; see §63 for a further survey on decidability, and §65 for fundamental undecidability results." (pp. 208-209 of the revised reprint)
12. ———. 1974. "An Incomplete Logic Containing S4." *Theoria* no. 40:23-29.

"This paper uses the standard terminology of modal logic. It should suffice to say that: all logics contain the minimal logic  $K$  and are closed under necessitation, substitution and modus ponens; frames consist of a relation defined on a non-empty set of points; models consist of a frame with a valuation; and truth-at-a-point is defined and notated in an obvious way; with the formula  $\Box A$  true at a point iff  $A$  is true at all accessible points. The formula  $A$  is true in (satisfied by) a model if it is true in all (some) points of the model;  $A$  is strongly verified in a model if all substitution-instances of  $A$  are true in the model; and  $A$  is valid in a frame if  $A$  is true in all models based upon the frame,  $A$  set of formulas is true, strongly verified, or valid if all of its members are. Unless otherwise stated, all logics contain S4 and all models and frames possess reflexive and transitive relations.

A logic is complete if any formula valid in all frames that validate the logic is in the logic. This paper exhibits a logic L containing S4 that is not complete." (p. 23)

13. ———. 1974. "Logics Containing K4. Part I." *Journal of Symbolic Logic* no. 39:31-42.

"There are two main lacunae in recent work on modal logic: a lack of general results and a lack of negative results. This or that logic is shown to have such and such a desirable property, but very little is known about the scope or bounds of the property. Thus there are numerous particular results on completeness, decidability, finite model property, compactness, etc., but very few general or negative results. In these papers I hope to help fill these lacunae. This first part contains a very general completeness result. Let  $I_n$  be the axiom that says there are at most  $n$  incomparable points related to a given point. Then the result is that any logic containing K4 and  $I_n$  is complete.

The first three sections provide background material for the rest of the papers. The fourth section shows that certain models contain no infinite ascending chains, and the fifth section shows how certain elements can be dropped from the canonical model. The sixth section brings the previous results together to establish completeness, and the seventh and last section establishes compactness, though of a weak kind. All of the results apply to the corresponding intermediate logics." (p. 31)

14. Fine, Kit, and Fine, Ben J. 1974a. "Social Choice and Individual Ranking I." *Review of Economic Studies* no. 41:303-322.

"This paper investigates social positional rules. The rules are social in that they produce a social output for any configuration of individual preference orderings. They are positional in that the output produced depends only upon the positions occupied by each alternative in the individual preference orderings. (3)

Social rules may be distinguished by the form of their output, be it a quasi-ordering, choice structure or complete ordering. For each form of output, we shall determine the class of social rules that satisfy certain desirable conditions. Part one deals with quasi ordering rules; part two will deal with the other types of rules.

Indeed, this part shows that certain desirable conditions are uniquely satisfied by the so-called positional rule. One alternative is as good as another by this rule if any individual's ranking of these cond alternative can be matched by as high a ranking of the first alternative by some possibly different individual. The individuals'rankings should be as good for the one alternative as for the other." (p. 303)

(\* ) Some of the results of this paper are contained in B. Fine's B.Phil. thesis, Oxford 1971. We should like to thank the editor and a referee for many helpful suggestions.

(3) There have been several recent papers on positional rules. See [2], [3], [5] and [8]. However, most of the results of these papers overlap with the material of Part II (which is forthcoming in this journal) rather than Part I. Further details will be given there, but let us note that Smith [8] also has a variable number of individuals and a composition condition (his separability).

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- [8] Smith, J. H. "Aggregation of Preferences with Variable Electorate", forthcoming in *Econometrica*. [Vol. 41, No. 6 (Nov., 1973), pp. 1027-1041 ]
15. ———. 1974b. "Social Choice and Individual Ranking II." *Review of Economic Studies* no. 41:459-475.
- "In Part I of this paper it was shown that certain appealing conditions forced any social quasi-ordering rule to include the positional rule, which is itself the intersection of all finite ranking (f.r.) rules. These conditions are slightly strengthened in the first three sections of this part, but this allows us to characterize in Section 3 the rules that also satisfy the additional properties as the intersection of some set of f.r. rules. In case a continuity property, which can be interpreted as a non-veto condition applied to groups, does not hold, the set of f.r. rules must be extended to include transfinite weightings. Section 1 finds sufficient conditions for a quasi-ordering rule to be positional. This is used in Section 2 to prove the results contained in Section 3 for the special case of a social ordering rule, when a single f.r. rule emerges. This special case is then generalized in Section 3.
- In Section 4, for the first time in the paper, we analyse conditions that recognize social decision depending upon the number of alternatives. Previously, only the number of individuals has been effectively allowed to vary. Again, simple and natural properties have powerful consequences, and it is thereby shown that the Borda rule is a compelling choice for making social decision, given a veil of ignorance, that is no knowledge of the special features of the individuals and alternatives concerned. In case only a quasi-ordering rule is required, social decision is based on the intersection of a set of f.r. rules symmetrical about the Borda rule.
- In Section 5 we turn to choice structure rules. First a positional choice structure is defined. It is the strongest such rule containing all the f.r. rules, since an alternative in a set belongs to the choice from that set iff for some f.r. it is best in the set. This last condition is shown to be equivalent to demanding that the *HC* of that element does not belong to the convex hull of the *HC* of the other alternatives in the set. Then an outline is made for a conditions analysis of the rule: it is found to be the weakest rule satisfying certain conditions, in the sense that any other rule satisfying those conditions must be more decisive. In this, the method, results and analysis correspond to Part I's consideration of the positional quasi-ordering rule.
- Section 6 is devoted to an examination of some questions concerned with the independence of conditions and Section 7 contains concluding remarks. The above only sketches the major results of this paper. In addition, the analysis of normal social quasi ordering rules in Section 2 and Section 3 has obvious relevance to the theory of production and utility under risk in the presence of indivisibility. Finally, it should be noted that throughout this part, individual preferences are assumed to be antisymmetrical. Whilst the complications posed by individual indifference were overcome in Part I (Section 6), a more general analysis becomes analytically cumbersome and presents more problems here. Nevertheless many of the results, especially analysis by conditions, do apply more generally, though possibly with slight modifications." (pp. 459-460)
- (\*) The first part of the paper [1974a] was written up by K. Fine and the second by B. Fine. Both authors have contributed to all sections of the paper, though the first

- has contributed more to the material on the positional rule and the second to the material on normal social rules. Some of the results for ordering rules in this paper have been independently established by Smith [Smith, J. H. "Aggregation of Preferences with Variable Electorate", *Econometrica* . Vol. 41, No. 6 (Nov., 1973), pp. 1027-1041].
16. Fine, Kit. 1975. "Vagueness, Truth and Logic." *Synthese* no. 30:265-300.  
Reprinted in: Rosanna Keefe & Peter Smith, *Vagueness: A Reader*, Cambridge: MIT Press, 1996, pp. 119-150.  
"My investigation of this topic began with the question "What is the correct logic of vagueness?" This led to the further question "What are the correct truth-conditions for a vague language?" And this led, in its turn, to a more general consideration of meaning and existence.  
The contents of the paper are as follows. The first half contains the basic material. Section 1 expounds and criticizes one approach to the problem of specifying truth-conditions for a vague language. The approach is based upon an extension of the standard truth-tables and falls foul of something I call penumbral connection. Section 2 introduces an alternative framework, within which penumbral connection can be accommodated. The key idea is to consider not only the truth-values that sentences actually receive but also the truth-values that they might receive under different ways of making them more precise. Section 3 describes and defends the favoured account within this framework.  
According to this account, as roughly stated, a vague sentence is true if and only if it is true for all ways of making it completely precise. The second half of the paper then deals with consequences, complications and comparisons of the preceding half. Section 4 considers the consequences that the rival approaches have for logic. The favoured account leads to a classical logic for vague sentences; and objections to this unpopular position are met. Section 5 studies the phenomenon of higher-order vagueness: first, in its bearing upon the truth-conditions for a language that contains a definitely-operator or a hierarchy of truth-predicates; and second, in its relation to some puzzles concerning priority and eliminability.  
Some of the topics tie in with technical material. I have tried to keep this at a minimum.  
But the reader must excuse me if the technical undercurrent produces an occasional unintelligible ripple upon the surface. Many of the more technical passages can be omitted without serious loss in continuity." (p. 265)
17. ———. 1975. "Normal Forms in Modal Logic." *Notre Dame Journal of Formal Logic* no. 16:229-237.  
"There are two main methods of completeness proof in modal logic. One may use maximally consistent theories or their algebraic counterparts, on the one hand, or semantic tableaux and their variants, on the other hand. The former method is elegant but not constructive, the latter method is constructive but not elegant.  
Normal forms have been comparatively neglected in the study of modal sentential logic. Their champions include Carnap [3], von Wright [10], Anderson [1] and Cresswell [4]. However, normal forms can provide elegant and constructive proofs of many standard results. They can also provide proofs of results that are not readily proved by standard means.  
Section 1 presents preliminaries. Sections 2 and 3 establish a reduction to normal form and a consequent construction of models. Section 4 contains a general completeness result. Finally, section 5 provides normal formings for the logics T and K4." (p. 229)  
[1] Anderson, A. R., "Improved decision procedures for Lewis's calculus S4 and Van Wright's calculus M," *The Journal of Symbolic Logic*, vol. 34 (1969), pp. 253-255.  
[2] Bull, R. A., "On the extension of S4 with *CLMpMLp*," *Notre Dame Journal of Formal Logic*, vol. VIII (1967), pp. 325-329.

- [3] Carnap, R., "Modalities and quantification," *The Journal of Symbolic Logic*, vol. 11 (1946), pp. 33-64.
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- [10] Wright, G. H. von, *An Essay in Modal Logic*, Amsterdam (1951).
18. ———. 1975. "Review of David Lewis ' *Counterfactuals* '." *Mind* no. 84:451-458. Reprinted in: *Modality and Tense. Philosophical Papers*, as chapter 10, pp. 357-365.  
 "This is an excellent book. It combines shrewd philosophical sense with fine technical expertise; the statement of views is concise and forthright; and the level of argument is high." (p. 451)  
 (...)  
 "Lewis suggests that merely possible worlds are like the actual world, 'differing not in kind but only in what goes on at them'. Indeed, for him there is no absolute difference between the actual world and the others: the difference is relative to a particular possible world as point of reference. A similar view has been held about the present time, but it is hard to accept for possible worlds. On the logical construction view, the actual world is distinguished by the property that all of its propositions are true. Here 'true' is an absolute term. It is not defined as truth in the actual world but, on the contrary, truth-in-a-world is defined as set-theoretic membership." (p. 455).
19. ———. 1975. "Some Connections between Elementary and Modal Logic." In *Proceedings of the Third Scandinavian Logic Symposium*, edited by Kanger, Stig, 15-31. Amsterdam: North-Holland.  
 "A common way of proving completeness in modal logic is to look at the canonical frame. This paper shows that the method is applicable to any complete logic whose axioms express a XA-elementary condition or to any logic complete for a A-elementary class of frames. We also prove two mild converses to this result. (1) The first is that any finitely axiomatized logic has axioms expressing an elementary condition if it is complete for a certain class of natural subframes of the canonical frame. The second result is obtained from the first by dropping 'finitely axiomatized', and weakening 'elementary' to 'A-elementary'.  
 Classical logic is used in the formulation and proof of these results.  
 The proofs are not hard, but they do show that there may be a fruitful and non-superficial contact between modal and elementary logic. Hopefully, more work along these lines can be carried out.  
 § 1 outlines some basic notions and results of modal logic. For simplicity, this is taken to be mono-modal. However, the results can be readily extended to multi-modal logics and, in particular, to tense logic.  
 § 2 proves the first of the above results and a related result as well; § 3 proves the second of the above results; and finally, § 4 constructs counterexamples to some plausible looking converse results." (pp. 15-16)  
 (1) After writing this paper, I discovered that A.H. Lachlan had already proved the first of these 'mild converses' in [5]. His proof uses Craig's interpolation theorem, whereas mine uses the algebraic characterization of elementary classes. R.I. Goldblatt [4] independently hit upon this latter proof at about the same time as I did.  
 He also has a counter-example to the converse of this result. It is similar to the one in § 4.  
 I should like to thank Steve Thomason for the references above and for some helpful comments on the paper.  
 References  
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 [5] A.H. Lachlan, A note on Thomason's refined structures for tense logic, *Theoria*, [Vol. 40, No. 2 (Aug. 1974), pp. 117-120]

20. ———. 1976. "Review of *The Nature of Necessity* ' (A. Plantinga)." *The Philosophical Review* no. 86:562-566.  
Reprinted in: *Modality and Tense. Philosophical Papers*, as chapter 11, pp. 366-370.  
"This book discusses several topics in the theory of modality: the *de re/de dicto* distinction, possible worlds, essences, names, possible objects, and existence. In the final two chapters, the preceding material is applied to the problem of evil and the ontological argument. In its philosophical (though not theological) parts, the book is close to Kripke's *Naming and Necessity* .  
There are similar accounts of the a priori/necessary distinction, proper names, transworld identity, and the identity theory." (p. 562)
21. ———. 1976. "Completeness for the Semi-Lattice Semantics. Abstract." *Journal of Symbolic Logic* no. 41:560.
22. ———. 1976. "Completeness for the S5 analogue of E<sub>i</sub>. Abstract." *Journal of Symbolic Logic* no. 41:559-560.
23. ———. 1977. "Properties, Propositions and Sets." *Journal of Philosophical Logic* no. 6:135-191.  
"This paper presents a theory of extensional and intensional entities. The entities in question belong to a hierarchy that begins with individuals, sets, properties and propositions. The hierarchy extends to higher orders, both extensional and intensional. Thus it contains sets of propositions, properties of sets, properties of such properties, and, in general, it contains relations-in-intension and relations-in-extension over types of entities already in the hierarchy.  
The theory does not say what a proposition or property is. Rather, a possible worlds account of these entities is taken for granted. Thus a proposition is regarded as a set of possible worlds, a property as a set of world-individual pairs, and similarly for the other intensional entities.  
What the theory does is to characterize and investigate various properties of the entities in terms of possible worlds. These properties include existence, being purely general or qualitative, being logical, having an individual constituent, and being essentially modal. Thus the theory is ontological rather than linguistic. Its main concern is with the ontological status of the various entities and not with their relation to language." (p. 135)
24. ———. 1977. "Prior on the Construction of Possible Worlds and Instants." In *Worlds, Times and Selves* , 116-168. London: Duckworth.  
Postscript to ' *Worlds, Times and Selves* ', by Arthur Norman Prior, reprinted in: *Modality and Tense. Philosophical Papers*, as chapter 4.  
"Fundamental to Prior's conception of modality were two theses:  
The ordinary modal idioms (necessarily, possibly) are primitive (1)  
Only actual objects exist (2)  
The first thesis might be called Modalism or Priority, in view of its nature and founder. The second thesis is sometimes called Actualism, and the two theses together I call Modal Actualism." (p. 116)  
(...)  
"My aim in this chapter is to carry out this programme of reconstruction, at least in outline. I have often followed the lead of Prior, much of whose later work (3) arose from this programme. However, I cannot be sure that he would have approved of all of the steps I take." (p. 118)  
(1) Many references might be given. See e.g. 'Modal Logic and the Logic of Applicability' *Theoria* , 34 (1968), reprinted as Chapter 6 above.  
(2) See *Papers on Time and Tense* , p. 143  
(3) See the chapter of this book, Ch. XI of *Papers on Time and Tense*, and V of *Past, Present and Future*.
25. ———. 1978. "Model Theory for Modal Logic Part I: The ' *de re / de dicto* ' Distinction." *Journal of Philosophical Logic* no. 7:125-156.

"It is an oddity of recent work on modality that the philosopher's main concern has been with quantificational logic whereas the logician's has been with sentential logic. There have, perhaps, been several reasons for this divergence of interest. One is that the area of sentential modal logic is already rich in logical problems; and another is that the semantics for quantified modal logic has been in an unsettled state. But whatever the reasons have been in the past, the time would now seem ripe for a more fruitful interaction between these two approaches to the study of modality.

My aim in these papers has been to bring the methods of model theory closer to certain common philosophical concerns in modal logic. Indeed, most of the results answer questions that arise from some definite philosophical position. In this respect, my approach differs from that of Bowen [1] and others, who attempt to extend the results of classical model theory to modal logic. Although this approach has its attractions, it also suffers from two drawbacks. The first is that most of its results are devoid of philosophical interest; and the second is that many standard results of classical model theory, such as the Interpolation Lemma, do not apply to some standard modal logics, such as quantified S5 (see my paper [5]).

The philosophical position that underlies the results of the first two parts of this paper may be called *de re* scepticism. It is the doctrine that quantification into modal contexts does not, as it stands, make sense. Call a sentence *de dicto* if, in it, the necessity operator never governs a formula that contains a free variable. Then for the *de re* sceptic, only *de dicto* sentences, or their equivalents, are legitimate." (p. 125)

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26. ———. 1978. "Model Theory for Modal Logic Part II: The Elimination of ' *de re*' Modality." *Journal of Philosophical Logic* no. 7:277-306.

"In the first part of this paper, two philosophical positions were introduced: *de re* scepticism; and anti-Haecceitism. According to the first, quantification into modal contexts does not, as it stands, make sense; and according to the second, the identity or non-identity of individuals in distinct possible worlds is a matter of convention. It was shown that the two positions are equivalent in the sense that whatever first-order modal sentence is legitimate for the one is also legitimate for the other.

A soft and hard version of each of these positions may be distinguished. According to the soft *de re* sceptic, it is possible to make sense of *de re* modal discourse; and according to the soft anti-Haecceitist, it is possible to define coherent identity conditions for individuals across possible worlds. Both of the soft positions, then, are compromising ones in that they allow that ordinary modal discourse may be reconstructed. The hard versions of the positions, on the other hand, deny that any such reconstruction is possible.

The soft *de re* sceptic may reconstruct ordinary modal discourse in various ways. One way is to reinterpret either quantification or modality (or both) so that each *de re* sentence is equivalent to one that is *de dicto*. Although this method has been prominent in the literature, I shall deal with it only incidentally here. I hope to deal with it more fully elsewhere. Another way is to add axioms to the standard modal logic so that two conditions are satisfied. The first (eliminability) is that every *de re* sentence should have a *de dicto* equivalent relative to the resulting system. The second (conservativeness) is that no *dicto* sentence should be provable in the resulting system that is not already a theorem of standard modal logic." (p. 277)

27. ———. 1979. "Failures of the Interpolation Lemma in Quantified Modal Logic." *Journal of Symbolic Logic* no. 44:201-206.

"Beth's Definability Theorem, and consequently the Interpolation Lemma, fail for the version of quantified S5 that is presented in Kripke's [7]. These failures persist

when the constant domain axiom-scheme  $\forall x \Box \phi \equiv \Box \forall x \phi$  is added to S5 or, indeed, to any weaker extension of quantificational  $K$ .

§1 reviews some standard material on quantificational modal logic. This is in contrast to quantified intermediate logics for, as Gabbay [5] has shown, the Interpolation Lemma holds for the logic CD with constant domains and for several of its extensions. §§2—4 establish the negative results for the systems based upon S5. §5 establishes a more general negative result and, finally, §6 considers some positive results and open problems. A basic knowledge of classical and modal quantificational logic is presupposed." (p. 201)

#### References

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Reprinted in: *Notre Dame Journal of Formal Logic*, 27, 1986, pp. 169-179.  
"Parry presented a system of analytic implication in [7] and [8], Dunn [2] gave an algebraic completeness proof for an extension of this system and Urquhart [10] later gave a semantic completeness proof for Dunn's system with necessity. This paper establishes completeness for Parry's original system, (\*) thereby answering a question of Gödel [6], and then, on the basis of the completeness result, derives decidability; it also deals with quantificational versions and other modifications of his system.

Section 1 contains some informal remarks on the notion of analytic implication. They are not strictly relevant to the later analysis, although they may help to place it in perspective. Section 2 presents the semantics and Section 3 exhibits a system of analytic implication. Section 4 helps to demonstrate that the system is equivalent to Parry's, and Section 5 establishes completeness. Finally, Section 6 outlines the theory for some related systems." (p. 64)

(\*) I mean the full system of [7] with adjunction, A14 and A15.

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29. ———. 1980. "First-Order Modal Theories. [II. Propositions]." *Studia Logica* no. 39:159-202.

Abstract. "This paper is part of a general programme of developing and investigating particular first-order modal theories. In the paper, a modal theory of propositions is constructed under the assumption that there are genuinely singular

propositions, ie. ones that contain individuals as constituents. Various results on decidability, axiomatizability and definability are established."

"In some recent work ([7], [8], [9], [10]), I have attempted to carry out a dual programme of developing a general model-theoretic account of first-order modal theories, on the one hand, and of studying particular theories of this sort, on the other. The two parts of the programme are meant to interact, with the second providing both motivation and application for the first. The present paper belongs to the second part of the programme and deals with the question of giving a correct essentialist account of propositions.

My approach is distinctive in two main ways, one linguistic and the other metaphysical. On the linguistic side, I have let the variables for propositions be both nominal and objectual. That is to say, the variables occupy the same position as names and are interpreted in terms of a range of objects, which, in the present case, turn out to be propositions. This approach stands in contrast to the earlier work of Prior [17], Bull [1], Fine [4], Kaplan [14] and Gabbay [12], [13], in which the variables are sentential (they occupy the same position as sentences) and are interpreted either substitutionally or in terms of a range of intensional values." (p. 159)

#### References

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[4] K. Fine, Propositional quantifiers in modal logic, *Theoria* 36 (1970), pp. 336–346.

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 "The aim of this paper is to formalize various metaphysical theories within a first-order modal language. The first part deals with modal set theory. The later parts will deal with propositions, possible worlds, and facts.  
 Such an undertaking is relevant both to logic and to metaphysics.  
 Its relevance to logic lies mainly in its bearing on the model theory for first-order modal languages. I have begun to develop such a theory in [8]. The consideration of particular theories can then provide both an application of and motivation for general results in this field. There is already a fruitful interaction between the proof of general results and the consideration of particular first-order theories within classical model theory; and the hope is that there should be as beneficial an interaction within modal logic.  
 The relevance of the undertaking to metaphysics consists mainly in the general advantages that accrue from formalizing an intuitive theory. First of all, one thereby obtains a clearer view of its primitive notions and truths. This is no small thing in a subject, such as metaphysics, that is so conspicuously lacking in proper foundations.  
 But once a formalization is given, one can establish results about the theory as a whole and thereby obtain that overall view of a subject that philosophers often strive for but rarely obtain." (p. 177)

(...)

"The plan of this part of the paper is as follows. §1 contains an informal discussion and justification of our axioms for modal set theory. §2 then presents the formal theories. §3 develops a proof- and a model-theory for class abstracts in modal set theory and establishes a useful result on transferring abstracts from classical set theory into a modal context. In §4, it is shown that the formal theories are equivalent in that any two of them share the same theorems in their common language. The proof of equivalence contains general result on when the possible worlds semantics for a given modal theory can be represented within that theory itself. The next section discusses the adequacy of our formalizations and shows that, in a certain sense, they capture all of the essential truths about sets as such. The last section is concerned with the identity of sets and places the problem within a general account of the identity of objects." (p. 178)

[8] Fine, K., 'Model Theory for Modal Logic I, II, III', *The Journal of Philosophical Logic*, (1978) 125-56, (1978) 277-306, and to appear. [1981, 293-307]

31. ———. 1981. "Model Theory for Modal Logic. Part III: Existence and Predication." *Journal of Philosophical Logic* no. 10:293-307.

"This paper is concerned with the technical implications of a certain view connecting existence to predication. This is the view that in no possible world is there a genuine relation among the nonexistents of that world or between the nonexistents and the existents. (1) The meaning of the term 'genuine' here may be variously explained. On an extreme interpretation, all relations are 'genuine', so that none of them are to relate non-existents.

On a milder interpretation, the genuine relations are those that are simple or primitive in some absolute sense. But even without appeal to an absolute concept of simplicity, we can require that all relations should be analyzable in terms of some suitable set of relations, relating only existents to existents.

In order to make our results applicable to the thesis, we shall suppose that the primitive non-logical predicates of our language correspond to the genuine relations, whatever they might be taken to be. Thus, the linguistic formulation of the thesis becomes that the primitive predicates of the language should only be true, in each world, of the existents of that world.

Of course, the thesis might have been given a linguistic formulation, without any reference to relations, in the first place.

The thesis is an instance of what has been called Actualism. This is the ontological doctrine that ascribes a special status to actual or existent objects. Another form of the doctrine, so-called World Actualism, says that the behaviour of nonexistents is supervenient upon the behaviour of the existents, that two possible worlds which agree in the latter respect cannot differ in the former respect. The present thesis, by contrast, might be called *Predicate Actualism*. It should be clear that Predicate Actualism implies World Actualism, at least if the predicates used to describe the world are to express 'genuine' relations; for then there are no relationships involving nonexistents by which two worlds might be distinguished. On the other hand, World Actualism does not, as it stands, imply Predicate Actualism." (p. 293)

(\* This paper is the third and final part of a series (see the references below). It was completed and submitted to the *Journal of Philosophical Logic* in 1977, at about the same time as the other parts. But because of some mishap in the mail, its publication was delayed. The present part is independent from the other parts in its results, but draws upon the terminology of Section 2 of Part I.

I should like to thank the editor, R. Thomason, for many valuable remarks on the earlier version of the paper.

(1) I have briefly discussed this thesis elsewhere. The reader may like to consult Section 7 of [ 11], pp. 151 and 156-160 of [2], p. 564 of [3], and Section 8 of [7b]. There has been a fair amount of recent literature on the topic. I cannot give a complete survey, but the reader may like to consult Chapters IV-V of [9], p. 86 of [8], Chapters VII-VIII of [10], and pp. 333-336 of [ 11].

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32. ———. 1982. "The Problem of Non-Existents. I: Internalism." *Topoi* no. 1:97-140. Contents: A. Introduction. 1. Outline 97; 2. Methodology 99; B. Preliminaries, 1. Contexts and Objects 101; 2. Identity and Being 102; 3. The Identity of Non-existents 104; c. An Internalist Theory. 1. The Rudiments 106; 2. The Extended Theory 108; D. Refinements. 1. Implicit /Explicit Copula 110; 2. Diagonal Difficulties 115; 3. Dual Diagonal Difficulties 120; 4. Correlates 123; 5. Modal Matters 129; E. Criticisms. 1. Against Platonism 130; 2. Against Internalism 132; 3. Other Theories 136; Notes 137; References 139.
- "The main philosophical question about non-existents is whether there really are any. My own view is that there are none. But even if this is granted, we may still ask what they are like, just as the materialist may consider the nature of sensations or the nominalist the nature of numbers.
- On this further topic, there seem to be three main divisions of thought, which may be respectively labelled as:
- (i) platonism /empiricism;  
(ii) literalism /contextualism;  
(iii) internalism / externalism.
- Let me attempt a rough characterization of these divisions. More refined formulations will come later. On a platonic conception, the non-existent objects of fiction, perception, belief and the like do not depend for their being upon human activity or upon any empirical conditions at all; they exist, or have being, necessarily.
- Under an empirical conception, on the other hand, these objects are firmly rooted in empirical reality; they exist, or have being, contingently. On an extreme conception of this sort, these objects are literally created and are brought into being by the appropriate activity either of or within the agent.
- (...)
- All in all, the three divisions provide for  $8 (= 2^3)$  combinations of positions. Each, I think, is coherent, but some are more natural than others. For example it is natural, though not necessary, for the 'platonist' to accept internalism and for the 'empiricist' to accept externalism; for the means by which the objects are individuated will naturally be taken to provide conditions for their existence or being.
- My own view on these questions is given by empiricism, contextualism and externalism, not that this is a common combination in the literature. This view will be defended in the second part of this paper. In the present part, I am concerned to discuss a view that combines internalism with contextualism and platonism; and in

the third part, I shall discuss the literalist position, mainly in association with platonism and internalism. I have not attempted systematically to consider all of the possible combinations of position. I have only looked at the more prominent or plausible of the views, though what I say on them should throw light on what is to be said of the others.

The plan of the present part is as follows. In section A2, I discuss general methodological issues facing any philosophical study of nonexistents and, in particular, defend the claim that one can say what they are like without presupposing that there really are any. In section B, I try first to delineate more precisely the subjectmatter of our theories and then to describe the problems of providing identity and existence conditions with which any such theory should deal. In section C, I give an initial formulation of an internalist theory, which is successively refined in section D. Finally, in section E, I give two major criticisms of the theory as thus developed. A more detailed account of each section is given in the list of contents.

It is of the greatest importance to note that the present part does not contain my own views on the subject. It is only in the last section of this part that the internalist position is criticized, and it is only in the second part of this paper that my own, more positive, views are developed." (pp. 97-99)

33. ———. 1982. "First-Order Modal Theories. III: Facts." *Synthese* no. 53:43-122. "This paper forms the third part of a series on the development and study of first-order modal theories. It was not originally intended for this issue, but is relevant to Prior's work in two main ways. First, it does not treat modal logic as a mere technical exercise, but attempts to relate it to common philosophical concerns. This was an approach that Prior himself adopted and perhaps did more than anyone else to foster. Secondly, the paper deals with the more specific topic of facts. This was a matter upon which Prior had definite views and upon which he had written extensively - in relation to the definition of necessity ([25]), the semantics for the modal system  $Q$  ([26]), and the correspondence theory of truth ([27] and [29]). I have found all of these writings useful and, although I have disagreed with him on several points, the influence of his views on my own should be evident. It is therefore with respect and affection that I dedicate this paper to his memory. The paper falls into two main parts, one philosophical and the other technical. Either may be read independently of the other, but both are required for an all-round view. The first part is in two sections. One attempts to show that a modal first-order theory of facts is viable, and the other discusses its principles and their bearing on various philosophical issues. The second part is in six sections, which fall into three groups. Those of the first group (§§3--4) deal with the modal theory of possible worlds, both in itself and in its application to other subject-matter. Since I regard worlds as very big facts, it is only natural that they should be considered in this paper. The next section (§5) deals with the theory of facts under the anti-objectualist assumption that they contain no individual constituents. The sections of the last group (§§6-8) deal with facts under objectualist assumptions and include a statement of the appropriate objectualist conditions, a proof of their equivalence to the corresponding conditions for propositions, and an account of the resulting theories. It will be helpful, and sometimes essential, to have the earlier parts of the series ([15] and [16]) at hand. In the technical part of this paper, I have concentrated on the question of finding a correct essentialist theory of facts. As far as I know, very little work has been done in this direction, although there is a start in [46]. On the other hand, there is now a fair amount of material on facts as a subject, not of object-theory, but of semantical metatheory (see [45], [21] and [43], for example). I do not wish to dispute the interest of this material, either for logic or the philosophy of language; but it will not fall within the purview of the paper." (pp. 43-44)

References

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34. ———. 1982. "Act, Events and Things." In *Sprache und Ontologie. Akten des sechsten Internationalen Wittgenstein-Symposiums, 23. bis 30. August 1981, Kirchberg am Wechsel (Osterreich)*, edited by Leinfellner, Werner, Kraemer, Eric and Schank, Jeffrey, 97-105. Wien: Holder-Pichler-Tempsky.
- "The purpose of my theory is not to provide a reference for ordinary uses of a *qua*-phrase but to account for the identity of certain other objects — chairs, tables and the like— to which we clearly do refer.
- Qua* objects are governed by certain principles; and it is in terms of them that they are best understood.
- Existence*. The *qua* object X *qua*  $\phi$  exists at a given time (world-time) if and only if x exists and has  $\phi$  at the given time (world-time);
- Identity*. (i) Two *qua* objects are the same only if their bases and glosses are the same, (ii) A *qua* object is distinct from its basis (or from the basis of its basis, should that be a *qua* object, and so on).
- Inheritance*. At any time (world-time) at which a *qua* object exists, it has those normal properties possessed by its basis." (p. 100)
- (...)
- "The theory of *qua*- objects has some other applications worth mentioning. First, the *qua* objects are very like Aristotle's compounds of matter and form, with the matter corresponding to the basis and the form to the gloss. Aristotle's views, it seems to me, have not been taken seriously enough; many of his more distinctive doctrines have either been forgotten or fallen into disrepute. A modern version of the Aristotelian theory should give us the courage to embrace some of those doctrines and the means to articulate them more clearly.
- Secondly, the theory of *qua* objects is able to throw light on the question of the ground ' for necessary truths." (p. 104)
35. ———. 1983. "The Permutation Principle in Quantificational Logic." *Journal of Philosophical Logic* no. 12:33-37.
- "The story goes back to 1940, with the publication of Quine's *Mathematical Logic* [5]. He there presents a system of quantificational logic in which only sentences or closed formulas are theorems."
- (...)
- "The story now goes to 1963, with the publication of papers by Kripke [2] and Lambert [3]. Kripke was concerned to block the derivation of the Barcan formula or its converse within a quantified version of the modal logic S5. He was able to do this by requiring, as in Quine [6], that only closed formulas be theorems. However, because he wished to dispense with the rule of necessitation and because he also wished to allow for the empty domain, he did not quite take Quine's revised system as the quantificational basis for his modal logic."
- (...)
- Quite independently, Lambert developed a similar system. Like Kripke, he was concerned to allow for the empty domain; but he also wished to allow for theorems with free variables."
- (...)

"As later became clear, Lambert's full system (with identity) is complete for its intended interpretation. But it was then generally assumed that this system without its identity axioms and the corresponding quantificational part of Kripke's system (which had not been formulated with identity in the first place) were also complete. Indeed, in their paper [4] of 1970, Leblanc and Meyer gave a metalogical investigation of the Lambert fragment in which it was presupposed that Permutation and related principles were derivable; and, in [2], Kripke claimed completeness for his full modal system, which would have entailed completeness for its quantificational fragment. But then, Lambert pointed out, in a letter to Meyer of around 1968-9, the difficulty of deriving Permutation within the identity-free part of his system; and independently, in his paper of 1970 ([7], p. 286, fn. 6), Trew pointed to the related difficulty of deriving Permutation within Kripke's system. The problem of deriving the principle became open and, at least within the world of free logicians, achieved some notoriety.

It now appears that Permutation is not derivable within these systems." (pp. 33-35)

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Reprinted in: Fred Landman, Frank Veltman (eds.), *Varieties of Formal Semantics. Proceedings of the Fourth Amsterdam Colloquium, September 1982*, Dordrecht: Foris Publications, 1984, pp. 123-142.

"There is the following view. In addition to individual objects, there are arbitrary objects: in addition to individual numbers, arbitrary numbers; in addition to individual men, arbitrary men. With each arbitrary object is associated an appropriate range of individual objects, its values: with each arbitrary number, the range of individual numbers; with each arbitrary man, the range of individual men. An arbitrary object has those properties common to the individual objects in its range. So an arbitrary number is odd or even, an arbitrary man is mortal, since each individual number is odd or even, each individual man is mortal. On the other hand, an arbitrary number fails to be prime, an arbitrary man fails to be a philosopher, since some individual number is not prime, some individual man is not a philosopher.

Such a view used to be quite common, but has now fallen into complete disrepute. As with so many things, Frege led the way." (p. 55)

(...)

"In the face of such united opposition, it might appear rash to defend any form of the theory of arbitrary objects. But that is precisely what I intend to do. Indeed, I would want to claim, not only that a form of the theory is defensible, but also that it is extremely valuable. In application to a wide variety of topics— the logic of generality, the use of variables in mathematics, the role of pronouns in natural language— the theory provides explanations that are as good as those of standard quantification theory, and sometimes better.

Rather than present the finished theory at the outset, we may see it as the outgrowth of the criticisms that have been directed against its cruder formulations. Each criticism, if not deflected, will lead to an appropriate change of formulation. The finished form of the theory will then emerge as the cumulative result of these various criticisms; it will be, if you like, the prize that the proponent of the naive view can carry off with him in the contest with his critics. This is not how I myself came to the theory; but it is perhaps the most congenial approach for those who are already sceptical. (pp. 55-56)

37. ———. 1984. "Critical Review of Parsons' ' *Nonexistent Objects* '." *Philosophical Studies* no. 45:95-142.

Review of: Terence Parsons, *Nonexistent Objects*, New Haven: Yale University Press, 1980.

"There has recently been a rebellion within the ranks of analytic philosophy. It has come to be appreciated that, in the debate between Russell and Meinong, Russell was perhaps mistaken in his criticisms and Meinong was perhaps correct in his views. As a consequence, an attempt was made to rehabilitate the Meinongian position, to defend it against the most obvious attacks and to develop it in the most plausible ways. T. Parsons was among the first of the contemporary philosophers to make this attempt, (1) and so it is especially appropriate that his views should now be set out in a book.

I should say, at the outset, that I thoroughly approve of the Meinongian project. As Parsons makes clear (pp. 32— 38), we refer to non-existents in much the same way as we refer to other objects. It is therefore incumbent upon the philosopher to work out the principles by which our discourse concerning such objects is governed. Not that this is necessarily to endorse a realist position towards the objects of the resulting theory. Nominalists and Platonists alike may attempt to set out the principles that govern arithmetical discourse; and it is in the same spirit that the realist or anti-realist may attempt to set out the principles of our fictional discourse. Despite my approval of the project, I must admit to some misgivings as to how Parsons has carried it out. These misgivings are of two kinds. There are first some internal criticisms, requiring only change within Parsons' basic approach. There are then some external criticisms, requiring change to the basic approach.

These criticisms, though, should not be thought to detract from the merits of Parsons' book. It is, in many ways, an admirable contribution to the field.

It gives weight both to the interest and the legitimacy of the Meinongian enterprise; it pinpoints the difficulties which any satisfactory theory must deal with; and in its solution to those difficulties, it sets up a theory with a degree of rigour and systematicity that should serve as a model for years to come. As a well worked-out and accessible contribution to object theory, there is no better book." (pp. 95-96)

(1) Others include Castafieda [1], Rapaport [7], Routley [8] and Zalta [9].

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[8] Routley, R.: 1980, *Exploring Meinong's Jungle and Beyond* (Australian National University, Canberra).

[9] Zalta, E. N.: 1980, 'An introduction to a theory of abstract objects', Ph.D. Thesis (University of Massachusetts, Amherst)

38. Fine, Kit, and Mc Carthy, Timothy. 1984. "Truth without Satisfaction." *Journal of Philosophical Logic* no. 13:397-421.

"In his famous paper [7], Tarski gave a definition of truth for a formalized language. Unable to perform a direct recursion on the concept itself, he gave a definition in terms of satisfaction. This makes it natural to ask if such an indirect procedure is necessary or whether a definition of truth can be given without using or somehow invoking the concept of satisfaction.

The question, as it stands, is vague; and later we shall be concerned to make it more precise. But even as it stands, it has an obvious technical interest. The situation that Tarski found himself in is common in mathematics. We wish to define a certain concept, but unable to perform a direct recursion on the concept itself we perform a recursion on a related concept of which the given concept is a special case. It would therefore be desirable to know when the related concept is necessary, both in the case of truth and in general.

The question may also have some philosophical interest. There is a fundamental difference between the concepts of truth and of satisfaction. The former merely applies to certain linguistic units; the latter connects language to an ontology of objects, typically extra-linguistic. A negative result on defining truth without satisfaction may perhaps constrain formal attempts to implement non-referential conceptions of truth. In the present paper, however, we will not be concerned in detail with the philosophical aspects of our question, although we will from time to time mention some points of contact between our discussion and the philosophical literature.

Interest in our question dates back to Wallace [9]; and the topic was subsequently taken up by Tharp [8] and Kripke [3] (especially Section 10).

We have made our presentation self-contained, though the reader may consult the earlier work for general background and for elucidation of particular points.

The plan of our paper is as follows. Section 1 sets out the general framework in which our question and its cognates are posed. Section 2 solves the questions in case the meta-theory is not required to be finitely axiomatized; and Section 3 gives partial solutions in case finite axiomatizability is required, thereby answering a question of Kripke's [3] and of Tharp's [8].

Finally, Section 4 considers the question under other provisos on the metatheory." (pp. 397-398)

#### References

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[9] Wallace, J., 'On the frame of reference', in D. Davidson and G. Harman (eds.), *Semantics of Natural Language*, D. Reidel, 1972, pp. 219-252.

39. Fine, Kit. 1985. "Natural Deduction and Arbitrary Objects." *Journal of Philosophical Logic* no. 14:57-107.

Reprinted in *Philosopher's Annual*, vol. 8, 1985.

"This paper is an abridged and simplified version of my monograph *Reasoning with Arbitrary Objects* [4]. It may be read by the diligent as a preparation for the longer work or by the indolent as a substitute for it. But the reader, in either case, may find it helpful to consult the paper, *A Defence of Arbitrary Objects* [3], for general philosophical orientation.

This paper deals with certain problems in understanding natural deduction and ordinary reasoning. As is well known, there exist in ordinary reasoning certain procedures for arguing to a universal conclusion and from an existential premiss. We may establish that all objects have a given property by showing that an arbitrary object has the property; and having shown that there exists an object with a given property, we feel entitled to give it a name and infer that it has the property." (p. 57).

#### References

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40. ———. 1985. "Logics Containing K4. Part II." *Journal of Symbolic Logic* no. 50:619-651.  
 "The plan of this part is as follows. §1 presents some elementary results on pmorphisms. §2 introduces the logics to be proved complete and §3 the conditions for which they are complete. §4 contains the completeness proof. In §5 we show that there are a continuum of subframe logics, while in §6 we give various alternative characterizations of the subframe logics and extend our results on the finite model property from logics to theories. The final section, §7, gives a general characterization of those of the subframe logics that are compact and gives reasonably practicable methods for determining when a logic is compact and what condition its axioms express.  
 I make free use of the material in the first five sections of Part I, and the reader is advised to have that part at hand." (p. 620)
41. ———. 1985. "Plantinga on the Reduction of Possibilist Discourse." In *Alvin Plantinga*, edited by Tomberlin, James and Inwagen, Peter van, 145-186. Dordrecht: Reidel.  
 Reprinted in: *Modality and Tense. Philosophical Papers*, as chapter 5, pp. 176-213.  
 "Plantinga is what I call a modal actualist. He believes that the idioms of necessity and possibility are to be taken as primitive in preference to talk of possible worlds and that only actuals, as opposed to possibles, are to be granted ontological status. On these two issues, he and I agree.  
 The modal actualist faces a challenge. Talk of possible worlds and of possible individuals appears to make perfectly good sense. There seems to be a clear meaning, for example, in the claim that some possible object does not exist. So the modal actualist, once he grants that possibilist discourse makes sense, must somehow give it sense. It is on this question of how such a challenge is to be met that Plantinga and I disagree.  
 He favours a reduction of possibilist discourse in which possible worlds and possible individuals give way to propositions and properties, respectively; I favour a reduction in which reference to possibles becomes a modal manner of reference to actuals. In this paper, I shall attempt to adjudicate between these rival positions. In the first section, I shall set out the problem of reduction and Plantinga's favoured solution. In the second, I shall present my central criticism of the reduction, viz. that it is question-begging. In the next three sections, I shall consider the related question of whether properties and propositions exist necessarily, first presenting an argument against and then disposing of an argument for their necessary existence. In the final section, I shall present my own reduction and the reasons for preferring it to Plantinga's.  
 The central theme of this paper is the question of reduction; but it should have a broader significance than such a theme might suggest. Partly this is because other issues, of independent interest, are raised: the connection between existence and predication; the necessary existence of propositions; the Priorian stand on modality. But perhaps more important than this question of particular issues is the question of how the issues are to be approached, of what is to count as a plausible consideration one way or another. Even when I have found myself in agreement with Plantinga on a certain view, I have often also found myself unhappy with the reasons he adduces in its favour. It is in this difference of approach, then, that the paper may also have a broader significance." (pp. 145-146)
42. ———. 1988. "Semantics for Quantified Relevance Logic." *Journal of Philosophical Logic* no. 17:27-59.  
 Reprinted in: Alan Ross Anderson, Nuel D. Belnap, Jr., with contributions by J. Michael Dunn ... [et al.], *Entailment: The Logic of Relevance and Necessity*, Princeton: Princeton University Press, 1992 vol. II, pp. 235-262.

"This paper is a companion piece to my *Incompleteness for Quantified Relevance Logics*. In that earlier paper, I showed that RQ and other systems of quantified relevance logic were not complete for the standard semantics. In the present paper, I provide a semantics with respect to which they are complete." (p. 27)

(...)

"This section is divided into five subsections. The first two lay out the semantics, the third presents the logics, and the last two establish soundness and completeness. A basic knowledge of the semantics for propositional relevance logic is presupposed (see §51). It is conceivable that the methods of the present section might be used to simplify the proofs of incompleteness for the standard semantics; but this is not here investigated." (p. 239 of the reprint)

43. ———. 1989. "Incompleteness for Quantified Relevance Logics." In *Directions in Relevant Logic*, edited by Norman, Jean and Sylvan, Richard, 205-225. Dordrecht: Kluwer.

Reprinted in: Alan Ross Anderson, Nuel D. Belnap, Jr., with contributions by J. Michael Dunn ... [et al.], *Entailment: The Logic of Relevance and Necessity*, Princeton: Princeton University Press, 1992 vol. II, pp. 235-261.

"In the early seventies, several logicians developed a semantics for propositional systems of relevance logic.

(...)

In the light of this work, it seemed reasonable to extend the completeness results to quantificational systems of relevance logic. But what systems should be chosen? One would like, in the first place, to deal with the systems that already exist in the literature, such as quantified R (RQ) or quantified E (EQ). This, at least, is a debt that we owe to the history of the subject. But one would also like to prove completeness for the quantificational analogues of propositional systems that have already been proved to be complete. These analogues might be obtained from the propositional system by adding a standard quantificational component, consisting of such and such axioms and rules. Such a component might be chosen in terms of its intrinsic plausibility as a quantificational basis. Less arbitrarily, it might be chosen so as to yield a complete system when combined with the minimal propositional system (the one complete under no special conditions on  $\circ$ , R or  $*$ ). Not surprisingly, the pre-existing systems turn out to be equivalent to the systems obtained by the other approach.

The construction of the quantificational analogue is not, in fact, as straightforward as this description might suggest; for the extension of the propositional semantics to the quantificational case is not unique. It must be decided whether the domain  $I$  of individuals is to be constant or not. If it is not constant, then there are various ways of dealing with nonexistent individuals, individuals that do not belong to the domain of the world or point under consideration. But once these decisions are made, the choice of the quantificational component can be fixed." (p. 205)

44. ———. 1989. "The Problem of *De Re* Modality." In *Themes from Kaplan*, edited by Almog, Joseph, Perry, John and Wettstein, Howard, 197-272. New York: Oxford University Press.

Reprinted in: *Modality and Tense. Philosophical Papers*, as chapter 2, pp. 40-104.

"I want now to evaluate Quine's objections to quantified modal logic, dealing first with the metaphysical and then with the logical argument.

I observed before that the metaphysical argument was operator-specific; for different operators it yields different problems. This observation applies as much to different notions of necessity as it does to notions other than necessity. There is not a single problem of essentialism, but a range of problems, that vary according to the notion of necessity in question.

There are perhaps four principal notions of necessity for which the problem arises; these are, respectively, the logical, the analytic, the metaphysical, and the natural. Of these, the most important is undoubtedly the problem for the metaphysical notion. Indeed, not only is this problem of great importance in itself, but it is central, in my opinion, to any attempt to understand the nature of metaphysics.

- However, it is not my intention to discuss this problem here. I wish to follow Quine and concentrate my attention on the logical and semantic modalities." (p. 202)
45. ———. 1989. "The Justification of Negation as Failure." In *Logic, Methodology and Philosophy of Science VIII. Proceedings of the Eighth International Congress of Logic, Methodology and Philosophy of Science, Moscow, 1987*, edited by Fenstad, Jens Erik, Frolov, Ivan and Hilpinen, Risto, 263-301. Amsterdam: North-Holland.
- "Prolog is a logic programming language; it is used to answer queries on the basis of information provided by the programmer. For the most part, the logic employed by Prolog is standard. But it uses a highly unorthodox rule for establishing negative facts. This rule, the so-called rule of negation as failure, allows us to deny a statement on the grounds that a certain attempt to prove it has failed. The rule is not classically valid; and therefore the question arises as to how it is to be justified. There are basically three different kinds of justification that have been proposed in the literature. The first is to re-interpret negation to mean something like unprovability. The second is to assume that the program is complete with respect to truths; all truths are derivable. The third is to suppose that the program is complete with respect to conditions; all sufficient conditions for the application of the predicates have been specified. My aim in this paper is to evaluate these various proposals and then to make a proposal of my own. I shall argue that the existing proposals all suffer from some defect or another: the first is unable to account for a classical reading of negation; the second delivers too much on programs which employ negation; and the third delivers too little on programs which make no use of negation. I shall then argue that my own proposal is able to avoid these difficulties. From one point of view, the proposal is not new; it is merely a form of the second proposal stated above, according to which all truths are derivable. However, the concept of derivability which is appealed to is quite novel; for the assumption that all truths are derivable, may itself be used in establishing that a given statement is derivable. The assumption has, in other words, a self-referential character. The proposal has various other features of interest. It provides a natural way of interpreting inductive definitions in which the positive instances of a predicate are allowed to depend upon its negative instances. It sanctions an extension of the rule of negation of failure, under which not only the finite, but also the transfinite, failure of a statement may constitute a ground for its denial. It is capable of variation in the choice of which other assumptions or rules are used in defining the concept of derivability. (...)
- One feature of my exposition is worthy of special note. I have for the most part confined my attention to the sentential case, under which only truth-functional complexity is ever exposed. Such a case is usually regarded as trivial, since most of the interesting features of Prolog depend upon the use of variables. However, in this regard, the rule of negation as failure is an exception. Most of the problems in justifying the rule already arise at the sentential level; and to solve these problems at this level is to have gone a long way towards solving them altogether. There are, however, certain difficulties which are peculiar to the introduction of variables and terms; and these are considered at the end of the paper. It is argued, in particular, that the usual assumptions concerning an ontology of terms are needlessly strong and that an ordinary ontology of individuals can be countenanced in its place." (pp. 263-264)
46. ———. 1990. "Quine on Quantifying In." In *Propositional Attitudes: The Role of Content in Logic, Language and Mind*, edited by Anderson, Anthony and Owens, Joseph, 1-26. Stanford: Center for the Study of Language and Information, Stanford University.
- Reprinted in: *Modality and Tense. Philosophical Papers*, as chapter 3, pp. 105-130. "It is my aim in this chapter to evaluate Quine's argument against quantifying into modal contexts, dealing first with the peculiarly modal considerations and then with

- the more general logical considerations." (p. 2)
47. ———. 1991. "The Study of Ontology." *Noûs* no. 25:263-294.  
 "A constructional ontology is one which serves to construct complexes from simples. The present paper is concerned with the nature and with the study of such ontologies. It attempts to say, in the first place, how they are constituted and by what principles they are governed. But it also attempts to say how their study may lead one to adopt certain positions and to make certain definitions.  
 The remarks on the study of ontology are meant to relate to the study of disciplines in general. I am interested in how the study of a discipline gets shaped by the positions which are adopted and the strategies which are pursued. These interact; for the pursuit of certain kinds of strategy will lead to the adoption of certain kinds of position, and the adoption of certain kinds of position will be required by the pursuit of certain kinds of strategy. One therefore needs to understand how they interact.  
 Certain subsidiary themes run through the paper, all interrelated in one way or another. One concerns a dialectical conception of modality, one that is determined by what is left open at a given stage of enquiry. Another involves a particular way of expressing modal claims, in terms of certain objects requiring others. Yet a third is an interest in a relativist conception of ontology, according to which no ontology stands out as being correct.  
 The paper concludes with a formal appendix, which attempts to make precise much of what can be made precise in the earlier informal part of the paper. Each part has been designed to be read independently of the other, although a proper understanding of either part depends upon reading them both." (p. 263)
48. ———. 1991. "The Identity of Material Objects." In *Topics in Philosophy and Artificial Intelligence*, edited by Albertazzi, Liliana and Poli, Roberto, 33-37. Bozen: Istituto Mitteleuropeo di Cultura.  
 Papers from the International Summer Schools in Bozen - 1989-1990.  
 "1. The Problem of Identity  
 What is a question of identity? Two responses to this meta-question of identity may be distinguished, which I call the *comparative* and the *intrinsic*. On the comparative conception, one answers a question of identity by saying when two objects of a given sort are the same. On the intrinsic conception, one answers a question of identity by saying what objects of a given sort are "in themselves".  
 The comparative conception goes back to Locke's famous chapter on identity. It was extended by Frege. Very roughly, we may say that Frege extended the application of the comparative conception from the identity of concrete objects to the identity of abstract objects. This conception is the dominant one of today; it informs the work of Strawson, Quine, Wiggins and of others.  
 The basic idea behind the comparative conception is to make the *what* of identity a *when*: to ask what an object of a given sort is is to ask when objects of that sort are the same. But to ask when two objects are the same invites the trivial answer: when they are the same. We need somehow to distinguish the intended answers to this question.  
 This can often be done by means of the concept of a *presentation*. I mean to use this term in a suitably abstract sense. Thus a sentence might be regarded as a presentation of a proposition; there is no need for a presentation to be something mental or even for it to be that by which we grasp the object.  
 An intended answer to an identity question then says when two presentations are presentations of the same object; and it says this in terms which do not presuppose the identity of the objects at issue.  
 Different questions of identity - e.g. at a time, across time, across worlds - turn on different accounts of how the objects are to be presented.  
 There is a fundamental criticism to be made of the comparative conception. For it says what kind of "career" the object has, not what kind of object it is that has the career. For example, a transtemporal criterion of identity for material things is compatible with a material thing being (a) a primitive substance, (b) a mereological

sum of time-slices, (c) the embodiment of a form, (d) an event, and so on. Similarly, the extensional criterion of identity for sets is compatible with a set being (a) constructive, (b) "exclusive", i.e. determined by its non-members rather than by its members, (c) logical, i.e. determined by a property with the required extension rather than by its members.

What is missing from the comparative conception? I would like to suggest that often what is missing is an account of how the objects of the given kind are generated or analysed. Thus primitive substances are not generated from anything else at all, mereological sums are generated by aggregation, embodiments are generated by a suitable embodiment operator, and so on. In each case, we need to say how (if at all) the object is to be analysed; we need to say what the object is in itself." pp. 33-34.

49. ———. 1992. "Aristotle on Matter." *Mind* no. 101:35-57.

"It is my belief that there is still a great deal to be learnt from Aristotle's views on the nature of substance; and it is my aim in a series of papers, of which this is the first, to make clear what these views are and what it is in them that is of value. (1) A peculiarity of my approach, compared to current scholarly practice, is the attempt at rigour. I have tried to provide what is in effect a formalization of Aristotle's views. I have, that is to say, attempted to make clear which of his concepts are undefined and which of his claims underived; and I have attempted to show how the remaining concepts are to be defined and the remaining claims to be derived. I can well understand a traditional scholar being suspicious of such an approach on the grounds that the various parts of Aristotle's thought are either too unclear to be capable of formalization or else are clear enough not to require it. Since the matter is not one for a priori dispute, I can only ask the scholar to put his suspicions at bay until the details of the case are examined. I then think that it will be found that the attempt at rigour provides a most valuable guide for the study of the text.

I have not tried to deal with all aspects of Aristotle's thought on substance. I have concentrated on those which centre on the concepts of matter, form, part, and change; and I have neglected those which concern the related concepts of predication, function, priority and power. It is to be hoped that the investigation will be rounded out at some later time to include all of the central aspects of his work. It should also be mentioned that my treatment of the text has not been altogether scholarly. Partly this has been a matter of competence, and partly of inclination. I have been more concerned with the broad sweep of Aristotle's views than with exegetical detail; and this has led me to conjecture that he held a certain opinion, not because of direct textual evidence but because it is what his view most naturally requires. Thus the Aristotle I have presented here is much more consistent, definite and complete than the Aristotle of the texts." (p. 35)

(1) This paper is based upon the first two sections of my unpublished paper "Aristotle on Substance". I should like to thank the members of a seminar I held at UCLA in the winter of 1991, and Frank Lewis in particular, for many helpful discussions on some of the topics of the paper. I am also grateful to Richard Sorabji for valuable remarks on an earlier version of the paper.

50. ———. 1992. "Transparent Grammars." In *Logic from Computer Science. Proceedings of a Workshop held November 13-17, 1989*, edited by Moschovachis, Yiannis N., 129-151. New York: Springer.

"1. Introduction

'Cat' is a word which occurs in 'cattle', but it does not occur as a word; '1-1-2' is a term which occurs in '1+ 2.3', but it does not occur as a term. All such occurrences of expressions might be said to be accidental, since they are accidents of how the syntax of the language happens to be realized.

The notion of accidental occurrence is significant in various areas of thought. In logic, it greatly aids the formulation and proof of meta-logical results if it can be assumed that the underlying language contains no accidental occurrences. For example, a subformula can then simply be defined as a formula which occurs within

a given formula rather than as an expression which is thrown up by a parsing of that formula. In philosophy, the issue of whether one can quantify into modal contexts has been seen to turn on such questions as to whether the occurrence of '9' in 'necessarily,  $9 > 7$ ' is accidental or not; and the absence of accidental occurrence has been regarded as a condition on any "ideal language". In computer science and in linguistics, the presence of accidental occurrences has an obvious relevance to parsing, since they lead to the danger that a parser might mistake an apparent constituent of the expression to be parsed for a genuine constituent.

Let us say that a language or grammar is transparent if it permits no accidental occurrences. It is the main purpose of the present paper to investigate the conditions under which a context-free grammar is transparent.

It is shown how any accidental occurrence reduces to a certain "primitive" case; and it is shown how such primitive occurrences might be detected.

On the basis of these results on reduction and detection, an effective test for transparency is then given.

The concept of transparency represents a strengthening of the more familiar concept of nonambiguity. Any transparent grammar, at least of a well-behaved sort, is unambiguous, though not every unambiguous grammar is transparent. Moreover, what is required for many purposes is not merely an unambiguous but a transparent grammar. It is therefore significant in this regard that there is an effective test for the stronger property even though there is no effective test for the weaker one.

The plan of the paper is as follows. The first two sections introduce the relevant notions from the theory of context-free grammars. The third section explains the connection between nonambiguity and transparency.

The fourth section establishes the reduction of accidental occurrence to the primitive case. The next three sections deal with the question of detecting the primitive accidental occurrences: a more fully articulated or canonical version of the given grammar is introduced; it is shown how accidental occurrences in the given grammar correspond to certain kinds of expression in the canonical grammar; and a precedence analysis is given of those expressions in the canonical grammar which correspond to the primitive accidental occurrences in the given grammar. An effective test for transparency is then provided in the final section.

The treatment of transparency in this paper has been very brief. Many of the results can be extended; and I have given a much fuller account in Fine [1]." (pp. 129-130)

References

[1] Fine, K., *Transparency I and II*, submitted to *Language and Control*.

51. ———. 1994. "Essence and Modality." *Philosophical Perspectives* no. 8:1-16. Reprinted in *The Philosopher's Annual for 1994*, volume 16, (edited by Patrick Grim, Gary Mar, Peter Williams), Stanford: CSLI 1996 and in J. Kim, D. Korman, E. Sosa (eds.), *Metaphysics: An Anthology*, Oxford: Wiley-Blackwell 2011 (second edition).

"The concept of essence has played an important role in the history and development of philosophy; and in no branch of the discipline is its importance more manifest than in metaphysics.

Its significance for metaphysics is perhaps attributable to two main sources. In the first place, the concept may be used to characterize what the subject, or at least part of it, is about.

For one of the central concerns of metaphysics is with the identity of things, with what they are.

But the metaphysician is not interested in every property of the objects under consideration. In asking 'What is a person?', for example, he does not want to be told that every person has a deep desire to be loved, even if this is in fact the case. What then distinguishes the properties of interest to him? What is it about a property which makes it bear, in the metaphysically significant sense of the phrase, on what an object is?

It is in answer to this question that appeal is naturally made to the concept of essence. For what appears to distinguish the intended properties is that they are essential to their bearers." (p. 1)

(...)

"It is my aim in this paper to show that the contemporary assimilation of essence to modality is fundamentally misguided and that, as a consequence, the corresponding conception of metaphysics should be given up. It is not my view that the modal account fails to capture anything which might reasonably be called a concept of essence. My point, rather, is that the notion of essence which is of central importance to the metaphysics of identity is not to be understood in modal terms or even to be regarded as extensionally equivalent to a modal notion. The one notion is, if I am right, a highly refined version of the other; it is like a sieve which performs a similar function but with a much finer mesh.

I shall also argue that the traditional assimilation of essence to definition is better suited to the task of explaining what essence is. It may not provide us with an analysis of the concept, but it does provide us with a good model of how the concept works. Thus my overall position is the reverse of the usual one. It sees real definition rather than de re modality as central to our understanding of the concept." (p. 3)

52. ————. 1994. "Compounds and Aggregates." *Noûs* no. 28:137-158.

"Some objects appear to be composed of parts: a quantity of sand of its grains, a throbbing pain of its throbs, a set of its members, and a proposition of its constituents.

There seem to be two fundamentally different ways in which an object can be composed of parts. One is nonstructural in character; the parts just merge. The other is structural; the parts hang together within a structure. Thus of the examples above, the first two, the sand and the pain, are composed from their parts in a nonstructural fashion, while the last two, the set and the proposition, are composed in a structural manner.

The notion of a nonstructural method of composition may be taken to be one which conforms to certain structure-obliterating identity conditions. These are as follows: order and repetition among the composing objects is irrelevant to the result; the composition of a single object is the object itself; and the composition of compositions of objects is the composition of those very objects'. Thus the first of these conditions excludes concatenation as a nonstructural method of composition; while each of the remaining conditions excludes the set-builder (the operation which composes a set from its members).

Let us agree to call any nonstructural method of composition a method of fusion.

There is a particular such method, I call it aggregation, which has been very prominent in the literature on part-whole. It may be characterized as a method of composition which conforms to the identity conditions above and which also conforms to the following existence conditions: the aggregate of objects which exist in time exists at exactly those times at which one of the objects exists; and an aggregate of objects which are located in space occupies, at any given time at which it exists, exactly those places which are occupied by one of the objects.

It has often been supposed that aggregation is a legitimate method of composition, that objects may be composed from others in conformity with the conditions set forth above. What has made aggregation so attractive, apart from any intuitive appeal it may have, are two main factors (which will be discussed in more detail later in the paper). The first, and most important, is the identification of a thing with the content of its spatio-temporal extension. The second is the identification of a thing with the fusion of its time-slices. Both of these forms of identification require that the objects fuse in the manner of aggregation.

It has also often been supposed that aggregation is the only legitimate method of fusion. Part of the appeal of this further position may arise from a general hostility to different methods of composition, whether they be methods of fusion or not.

Under the form of nominalism championed by Goodman, for example, there can be

no difference in objects without a difference in their parts; and this implies that the same parts cannot, through different methods of composition, yield different wholes.

However, I suspect that many of those who would be open to structural methods of composition would still not be open to distinct nonstructural methods of composition. For it is hard to see, especially given the identification of a thing with its spatio-temporal content, what other methods of fusion there might be; and it is hard to see how there could be alternative conceptions of a fusion, of a whole at the same level as its elements and formed without regard to their order or repetition. Let us call the extreme position, that there is only one method of composition, mereological monism; let us call the less extreme position, that there is only one method of fusion, fusion monism; and let us call that particular version of fusion monism according to which aggregation is the sole method of fusion aggregation monism.

The main purpose of this paper is to show that the last of these three positions is mistaken. I want to show that there is a method of fusion which is not aggregative, i.e. which does not conform to the characteristic existence conditions for aggregates. However, my attack on this position may be relevant to the two other positions as well. For granted that aggregation is itself a legitimate method of fusion, it follows that fusion monism should be dropped in favour of a pluralist position. And to the extent that the adoption of monism depended upon a general hostility to structural considerations, the way is then open to the admission of structural methods of composition.

It is also my intention to attack two related forms of monistic doctrine. For just as we can single out the aggregative method of nonstructural composition, so we can single out the aggregative way of being a nonstructural part and the aggregative kind of nonstructural whole. One might then maintain that not only does aggregation constitute the only nonstructural method of composition, but that it also constitutes the only nonstructural way of being a part and the only nonstructural way of being a whole. We therefore have three forms of monism, one with respect to composition, another with respect to part, and a third with respect to whole. As will later become clear, the two further forms of monism are successively weaker than the original; and so their denials might be taken, in mimicry of Quine, to comprise three grades of mereological involvement.

From the discussion of monism will emerge objections to two other prominent doctrines: extensionalism and mereological atomism. According to the first of these, things are the same when their extensions (spatial, spatio-temporal, or modal-spatio-temporal) are the same; and according to the second, parts are prior to their wholes.

For the purposes of attacking the aggregation monist, I have assumed that aggregation is a legitimate method of fusion. Towards the end of the paper, I suggest that there is no such method and propose a form of fusion monism in which some other method of fusion takes the place of aggregation. However, my tentative endorsement of fusion monism is not meant in any way to lend support to a general monist position." (pp. 137-139)

53. ———. 1994. "A Puzzle Concerning Matter and Form." In *Unity, Identity, and Explanation in Aristotle's Metaphysics*, edited by Scaltsas, Theodore, Charles, David and Gill, Mary Louise, 13-40. Oxford: Clarendon Press.
- "Montgomery Furth has written (1), "given a suitable pair of individuals ... there is no reason of Aristotelian metaphysics why the very fire and earth that this noon composes Callias and distinguishes him from Socrates could not, by a set of utterly curious chances, twenty years from now compose Socrates ...". He does not specify what these "curious chances" might be. But we may suppose that Socrates eats Callias for his lunch and that, owing to the superiority of Callias' flesh and bone, it is the matter of this which remains in Socrates after the period of twenty years. That such an exchange of matter is possible is a point on which many Aristotelian scholars could agree. However, I wish to argue that such a case gives rise to a

fundamental difficulty; for its possibility runs into conflict with certain basic metaphysical principles which are commonly attributed to him and which would also be commonly accepted.

The problem consequently arises as to how this difficulty is to be resolved. This problem itself may be regarded in two somewhat different lights. On the one hand, it may be regarded as a difficulty for Aristotle. The question then is whether one can find a solution which would be acceptable to him, either in the sense that he would or that he could accept it. On the other hand, it may be regarded as a difficulty for a neo-Aristotelian, i.e. to someone who is sympathetic to the analysis of things into matter and form. The question then is to find a solution, regardless of whether or not it would be acceptable to Aristotle.

For the most part, my concern has been with the exegetical question; and even here, my purposes have been somewhat limited. For I have not attempted to settle on one solution as opposed to another. My aim has been to map out the exegetical space rather than to locate the views of Aristotle within it.

However, it should be mentioned that I count myself a neo-Aristotelian (and, indeed, it was my own commitment to hylomorphism which led me investigate Aristotle's views in the first place). It has therefore been of some importance for me to take the purely metaphysical question into account."(p. 13)

(1) Furth, M. *Transtemporal Stability in Aristotelian Substances*, *Journal of Philosophy*, 75 (1978), 624-646; reprinted in *Substance, Form, and Psyche: An Aristotelean Metaphysics*, Cambridge University Press: Cambridge, 1988. (note abbreviated).

54. ———. 1995. "The Logic of Essence." *Journal of Philosophical Logic* no. 24:241-273.

"Central to this paper is a certain distinction. This is the distinction between objects simply having a property and their having that property essentially or by their very nature. Also central to the paper is a certain claim. This is the claim that the notion of essence, of objects essentially having a property, is not to be understood in terms of the notion of necessity.

The claim is defended in my paper *Essence and Modality*. But the basic idea behind the defence can be given here. Consider Socrates and the singleton set containing him. Now although it is plausible to suppose that the singleton essentially contains the man, it is not plausible to suppose that the man essentially belongs to the singleton. There is nothing in the nature of Socrates which demands that there be any sets, let alone one that contains him. However, the standard accounts of essence in terms of necessity are unable to account for this asymmetry. For under such an account, the singleton essentially containing Socrates will consist in something like its being necessarily the case that the set contains Socrates if the set exists. But if this is true, then it will also be necessarily the case that Socrates belongs to the set if the man exists." (p. 241)

55. ———. 1995. "Part-Whole." In *The Cambridge Companion to Husserl*, edited by Smith, Barry and Smith, David Woodruff, 463-485. Cambridge: Cambridge University Press.

"Husserl's third *Logical Investigation* is perhaps the most significant treatise on the concept of part to be found in the philosophical literature. (1) In it Husserl attempts to analyze the notion of dependent part, to lay down the principles governing its use, and to relate it to more general considerations concerning the nature of necessity and unity.

He begins his study with the consideration of objects in the psychological sphere. A typical example of the kind of object he has in mind is that of a visual datum, a red patch, let us say, and its various aspects or "moments"- its colour, say, or its extension. He takes each of these moments to be peculiar to the object in question; no other datum, no matter how great its resemblance to the original datum, will have the very same moments. He also takes the moments to be, in a suitably broad sense, part of the given object; they are thought to be actually present in it." (p. 463) (...)

"My aim in the present essay is to clarify certain formal aspects of Husserl's thought. I have here and there, inserted some critical comments; but my main concern has been to say what the views are, and not to say whether or not they are right. Husserl himself took the formalization of his ideas to be not only possible, but highly desirable. He writes (§24, 484):

a proper working out of the pure theory we here have in mind would have to define all concepts with mathematical exactness and to deduce all theorems by argumenta in forma, i.e., mathematically. . . . That this end can be achieved has been shown by the small beginnings of a purely formal treatment in our present chapter. In any case, the progress from vaguely formed to mathematically exact concepts and theories is here, as everywhere, the precondition for full insight into a priori connections and an inescapable demand of science.

Thus the present paper can be regarded as an attempt to carry through the project that he began." (p. 464)

56. ———. 1995. "The Problem of Mixture." *Pacific Philosophical Quarterly* no. 76:266-369.

Reprinted in: Frank A. Lewis and Robert Bolton (eds.), *Form, Matter and Mixture in Aristotle*, Oxford: Blackwell, 1996, pp. 82-182.

"For Aristotle, the everyday world contains three main kinds of things: the elements, the homogeneous mixtures, and the heterogeneous substances. The topic of mixture was vigorously debated in medieval times (see Maier (1982): 142). But contemporary interest has focused on the objects at the extremes of his ontology -- the elements and the substances -- while the topic of mixture has been relatively neglected. This is unfortunate. For not only is the topic of great interest in its own right, it is also important for a wider understanding of Aristotle's scientific and metaphysical views.

The intrinsic interest of the topic largely arises from the difficulty in seeing how a non-atomistic conception of matter is to be reconciled with a plausible view of mixture. The exegetical interest has perhaps two main sources. The first resides in the special position occupied by mixtures in Aristotle's ontology. For all substances are composed of mixtures; and all elements compose mixtures, in so far as they compose anything at all. Thus the mixtures provide the cushion, as it were, between the elements and the substances; and any account of the role of the elements or of the nature of the substances should deal with the relationship of each to the mixtures.

The other source of exegetical interest lies in the relevance of the topic of mixture to other, more general, topics -- principally, potentiality and change. Just as mixtures occupy a kind of midpoint between the elements and the substances, so mixing occupies a kind of midpoint between accidental and substantial change; and the potentiality of the ingredients in a mixture is one of the more important and problematic forms of potentiality for Aristotle. Thus no exegesis of his views on either change or potentiality can be considered complete unless it takes into account his views on mixture.

We now know that Aristotle's views on mixture are mistaken, and badly mistaken at that. In rejecting atomism he made a critical (though understandable) error; and when one combines the rejection of atomism with the antiquated belief in the four elements, it is easy to conclude that his views are purely of scholarly interest with no real relevance to contemporary concerns. But even though his views may be much further removed from reality than those of modern science, they are much closer in many ways to common sense. In the laboratory we do not suppose that every part of some butter is butter. But in the kitchen we do; and it is convenient, though erroneous, assumptions of this sort that guide us in our everyday life. This therefore suggests that we treat these views of Aristotle as having their most direct bearing, not on the nature of reality, but on the structure of common sense.

There have been recent attempts in cognitive science to formalize the content of folk or naive physics; such a physics is meant to provide the principles that would enable one to construct a robot that could deal with the everyday world in much the

same way as we do. If I am not mistaken, the contemporary interest of Aristotle's scientific views may lie as much in their connection with these developments within cognitive science as it does with the content of the established sciences. I might add that the recent attempt to rehabilitate the notion of capacity by Cartwright (1989) and others also gives a topical interest to Aristotle's general views on capacities and on the way they might compose or interact within a mixture.

The paper is in six sections. In the first, I state the problem with which Aristotle opens his discussion of mixture in *Generation and Corruption*: how is mixture possible? Aristotle thinks he has a solution; and our problem is to understand what that solution is. In the next section, I consider three interpretations of his views on mixture, those of Sharvy (1983), Gill (1989) and Bogen (1995), and find all of them wanting. The main defect with these proposals, from my own point of view, is that they do not take Aristotle's hylomorphic outlook sufficiently seriously. In the third section, I provide a sketch of that outlook and set out the two main accounts of mixture that are in conformity with it, Leveling and Ascent; one places mixture at the same level as the elements, the other at a higher level. The next two sections are the heart of the paper and constitute a sustained argument in favor of Leveling. It is shown how two doctrines -- the doctrines of intermediates and of derived parts -- enable Aristotle to avoid the apparently insuperable difficulties that lie in the way of its acceptance. The final section considers the problem of how mixing, as opposed to mixture, is possible and argues that Aristotle is also in a position to solve this problem." (pp. 82-83).

References:

Bogen, 1995 "Fire in the belly: Aristotelian elements, organisms, and chemical compounds", this volume [pp. 183-216]

Gill, M. 1989 *Aristotle on Substance: The Paradox of Unity*, New Jersey: Pennsylvania University Press

Maier, A. 1982 *On the Threshold of Exact Science*, Philadelphia: University of Pennsylvania Press

Sharvy, R. 1983 "Aristotle on Mixtures", *Journal of Philosophy*, 80, 439-457.

57. ———. 1995. "Ontological Dependence." *Proceedings of the Aristotelian Society* no. 95:269-290.

"There appears to be a distinctively ontological sense in which one thing may be said to depend upon another. What the one thing is will depend upon the other thing, upon what it is. It is in this sense that one is tempted to say that a set depends upon its members or that a particularized feature, such as a smile, upon the particular in which it is found. For what the set is will depend upon its members; and what the feature is will depend upon the particular that instantiates it. (1) Granted that there is an intelligible notion of ontological dependence, it would appear to be of great importance to the study of metaphysics. Metaphysics has two main areas of concern: one is with the nature of things, with *what* they are; and the other is with the existence of things, with *whether* they are. Considerations of dependence are relevant to both. For central to the question of the nature of any item is the determination of what it depends upon; and if something is taken to exist, then so must any thing upon which it depends. Indeed, it has often been maintained that it is only those things which do not depend upon anything else that can properly be said to exist at all." (p. 269)

(...)

"But how is the notion of dependence itself to be understood? The idea of what something is, its *identity* or *being*, is notoriously obscure; and the idea of the being of one thing *depending* upon that of another is doubly obscure. A natural suggestion at this point is to take the being of something simply to be its existence. Thus in saying that a set depends upon its members, or a feature upon its instantiator, we are taking the existence of the one to depend upon that of the other. Call this the *existential* construal of dependence. Another natural suggestion is to take the dependence between the beings of the two items, as opposed to the items themselves, to be modal in character. The being of the one will depend upon that of

the other in the sense that it is necessary that if the one item has its 'being' then so does the other. Call this the *modal* construal of dependence." (p. 270)

(1) This paper derives from an earlier paper 'Dependent Objects', that was written in 1982 but remained unpublished. Some of the issues raised are discussed at greater length in Fine [1995b]; and no attempt is here made to settle the methodological, as opposed to the conceptual, issues. I should like to thank Ruth Chang and the members of the Wednesday Group at Oxford for helpful comments.

#### References

Fine K. [1995b] 'Senses of Essence', to appear in *Festschrift for Ruth Barcan Marcus*.

58. ———. 1995. "Senses of Essence." In *Modality, Morality and Belief. Essays in Honor of Ruth Barcan Marcus*, edited by Sinnott-Armstrong, Walter, 53-73. Cambridge: Cambridge University Press.
- "One may distinguish between the essential and accidental properties of an object. A property of an object is essential if it must have the property to be what it is; otherwise the property is accidental.
- But what exactly is meant by this account? It has been common to give a further explanation in modal terms. A property is taken to be essential when it is necessary that the object have the property or, alternatively, when it is necessary that it have the property if it exist. For reasons that I have already given in my paper "Essence and Modality," I doubt whether this or any other modal explanation of the notion can succeed. Indeed, I doubt whether there exists any explanation of the notion in fundamentally different terms. But this is not to deny the possibility of further clarification; and it is the aim of the present paper to provide it.
- What I shall do is to distinguish some of the closely related ways in which the notion may be understood. This will be important for getting clearer both on which claims can be made with its help and on which concepts can be defined with its help. In particular, we shall see that several different senses of ontological dependence correspond to the different senses of essence. The task is also important for the purpose of developing a logic of essentialist reasoning; for most of the different senses of essence that we distinguish will make a difference to the resulting logic. My main concern in this paper has been with making the distinctions, and not with drawing out their implications; but I hope it is clear from the examples what some of these implications are." (p. 53)
59. Fine, Kit, and Schurz, Gerhard. 1996. "Transfer Theorems for Multimodal Logics." In *Logic and Reality: Essays on the Legacy of Arthur Prior*, edited by Copeland, Jack, 169-214. Oxford: Oxford University Press.
- "Many of the modal logics that have been developed contain two or more modal operators. A notable example is the tense logic of Prior, which contains operators for both the past and the future. A more recent example is the logic of programs, which contains infinitely many operators, one for each program.
- A multimodal logic will have various monomodal fragments; and in the simplest case, it will be the join of these fragments -- there will be no interactive axioms. Our concern in the present chapter is to investigate the question of when certain properties of the monomodal logics transfer to their join. To answer this question, we develop a very general proof method, which allows us to piece together models for different logics. The resulting theorems provide very general answers to our question, which are positive in most cases, but not in all.
- Our investigation is a natural continuation of those begun by Prior. For he was interested both in the development of multimodal logics and in their relationship to monomodal logics. It is therefore, with a keen sense of his own contribution to the subject that we have pursued the present line of research." (p. 169)
- [Note:] Some of the initial ideas behind this chapter were contained in a letter from Fine to Schurz in 1990. The subsequent work has been joint, with Fine writing up sections 1 and 6 and Schurz writing up the rest. The result on strong completeness transfer has been obtained independantly by Valentin Goranko and Solomon Passy;

the results on transfer of strong and weak completeness, f.m.p., and of decidability (under the assumption of weak completeness) have 'been obtained independently by Marcus Kracht and Frank Wolter. Our own proof of decidability transfer is based upon ideas in their proof.

60. Fine, Kit. 1998. "Mixing Matters." *Ratio* no. 11:278-288.  
 Reprinted in: David Oderberg, *Form and Matter. Themes in Contemporary Metaphysics*, Oxford: Blackwell. 1999 pp. 65-75.  
 Abstract: "Aristotle raised a puzzle about the possibility of mixing whose solution is by no means obvious. I here explicate his solution to the puzzle and attempt to make it plausible within the context of his thought. Although we now know that his specific views on mixing were mistaken, his discussion of the topic raises questions concerning the role of capacities and the relationship of part to whole that are still of interest."  
 "The topic of mixture plays a central role in Aristotle's metaphysics (1). For every concrete substance is composed of mixtures and underlying every substantial change is a process of mixing.  
 Thus no understanding of substance or of substantial change is complete without an understanding of mixtures and mixing.  
 Aristotle's account of mixture may also be of some contemporary interest. For it depends upon a view, still worthy of attention, of how dispositions may conflict. The main text in which mixture is discussed is chapter I.10 of *Generation and Corruption*. Aristotle there raises two puzzles that purport to show that mixing is impossible.  
 (1) The present paper is a much abridged version of Fine [95].  
 Many people have helped me develop the ideas in these two papers; and I am especially indebted to the work of Boguen [95] and Code [95].  
 References  
 Bogen [95] J., 'Fire in the Belly; Aristotelian Elements, Organisms, and Chemical Compounds', *Pacific Philosophical Quarterly*, v. 76, nos 3&4, pp. 370-404.  
 Code A., [95] 'Potentiality in Aristotle's Science and Metaphysics', *Pacific Philosophical Quarterly*, v. 76, nos 3 & 4, pp. 405-418.
61. ———. 1998. "Cantorian Abstraction: A Reconstruction and Defense." *Journal of Philosophy* no. 95:599-634.  
 "In what follows I shall concentrate on the views of Cantor, though it should be clear how what I say will can be modified to apply to the views of Dedekind. I have not attempted to capture all of the nuances or tensions in Cantor's thought but merely to develop what I take to be its spirit, or central idea. And in developing this idea, I have been guided more by what the idea itself requires than by Cantor's own writings.  
 The plan of the paper is as follows. I begin by setting out what appear to be decisive objections to the Cantorian account. I then show how these objections can be overcome by making use of the theory of arbitrary objects developed in my book '*Reasoning with Arbitrary Objects*' [Chapter VII. The relevant parts of the theory are outlined in section 2; and the application to Cantor's account of number is made in section 3. I show, in section 4, how the approach may be extended to order types and to structure types in general. In the final two sections, I first compare the Cantorian approach to abstraction with the standard approaches of von Neumann and Zermelo, on the one side, and of Russell and Frege, on the other; and I then consider to what extent the Cantorian approach is capable of yielding a structuralist conception of number and order type. In a formal appendix, I briefly indicate how the present theory might be formalized within an extension of ZF [Zermelo-Frankel]." (p. 603)
62. ———. 1998. "The Limits of Abstraction." In *The Philosophy of Mathematics Today*, edited by Schirn, Matthias, 503-630. Oxford: Oxford University Press. Reprinted in expanded form as *The Limits of Abstraction*, New York: Oxford University Press 2002.

"This paper has been written more from a sense of curiosity than commitment. I was fortunate enough to attend the Munich Conference on the Philosophy of Mathematics in the Summer of 1993 and to overhear a discussion of recent work on Frege's approach to the foundations of mathematics. This led me to investigate certain technical problems connected with the approach; and these led me, in their turn, to reflect on certain philosophical aspects of the subject. I was concerned to see to what extent a Fregean theory of abstraction could be developed and used as a foundation for mathematics and to place the development of such a theory within a general framework for dealing with questions of abstraction. My conclusions were somewhat mixed: a theory of abstraction could be developed somewhat along the lines that Frege has envisaged; and it could indeed be used as a basis for both arithmetic and analysis. When wedded to a suitable version of the context principle, the theory was capable of accounting for our reference to numbers and other abstract objects. But without the support of the principle, it was not clear that the theory had any great advantage over its rivals. Thus my results would be congenial to someone already committed to the Fregean approach though unconvincing to someone who was not. I therefore present them in somewhat the same spirit as someone who sends off a message in a bottle. I have no desire to announce my communication to the world; but if someone stumbles across it and finds it to be of interest, I shall be pleased.

The paper is in three parts. The first is devoted to philosophical matters, which help explain the motivation for the subsequent technical work and also its significance. It is centred on three abstracts with which they deal? And to what extent can they provide a foundation for mathematics? The second part proposes and investigates a set of necessary and sufficient conditions for an abstraction principle to be acceptable. The acceptable principles, according to this criterion, are precisely determined and it is shown, in particular, that there is a strongest such principle. The third part attempts to develop a general theory of abstraction within the technical limitations set out by the second part; the theory is equipped with a natural class of models; and it is shown to provide a foundation for both arithmetic and analysis.

The original version of the paper contained a lengthy section on the context principle. But this acquired a life of its own (just as reference does under the principle); and it has therefore been omitted. I hope to be able to present the material elsewhere." (pp. 503-504)

63. ———. 1999. "Things and their Parts." *Midwest Studies in Philosophy* no. 23:61-74.

"I wish to sketch a theory of the general nature of material things. It is a theory on which I have been working for some time; and what I present here is the merest sketch. Details are slid over, significant questions not raised, and controversial assumptions left undefended. But I hope, all the same, that enough is said to indicate the relevance of the theory to questions concerning the nature of material things and the plausibility of its answers.

One way into the theory is through consideration of part-whole. Things have parts; and so we are led to consider how they are capable of having the parts that they do. What in their nature accounts for their division into parts? It has often been supposed that we may give an adequate answer to this question by conceiving of a material thing as the material content of a space-time region or as a successive stream of matter. But I believe that there are enormous difficulties with these positions and that, once they are taken into account, we are led to adopt a very different conception of a material thing and of its relationship to its parts.

Central to the paper is a distinction between two different ways in which one thing can be part of another. It can, in the first place, be apart in a way that is relative to a time. It is in this way, for example, that a newly installed carburetor is now apart of my car, whereas earlier it was not, or that certain molecules are now parts of my body though later, through the exercise of natural bodily functions, they no longer will be.

In the second place, one object can be a part of another in a way that is not relative to a time. For something that is a part in this way, it is not appropriate to ask when, or for how long, it is a part; it just is a part. It is in such a way that the pants and the jacket, for example, are parts of a suit or various atoms are parts of a water molecule, or two particular pints of milk are parts of a quart of milk, or various time-slices, if there are such things, are parts of a persisting individual." (p. 61)

64. ———. 2000. "Semantics for the Logic of Essence." *Journal of Philosophical Logic* no. 29:543-584.

"In a previous paper ' *The Logic of Essence* ', I presented a system for the logic of essence. In this paper, I present a semantics for a variant of the system and prove it complete with respect to that semantics.

(...)

The basic idea behind the semantics is that a statement should be taken to be true in virtue of the nature of certain objects if it is true in any world compatible with the nature of those objects. We shall make the simplifying assumption that each world is compatible with the nature of all and only those objects that it contains. Thus the condition for a statement to be true in virtue of the nature of certain objects is that it should be true in all those worlds that contain those objects. However, the presence of an object in a world is not taken to guarantee its existence but merely its possibility.

Thus each world will be taken to embody its own 'view' of which objects are possible and which are not.

(...)

The first two sections are devoted to the language of the logic (Section 1) and the system of proof (Section 2). The next section gives the semantics (Section 3). The remaining six sections develop the completeness proof. The first three (Sections 4–6) provide lemmas crucial to the construction of the canonical model. The next two sections (Sections 7, 8) show how to build up a 'diagram' of the model; and the last section (Section 9) shows how to obtain the model itself. The reader might find it helpful to have the previous paper 'The Logic of Essence' at hand (henceforth abbreviated to 'LE') and also to consult the papers 'Essence and Modality' and 'Senses of Essence' for further explanation of the notion of essence and for general philosophical motivation." (pp. 543-544)

65. ———. 2000. "Neutral Relations." *The Philosophical Review* no. 109:1-33.

"There is a standard view of relations, held by philosophers and logicians alike, according to which we may meaningfully talk of a relation holding of several objects in a given order. Thus it is supposed that we may meaningfully - indeed, correctly - talk of the relation loves holding of Anthony and Cleopatra or of the relation between holding of New York, Washington, and Boston. But innocuous as this view might appear to be, it cannot be accepted as applying to all relations whatever. For there is an important class of metaphysical and linguistic contexts which call for an alternative conception of relation, one for which the order of the relata plays no role and in which the application of the relation to its relata is achieved by other means.

My argument for this conclusion will be roughly Hegelian in form (though not at all in content). I begin with a thesis, the standard view on relations, and consider various problems to which it gives rise (§ 1). After considering what is required of a solution to these problems (§ 2), I propose an antithesis, the positionalist view, according to which each relation is taken to be endowed with a given number of argument-places, or positions, in no specified order (§ 3). But this view is beset with certain ontological and substantive problems; and I conclude with a synthesis, the antipositionalist view, which combines the virtues of the two previous accounts (§ 4) and is seen to lead to a distinctive conception of relations (§ 5).

I have largely confined my attention to metaphysical issues; and as a consequence, two important topics have not been pursued.

One is the logic of complex neutral relations; and the other is the role of neutral relations in the interpretation of language (and in our mental representation of

- reality). However, I hope enough has been said on the metaphysics of the issue to make clear why these topics are of interest and how they might be developed." (pp. 1-2)
66. ———. 2000. "A Counter-Exemple to Locke's Thesis." *The Monist* no. 83:357-361. "Locke's thesis states that no two things of the same sort can be in the same place at the same time. The thesis has recently received extensive discussion, with some philosophers attempting to find arguments in its favour and others attempting to provide counter-examples.(1) However, neither the arguments nor the counter-examples have been especially convincing;and it is my aim, in this short note, to present what I believe is a more convincing counter-example to the thesis." (p. 357) (...)  
 "Many philosophers have thought that no two things can necessarily always coincide even if they are not of the same sort. But if this second example is correct, it shows that things may necessarily coincide even when they are of the same sort. (2)" (p. 361)  
 (1) The detractors include Hughes [97a, b, c], Shorter[77], and Simons ([85], [87], [97]).The defenders include Wiggins ([68], [75], [80]),Odergard [96] and also, of course, all those who hold that no two things can coincide,whether of the same sort or not.
- References  
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 \_ [97b] "An IncredibleCoincidence," *Mind* , vol. 106,769-72.  
 Leibniz,G.W. [81] *New Essays on Human Understanding* (trans,and ed. Peter Remnant and Jonathon Bennett), Cambridge: Cambridge University Press.  
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 Simons,P. [85] "Coincidence of Things of a Kind," *Mind* 94, 70-75.  
 \_ [87] *Parts: A Study in Ontology* , Oxford: Clarendon.  
 \_ [97] "On Being the Same Ship(s)? or Electron(s): Reply to Hughes," *Mind* 106, 761-68.  
 Wiggins, D. [68] "On Being in the Same Place at the Same Time," *Philosophical Review* 77: 90-95, reprintedin Rea [97].  
 \_ [80] *Sameness and Substance* , Cambridge,MA: Harvard University Press.
67. ———. 2001. "The Question of Realism." *Philosopher's Imprint* no. 1:1-30. Reprinted in Andrea Bottani, Massimiliano Carrara, Pierdaniele Giaretta (eds.) , *Individuals, Essence and Identity. Themes of Analytic Metaphysics* , Dordrecht: Kluwer 2002, pp. 3-48.  
 "My aim in this paper is to help lay the conceptual and methodological foundations for the study of realism. I come to two main conclusions: first, that there is a primitive metaphysical concept of reality, one that cannot be understood in fundamentally different terms; and second, that questions of what is real are to be settled upon the basis of considerations of *ground* . The two conclusions are somewhat in tension with one another, for the lack of a definition of the concept of reality would appear to stand in the way of developing a sound methodology for determining its application; and one of my main concerns has been to show how the tension between the two might be resolved.  
 The paper is in two main parts. In the first, I point to the difficulties in making out a metaphysical conception of reality.  
 I begin by distinguishing this conception from the ordinary conception of reality (§ 1) and then show how the two leading contenders for the metaphysical conception - the factual and the irreducible-both appear to resist formulation in other terms.

- This leads to the quietist challenge, that questions of realism are either meaningless or pointless (§ 4); and the second part of the paper (§§ 5-10) is largely devoted to showing how this challenge might be met. I begin by introducing the notion of ground (§ 5) and then show how it can be used as a basis for resolving questions both of factuality (§§ 6-7) and of irreducibility (§§ 8-9). I conclude with some remarks on the essential unity of these two questions and of the means by which they are to be answered (§ 10)." (pp. 3-4)
68. ———. 2002. "The Varieties of Necessity." In *Conceivability and Possibility*, edited by Gendler, Tamar Szabo and Hawthorne, John, 253-282. New York: Oxford University Press.  
Reprinted in: *Modality and Tense. Philosophical Papers*, as chapter 7, pp. 235-260.  
"Necessity abounds. There are the necessary truths of logic, mathematics and metaphysics, the necessary connections among events in the natural world, the necessary or unconditional principles of ethics, and many other forms of necessary truth or connection. But how much diversity is there to this abundance? Are all necessary truths and connections reducible to a single common form of necessity? And if not, then what are the different ways in which a truth might be necessary or a necessary connection might hold? It is the aim of this paper to show that diversity prevails. I shall argue that there are three main forms of necessity - the metaphysical, the natural and the normative - and that none of them is reducible to the others or to any other form of necessity. Thus what it is for a necessity or possibility of any of these forms to obtain does not consist in the obtaining of some other form or forms of necessity or possibility. Although the focus of the paper falls squarely within the philosophy of modality, some of my arguments may be of broader interest. For certain currently fashionable views on scientific essentialism and ethical naturalism entail the collapse of forms of necessity that I would wish to keep distinct. Thus I have found it essential to indicate what it is in these views that I take to be in error; and this has required consideration of questions from within the metaphysics of natural kinds and the epistemology of ethical belief." (p. 253)
69. ———. 2003. "The Problem of Possibilia." In *The Oxford Handbook of Metaphysics*, edited by Loux, Michael J. and Zimmerman, Dean, 161-179. Oxford: Oxford University Press.  
Reprinted in: *Modality and Tense. Philosophical Papers*, as chapter 6, pp. 214-231.  
"Are there, in addition to the various actual objects that make up the world, various possible objects? Are there merely possible people, for example, or merely possible electrons, or even merely possible kinds? We certainly talk as if there were such things. Given a particular sperm and egg, I may wonder whether that particular child which would result from their union would have blue eyes. But if the sperm and egg are never in fact brought together, then there is no actual object that my thought is about.(1) Or again, in the semantics for modal logic we presuppose an ontology of possibilia twice over.(2) For first, we countenance various possible worlds, in addition to the actual world; and second, each of these worlds is taken to be endowed with its own domain of objects. These will be the actual objects of the world in question, but they need not be actual simpliciter, i.e., actual objects of *our* world. What are we to make of such discourse? There are four options:  
(i) the discourse is taken to be unintelligible; (ii) it is taken to be intelligible but nonfactual, i.e. as not in the business of stating facts; (iii) it is taken to be factual but reducible to discourse involving no reference to possibilia; (iv) it is taken to be both factual and irreducible.(3) These options range from a fullblooded form of actualism at one extreme to a full-blooded form of possibilism at the other. The two intermediate positions are possibilist in that they accept the intelligibility of possibilist discourse but actualist in that they attempt to dispense with its *prima facie* commitment to possibilia. All four positions have found advocates in the

literature. Quine, in his less irenic moments, favours option (i); Forbes ([85], p. 94) advocates option (ii), at least for certain parts of possibilist discourse; many philosophers, including Adams [74] and myself, opt for (iii); while Lewis [86] and Stalnaker [75] have endorsed versions of (iv), that differ in how full-blooded they take the possible objects to be.

My focus in the present article is on the third option. I wish to see to what extent reference to possibilia might be understood in other terms. Can we regard talk of possibilia as a mere *façon de parler*, perhaps somewhat in the same manner as talk of the average man or of infinitesimals? (4) I shall not be concerned to argue directly against any of the other options.

However, any argument for the viability of (iii) is indirectly an argument against the plausibility of these other options.

For (iv), especially in its more extreme forms, offends against what Russell has called our 'robust sense of reality', (i) offends against our even more robust sense of what is intelligible, while (ii) offends against our somewhat less robust sense of what is factual. It is therefore preferable to go with the third option, if we possibly can." (pp. 161-162)

(1) Cf Gupta ([80], 20, n.15.

(2) See Kripke [63] for a standard exposition of the semantics.

(3) See Fine [01] for a general discussion of what these various options amount to.

(4) As should be clear from Fine [01], the viability of any reduction will also depend upon its success in accounting for our understanding of modal discourse and our knowledge of modal

truth. See Peacocke [01] for a broader discussion along these lines.

#### References

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Peacocke C., [01] 'Principles for Possibilia', to appear. [*Nous*, vol. 36, 2002, pp. 486-508]

70. ———. 2003. "The Role of Variables." *Journal of Philosophy* no. 50:605-631. Reprinted in the *Philosopher's Annual* 2003; revised in Joseph Almog, Paolo Leonardi (eds.), *The Philosophy of David Kaplan*, New York: Oxford University Press, 2009 pp. 109-133.

"It is generally supposed - by logicians and philosophers alike - that we now possess a perfectly good understanding of how variables work in the symbolism of logic and mathematics.

Once Gottlob Frege had provided a clear syntactic account of variables and once Alfred Tarski had supplemented this with a rigorous semantic account, it would appear that there was nothing more of any significance to be said. It seems to me, however, that this common view is mistaken. There are deep problems concerning the role of variables that have never been properly recognized, let alone solved, and once we attempt to solve them we see that they have profound implications not only for our understanding of variables but also for our understanding of other forms of expression and for the general nature of semantics.

It is my aim here to say what these problems are and how they are to be solved, and to indicate the implications for the rest of semantics. I begin with an antimony concerning the role of variables which I believe any satisfactory account of them should solve (section 1). I then argue that the three main semantical schemes currently on the market - the Tarskian, the instantial and the algebraic -- are unsuccessful in solving the puzzle (sections II-III) or in providing a satisfactory semantics for first-order logic (Sections IV-V). Finally, I offer an alternative scheme that it is capable of solving the antimony (section VI) and of providing a more satisfactory semantics for first-order logic (section VII). It is based upon a new approach to representational semantics, which I call *semantic relationism*; and I

- conclude by discussing the implications of this approach for the semantics of names and belief-reports." (p. 605)
71. ———. 2003. "The Non-Identity of a Material Thing and Its Matter." *Mind* no. 112:195-234.  
 "Many philosophers have thought that a material thing is, or may be, one and the same as its matter - that a statue, for example, may be the same as the clay from which it is made or a river the same as the water which flows through it. There appears to be a powerful argument against such views, for the thing in each of these cases would appear to have properties not possessed by its matter.  
 Thus the clay of a statue may exist even though the statue itself has ceased to exist and the river may be composed of different water at different times even though this cannot be true of the water that composes it at any given time. However, these philosophers have responded to this argument by claiming that the apparent difference in properties represents, not a difference in the objects themselves, but a difference in the descriptions under which they may be conceived. We may conceive of a given thing as a statue or some clay or as a river or a body of water, for example, and, depending upon how the object is conceived, we will say one thing about it rather than another.  
 It is the aim of this paper to show that this counter-response cannot be sustained and that the original argument against identity should therefore be allowed to stand. This is no easy task since there would appear to be nothing in the immediate linguistic data to settle the question one way or the other.  
 However, by working through the consequences of the counter-response for the rest of our language, I think it may be shown to be extremely implausible. The paper is in two main parts. The first (§§1-4) is largely concerned with setting up the problem. We characterize the different forms the identity theory can take (§1), explain how the argument in favor of non-identity might in principle break down (§2), present the most plausible versions of such arguments (§3), and then consider the most plausible counter-response to them (§4). The second part (§§5-8) embarks on a detailed investigation of the difficulties with the counter-response. It is shown to be unable to account for a wide variety of different linguistic data, that is loosely classified according as to how reference to a material thing might be achieved. Four main kinds of case will be considered: those in which a sort is explicitly invoked (§5); those in which it is implicitly invoked (§6); those in which the very notion of reference is itself used in securing reference (§7); and those in which there is reference to a plurality of things (§8)." (p. 195)
72. ———. 2005. "Replies [to Comments on 'Limits of Abstraction']." *Philosophical Studies* no. 122:367-395.  
 Replies to critics about *The Limits of Abstraction* .  
 "I am extremely grateful to the contributors for their careful, perceptive and sympathetic discussion of my book. For the most part, they have chosen not to criticize what I say but to see how the doctrines of the book might be developed or be used to throw light on other questions. A defense of the book is therefore out of place; and I can do no better than to continue the discussion of some of the questions that they raise. There is perhaps only one point on which there is a substantive disagreement; and this concerns the status of second-order logic. Weir takes it to be epistemologically problematic; I do not. This issue was not discussed in the book, and I have here attempted to explain the grounds upon which I think its epistemic innocence might be defended." (p. 367)
73. ———. 2005. "Précis [of " *The Limits of Abstraction* " ]." *Philosophical Studies* no. 122:305-313.  
 Symposium on Kit' Fine's book *The Limits of Abstraction*.  
 " Before dealing with the contributors' comments, I would like to provide a selective summary of the book. I will focus on two main themes: the development of a general theory of abstraction; and the critique of Hume's principle as a form of definition. There are several other topics from the book that I would have liked to

have covered. They include the question of the identity of abstracts and the viability of the context principle, on the philosophical side (§1.5, §§11.3-5) and the analysis of invariance and the proofs of categoricity, on the technical side (§§6,7). But in the interests of brevity, I have had to exclude them.

The general idea of abstraction is one that has been discussed by philosophers throughout the ages but it was Frege who first showed how the idea could be put on a rigorous footing. For Frege, the idea of abstraction had two main components. The first related to the items upon which the abstraction was to be performed. These were to be taken to be related by an equivalence relation, i.e. by a relation that was reflexive, symmetric and transitive. As examples, we have the relation of parallelism on lines or the relation of equinumerosity on concepts. The second component related to the abstracts themselves. These were to be obtained from the items by means of a suitable operation of abstraction - the operation of forming directions in the case of parallel lines and of forming numbers in the case of equinumerous concepts. These two components, the equivalence relation and the operation of abstraction, were then to be connected by a principle relating the identity of the abstracts to the equivalence of the items from which they were formed." (p. 305)

74. ———. 2005. "Class and Membership." *Journal of Philosophy* no. 102:547-572. Abstract: "I wish to describe a construction that is capable of yielding a new solution to the set-theoretic paradoxes. Perhaps what is most distinctive about the construction is the reversal in the roles of the predicate of membership and the ontology of sets. On the usual conception of the cumulative hierarchy of Zermelo-Fraenkel set theory (ZF), we think of the membership predicate as given and of the ontology of sets or classes as something to be made out. Thus given an understanding of membership, we successively carve out the ontology of sets by using the membership predicate to specify which further sets should be added to those that are already taken to exist. Under the present approach, by contrast, we think of the ontology of classes as given and of the membership predicate as something to be made out. Thus given an understanding of the ontology of classes, we successively carve out extensions of the membership predicate by using conditions on the domain of classes to specify which further membership relationships should obtain. What unfolds is not the ontology of sets or classes but the meaning of membership. This "Copernican revolution" in our conception of class membership, once properly implemented, is capable of yielding a theory of classes that is just as natural as the standard theory of ZF and yet far more powerful in the strength of its principles and the scope of its applications."
75. ———. 2005. "Our Knowledge of Mathematical Objects." In *Oxford Studies in Epistemology. Vol. 1*, edited by Gendler, Tamar Szabo and Hawthorne, John, 89-110. Oxford: Clarendon Press.
- "I have recently been attempting to provide a new approach to the philosophy of mathematics, which I call 'proceduralism' or 'procedural postulationism'.(1) It shares with traditional forms of postulationism, advocated by Hilbert (1930) and Poincaré (1952), the belief that the existence of mathematical objects and the truth of mathematical propositions are to be seen as the product of postulation. But it takes a very different view of what postulation is. For it takes the postulates from which mathematics is derived to be imperatival, rather than indicative, in form; what are postulated are not propositions true in a given mathematical domain, but procedures for the construction of that domain.
- This difference over the status of the postulates has enormous repercussions for the development and significance of such a view. The philosophy of mathematics is faced with certain fundamental problems.
- How are we capable of acquiring an understanding of mathematical terms? How do we secure reference to mathematical objects? What is the nature of these objects? Do they exist independently of us or are they somehow the products of our minds? What accounts for the possibility of applying mathematics to the real world? And how are we able to acquire knowledge of mathematical truths? The procedural form

of postulationism, in contrast to the propositional form, is capable of providing plausible answers to each of these questions. By going procedural, we convert a view that is beset with pitfalls to one that is worthy of serious consideration. In what follows I shall focus on the last question concerning our knowledge of mathematics (although this will inevitably involve the other questions). I do this not because this question is the most interesting or even because it provides the most convincing illustration

of the value of our approach, but because it helps to bring out what is most distinctive—and also most problematic—about the approach. If one can go along with what it recommends in this particular case, then one is well on the way to accepting the view in its entirety.

As with the ‘big three’ traditional approaches to the philosophy of mathematics—logicism, formalism, and intuitionism—the present approach rests upon a certain technical program within the foundation of mathematics. It attempts to derive the whole of mathematics—or a significant part thereof—within the limitations imposed by its underlying philosophy. Since the viability of the underlying philosophical view largely depends upon the possibility of carrying out such a program, it will be helpful to give a sketch—if only in the barest form—of what the program is and of how it is to be executed. I hope elsewhere to provide a much more extensive development of the view in both its philosophical and technical aspects." (pp. 90-90)

(1) First broached in Fine (2002: 36, 56, 100).

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76. ———. 2005. "Reference, Essence, and Identity." In *Modality and Tense. Philosophical Papers*, 19-39. New York: Oxford University Press. Previously unpublished and written up in the spring of 1984 as a talk for the conference ‘Themes from Kaplan’. Chris Peacocke was the commentator. "There are three main concerns within current thinking on modality. One relates to the problem of essentialism, of making sense of *de re* modal discourse. Another relates to the problem of transworld identification, of individuating objects across possible worlds. The third relates to the problem of direct reference, of whether any terms can refer to their bearers independently of how they are described. It has commonly been supposed that these various problems are connected and that a solution to the one will push us in a certain direction in regard to another. But I shall argue that, once the problems are properly understood, it will be seen that they are quite distinct and that the supposed connections among them are illusory." (p. 19)
77. ———. 2005. "Necessity and Non-existence." In *Modality and Tense. Philosophical Papers*, 321-354. New York: Oxford University Press. Previously unpublished. "Is it possible for Socrates to be a man and yet not exist? This is the kind of question that is likely to strike someone from outside philosophy as preposterous and that may not be taken seriously even by philosophers themselves. But I believe that the answer to this question has profound implications for our understanding of the concepts of existence, identity, and modality and for how these concepts connect to one another and to the world. It is my central contention that, just as there is a distinction between tensed and tenseless sentences, so there is a distinction between worldly and unworldly sentences, between sentences that depend for their truth upon the worldly circumstances and those that do not. It is in terms of such a distinction that we should assess the possibility that Socrates might be a man and yet not exist, since his non-existence will be a matter of the circumstances while his being a man will not. But once the distinction is drawn, it will be seen to have consequences for a

wide range of further questions. It will lead us to distinguish, within the realm of what are normally regarded as necessary truths, between the necessary truths proper, those that hold whatever the circumstances, and the transcendent truths, those that hold regardless of the circumstances. It will also lead us to make an analogous distinction, within the realm of what are normally regarded as necessary existents, between the necessary existents proper, those that exist whatever the circumstances, and the transcendent objects, those that exist regardless of the circumstances. Thus some objects will not properly be in the world just as it has been supposed that some objects are not properly in time. Finally, it will be suggested that the identity of an object—what it is—is not, at bottom, a worldly matter; essence will precede existence in the sense that the identity of an object may be fixed by its unworldly features even before any question of its existence or other worldly features is considered." (p. 321)

78. ———. 2006. "The Reality of Tense." *Synthese* no. 150:399-414.  
Expanded version in: *Modality and Tense. Philosophical Papers*, as chapter 8, pp. 261-320.  
"Is reality somehow tensed? Or is tense a feature of how we represent reality and not properly a feature of reality itself? Although this question is often raised, it is very hard to say what it comes to. For both sides to the debate can agree to certain tensed claims. They can agree that I am sitting right now, for example, or that Queen Ann is dead. So in a clear and obvious sense there are tensed facts. And so how can it sensibly be denied that reality is tensed?  
My own view is that the question can only be made clear by drawing a distinction between how things are (*mere* reality) and how things are in reality (*metaphysical* reality). Thus what the antirealist about tense wishes to dispute is not how things are, which should be common ground between him and his opponent, but how things are in reality. Of course, he will say, Queen Ann is dead but this representation of the facts is not faithful to how things are in reality; and this is so, not because of the reference to Queen Ann or to her being dead, but because of the tense. In a faithful representation of how things are in reality, there will be nothing that corresponds to our use of tense. (1)"  
(1) The more formal minded reader may suppose that there is a sentential operator 'in reality,\_' by means of which the various realist claims are to be made (Fine 2000). I should add that this paper is a summary of views which are elaborated at much greater length in Fine (2005). In the interests of brevity, I have made no attempt to engage with the extensive literature on the topic.  
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Fine. K.: 2000, 'The Question of Reality', *Philosophers Imprint* 1 (1).
79. ———. 2006. "Modal Logic and Its Application." *EOLSS Survey of Mathematical Logic* :1-25.  
Summary; "Modal logic is a broad and rapidly expanding area of logic with applications to such diverse areas as computer science, linguistics and philosophy. It deals with the logical behavior of such modal locutions as 'must' and 'might', 'was' and 'will', 'ought', and 'may'. It specifies formal languages within which such locutions may be encoded, it lays down axioms and rules by which the locutions are governed, it sets up an interpretation for the resulting symbolism, and it proves various general results concerning the system and its interpretation."
80. ———. 2006. "Arguing for Non-Identity: A Response to King and Frances." *Mind* no. 115:1059-1082.  
"Jeffrey King and Bryan Frances are both critical of my paper, 'The Nonidentity of a Thing and its Matter' (Fine 2003), though in rather different ways. King engages in carpet bombing; his aim is to destroy every argument in sight, even to the extent of showing that the linguistic data cited by the paper favours the monist rather than the pluralist. Frances, by contrast, engages in strategic warfare; by 'taking out' certain key arguments, he attempts to demolish the paper as a whole.  
I remain unmoved -- and, I hope, unscathed -- by their attacks.

King's carpet bombing may cause a great deal of collateral damage but not to its intended target; and Frances's strategic bombing may hit its target but without inflicting much harm. Still, their papers raise many interesting issues not discussed - or, at least, not properly discussed -- in my original paper; and I am grateful to them for providing me with the opportunity to take these issues into account. My response will be in three main parts: I begin by outlining the central line of argument of my original paper (Sect. 1); I then discuss King's criticisms of the paper (Sects 2, 3, 4); and finally I turn to Frances's criticisms (Sect. 5). I have tried to make my response reasonably self-contained and to bring out the independent significance of the issues under discussion but it would be helpful, all the same, if the reader had all three papers at hand." (p. 187)

Fine, K. 2003: 'The Non-identity of a Material Thing and its Matter' *Mind* 112, pp. 195-234.

Frances, Bryan 2006: 'The New Leibniz's Law Arguments for Pluralism' *Mind* 115, pp. 1007-1022.

King, Jeffrey C. 2006: 'Semantics for Monists'. *Mind* 115, pp. 1023-1058.

81. ———. 2006. "In Defence of Three-Dimensionalism." *Journal of Philosophy* no. 103:699-714.

Reprinted in: Robin Le Poidevin (ed.), *Being: Developments in Contemporary Metaphysics*, Cambridge: Cambridge University Press, 2008, pp. 1-16.

"Let us use the term 'present' in such a way that a material thing can be said to be present both in space and in time. Thus on this usage we can say that the desk in front of me is present at any moment at which it exists and also that it is present at any position within its spatial location at that moment. We might similarly talk of presence throughout a period of time or a region of space and of the presence of other categories of objects, such as states or events.

Some philosophers, the "three-dimensionalists," have thought that there is a distinctive way in which material things are present in time as opposed to space. They have thought that a thing is somehow "stretched out" through its location at a given time though not through the period of during which it exists and that it is somehow present in its entirety at any moment at which it exists though not at any position at which it is located. Other philosophers, the "four dimensionalists," have denied that this was so; they have thought that a material thing is as equally "stretched out" in time as it is in space and that there is no special way in which it is entirely present at a moment rather than at a position.

We might use the term 'existence' for the way in which 3D-ers have thought that a thing is present in time and 'extension' or 'location' for the way in which 4D-ers have thought that a thing is present in space. The 3D-ers have then held that things exist in time but are extended in space while the 4D-ers hold that things are extended both in space and in time. (1)" (p. 699)

(1) My terms 'presence', 'existence', and 'extension' (deriving from my paper, "Compounds and Aggregates," *Nous*, xxviii, 2 (1994): 137-58) correspond to the more familiar terminology of 'persistence', 'endurance', and 'perdurance'. I prefer my own terminology since it is somewhat more general, allowing one to talk of existence or extension at a moment when one cannot very well talk of endurance or perdurance at a moment and allowing one to talk of existence or extension in space when one cannot very well talk of endurance or perdurance in space.

82. ———. 2006. "Relatively Unrestricted Quantification." In *Absolute Generality*, edited by Rayo, Agustin and Uzquiano, Gabriel, 20-44. New York: Oxford University Press.

"There are four broad grounds upon which the intelligibility of quantification over absolutely everything has been questioned—one based upon the existence of semantic indeterminacy, another on the relativity of ontology to a conceptual scheme, a third upon the necessity of sortal restriction, and the last upon the possibility of indefinite extendibility. The argument from semantic indeterminacy derives from general philosophical considerations concerning our understanding of language. For the Skolem-Lowenheim Theorem appears to show that an

understanding of quantification over absolutely everything (assuming a suitably infinite domain) is semantically indistinguishable from the understanding of quantification over something less than absolutely everything; the same first-order sentences are true and even the same first-order conditions will be satisfied by objects from the narrower domain. From this it is then argued that the two kinds of understanding are indistinguishable tout court and that nothing could *count* as having the one kind of understanding as opposed to the other.

The second two arguments reject the bare idea of an object as unintelligible, one taking it to require supplementation by reference to a conceptual scheme and the other taking it to require supplementation by reference to a sort. Thus we cannot properly make sense of quantification over *mere* objects, but only over objects of such and such a conceptual scheme or of such and such a sort. The final argument, from indefinite extendibility, rejects the idea of a *completed* totality. For if we take ourselves to be quantifying over all objects, or even over all sets, then the reasoning of Russell's paradox can be exploited to demonstrate the possibility of quantifying over a more inclusive domain. The intelligibility of absolutely unrestricted quantification, which should be free from such incompleteness, must therefore be rejected.

The ways in which these arguments attempt to undermine the intelligibility of absolutely unrestricted quantification are very different; and each calls for extensive discussion in its own right. However, my primary concern in the present paper is with the issue of indefinite extendibility; and I shall only touch upon the other arguments in so far as they bear upon this particular issue. I myself am not persuaded by the other arguments and I suspect that, at the end of day, it is only the final argument that will be seen to carry any real force. If there is a case to be made against absolutely unrestricted quantification, then it will rest here, upon logical considerations of extendibility, rather than upon the nature of understanding or the metaphysics of identity." (pp. 20-21)

83. ———. 2007. "Response to Correia." *Dialectica. International Journal of Philosophy* no. 61:85-88.  
 "Correia's paper contains two highly novel and interesting suggestions. The first is to generalize the Priorian perspective so that all that is required for there to be a fact about an object is that there be something that is the object though not necessarily something that exists. The second, building on the first, is to see essence as a form of Priorian implication. There is no doubt that these suggestions help to illuminate the concept of essence, in regard to both its Priorian underpinnings and its connection with modality. But I do not think that they are in tension with the central claims of 'Essence and Modality' and nor do I think that they should lead us to suppose that essentialist statements might be formulated more directly in terms of an 'arrow' rather than a 'box'." (p. 88)
84. ———. 2007. "Response to Garcia-Carpintero." *Dialectica. International Journal of Philosophy* no. 61:191-194.  
 "I attempted to argue for a supervaluational account of vagueness in an early paper, 'Vagueness, Truth and Logic' (VT&L) and Manuel García-Carpintero is concerned, in his rich and wide-ranging paper, to defend such an account against two objections from M. Andjelkovic and T. Williamson, 'Truth, Falsity and Borderline Cases', *Philosophical Topics* 28, 2000, pp. 211–244. I no longer hold a supervaluational view but am inclined to agree with García-Carpintero that the objections are not successful, though not quite for the reasons that he gives." (p. 191)
85. ———. 2007. "Response to Horwich." *Dialectica. International Journal of Philosophy* no. 61:17-23.  
 "In a sustained series of articles and books, Horwich has attempted to deflate the pretensions of philosophy by showing how many of its problems are not problems at all and how many of its 'theories' are explanations of phenomena standing in no need of explanation and, in keeping with this general line of thought, he is

- concerned, in the present highly interesting and provocative paper, to show how even the modest aims of ' *The Question of Realism* ' go too far in attempting to breathe some life into realist disputes. He is concerned to argue, in particular, that two of the principles that are meant to belong to the common ground between the realist and the antirealist might plausibly be questioned and that the strategy of the paper therefore fails (p. 11)." (p. 17)
86. ———. 2007. "Response to Koslicki." *Dialectica. International Journal of Philosophy* no. 61:161-166.  
 "Koslicki's paper is an extraordinarily perceptive and comprehensive discussion of my published work on the nature of material things. Although she is sympathetic to my criticisms of the standard mereological approaches to this topic, she is not so happy with my positive views. She has three main objections in all, which she summarizes as follows:  
 Fine's theory gives rise, first, to a proliferation of primitive sui generis relations of parthood and composition, whose characteristics must be imposed on them stipulatively by means of distinct systems of postulates, tailored to the different domains of objects. Secondly, we noted that, given its 'superabundance' of objects, Fine's theory is committed to its very own population of 'monsters'. Thirdly, once rigid embodiments are abandoned, the explicitly mereological aspect of Fine's hylomorphic theory is preserved only at the cost of abandoning the Weak Supplementation Principle. This, in turn, along with the other formal properties of Fine's system, makes us wonder why one should consider the primitive sui generis operations introduced by Fine's theory to be genuinely mereological at all (pp. 157–158).  
 Let me briefly consider the first and third of these objections but devote most of my attention to the second." (p. 161)
87. ———. 2007. "Response to MacBride." *Dialectica. International Journal of Philosophy* no. 61:57-62.  
 "Fraser MacBride's paper is a deep and searching treatment of the topic of neutral relations. He very clearly explains the motivation for wanting a theory of neutral relations, providing much more than my own paper by way of philosophical and historical context, and he subjects the available theories to a number of interesting and difficult challenges. Although he is critical of my own antipositional line, he shows a keen appreciation of the problems it was meant to solve and of the considerations that led me to adopt it.  
 I should like to take up two main issues from his paper – one concerning the question of symmetric relations and of whether the positionalist can provide an adequate account of them and the other concerning the question of 'solitary' relational states and of whether the anti-positional can provide an adequate account of how their relata are related." (p. 58)
88. ———. 2007. "Response to Weir." *Dialectica. International Journal of Philosophy* no. 61:117-125.  
 "In a recent paper, 'Our Knowledge of Mathematical Objects' (KMO), I have outlined a new approach to the foundations of mathematics. I call it 'procedural postulationism' and it is based upon the idea that one may lay down procedures for the expansion of a given domain. The ontology of mathematics is taken to result from the execution of such procedures; and our knowledge of mathematics is to be attained by seeing what would true upon their execution.  
 Weir has raised some sharp and significant objections to this approach – one concerning the constraints by which postulation is governed, another concerning the ontological neutrality of second-order logic, upon which my approach is based, and a third concerned with my realist construal of the expanded domains.  
 Let me deal with each in turn." (p. 117)
89. ———. 2008. "Coincidence and Form." *Aristotelian Society. Supplementary Volume* no. 82:101-118.  
 Paper read at the Kit Fine Day: Ontology Talks, February 11, 2008, Paris.

Abstract. "How can a statue and a piece of alloy be coincident at any time at which they exist and yet differ in their modal properties? I argue that this question demands an answer and that the only plausible answer is one that posits a difference in the form of the two objects."

"Many philosophers are pluralists about material things. They believe that distinct material things may coincide at a time, i.e. that they may occupy the very same spatial region and be constituted by the very same matter at that time. A familiar example is that of an alloy statue and the piece of alloy from which it is made. They are clearly coincident, and they would also appear to be distinct, given that the piece of alloy may exist before the statue is created or after it has been destroyed. A number of these philosophers also believe that two distinct material things may coincide in a world, i.e. that they may exist at the same times in the world and coincide at each time at which they exist." (p. 101)

(...)

"The account of an object as a given rigid or variable embodiment may be regarded as a *fundamental* account of what the object is, one that itself stands in need of no further explanation. We may therefore claim, with some plausibility, to have traced the various features and differences of such objects to their source." (p. 116)

90. ————. 2008. "The Impossibility of Vagueness." *Philosophical Perspectives* no. 22:111-136.

"I wish to present a proof that vagueness is impossible. Of course, vagueness is possible; and so there must be something wrong with the proof. But it is far from clear where the error lies and, indeed, all of the assumptions upon which the proof depends are ones that have commonly been accepted. This suggests that we may have to radically alter our current conception of vagueness if we are to make proper sense of what it is.

The present investigation was largely motivated by an interest in what one might call the 'global' aspect of vagueness. We may distinguish between the indeterminacy of a predicate in its application to a single case (the local aspect) and in its application to a range of cases (the global aspect). In the first case, it is indeterminate how a predicate, such as a bald, applies in a given case; and, in the second case, it is indeterminate how a predicate applies across a range of cases. Given such a distinction, the question arises as to whether one might understand the indeterminacy of a predicate in its application to a range of cases in terms of its indeterminacy in application to a single case; and considered from this point of view, the result can be seen to show that there is no reasonable way in which this might be done." (p. 111)

(...)

"I begin by giving an informal presentation of the result and its proof and I then consider the various responses that might be made to the alleged impossibility. Most of these are found wanting; and my own view, which I hint at rather than argue for, is that it is only by giving up on the notion of singlecase indeterminacy, as it is usually conceived, and by modifying the principles of classical logic that one can evade the result and thereby account for the possibility of vagueness. There are two appendices, one providing a formal presentation and proof of the impossibility theorem and the other giving a counter-example to the theorem under a certain relaxation of its assumptions. The mathematics is not difficult but those solely interested in the philosophical implications of the results should be able to get by without it.

The general line of argument goes back to Wright [1987] and further discussion and developments are to be found in Sainsbury [1990, 1991], Wright [1992], Heck [1993], Edgington [1993], Gomez Torrente [1997, 2002], Graff-Fara [2002, 2004], and Williamson [1997, 2002]. It would be a nice question to discuss how these various arguments relate to one another and to the argument in this paper. I shall not go into this question, but let me observe that my own approach is in a number of ways more general. It relies, for the most part, on weaker assumptions concerning the underlying logic and the logic of definitely and on weaker constraints

concerning the behavior of vague terms; and it also provides a more flexible framework within which to develop arguments of this sort." (p. 112)

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91. ———. 2009. "The Question of Ontology." In *Metametaphysics: New Essays on the Foundations of Ontology*, edited by Chalmers, David J., Manley, David and Wassermann, Ryan, 157-177. New York: Oxford University Press.  
 "There are a number of difficulties with the standard quantificational view. They are for the most part familiar but it will be worth spelling them out, if only to make clear how far removed our understanding of the ontological question is from our understanding of their quantificational counterparts. Philosophers may have learned to live with the disconnect between the two, but their tolerance of the situation should not lull us into thinking that it is tolerable." (p. 138)  
 "This account of our method for settling ontological dispute requires that we have a grasp not only of an absolute conception of reality, of there *being nothing more than* ..., but also of a relative conception, of *there being nothing more to ... than ...*, since it is through our assessment of the relative claims that we attempt to adjudicate the plausibility of the absolute claims. Many philosophers seem to have supposed that our having a good working grasp of such notions depends upon our being able to define them in other terms, so that questions of metaphysics or ontology thereby become questions of semantics or epistemology or total science. I consider this to be a serious methodological error: upon careful reflection we can see that our intuitive grasp of these notions is a sufficient guide in itself to their proper employment; and the attempt to define these notions in other terms has served merely to distort our understanding of the metaphysical questions and of the methods by which they are to be resolved." (p. 176)
92. ———. 2010. "Towards a Theory of Part." *Journal of Philosophy* no. 107:559-589. Paper read at the *Kit Fine Day: Ontology Talks*, Paris, February 11, 2008.  
 "My aim in this paper is to outline a general framework for dealing with questions of partwhole. Familiar as this topic may be, my treatment of it is very different from more conventional approaches. For instead of dealing with the single notion of mereological part or sum, I have attempted to provide a comprehensive and unified account of the different ways in which one object can be a part of another. Thus mereology, as it is usually conceived, becomes a small branch of a much larger subject. (1)  
 My discussion has been intentionally restricted in a number of ways. In the first place, my principal concern has been with the notion of absolute rather than relative

part. We may talk of one object being a part of another relative to a time or circumstances (as when we say that the tire was once a part of the car or that or that the execution of Marie Antoinette was as a matter of contingent fact a part of the French Revolution) or in a way that is not relative to a time or the circumstances (as when we say that this pint of milk is a part of the quart or that the letter 'c' is part of the word 'cat'). Many philosophers have supposed that the two notions are broadly analogous and that what goes for one will tend to go for the other. (2) I believe this view to be mistaken and a source of endless error. But it is not my aim to discuss either the notion of relative part or its connection with the absolute notion. (3) In the second place, I have focused on the 'pure' theory of part-whole rather than its application to our actual ontology. Once given a theory of part-whole, there arises the question of how it applies to the objects with which we are already familiar. This question becomes especially delicate and intricate on my own approach since, although we may recognize that such and such a familiar object is a part or whole, it may not be clear, according to the theory, what kind of whole or part it is. But despite the considerable interest of this question, my focus has been on the abstract development of the theory itself and not on its application to ontology. Finally, I have only provided the merest sketch of the framework (on which I hope say more elsewhere). Many points are not developed and some not even stated. I have, in particular, said relatively little about the technical foundations of the subject, which are mathematically quite distinctive, or about some of the broader philosophical issues to which they give rise. I have given a rough map of the terrain rather than a guided tour, but I hope I have done enough to bring out the interest of the approach and to make clear how a more systematic and philosophically informed account might proceed." (pp. 559-560)

(1) The material outlined in this paper has been developed over a period of thirty years. It was most recently presented in a seminar at Princeton in 2000; and I am grateful to Cian Dorr, Michael Fara, Gail Harman, Mark Johnston, David Lewis and Gideon Rosen for their comments.

I am also grateful for some comments I received from Ted Sider and two anonymous referees for the journal; and I owe a special debt of thanks to Achille Varzi for his encouragement.

(2) As in T. Sider, *Four Dimensionalism* (Oxford: Clarendon Press, 2001), for example.

(3) The matter is briefly discussed in K. Fine, *Things and Their Parts*, *Midwest Studies in Philosophy XXIII* (1999), 61-74.

93. ———. 2010. "Some Puzzles of Ground." *Notre Dame Journal of Formal Logic* no. 51:97-118.

"In recent years there has been a growing interest in the concept of ground—of one thing holding in virtue of another, and, in developing an account of ground, a number of philosophers have laid down principles which they regard as unquestionably true of the concept. (1) The purpose of this note is to show that these principles are in conflict with seemingly impeccable principles of logic. Thus a choice must be made; either one or more of the metaphysical principles or one or more of the logical principles should be given up.

Some philosophers—and especially those already unsympathetic to ground—may think that the conflict reveals some underlying defect in the concept. For if acceptance of the concept of ground has such untoward consequences, then this can only be because the concept was no good in the first place. My own view—which I suggest toward the end of the paper—is quite different. It is not that considerations of ground should be ignored or even that the principles of ground should be given up in the light of their conflict with the principles of logic. Rather we need to achieve some kind of reflective equilibrium between the two sets of principles, one that does justice both to our logical intuitions and to our need for some account of their ground. Thus the conflict, far from serving to undermine the concept of ground, serves to show how important it is to arriving at a satisfactory view of what in logic, as in other areas of thought, can properly be taken to hold.

The puzzle to which the conflict of principles gives rise bears some resemblance to the paradoxes of self-reference. It is not itself a paradox of self-reference: the puzzle, on the one side, makes no direct use of self-reference; the paradox, on the other side, makes no direct appeal to the notion of ground. But considerations of ground are often used to motivate certain solutions to the paradoxes, and the puzzle makes clear the reasoning behind these considerations and brings out the critical role played by the notion of ground. (2)" (pp. 97-98)

(1) They include Audi [1], Batchelor [2], Correia [3], Correia [4], Rosen [10], Schneider [11], and Schneider [12].

(2) I especially have in mind the kind of solution to the semantic paradoxes to be found in Kripke [8].

#### References

[1] Audi, P., "Grounding," forthcoming, 2010. [Paul R. Audi, 'Grounding: Toward a Theory of the In-Virtue-Of Relation', *The Journal of Philosophy* 109, 2012, pp. 685-711.]

[2] Batchelor, R., "Grounds and consequences," *Grazer Philosophische Studien*, vol. 80 (2010), pp. 65–77.

[3] Correia, F., *Existential Dependence and Cognate Notions*, Philosophia Verlag GmbH, München, 2005.

[4] Correia, F., "Grounding and truth-functions," forthcoming in *Logique et Analyse* [211 (2010), 251–279]

[8] Kripke, S., "Outline of a theory of truth," *Journal of Philosophy*, vol. 72 (1975), pp. 690–71.

[10] Rosen, G., "Metaphysical dependence: Grounding and reduction," pp. 109–36 in *Modality: Metaphysics, Logic and Epistemology*, edited by B. Hale and A. Hoffman, Oxford University Press, Oxford, 2010.

[11] Schneider, B., "Truth-functionality," *Review of Symbolic Logic*, vol. 1 (2008), pp. 64–72.

[12] Schneider, B., "A logic of 'because'," in progress, 2010.

94. ———. 2010. "Semantic Necessity." In *Modality: Metaphysics, Logic, and Epistemology*, edited by Hale, Bob and Hoffmann, Aviv, 65-80. New York: Oxford University Press.

"In the recent monograph 'Semantic Relationism', I made use of a certain notion of what was semantically necessary, or required, in arguing that it might be a semantic requirement that two names were coreferential even though there were no intrinsic semantic features of the names in virtue of which this was so. In the present paper, I wish to consider the bearing of the notion on the nature and content of semantic enquiry. I shall argue that a semantics for a given language is most perspicuously taken to be a body of semantic requirements and that the notion of a semantic requirement should itself be employed in articulating the content of those requirements. There are two main alternatives to this conception to be found in the literature. According to one, a semantics for a given language is taken to be an assignment of semantic values to its expressions; and according to the other, a semantics for a given language is taken to be a theory of truth for that language. I attempt to show how these alternatives do not provide us with the most perspicuous way of representing the semantic facts and that it is only in terms of our conception that one can properly appreciate what these facts are.

The importance of the notion of metaphysical necessity for metaphysics has long been appreciated, in regard to both explicating the nature of the subject and articulating the content of its claims. If the argument of this paper is correct, then it will help to show that the notion of semantic necessity has a similar and equally important role to play in understanding the nature and content of semantics." (p. 65)

95. ———. 2010. "Comments on Scott Soames' 'Coordination Problems'." *Philosophy and Phenomenological Research* no. 81:475-484.

"A major theme of 'Semantic Relationism' was that many of the familiar worries over the substitutivity of names in belief contexts may be resolved by going relational. But Soames, in his interesting and actionpacked paper, has argued that

- even if the more familiar worries are removed there are variants of them that will remain." (p. 475)  
 (...)  
 "So we see that the relationist does have a response to the worry that Soames raises. However, the way relationism comes in is not through embedding the speaker's report in a larger context of belief attributions, as Soames had supposed, but through seeing the speaker's report and the agent's belief as forming a single context, in which relationships of coordination relevant to the truth of the report may then be discerned."(p. 476)
96. ———. 2010. "Reply to Lawlor's 'Varieties of Coreference'." *Philosophy and Phenomenological Research* no. 81:496-501.  
 "The focus of Krista Lawlor's challenging paper [\*] is on cases of confused reference. By way of illustration, she asks us to suppose that 'Wally says of Udo, "He needs a haircut"', and Zach, thinking to agree, but looking at another person, says, 'he sure does'" (p. 4). Zach is confused, since he takes the person he is looking at to be the same as the person Wally was referring to. This might not be a semantic confusion, which is what I think Lawlor is after, but a straight confusion over the facts.  
 For Zach's primary intention may be to refer to the same person as Wally or, alternatively, to the person he is looking at and he may mistakenly believe that these two people are the same. But let us suppose that Zach means to use 'he' indifferently as a pronoun anaphoric on Wally's original use of 'he' and as a pronoun that is deictic on the person he is looking at. We would then have a case of confused reference of the kind Lawlor has in mind." (p. 496)  
 [\* Krista Lawlor, "Varieties of Coreference", *Philosophy and Phenomenological Research* 81, 2010, pp. 485-495.]
97. ———. 2010. "Comments on Paul Hovda's 'Semantics as Information About Semantics Values'." *Philosophy and Phenomenological Research* no. 81:511-518.  
 "In SR [ *Semantic Relationism* ] (7-9), I posed the 'antimony of the variable'. How can the pair of variables x, y have a different semantic role from the pair x, x when x has the same semantic role as y? In attempting to solve this antimony, I suggested that we appeal to the idea of the values that are taken, not merely by a single variable, but by a sequence of variables (SR, 23-4).  
 The semantic role of the two pairs of variables can then be distinguished, since the first pair will take a distinct pair of objects from the domain as values (assuming that the domain contains at least two objects) while the second pair will not.  
 Hovda's makes a marvelous alternative suggestion. [\*] 'The basic idea', he writes (pp. 4-5) 'is that a variable can refer to anything and must refer to exactly one thing.' The more usual idea is that a variable actually takes all of the objects in the domain as values (or 'referents'). My own relational account of variables is an instance of this approach, but with the modification that variables can now take their values simultaneously and not merely singly." (p. 511)  
 [\* Paul Hovda "Semantics as Information About Semantics Values", *Philosophy and Phenomenological Research* 81, 2010, pp. 485-495.]
98. ———. 2011. "Aristotle's Megarian Manoeuvres." *Mind* no. 120:993-1034.  
 Abstract: "Towards the end of *Theta* 4 of the *Metaphysics*, Aristotle appears to endorse the obviously invalid modal principle that the truth of A will entail the truth of B if the possibility of A entails the possibility of B. I attempt to show how Aristotle's endorsement of the principle can be seen to arise from his accepting a non-standard interpretation of the modal operators and I indicate how the principle and its interpretation are of independent interest, quite apart from their role in understanding Aristotle."  
 "I begin by considering the different ways in which Aristotle's two principles might be formalized within the framework of propositional modal logic (Sect. 1). I then consider the deductive and semantic consequences of the different ways in which these principles might be formalized, using the apparatus of contemporary modal

logic (Sect. 2). It is shown that the difficulties confronting Aristotle are even greater than might have been thought, since the second principle leads to ‘modal collapse’, the collapse of possibility to actuality, which is something that Aristotle had previously argued explicitly against.

Three recent attempts to get Aristotle ‘off the hook’ — those of Brennan (1994), Makin (1999 and 2006), and Nortmann (2006) — are considered and found wanting (Sect. 3). I then propose an alternative solution, which rests upon distinguishing between a world as the locus and as the witness of possibilities (Sect. 4). Once the semantics for Aristotle’s use of the modalities is understood in this way, it becomes perfectly explicable why he would have wanted to endorse the converse principle and how he can avoid modal collapse. I defend this interpretation of Aristotle against some objections and try to indicate why it is of independent interest (Sect. 5). I conclude with an attempt to vindicate Aristotle’s argument for the first principle (Sect. 6)." (pp. 994-995)

#### References

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Nortmann, Ulrich 2006: ‘Against Appearances True: On a Controversial Modal Theorem in Metaphysics Theta 4’. *Zeitschrift für Philosophische Forschung* , 60, pp. 380–93.

99. ———. 2011. "An Abstract Characterization of the Determinate/Determinable Distinction." *Philosophical Perspectives* no. 25:161-187.  
 "My aim in this paper is to provide an account of what it is for the world to have a determinate/determinable structure. Patches have colors, people have heights, particles have mass. These are all instances of the determinate/determinable structure, with a given state of the world consisting in something’s possessing a determinate (be it a given color or height or mass) from within a given determinable (color, height or mass). But what is it for the world as a whole to possess such a structure?

In the *Tractatus* , Wittgenstein took the atomic propositions, by which the world is to be described, to be completely independent of one another. But he later revised his view (Wittgenstein [1929]) and allowed that the atomic propositions might exhibit the kind of dependence that is characteristic of the way in which different determinants of a given determinable are exclusive of one another. Our question might therefore be put in the form: how in the most abstract terms should we conceive of the post-Tractarian world?" (p. 161)

#### References

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100. ———. 2011. "The Silence of the Lambdas." *The Philosophers's Magazine* no. 55:19-27.

James Garvey interview Kit Fine.

"We come finally to Fine’s influential views on vagueness and the so-called “sorites” paradox.

The name comes from the Greek word for heap, “soros”. Eubulides, an ancient Greek philosopher with a thing for paradoxes, asked, roughly, when do you go from a few grains of wheat to a heap? One grain doesn’t count, neither do two or three or four, but keep adding grains and, eventually, you’d say that you do have a heap. The trouble is that for a range of borderline cases, we don’t know what to do with the predicate “is a heap”. There are a number of instances in which “This is a heap” is neither true nor false, but how could that be? When I ask Fine about his views on vagueness, he thinks for a very long minute, noticeably brightening as he does so, and finally tells me he’s found an entirely new way to think about vague predicates.

- “I can briefly outline my new view, which is very radical.” He goes on, half smiling, “If I’m right almost everyone else is wrong.” I lean in.
- “Predicates can be vague. Take a predicate like bald. It’s vague. Perhaps one way of expressing that is that the predicate is not completely determined in its application. Many people have thought that the phenomenon of vagueness is to be understood through borderline cases: what it is for a predicate to be vague is for there to be borderline cases. My view is that this approach to the problem of vagueness is fundamentally misguided. There is no intelligible notion of borderline case which is relevant to the phenomenon of vagueness. We have to achieve an understanding of vagueness in some other way.
- (...)
- The new thought is that that’s a mistake, that the indeterminacy cannot be localised in that way.
- We cannot point our finger at any one case.
- “It means everyone else has been wrong. It leads to a very different conception of vagueness, the logic of vagueness, how you handle various problems. It leads to a completely new logic. It’s something I’ve been thinking about.” (p. 27)
101. ———. 2012. "What is Metaphysics?" In *Contemporary Aristotelian Metaphysics*, edited by Tahko, Tuomas E., 8-25. Cambridge: Cambridge University Press.
- "There are, I believe, five main features that serve to distinguish traditional metaphysics from other forms of enquiry. These are: the aprioricity of its methods; the generality of its subject-matter; the transparency or 'non-opacity' of its concepts; its eicity or concern with the nature of things; and its role as a foundation for what there is. In claiming that these are distinguishing features, I do not mean to suggest that no other forms of enquiry possess any of them. Rather, in metaphysics these features come together in a single package and it is the package as a whole rather than any of the individual features that serves to distinguish metaphysics from other forms of enquiry.
- It is the aim of this chapter to give an account of these individual features and to explain how they might come together to form a single reasonably unified form of enquiry. I shall begin by giving a rough and ready description of the various features and then go into more detail about what they are and how they are related." (p. 8).
102. ———. 2012. "Guide to Ground." In *Metaphysical Grounding: Understanding the Structure of Reality* edited by Correia, Fabrice and Schnieder, Benjamin, 37-80. Cambridge: Cambridge University Press.
- "A number of philosophers have recently become receptive to the idea that, in addition to scientific or causal explanation, there may be a distinctive kind of metaphysical explanation, in which explanans and explanandum are connected, not through some sort of causal mechanism, but through some constitutive form of determination. I myself have long been sympathetic to this idea of constitutive determination or "ontological ground"; and it is the aim of the present chapter to help put the idea on a firmer footing – to explain how it is to be understood, how it relates to other ideas, and how it might be of use in philosophy. (1)" (p. 37)
- (1) A number of other philosophers (they include Audi [forthcoming], Batchelor [2010], Schaffer [2009b], Correia [2005, 2010], Raven [2009], Rosen [2010], Schnieder [2011]) have done related work in defense of the notion; and I have not attempted to make a detailed comparison between their ideas and my own.
- I am grateful to the participants at the Boulder conference on dependence and to Neil Tennant for many helpful comments on an earlier draft of the chapter. I should add that, for reasons of space, some of the material in the chapter originally submitted to the volume had been abridged.
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103. ———. 2012. "A Difficulty for the Possible Worlds Analysis of Counterfactuals." *Synthese* no. 189:29-57.  
 "A number of different accounts of counterfactual statements have been proposed in the literature. It has been thought that they should be understood in terms of the closeness of possible worlds, for example, with the counterfactual from A to C being true if all sufficiently close worlds in which A is true are worlds in which C is true or that they should be understood in terms of some notion of cotenability, with the counterfactual from A to B being true if A in conjunction with truths cotenable with A entails C. But a common presupposition of almost all of these accounts is that counterfactual claims should be intensional. If the sentences A and AN or C and CN are necessarily equivalent then the substitution of AN for A or CN for C in the antecedent or consequent of a counterfactual should preserve its truth-value. Thus, under the usual form of the possible worlds account, the truth-value of a counterfactual will simply turn on the possible worlds in which the antecedent and the consequent are true and so the account will be unable to distinguish between the truth-values of counterfactuals whose antecedents or consequents are true in the same possible worlds and hence are necessarily equivalent while, under the entailment-based accounts, the entailments will remain the same under the substitution of necessary equivalents and so the truth-values of the counterfactuals will also remain the same. (1)  
 It is the aim of this paper to show that no plausible account of counterfactuals should take them to be intensional and that if we are to describe the different kinds of counterfactual scenarios in the way we want and to reason about them in the way we would like, then the assumption of intensionality should be abandoned. Indeed, it is not merely the assumption of 'modal' intensionality that will fail but also the weaker assumption of 'logical' or 'classical' intensionality. For the cases we shall consider are ones in which the substitution of AN for A or CN for C should not be permitted, even though they are logical and not merely necessary equivalents." (pp. 29-30)  
 (1) The present paper expands on material in the first part of Fine, 'Counterfactuals without Possible Worlds', to appear in *Journal of Philosophy* [2012].
104. ———. 2012. "Counterfactuals Without Possible Worlds." *Journal of Philosophy* no. 109:221-246.  
 "Ever since the pioneering work of Stalnaker and Lewis (1), it has been customary to provide a semantics for counterfactuals statements in terms of possible worlds. Roughly speaking, the idea is that the counterfactual from A to C should be taken to be true just in case all of the closest worlds in which A is true are worlds in which C is true. Such a semantics is subject to some familiar difficulties - counterfactuals involving impossible antecedents, for example, or counterfactuals involving big changes consequential upon small changes. But it is not clear how seriously to take these difficulties - either because they might be met through some modification in the notion of closeness or because the intuitions on which the cases depend might be challenged or because the cases themselves might be dismissed as peripheral to the central use of the counterfactual construction; and nor has it been clear what a

- more satisfactory alternative to the possible world semantics might be put in its place." (p. 221)
- References  
 (1) Stalnaker, 'A Theory of Conditionals' in N. Rescher (ed.) *Studies in Logical Theory*, American Philosophical Quarterly Monograph Series, No. 2' (Oxford: Blackwell, 1968), 98-112 and Lewis, *Counterfactuals* (Oxford: Blackwell, 1973).
105. ———. 2012. "Modal Logic and its Applications to the Philosophy of Language." In *The Routledge Companion to Philosophy of Language*, edited by Russell, Gilliam and Graff Fara, Delia 609-623. New York: Routledge.  
 "Modal logic is the logic of possibility and necessity and of other such notions. It began, as did logic in general, with Aristotle, in his theory of the 'modal syllogism'; and various notions and principles of modal logic were extensively discussed in the middle ages.  
 But the subject only came into its own at the beginning of the twentieth century (see Goldblatt 2005 for an account of its recent history).  
 I begin by presenting some basic material on the possible worlds' approach to modal logic and then show how it relates to certain key topics in the philosophy of language.  
 For reasons of space, I have had to be very selective and, inevitably, a great deal of interesting material has not been covered." (p. 609)  
 (...)  
 "7.6 Limitations  
 The possible worlds approach to meaning is subject to some well-known limitations. It cannot distinguish, for example, between knowing one necessary truth from knowing another. Or again, it may be permitted that I post the letter but not permitted that I post the letter or post the letter and burn down the post office, even though the two embedded clauses are true in the same possible worlds.  
 There is a question of how seriously to take these difficulties. My own view is that they cannot properly be overcome or ignored and that the possible worlds approach, for all of its success, can only be regarded as the first step towards a more adequate account of meaning." (p. 622)  
 References  
 Goldblatt R. (2005) 'Mathematical Modal Logic: A View of its Evolution' in *Handbook of the History of Logic*: VII (eds. D. M. Gabbay and J. Woods), Amsterdam: Elsevier.
106. ———. 2012. "The Pure Logic of Ground." *The Review of Symbolic Logic* no. 5:1-25.  
 "Ground is the relation of one truth holding in virtue of others. This relation is like that of consequence in that a necessary connection must hold between the relata if the relation is to obtain but it differs from consequence in so far as it required that there should also be an explanatory connection between the relata. The grounds must account for what is grounded. Thus even though P is a consequence of P & P, P & P is not a ground for P, since it does not account for the truth of P.  
 It is the aim of this paper to develop a semantics and proof theory for the pure logic of ground. The pure logic of ground stands to ground as Gentzen's structural rules stand to consequence. One prescind from the internal structure of the propositions under consideration and simply asks what follows from what in virtue of the formal features of the underlying relation. Thus the claim that ground is transitive, that if P is a ground for Q and Q a ground for R then P should be a ground for R, is plausibly regarded as part of the pure logic of ground; but the claim that P is a ground for P & P will be part of the applied as opposed to the pure logic of ground, since it turns on the logical properties of &." (p. 1)
107. ———. 2012. "Mathematics: Discovery or Invention." *Think* no. 11:11-27.  
 Abstract: "Mathematics has been the most successful and is the most mature of the sciences. Its first great master work – Euclid's 'Elements' – which helped to establish the field and demonstrate the power of its methods, was written about

- 2400 years ago; and it served as a standard text in the mathematics curriculum well into the twentieth century. By contrast, the first comparable master work of physics – Newton's *Principia* – was written 300 odd years ago. And the juvenile science of biology only got its first master work – Darwin's 'On the Origin of Species' – a mere 150 years ago. The development of the subject has also been extraordinarily fertile, particularly in the last three centuries, and it is perhaps only in the last century that the other sciences have begun to approach mathematics in the steady accumulation of knowledge that it has been able to offer. There has, moreover, been almost universal agreement on its methods and how they are to be applied. What we require is proof; and, in practice, there is very little disagreement over whether or not we have it. The other sciences, by contrast, tend to get mired in controversy over the significance of this or that experimental finding or over whether one theory is to be preferred to another."
108. ———. 2013. "A Note on Partial Content." *Analysis* no. 73:413-419.  
 "Some philosophers have looked for a notion of partial content for which the content of A is in general part of the content of A & B but the content of A v B is not in general part of the content of A. (1) But they have realized that these two requirements are in tension with one another. For A is logically equivalent to (A \_ B) & A and so, if the content of (A \_ B) is part of the content of (A v B) & A, it should also be part of the content of A.  
 There is a related difficulty for allied notions. Thus, one might want A & B to be partially true via A being true though not want A to be partially true via A v B being true (since A v B might be true through B being true, which has nothing to do with A). Or one might want A & B to have at least much truth in it as A even though A does not in general have at least much truth in it as A v B. Or one might want A to confirm A & B but not want A v B to confirm A (since A v B might in its turn be confirmed by B).  
 In this note, I show that this difficulty is of a quite general nature and does not simply arise from the desire to have the content of A be part of the content of A & B but not have the content of A v B be part of the content of A." (p. 413)  
 (1) As in Angell 1977, Gemes 1994 and Yablo 2013, for example.  
 References  
 Angell, R.E. 1977. Three systems of first degree entailment. *Journal of Symbolic Logic* 42: 147.  
 Gemes, K. 1994. A new theory of content. *Journal of Philosophical Logic* 23: 596–620.  
 Yablo, S. 2013. *Aboutness*. Princeton, NJ: Princeton University Press.
109. ———. 2013. "Fundamental Truth and Fundamental Terms." *Philosophy and Phenomenological Research* no. 87:725-732.  
 Comments on Siders' 'Writing the Book of the World' [\*]  
 "Ted Sider's 'Writing the Book of the World' is a bold and ambitious work, offering original and provocative answers to a wide range of questions within metaphysics and meta-metaphysics. The book is focused on the topic of fundamentality—of what is fundamental and of what it is to be fundamental and, although Sider is largely concerned to develop his own positive views on the topic, he does devote a couple of sections (§§8.1-2) to my views, as laid out in the paper, 'The Question of Realism'. (1) I hope I may therefore be forgiven for devoting my attention to some of the more critical points that he makes in these sections." (p. 725)  
 [\*] New York: Oxford University Press, 2011.  
 (1) Imprint, vol. 1, no. 1, 2001, reprinted in ' *Individuals, Essence and Identity: Themes of Analytic Philosophy* ' (ed. A. Bottani, M Carrara, P. Giaretta), Dordrecht: Kluwer 2002, 3-41.
110. ———. 2014. "Truth-Maker Semantics for Intuitionistic Logic." *Journal of Philosophical Logic* no. 43:549-577.

Abstract "I propose a new semantics for intuitionistic logic, which is a cross between the construction-oriented semantics of Brouwer-Heyting-Kolmogorov and the condition-oriented semantics of Kripke. The new semantics shows how there might be a common semantical underpinning for intuitionistic and classical logic and how intuitionistic logic might thereby be tied to a realist conception of the relationship between language and the world."

"I wish to propose a new semantics for intuitionistic logic, which is in some ways a cross between the construction-oriented semantics of Brouwer-Heyting-Kolmogorov (as expounded in [8], for example) and the condition-oriented semantics of Kripke [6]. The new semantics is of some philosophical interest, because it shows how there might be a common semantical underpinning for intuitionistic and classical logic and how intuitionistic logic might thereby be tied to a realist conception of the relationship between language and the world. The new semantics is also of some technical interest; it gives rise to a framework, intermediate between the frameworks of the two other approaches, within which several novel questions and approaches may be pursued.

I begin with a philosophical discussion and conclude with a long technical appendix. In principle, the two can be read independently of one another but it is preferable if the reader first gains a formal and informal understanding of the semantics and then goes back and forth between the philosophical and technical exposition. (1)" (pp. 549-550)

(1) An earlier version of this paper was presented at a conference on truthmakers in Paris, 2011, and at a conference on the philosophy of mathematics in Bucharest, 2012. I should like to thank the participants of these two conferences for helpful comments and also an anonymous referee for the journal. After completing the paper, I learned that Ciardelli's thesis [1] on inquisitive logic contains some related work.

In particular, the system HH of the appendix is similar to the system for inquisitive logic while lemma 22 corresponds to the disjunctive-negative normal form theorem for inquisitive logic. It would be worthwhile to explore the connections between the two approaches in more detail. I should like to thank Ivano Ciardelli for bringing his thesis to my attention and for helpful correspondence.

#### References

1. Ciardelli, I. (2009). 'Inquisitive semantics and intermediate logics', M Sc. Thesis, University of Amsterdam.
6. Kripke, S. (1965). 'Semantical analysis of intuitionistic logic'. In J. Crossley and M. A. E. Dummett (Eds.), [ *Formal Systems and Recursive Functions* , Amsterdam: North Holland, 1965], 92–130.
8. Troelstra, A., & van Dalen, D. (1988). '*Constructivism in mathematics*' (volumes 1 & 2) . Amsterdam: North Holland.

111. ———. 2014. "A New Theory of Vagueness (Abstract)." In *Formal Ontology in Information Systems* , edited by Garbacz, Pawel and Kutz, Oliver, 4. Amsterdam: IOS Press.  
 "I propose a new theory of vagueness. It differs from previous theories in two main respects. First, it treats vagueness as a global rather than local phenomenon, i.e. vagueness always relates to a number of cases rather than a single case. Second, it treats vagueness as a logical rather than a material matter, i.e. vagueness can be expressed by logical means alone without the help of additional vagueness-theoretic primitives. I shall criticize alternative views, develop a logic and semantics for my own view, and explain how it deals with the sorites."
112. ———. 2014. "Recurrence: A Rejoinder." *Philosophical Studies* no. 169:425-428.  
 "I am grateful to Nathan Salmon (in Salmon [2012]) for being willing to spill so much ink over my monograph on semantic relationism [2007], even if what he has to say is not altogether complimentary. There is a great deal in his criticisms to which I take exception but I wish to focus on one point, what he calls my 'formal disproof' of standard Millianism. He believes that 'the alleged hard result is nearly demonstrably false' (p. 420) and that the disproof contains a 'serious error' (p.

407). Neither claim is correct; and it is the aim of this short note to explain why." (p. 425)

#### References

Fine K., [2007] '*Semantic Relationism*', Oxford: Blackwell

Salmon N., [2012] 'Recurrence', *Philosophical Studies* 159, 407- 411.

113. ———. 2014. "Permission and Possible Worlds." *Dialectica* no. 68:317-336.  
 "It is often taken for granted, by philosophers and linguists alike, that one can give an account of the truth-conditions of statements of permission in terms of possible worlds, that it will be permissible to see to it that p just in case p is true in some permissible or 'deontically accessible' world. In this paper, I shall argue that if statements of permission are to serve their purpose as a guide to action then no possible worlds account of their truth-conditions can possibly be correct. In a previous paper, I presented a simple argument against the possible worlds account of counterfactuals (The author [2012a], p. 45); and the present paper arose from my seeing that a similar form of argument applied with even greater force against the possible worlds account of statements of permission.  
 The objection may be briefly and loosely stated as follows. Suppose God has placed infinitely many apples a<sub>1</sub>, a<sub>2</sub>, a<sub>3</sub>, ... in Alternative Eden and tells Eve (for some reason, this is not mentioned in the Bible) :  
 You may eat infinitely many of the apples a<sub>1</sub>, a<sub>2</sub>, a<sub>3</sub>, ....  
 What then is Eve permitted to do?  
 She might initially have thought that she is permitted to eat all of the apples, say, or all but one, or every other apple, and so on. But whatever her other failings, she is not lacking in logical acumen. She realizes that eating infinitely many of the apples a<sub>1</sub>, a<sub>2</sub>, a<sub>3</sub>, ... is logically equivalent to eating infinitely many of the apples a<sub>0</sub>, a<sub>1</sub>, a<sub>2</sub>, a<sub>3</sub>,..., where a<sub>0</sub> happens to be the apple from the Tree of Knowledge in Original Eden and so, she reasons, if the truth of permission claims is preserved under the substitution of logical equivalents, as it should be under a possible worlds account, then God might just as well have said:  
 You may eat infinitely many of the apples a<sub>0</sub>, a<sub>1</sub>, a<sub>2</sub>, a<sub>3</sub>, ....  
 But if God has said this she would have been permitted to eat the Forbidden Fruit in combination with an infinite selection of the other apples; and so she goes ahead and eats the Forbidden Fruit.  
 Yet clearly, there is nothing in God's initial statement of permission that actually justifies Eve in eating the Forbidden Fruit, as she soon discovers to her dismay." (pp. 317-318)  
 References  
 Fine, Kit 2012a. "Counterfactuals Without Possible Worlds", *Journal of Philosophy* 109, 221-246.

114. ———. 2015. "Unified Foundations for Essence and Ground." *Journal of the American Philosophical Association* no. 1:296-315.  
 "There are, I believe, two different kinds of explanation or determination to be found in metaphysics - one of identity, or of what something is, and the other of truth, or of why something is so. One may explain what singleton Socrates is, for example, by saying that it is the set whose sole member is Socrates and one may explain why, or that in virtue of which, singleton Socrates exists by appeal to the existence of Socrates. One might talk, in connection with the first, of essence, of what singleton Socrates essentially is and, in connection with the second, of ground, of what grounds the existence of singleton Socrates. (1)  
 Of course, explanations of identity and of truth also occur outside of metaphysics, but what is characteristic of their occurrence within metaphysics is the especially tight connection between explanandum and explanans. Being a set whose sole member is Socrates is somehow constitutive of what Socrates is; and Socrates' existing is somehow constitutive of the existence of singleton Socrates. It is perhaps hard to say in general what constitutes a constitutive explanation but it is at least required, in any case of a constitutive explanation, that there should be metaphysically necessary connection between explanandum and explanans. Given

that singleton Socrates is essentially a set whose sole member is Socrates, then it is metaphysically necessary that the set is one whose sole member is Socrates; and given that Socrates existence grounds the existence of singleton Socrates, it will be metaphysically necessary if Socrates exists that his singleton exists." (p. 296)  
(...)

"My present view is that the relationship between the two kinds of explanation is much closer than I had originally taken it to be. The decisive step towards achieving the desired rapprochement is to see both kinds of explanation as having a generic, as well as a specific, bearing on the objects with which they deal; they must be allowed to have application to an arbitrary individual of a given kind and not just to specific individuals of that kind. Once this step is taken, the initial disparities between essence and ground disappear and we are able to provide a unified and uniform account of the two notions. I had previously referred to essence and ground as the pillars upon which the edifice of metaphysics rests (Fine [2012], p. 80), but we can now see more clearly how the two notions complement one another in providing support for the very same structure." (p. 297)

(1) I should like to thank the members of audiences at Birmingham, Oxford and Oslo for many helpful comments. The present paper is a companion to my paper 'Identity Criteria and Ground' and the reader may find it helpful, if not essential, to have the other paper at hand. I should note that Correia [2014] attempts to provide unified foundations, of a very different sort, in terms of an underlying notion of factual identity.

There has been a growing literature on essence and ground in the recent philosophical literature. My own work on essence dates back to Fine [1994]; and a useful reference on ground is the anthology of Correia & Schnieder [2012].

#### References

Correia F. & Schnieder B. (eds.), [2012] ' *Metaphysical Grounding* ', Cambridge: Cambridge University Press.

Correia F. [2014] 'Identity, Essence and Ground', slides for a talk.

Fine K., [1994] 'Essence and Modality', in *Philosophical Perspectives* 8 (ed. J. Tomberlin) as the Nous Casteneda Memorial Lecture, pp. 1-16, (1994); reprinted in ' *The Philosopher's Annual* ' for 1994, volume 16, (ed. P. Grim), Stanford: CSLI; and reprinted in ' *Metaphysics: An Anthology* ' (2nd edition), eds. J. Kim, D. Korman, E. Sosa, Oxford: Wiley-Blackwell (2011).

Fine K., [2012] 'Guide to Ground' in ' *Metaphysical Grounding* ' (eds. B. Schnieder & F. Correia), Cambridge: Cambridge University Press, 8-25 pp.; reprinted online in ' *Philosophers Annual* ' for 2012 (eds. P. Grim, C. Armstrong, P. Shirreff, N-H Stear).

Fine K., [2014] 'Identity Criteria and Ground', to appear in *Philosophical Studies* . [vol. 173, 2016, pp. 1-19]

115. ———. 2016. "Angelic Content." *Journal of Philosophical Logic* no. 45:199-226.  
"In a number of publications dating from 1977, Angell developed various systems of analytic entailment. The intended interpretation of a statement  $A \rightarrow B$  of analytic entailment is that the content of B should be part of the content of A, and a guiding principle behind the understanding of partial content is that the content of A and of B should each be part of the content of  $A \wedge B$  but that the content of  $A \vee B$  should not in general be part of the content of either A or B. Thus partial content cannot be understood as classical consequence or even as relevant consequence under its more usual interpretation.  
Quite independently of Angell's work, I had attempted to develop a semantics for partial content in terms of truthmakers. It was taken to be an intuitive requirement on a truthmaker, or verifier, for a given statement that the verifier should be relevant to the truth of the statement and I had thought that one might take the analytic entailment  $A \rightarrow B$  to hold if every verifier for A contained a verifier for B and if every verifier for B was contained in a verifier for A.  
I was naturally interested in the resulting logic of entailment.

Much to my surprise, I discovered that the resulting logic coincided with the first degree fragment of Angell's system. Under the proposed account of partial content, his system exactly captures the logic of partial content, once the content of a statement is identified with a suitable set of verifiers."

(...)

"The paper has 10 sections in all. I detail the systems of analytic entailment to be considered (§1). I provide an outline of the truthmaker semantics (§2), give a definition of containment as a relation between contents (§3), and relate containment to the notion of subject-matter (§4). I establish soundness (§5) and then establish completeness by means of disjunctive normal forms (§§6-7). I consider two alternative semantics for the system, one in terms of falsifiers as well as verifiers (§8), and the other in terms of a many-valued logic (§9). I conclude by briefly considering some of the ways in which the system might be extended (§10)."

References

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Angell R. B. [1989] 'Deducibility, Entailment and Analytic Containment', chapter 8 of Norman and Sylvan [1989], pp. 119 - 144.

Angell R. B. [2002] *A-Logic*, University Press of America.

Norman J., Sylvan R. (eds) [1989] '*Directions in Relevant Logic*', Dordrecht: Kluwer.

116. ———. 2016. "Identity Criteria and Ground." *Philosophical Studies* no. 173:1-19. "Philosophers often look for criteria of identity or think they are not to be found. They may ask for a criterion of identity for sets, for example, or for propositions, or for persons across time, or for individuals across possible worlds. And in response to such requests, they have said such things as: a criterion of identity for sets is their having the same members; or a criterion of identity for persons across time is their psychological continuity. (1) But what are these philosophers asking for when they ask for such criteria? I shall argue that the usual way of construing these questions is seriously misguided. I shall also propose an alternative - and, I hope, preferable - way of construing these questions and shall briefly indicate its significance for our more general understanding of metaphysical explanation. In what follows, I shall often use the criteria of identity for sets and for persons as examples. But it is important to bear in mind that they are just that, examples, and that the points I make concerning them are meant to apply, across the board, to all identity criteria." (p. 1) (1) I should like to thank Ted Sider, Fatema Amijee and Martin Glazier for their very helpful written comments and members of the audiences at Austin, Birmingham, CUNY, Oberlin, Oxford and Oslo for many helpful oral comments.
117. ———. 2016. "Williamson on Fine on Prior on the reduction of Possibilist Discourse." *Canadian Journal of Philosophy* no. 46:548-570. "Timothy Williamson's *Modal Logic as Metaphysics* (2013; MLM) is a tour de force — comprehensive in its scope, brilliant in its argumentation, and startling in its conclusions. It merits discussion on a wide range of different fronts, but I hope I can be forgiven for focusing on chapter 7 of the book, in which Williamson criticizes my attempt to carry out Prior's project of reducing possibilist discourse to actualist discourse. My response is in three main parts. I begin by discussing what the reductive project should be. Williamson and I disagree on this question and, although it is not important for the evaluation of my own reductive proposal, it is important for a broader understanding of the metaphysical issues at stake. I then discuss and evaluate Williamson's criticisms of my original reductive proposal. Although I believe that these criticisms can to some extent be met, they point to the need for a more satisfactory and less contentious form of reduction. Finally, I lay out the new proposed reduction; it is based on the idea of finding a general way of extending a reduction of first-order discourse to higher order discourse." (p. 548)

118. ———. 2017. "The Possibility of Vagueness." *Synthese* no. 194:3699-3725.  
 "I wish in this paper to propose a new approach to the topic of vagueness. It is different from the supervaluational approach, which I had previously advocated in Fine (1975), and from almost all other approaches in the literature of which I am aware.(1) There are two principal respects in which it differs from previous approaches: one concerns the global character of vagueness, of how vagueness relates to a whole range of cases and not merely to a single case; the other concerns the logical character of vagueness, of how it is capable of being conveyed by logical means alone. And so let me say a little more about these two features of the view before proceeding to the account itself." (p. 3699)  
 (1) The one exception appears to be Zardini (2014), although his view appears to be very different from mine in a number of fundamental respects.  
 References  
 Fine, K. (1975). Vagueness, truth and logic. *Synthese* 30, 265–300. Reprinted in Keefe & Smith (eds.). (1996). *Vagueness: A reader*. Boston: MIT University Press.  
 Zardini E. (2014). First-order tolerant logics. *Review of Symbolic Logic* (forthcoming).
119. ———. 2017. "A Theory of Truthmaker Content I: Conjunction, Disjunction and Negation." *Journal of Philosophical Logic* no. 46:625-674.  
 Abstract: "I develop a basic theory of content within the framework of truthmaker semantics and, in the second part, consider some of the applications to subject matter, common content, logical subtraction and ground."  
 "The paper is in two parts - the present part dealing with the familiar concepts of conjunction, disjunction and negation and the subsequent part dealing with the less familiar concepts of subject-matter, common content, logical remainder and ground. We shall provide an account of the quasi-structural notions of conjunctive and disjunctive part in the present part, but it is only in the second part that the approach will come into its own and its distinctive contribution to the theory of content become most apparent. Each of the two parts begins with an informal exposition of the material and concludes with a technical addendum. In principle, the exposition and addendum could be read independently of the other, though the reader may find it helpful to go back and forth between them." (p. 626)
120. ———. 2017. "A Theory of Truthmaker Content II: Subject-matter, Common Content, Remainder and Ground." *Journal of Philosophical Logic* no. 46:675-702.  
 "We continue with the development of the theory of truthmaker content begun in part I, dealing with such 'non-standard' topics as subject matter, common content, logical remainder and ground. This is by no means an exhaustive list of topics that might have been considered but it does provide an indication of the nature and scope of the theory. As before, the paper is divided into an informal exposition and a technical addendum. Both can be read independently of the other but it would be helpful, in either case, to have the first part of the paper at hand." (p. 675)
121. ———. 2017. "Naive Metaphysics." *Philosophical Issues. A Supplement to NOÛS* no. 27:98-113.  
 "Metaphysics has two central concerns. One is with the nature of things, with what they are like; and the other is with reality, with what there is.  
 (...)  
 We therefore arrive at a traditional distinction within metaphysics between *ontology*, which is concerned with what there is, and what one might call *metaphysics proper*, which is concerned with the nature of what there is.(2) I wish, in this paper, to argue that this traditional division in the subject-matter of metaphysics is misguided and the connection between its two branches misconceived and that it should be replaced by a different division of the subject matter — into what I call *naive* and *foundational metaphysics* — and by a different conception of how the two branches are related. If I am right, then a good deal of metaphysical enquiry has labored under a false or unduly limited view of what the questions of metaphysics are and of how they are to be answered and it is only by reconfiguring the

- metaphysical landscape that we can obtain a proper view of how the subject should be pursued." (p. 98)
- (2) I have in mind here a recent tradition within analytic philosophy, perhaps derived from Quine, and not the more historical tradition deriving from Aristotle.
122. ———. 2017. "Truthmaker Semantics." In *A Companion to the Philosophy of Language. Second Edition. Vol. II*, edited by Hale, Bob, Wright, Crispin and Miller, Alexander, 556-577. Malden: Wiley Blackwell.  
 "My aim in the present chapter is to explain the basic framework of truthmaker or 'exact' semantics, an approach to semantics that has recently received a growing amount of interest, and then to discuss a number of different applications within philosophy and linguistics." (p. 556)
123. ———. 2017. "Form." *Journal of Philosophy* no. 114:509-535.  
 "This paper is a belated sequel to my paper on Cantorian abstraction.(1) In that paper, I attempted to defend Cantor's account of cardinal numbers as sets of units, using a theory of arbitrary objects that I had previously developed to explain what the units were.(2) Of course, no one now adopts Cantor's own account of cardinal number, preferring instead von Neumann's elegant treatment of cardinal numbers as initial ordinals; this may have led some readers—or potential readers—of my earlier paper to dismiss it as being of purely scholarly interest. But as I had already mentioned in the paper on Cantorian abstraction, "the Cantorian theory can be extended to provide a more general theory of types—covering not merely the abstract formal types of mathematics but also the more concrete types of ordinary and scientific discourse" [p. 602]; in the present paper, I wish to consider the extension of the account to these other kinds of types (or what I now also wish to call *forms* )." (p. 509)  
 (1) Kit Fine, "Cantorian Abstraction: A Reconstruction and Defense," this journal, xcv, 12 (December 1998): 599–634.  
 (2) Kit Fine, *Reasoning with Arbitrary Objects* (Oxford: Blackwell, 1986).
124. ———. 2018. "Compliance and Command I, Categorical imperative." *The Review of Symbolic Logic* :1-25.  
 "The main aim of this series of papers is to develop a truthmaker semantics for the logic of imperative and deontic sentences. The first part deals with categorical imperative sentences, the second with deontic sentences and their interplay with categorical imperative sentences, and the third part with the interplay between indicative, imperative and deontic sentences and with conditional imperative and deontic sentences in particular. It would be helpful, though not strictly necessary, to have some standard exposition of truthmaker semantics at hand (such as Fine [2015]). I have for the most part been content with informal exposition but the reader may consult the appendix for some technical detail." (p. 1)  
 References  
 Fine K. [2015] 'Angelic Content', to appear in *Journal of Philosophical Logic*, I-28 (2015).
125. ———. 2018. "Compliance and Command II, Imperatives and deontics." *The Review of Symbolic Logic* :1-25.  
 "In this part of the paper, I am interested in providing a semantics and logic for deontic sentences and working out their connection with the previous semantics and logic for imperatives.  
 (...)  
 The plan of the paper is as follows. I begin by making some distinctions and stipulations which will be useful in the rest of the paper (§1); I introduce and explain the key notion of a code of conduct, relative to which deontic formulas are to be interpreted (§2); I give the clauses for when a deontic formula is true or false relative to a code of conduct (§3) and spell out some of the consequences of these clauses, especially in regard to the contrast with the standard possible worlds semantics for deontic logic (§4); I consider various ways of reformulating the criterion of validity for deontic formulas and point, in particular, to a very close

- connection between this criterion and the criterion of validity for imperative inference proposed in part I (§5); I consider some of the characteristic inferences that are or fail to be valid (§6) and outline a system of deontic logic within the truthmaker approach (§7); I show how one might deal with the problem of deontic updating within the truthmaker framework (§8); and I conclude with a brief formal appendix.
- I assume the reader is familiar with the basic material from part I, including the truthmaker semantics for imperatives and the definition of validity for imperative inference; and it would also be helpful for her to have some knowledge of the standard possible worlds semantics for deontic logic." (p. 1)
126. ———. 2018. "The World of Truthmakers." In *Being Necessary: Themes of Ontology and Modality from the Work of Bob Hale*, edited by Fred-Rivera, Ivette and Leech, Jessica, 36-59. Oxford: Clarendon Press.
- "It is a common idea that the full resources of possible worlds semantics are not required to provide an intensional semantics for classical logic. For these purposes, one need only appeal to partial possibilities, or what I shall call 'states', as long as one is willing to modify the usual clauses for the connectives or the definition of validity or perhaps both.
- Humberstone (1981), Hale (2013), Rumfitt (2015), and Holliday (2015) are among those who have attempted to develop a semantics of this sort; and manifestations of the same idea are to be found within situation semantics and in the more recent work on inquisitive semantics. It is an approach to semantics to which I myself have been attracted, both in earlier unpublished work and in some recent work on 'exact' truthmaking; and, indeed, it was from the attempt to relate 'exact' truthmaker semantics to the other semantical approaches that the present work arose." (p. 36, notes omitted)
- References
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127. ———. 2018. "Ignorance of Ignorance." *Synthese* no. 19:4031-4045.
- Abstract: "I discuss the question of when knowledge of higher order ignorance is possible and show in particular that, under quite plausible assumptions, knowledge of second order ignorance is impossible."
128. ———. 2019. "Verisimilitude and Truthmaking." *Erkenntnis* no. 86:1239-1276.
- Abstract: "I provide and defend a hyper-intensional account of verisimilitude within the truthmaker framework."
- "The main aim of this paper is to apply the recently developed framework of truthmaker semantics to the problem of verisimilitude, or likeness to the truth. Some important initial steps in this direction were taken by Gemes (2007); and some further steps have been taken by Yablo (2014, §6.7). My own thinking on the topic is somewhat different from theirs, however, both in its general conception of truthmaker semantics and in the specific application of the semantics to the concept of verisimilitude; and my hope is that these various accounts, when taken together, will go some way towards demonstrating the general fruitfulness of the approach." (p. 1239, a note omitted)
- References
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- Yablo, S. (2014). *Aboutness*. New Jersey: Princeton University Press.
129. Fine, Kit, and Jago, Mark. 2019. "Logic for Exact Entailment." *The Review of Symbolic Logic* no. 12:536-556.

- Abstract: "An *exact truthmaker* for  $A$  is a state which, as well as guaranteeing  $A$ 's truth, is wholly relevant to it. States with parts irrelevant to whether  $A$  is true do not count as exact truthmakers for  $A$  .  
Giving semantics in this way produces a very unusual consequence relation, on which conjunctions do not entail their conjuncts. This feature makes the resulting logic highly unusual. In this paper, we set out formal semantics for exact truthmaking and characterise the resulting notion of entailment, showing that it is compact and decidable. We then investigate the effect of various restrictions on the semantics. We also formulate a sequent-style proof system for exact entailment and give soundness and completeness results."
130. Fine, Kit. 2020. "The Identity of Social Groups." *Metaphysics* no. 3:81-91.  
"I am of the opinion, along with a number of other philosophers, that social groups and organizations are of the same general nature as material things: the differences, insofar as they exist, are intra- rather than extra-categorical. Thus if we wish to understand what it is to be a member of a group, or to understand how a group can change its members while remaining the same, or to understand how two groups can have the very same members, then the answers we should give will be essentially the same as the answers we should give to the questions as to what it is to be a constituent of a material thing, or how a material thing can change its constitution over time, or how two material things can have the very same material constitution.  
I have attempted to answer these questions in the case of material things in an earlier paper (Fine 1999). My view, roughly speaking, is that there are three basic operations by which material things may be formed from some underlying matter. One of these is the familiar operation of compounding or fusion, whereby two or more things may combine to form a sum. The other two operations are less familiar and their admission constitutes a fundamental departure from standard mereological doctrine. I call them rigid and variable embodiment. Rigid embodiment is an operation whereby various objects are combined into a whole whose component parts bear certain properties or stand in certain relations to one another. Thus the component parts are not merely fused but integrated into some kind of structured whole. Variable embodiment, on the other hand, is an operation whereby we may form an object that is manifested as different, more particular, objects at different times or in different counterfactual circumstances. The one operation accounts for the constitution of the object at a time, while the other accounts for the actual or possible changes in its constitution." (p. 81, notes omitted)
131. ———. 2020. "Semantics." In *The Routledge Handbook of Metaphysical Grounding*, edited by Raven, Michael J., 501-509. New York: Routledge.  
"It has often been supposed that there need only be a modal connection between a truth-maker and the sentence it makes true or that the truth-maker need only be partially relevant to the sentence it makes true, so that the fact that it is raining and windy, for example, would then be a truth-maker for the sentence 'it is raining or snowing'. It is therefore important to note that the notion of ground gives rise to a quite distinctive notion of truth-making, which requires not merely a modal connection but also a very strong relevant connection.  
Truth-making has been used for two quite distinct ends, one metaphysical and the other semantical. By attempting to discern the truth-makers of sentences, it has been thought that we might achieve a better understanding of the world via an understanding of *what* makes the sentences true and also that we might achieve a better understanding of language via an understanding of *how* the sentences are made true." (p. 502, note omitted)
132. ———. 2020. "Yablo on subject-matter." *Philosophical Studies* no. 177:129-171.  
Abstract: "I discuss Yablo's approach to truthmaker semantics and compare it with my own, with special focus on the idea of a proposition being true of or being restricted to some subject-matter, the idea of propositional containment, and the development of an 'incremental' semantics for the conditional. I conclude with

- some remarks on the relationship between truth-maker approach and the standard possible worlds approach to semantics."
- References
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133. ———. 2020. "Indeterminate Identity, Personal Identity and Fission." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 141-163. New York: Oxford University Press.
- "I have recently developed a new approach to vagueness and, in this chapter, I wish to show how this approach applies to ontic indeterminacy—or vagueness in the world.
- Although the supervaluational approach, which I previously endorsed in Fine (1975), is often associated with a representational conception of indeterminacy—vagueness in language or in thought, it is worth noting that I have always been sympathetic to the idea of ontic indeterminacy. Thus in footnote 10 of the earlier paper, I write “Philosophers have been unduly dismissive over intrinsically vague entities.” I am therefore especially pleased that the present approach is not only able to rehabilitate the ontic conception of indeterminacy but to rehabilitate it in such a way as to make it continuous with the more usual representational conception of indeterminacy.(1)" (p. 141)
- (1) For recent discussion of the general topic, the reader might like to consult the collection of essays in Akiba and Abasnezhad (2014).
- References
- Akiba, K. and Abasnezhad A. (2014) “Vague Objects and Vague Identity,” Springer.
- Fine, K. (1975) “Vagueness, Truth and Logic,” *Synthese* 30 (April–May 1975): 265-300; reprinted in *Vagueness: A Reader*, ed. Keefe and Smith, 1997.
134. ———. 2020. "Introduction." In *Essence and Existence: Selected Essays by Bob Hale*, edited by Leech, Jessica, 1-8. New York: Oxford University Press.
- "It is, of course, impossible in a brief introduction to do justice to the full range of his work. What I would like to do instead is to discuss the two papers in the volume that are on truthmaking—chapter 6 on truthmakers for universal statements and chapter 7 on truthmakers for modal statements—which continue a line of work he began in chapter 10 of Hale (2013a). Bob’s treatment of this topic is tentative and exploratory in character yet well worthy, in my opinion, of further study; and, even though the topic is one of many that I might have profitably discussed, I hope my discussion of it will help bring out the extraordinary combination of flair and level-headedness that runs through everything he writes." (p. 1)
- References
- Chapter 6. *What Makes True Universal Statements True?*, pp. 104-123. (originally published as Bob Hale, ‘What makes true universal statements true?’ in: *The Logica Yearbook 2017*, edited by Pavel Arazim and Tomáš Lávička, published by College Publications, 2018).
- Chapter 7. *Exact Truthmakers, Modality, and Essence*, pp. 124-140. (first edition in this volume).
- Hale, Bob. 2013a. *Necessary Beings: An Essay on Ontology, Modality, and the Relations between them*. Oxford: Oxford University Press.
135. ———. 2020. "Critical notice of The Metaphysics and Mathematics of Arbitrary Objects, by Leon Horsten." *Mind*.  
First online.
136. ———. 2020. "Comments on Fred Kroon and Jonathan McKeown-Green’s “Ontology: What’s the (Real) Question?”." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 397-402. New York: Oxford University Press.

- "Kroon and McKeown-Green's (K/M) chapter is a careful and thoughtful discussion of my views on a number of issues concerning the nature of ontology. These include: the connection between what I say on the topic in three different, though related, papers—"What is Metaphysics?" (WM), "The Question of Ontology" (QO), and "The Question of Realism" (QR); my objection that standard quantificational accounts are unable to do justice to full ontological commitment; and the concerns I have against skeptical forms of anti-realism which run counter to received nonphilosophical opinion. In what follows, I shall, for reasons of space, focus on the first two of these issues, although the third is of great interest and importance in its own right." (p. 397)
137. ———. 2020. "Comment's on Philip Percival's "Beyond Reality?"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 403-411. New York: Oxford University Press.  
 "Percival is interested in what Kierland and Monton (2007: 487) call the "Reality Principle":  
 (RP) Reality consists, and only consists, in things and how things are.  
 He is interested in two different ways in which the all-encompassing conception of reality suggested by this principle may be challenged. We may, on the one hand, wish to restrict reality to only some of the things or to only some of the ways in which things are. This is how my reality predicate from QO and my reality operator from QR work; they effect a division within things or within how things are. We may, on the other hand, wish to allow for something beyond the things or how things are and hence beyond reality itself if reality only consists in things and how things are. Percival considers a number of different ways in which each of these two restrictive conceptions of reality might play out and he considers a striking application of the second conception to the case of time: for under a certain restrictive version of presentism, one may wish to claim both that reality consists in present things or how things presently are and that the past is somehow beyond reality as so conceived.  
 In what follows, I shall simply focus on the application of the second restrictive conception of reality to the case of time, since I think the framework suggested by my RT and TR may help in providing a proper formulation of the view." (p. 403)  
 References  
 Kierland, B. and Monton, B. (2007) "Presentism and the Objection from Being-Supervenience," *Australasian Journal of Philosophy* 85(3): 485-97.  
 Sigla  
 QO = Question of Ontology  
 QR = Question of Realism  
 RT = The Reality of Tense  
 TR = Tense and Reality (Chapter 8 of *Modality and Tense*)
138. ———. 2020. "Comments on Joseph Almog's "One Absolutely Infinite Universe to Rule Them All: Reverse Reflection, Reverse Metaphysics"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 412-417. New York: Oxford University Press.  
 "Joseph Almog's chapter is a daring and dazzling investigation into the nature of the universe, situated within the grand tradition of absolutist metaphysics, but motivated more by the comparison of the absolute with the set-theoretic universe than with God. It is impossible for me to deal adequately with the deep and difficult issues which his chapter raises and so I hope I may be forgiven if I focus on a few remarks he makes in his Appendix on "the Nature versus Concept/Essence of BO and {BO}."  
 Some of my comments are relatively minor and serve simply to clear up possible misunderstandings of my position, but others raise substantive and neglected issues concerning the possible "absolutist" source of necessary truth." (p. 412)
139. ———. 2020. "Comments on Alasdair Urquhart's "Fine on Arbitrary Objects"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru,

- Mircea, 418-422. New York: Oxford University Press.  
 "Alasdair Urquhart's chapter is a wonderful mix of observations on the theory of arbitrary objects, ranging over a number of historical, logical, and philosophical aspects of the theory. I was especially interested in what he had to say about the evolving conception of variables in the history of mathematics and, in the light of my own previous somewhat casual remarks on the topic, I would now like to follow up on his discussion." (p. 418)
140. ———. 2020. "Comments on Gabriel Sandu's "Indefinites, Skolem Functions, and Arbitrary Objects." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 423-428. New York: Oxford University Press.  
 "The main focus of my monograph *Reasoning with Arbitrary Objects* (Fine 1985) was on the application of arbitrary objects to systems of natural deduction. But as Sandu points out, I also thought that appeal to arbitrary objects "would be useful for the semantic analysis of both mathematical and ordinary language." Although I spent a great deal of effort at the time in working on these further applications, I did not write up my work. I therefore hope it may be helpful if I say a little more on how I intended these applications to proceed. However, I should warn the reader that my thoughts on the topic are still somewhat tentative and underdeveloped and that I have here made no attempt to defend the position or to compare it with any of the many other competing views on the topic." (p. 423)
141. ———. 2020. "Comments on Kathrin Koslicki's "Essence and Identity"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 429-434. New York: Oxford University Press.  
 "Kathrin Koslicki's chapter is a wonderfully bold and innovative attack on the question of crossworld-identity: Quine thought Aristotelian essentialism was the problem; and she takes Aristotelian hylomorphism to be the solution." (p. 429)
142. ———. 2020. "Comments on Graeme Forbes's "Fine's New Semantics of Vagueness"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 435-443. New York: Oxford University Press.  
 "Graeme Forbes is well known for his advocacy of a degree-theoretic approach to vagueness, especially in application to questions of identity; and I am grateful to him for casting his expert and critical eye over my own, very different, approach." (p. 435)
143. ———. 2020. "Comments on Steven T. Kuhn's "Necessary, Transcendental, and Universal Truth"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 444-449. New York: Oxford University Press.  
 "I should begin with an apology. In my paper "Necessity and Non-existence" (NN), I made no reference to the importantly related work of Prior in appendix C of *Prior 1957* and to the importantly related work of Steven Kuhn in his superb thesis (Kuhn 1977). The oversight was doubly unfortunate in that Prior was my mentor and Kuhn my student; and my only excuse is that, in the haste to prepare my own paper for publication, I failed to take proper heed to the previous literature, even when it was already known to me.  
 In NN, I attempted to argue for a distinction between worldly and unworldly sentences, analogous to the distinction between tensed and tenseless sentences. Kuhn is willing to accept the distinction, but he does not like my argument for the distinction and thinks that I mischaracterize the connection between the necessary and the unworldly." (p. 444)  
 References  
 Kuhn, Steven. 1977. *Many-sorted Modal Logics (Vols I and II)*. Uppsala, Sweden: Filosofiska föreningen.  
 Prior, Arthur. 1957. *Time and Modality*. Oxford: Oxford University Press.
144. ———. 2020. "Comments on Gideon Rosen's "What is Normative Necessity?"". In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 450-455. New York: Oxford University Press.

- "Gideon Rosen supports the central theses of "Varieties of Necessity" (VN) concerning the distinction between metaphysical and normative necessity and the proper formulation of moral supervenience; and he takes the defense of these theses much further than I did in my own paper and makes the case for them especially vivid and compelling. I was especially impressed by his attempt to find out what might lie behind the distinction between metaphysical and normative necessity and the doctrine of supervenience and to show how the resulting metaphysical view might have significant implications for the epistemology of moral belief. In what follows, I would like to draw a further distinction and to work through some of the consequences of this distinction for various of the issues that Rosen raises. Some of the points I make in this regard may be familiar, though not the general context in which they are made." (p. 450)
145. ———. 2020. "Comments on Bob Hale's "The Problem of *de re* Modality"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 456-460. New York: Oxford University Press.  
"There is a great deal in Hale's chapter which I admire and with which I agree. In particular, I would go along with him in drawing a distinction between the syntactic and semantic *de re*, in finding no reasonable basis for modality *de re* within a linguistic conception of modality, and in diagnosing where Quine's argument (or what I would call his "logical" argument) goes wrong. However, in typical philosophical fashion, I shall focus on two points of disagreement, one concerning the problem of accounting for the *de re* form of modality within the linguistic conception, and the other concerning whether Quine should be regarded as having one or two arguments against quantifying into modal contexts." (p. 456)
146. ———. 2020. "Comments on Penelope Mackie's "Can Metaphysical Modality Be Based on Essence?"". In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 461-465. New York: Oxford University Press.  
"Penelope Mackie's chapter raises a serious challenge to the essentialist account of modality." (p. 461)  
"I would like to think that in a properly systematic account of first-order metaphysical enquiry we could simply take the notion of necessitist essence as primitive and that nothing would be thereby lost, and something even gained, by defining the other notions in terms of it in the way I have explained. But I have to admit that, for certain—perhaps quite limited—purposes, this point of view may be unduly restrictive and that we should therefore be open to there being independently given notions of neutral essence or metaphysical necessity." (p. 465)
147. ———. 2020. "Comments on Fabrice Correia's "More on the Reduction of Necessity to Essence"". In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 466-470. New York: Oxford University Press.  
"I have long admired Fabrice Correia's work on the conceptual foundations of metaphysics and his present chapter is a characteristically judicious and original contribution to the subject.  
He is principally concerned with certain reductive theses that I propounded in "Essence and Modality" (EM; 1994). These are that a metaphysical necessity is a proposition true in virtue of the nature of all objects, that a conceptual necessity is a proposition true in virtue of the nature of all concepts, and that a logical necessity is a proposition true in virtue of the nature of all logical concepts. Given that there are different notions of what it is for a proposition to be true in virtue of the nature of some objects, Correia's interest is in what notion or notions of this sort might underwrite these various reductive claims and, to this end, he is prepared in principle to relinquish any other desiderata one might wish to impose upon these notions." (p. 466)
148. ———. 2020. "Comments on Jessica Wilson's "Essence and Dependence"". In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 471-475. New York: Oxford University Press.

- "Jessica Wilson's paper is a wonderfully sympathetic account of my general approach to metaphysics; and there is a special satisfaction to be had in being, not merely understood, but understood so well.  
 (...)  
 But her paper is not all praise. For she wishes to criticize my account of ontological dependence in terms of essence - perhaps as part of a larger critique of the use of a general notion of dependence in metaphysics (§ 4). In a number of papers, I have suggested that an object *x* will depend upon an object *y* if and only if *y* figures in the essence of *x*, i.e., if and only if, in giving an account of what *x* is, reference must be made  
 to *y*. But she thinks that this equivalence may fail in the right to left direction, that an object *y* may figure in the essence of *x* without *x* depending upon *y* (she may be perfectly happy with the left to right direction, though this is not something that she discusses)." (p. 471)
149. ———. 2020. "Comments on Scott Shalkowski's "Essence and Nominalism"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 476-481. New York: Oxford University Press.  
 "Scott Shalkowski and I share a distaste for the ontological extravagance of modal realism and it is a delight to read him write with such eloquence and passion on the need for "sober metaphysics."  
 However, there is a point on which we appear to disagree and this has to do with the formulation and defense of nominalism; and it will perhaps help to illuminate the general doctrines of QR and QO by drawing out the contrast between our different views in this particular case." (p. 476)  
 Sigla  
 QR = Question of Realism  
 QU = Question of Ontology
150. ———. 2020. "Comments on Robert Goldblatt's "Fine's Theorem on First-Order Complete Modal Logics"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 482-484. New York: Oxford University Press.  
 "I am grateful to Robert Goldblatt for his lucid and masterly chapter on "canonicity" in modal logic.  
 (...)  
 I have nothing of a technical interest to add to what Goldblatt writes, but I did think that it might be helpful to say something more about the context in which I pursued some of these early enquiries into the mathematical foundations of modal logic. There is no doubt that the Lemmon Scott notes served as a great stimulus to those of us who were working in the area. Kripke's original completeness proofs in terms of semantic tableaux were inelegant and unwieldy (as pointed out by Kaplan in his review; 1966), and the Lemmon Scott method of canonical models held out the hope of providing a simple and uniform method of proving completeness for a wide range of modal logics." (p. 482)  
 References  
 Kaplan, David (1966). "Review: Saul A. Kripke, *Semantical Analysis of Modal Logic I. Normal Modal Propositional Calculi*". In: *The Journal of Symbolic Logic* 31.1, pp. 120–122.
151. ———. 2020. "Comments on Gary Ostertag's "Fine on Frege's Puzzle"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 485-490. New York: Oxford University Press.  
 "Gary Ostertag's chapter is an intriguing and probing investigation into the concept of coordination, or *de jure* co-reference, in which he is concerned not only to criticize the views on coordination which I presented in "Semantic Relationism" (SR) but also to develop a view of his own, one in which coordination is not a feature of what we say, but of how we say it.  
 There are perhaps two main points on which Ostertag takes us to disagree: one concerns whether coordination is syntactic in nature; and the other concerns

- whether a coordinated sentence expresses a coordinated, as opposed to an uncoordinated, proposition. However, as I read through his chapter, it was hard for me to get a firm sense of where our disagreement lay; and I was inclined to think, at the end of the day, that there was perhaps no real disagreement between us at all." (p. 485)
152. ———. 2020. "Comments on Paolo Bonardi's "Coordination, Understanding, and Semantic Requirements"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 491-495. New York: Oxford University Press. "Paolo Bonardi has written extensively and illuminatingly on direct reference theory, and I am grateful for his present comments on the conceptual foundations of semantic relationism. Central to the doctrine of semantic relationism is the relation of coordination. (...) As I mention in *Semantic Relationism* (p. 40), "other philosophers can acknowledge the phenomenon [of coordination]"; and, indeed, I think that any reasonable view should recognize the distinction between the two kinds of co-reference. What is distinctive about semantic relationism is that the phenomenon of coordination is taken to be both semantic (as opposed to syntactic) and essentially relational (as opposed to supervening on the intrinsic meanings of the individual terms)." (p. 491)
153. ———. 2020. "Comments on Friederike Moltmann's "Variable Objects and Truth-Making"." In *Metaphysics, Meaning, and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 496-502. New York: Oxford University Press. "The present paper is a characteristically rich, original and thought-provoking contribution to the subject; and I am afraid that I can do no more than pick my way through one or two of the many interesting issues that she raises. However, any criticisms I make on this score should not be seen to detract from my broad agreement with much of what she says." (p. 496, a note omitted)
154. ———. 2021. "Constructing the Impossible." In *Conditionals, Paradox, and Probability: Themes from the Philosophy of Dorothy Edgington*, edited by Walters, Lee and Hawthorne, John, 141-163. New York: Oxford University Press. "In recent years, I have been working on a version of situation semantics - one might call it 'truthmaker semantics'—which is meant to provide an alternative to possible worlds semantics. One of the things that has struck me about this alternative semantics is how easily it is able to accommodate the impossible. Rather than being an artificial addition to the possibilist semantics, the impossible emerges as a natural—one might almost say *inevitable*—extension of the possible, in much the same way in which the system of real numbers emerges as a natural extension of the rational number system or the system of complex numbers emerges as a natural extension of the real number system. It is the aim of this paper to show how this is so; and, if I am successful, then this will constitute an argument for the admission of the impossible into semantics—something which I myself have been slow to appreciate—but also for truthmaker semantics itself as a viable and valuable alternative to the possible worlds approach. I begin with an exposition of a standard approach to truthmaker semantics, using possible states in place of possible worlds (Section 9.1). I go on to describe a key construction, analogous to the extension of the rationals to the reals, for extending a space of possible states to one that also contains impossible states (Section 9.2). This has a number of advantages—mathematically and in theory and application—over the more usual approaches (Section 9.3-9.4). I then describe another construction, somewhat analogous to the extension of the reals to the complex numbers, which provides further resources for countenancing the impossible and further applications (Section 9.5). I conclude with a lengthy formal appendix." (pp. 143-144)
155. ———. 2021. "Truthmaking and the is-ought gap." *Synthese* no. 198:887–914. Abstract: "This paper is an attempt to apply the truthmaker approach, recently developed by a number of authors, to the problem of providing an adequate

- formulation of the is-ought gap. I begin by setting up the problem and criticizing some other accounts of how the problem should be stated; I then introduce the basic apparatus of truth-making and show how it may be extended to include both descriptive and normative truth-makers; I next consider how the gap principle should be formulated, attempting to deal as systematically as possible with the 'harmless' counter-examples; I also consider the relationship between the gap principle and various other doctrines concerning the separation between the normative and descriptive realms; and I conclude this part of the paper with some general remarks in favor of adopting the truth-maker approach over some of the alternative approaches. The paper concludes with a formal appendix, which gives precise expression to some of claims made in the previous informal part of the paper."
156. ———. 2021. "Some Remarks on the Role of Essence in Kripke's "Naming and Necessity"." *Theoria* :1-3.  
First on line.  
Abstract: discuss the use Kripke makes of the concept of essence in "Naming and Necessity".  
"So much has already been written about *Naming and Necessity* ; and all that I would like to do in what follows is to make a few brief remarks about the relationship between the notions of essence and de re necessity in that work. Now, it might be thought that these remarks could be very brief indeed." (p. 1)
157. ———. 2021. "Critical Notice. The Metaphysics and Mathematics of Arbitrary Objects, by Leon Horsten. Cambridge: Cambridge University Press, 2019." *Mind* :1-16.  
First online.  
"This book is an attempt to develop a metaphysical and mathematical account of arbitrary objects. It is focused on two main applications: structuralism in the philosophy of mathematics; and the concept of a random variable in probability theory. However, the book deals with a host of other topics along the way.  
(...)  
"Clearly, I cannot deal with all of these topics in a single review.(1)  
But what I would like to do is to focus on certain central issues over which there is room for reasonable disagreement, even for those of us who are already willing to accept arbitrary objects." (pp. 1-2)  
(1) hope to deal with some of these topics, and especially the issue of how the theory of arbitrary objects should be axiomatized, in a new introduction to the re-issue of 'Reasoning with Arbitrary Objects' (Fine (1985)), to be published by OUP.
158. Fine, Kit, Boghossian, Paul, and Peacocke, Christopher. 2021. "The Live Concert Experience: Its Nature and Value." In *Classical Music* , 7-13. Open Edition Books.  
"Virgil Thomson, the composer and music critic, wrote that we never enjoy a recorded performance in the same way as we enjoy a live performance (2014: 251). The same applies to live performance in the theatre and to attendance at a sports event, as opposed to seeing a performance or game on DVD or a TV recording. This difference is of great value to us. But why?" (p. 8)  
References  
Thomson, Virgil. 2014. "Processed Music", in *Music Chronicles 1940-1954* , ed. by T. Page (New York: Library of America, Penguin Random House), pp. 249–252.
159. Fine, Kit. 2022. "Some Remarks on Bolzano on Ground." In *Bolzano's Philosophy of Grounding: Translations and Studies* , edited by Roski, Stefan and Schnieder, Benjamin, 276-300. New York: Oxford University Press.  
"When I developed my own ideas on ground in the 1990s I was oblivious to Bolzano's work on the topic in his *Theory of Science* (henceforth *WL* ). It was almost a couple of decades later that I became aware of his work and I was then astonished both by its level of sophistication and by the extent to which he had anticipated many of our contemporary concerns. Although the topic has had a long history, going all the way back to the ancients, there is little doubt in my mind that

- Bolzano deserves a special place as the first person to embark upon a systematic study of the topic; and I believe his contributions in this area to be as great an intellectual achievement, in their own way, as his contributions to logic or real analysis." (p. 276, a note omitted)
160. ———. 2022. "Some Remarks on Poppers' Qualitative Account of Verisimilitude." *Erkenntnis* no. 87:213-236.  
Abstract: "The paper sets up a general framework for defining the notion of verisimilitude.  
Popper's own account of verisimilitude is then located within this framework; and his account is defended on the grounds that it can be seen to provide a reasonable structural or Pareto criterion, rather than a substantive criterion, of verisimilitude. Some other criteria of verisimilitude that may be located within the framework are also considered and their relative merits compared."

### Unpublished papers (1969-2022)

1. Fine, Kit. 1969. *For some Proposition and so many Possible Worlds*, University of Warwick.  
Available at: <http://wrap.warwick.ac.uk/72219/>  
"In this thesis, I deal with the notions of a condition holding for some proposition and a proposition being true in a certain number of possible worlds. These notions are called propositional quantifiers and numerical modalizers respectively.  
In each chapter, I attempt to dispose of a system. A system consists of: a language; axioms and rules of inference; and an interpretation. To dispose of a system is to prove its decidability and its consistency and completeness for the given interpretation. I shall, in passing, make applications to decidability, translatability and other topics." (From the Abstract)
2. ———. 2010. "The Structure of Joint Intention (Draft)." 1-50.  
Available at <https://www.academia.edu/42971332>  
"The topics of joint intention and response dependence are not normally thought to be connected. But it is my belief that that there are problems concerning the very possibility of joint intention that can only be satisfactorily resolved by providing a response dependent account of what it is. Our having a joint intention will in part be realized by our responding to it as a joint intention.  
I shall begin by outlining the problems and then consider various attempted solutions to them. None of them turns out to be satisfactory. I shall then outline a theory of response dependent concepts and show how it is able to solve the problems and provide a satisfactory account of joint attention. I conclude by briefly considering the application of the theory of response dependence to other topics in social philosophy, including the prisoners' dilemma and the concept of law.  
The paper was hurriedly written and very rough. Many important topics are barely discussed and some are not even mentioned. But I hope I have said enough to make clear how a number of issues concerning joint intention can be put on a firmer footing and how a theory of response dependence can be of help in resolving them." (p. 1)
3. ———. 2012. "The Essential Glossary of Ground." 1.  
Available at <https://www.academia.edu/27080402>  
"ground - a philosophical foodstuff, considered by some to be the elixir of life and by others to be a deadly poison." (p. 1)
4. ———. 2015. "Mathematics and the Method of Abstraction." 1-10.  
Available at <https://www.academia.edu/12136893>  
Public Lecture.

"It is a familiar thought that mathematics derives from abstraction.

(...)

Abstraction may be a familiar idea but it is also vague. What exactly is abstraction? From what do we abstract? To what do we abstract? And how do we get from the one to the other?

These are questions which have been discussed since the beginning of mathematics and philosophy. But what I want to consider is the discussion of the questions in a particular period and by a particular group of people. The period was the end of the nineteenth century and the early twentieth century. And the people in question were mathematicians who had a strong interest in foundational issues. They were not only concerned to do mathematics but also to put the subject on a firm foundation. All of the mathematicians involved - with one or two exceptions - were German. I do not know whether or not this was accidental, though it does speak to the great contribution that German mathematicians were then making to their subject." (p. 1)

5. ———. 2015. "A Theory of Truth-Conditional Content I: Conjunction, Disjunction and Negation."1-40.

Available at <https://www.academia.edu/9186494>

"The semantic content of a statement is often taken to be its truth-conditional content, as constituted by the conditions under which it is true. But there are somewhat different ways to understand what these truth-conditions are. On the clausal approach, especially associated with the name of Davidson, the truth-conditions of a statement are not entities as such but the clauses by which a truth-theory specifies when a statement is true. On the objectual approach, by contrast, the truth-conditions are objects, rather than clauses, which stand in a relation of truthmaking to the statements they make true.

Under the most familiar version of the objectual approach, the truth-conditions of a statement are taken to be possible worlds and the content of a statement may, accordingly, be identified with the set of possible worlds in which it is true. Under a somewhat less familiar version of the entity-based approach, the truth-conditions are not - or not, in general - possible worlds but possible states or situations - fact-like entities that make up a world rather than the worlds themselves; and the content of a statement may, in this case, be identified with the set of verifying states or situations in which it is true.

In this paper I pursue the last of these options. However, my understanding of what it is for a state to verify a statement is somewhat unusual. It is often supposed that verification is monotonic; if a state verifies a statement then so does any more comprehensive state. But on the account that I wish to adopt, this will not be generally true. For it is to be a general requirement on verification that a verifier should be relevant as a whole to the statement that it verifies; and in extending a verifier with additional material, this holistic relevance of the verifier to the statement may be lost." (p. 1)

6. ———. 2015. "A Theory of Truth-Conditional Content II: Subject-matter, Common Content, Remainder and Ground."1-25.

Available at <https://www.academia.edu/9206919>

"We continue with the development of the theory of truth-conditional content begun in part I, dealing with such 'non-standard' topics as subject matter, common content, logical remainder and ground. This is by no means an exhaustive list of topics that might have been considered but it does provide an indication of the nature and scope of the theory. As before, the paper is divided into an informal exposition and a technical addendum. Both can be read independently of the other but it would be helpful, in either case, to have the first part at hand.

One feature of great interest in the present account is that it deals with a number of the topics that lack an adequate treatment either within the possible worlds account or under a structural conception of propositions. The notion of common content, for example, can be readily handled within the present framework but cannot be properly handled in the other two frameworks without either introducing or deriving something like the present conception of verification. Thus we should not

- simply regard the present 'extensional' conception of content as a mere approximation to a structural conception but as an important conception in its own right." (p. 1)
7. ———. 2015. "The Sorites." Available at <https://www.academia.edu/9374594>  
"No treatment of vagueness is complete without an account of the sorites argument. This argument, in a familiar form, starts with the premiss that a given man (with no hairs on his head) is bald, it proceeds to the intermediate conclusion that a man with very slightly fewer hairs on his head is bald, given the assumption that a slight difference in the number of cranial hairs can make no difference to whether someone is bald, and it then proceeds, by a large number of further steps of this sort, to the final conclusion that a man with a full head of hair is bald, which is clearly absurd." (p. 1)
  8. ———. 2016. "Acts and Embodiment." In, 1-17. Available at <https://www.academia.edu/35032853>  
"I wish in this paper to consider how the theory of embodiment outlined in some of my earlier papers (Fine [1982], [1999]) [2006]) can be applied to questions concerning the identity of acts. This will involve going over some old ground. But I also hope to elaborate on what I previously said and to relate it to some of the more recent literature on the topic." (p. 1)  
References  
Fine K., [1982] "Acts, Events and Things," *Language and Ontology* Wien: Holder-Pichler-Tempsky (1982), 97-105 as part of the proceedings of the Sixth International Wittgenstein Symposium 23rd to 30th August 1981, Kirchberg/Wechsel (Austria).  
Fine K., [1999] "Things and Their Parts", *Mid-west Studies XXIII* (ed. French & Wettstein), 61-74.  
Fine K., [2006] 'In Defense of Three-dimensionalism', *Journal of Philosophy*, CIII.12, 699-714.
  9. ———. 2017. "Mathematical Existence."1-10. Available at <https://as.nyu.edu/content/dam/nyu-as/asSilverDialogues/documents/Fine%20Essay.pdf>  
"Anyone who has thought about the nature of mathematics has probably been puzzled over the status of its objects. Are the objects with which mathematics deals - numbers, sets, functions and the like - created or are they discovered? Should we think of them in the manner of the stars and the planets, whose character and existence is entirely independent of our investigations and activities? Or should we think of them in the manner of the objects of fiction, whose existence and character is entirely dependent upon what their authors make of them?" (p. 1)
  10. ———. 2019. "Chisholm's Puzzle and Unconditional Obligation."1-19. Available at <https://www.researchgate.net/publication/333532612>  
"In this paper, I would like to suggest a new angle on Chisholm's puzzle concerning contrary-to-duty obligations. It differs from previous approaches in its conception of what the problem is and how it is to be solved. I shall argue that the problem is, in no small part, about unconditional, rather than conditional, obligation and that, once it is viewed in this light, we obtain a somewhat different perspective on how the puzzle might be solved." (p. 1)
  11. Fine, Kit, and Martin, Errol. 2020. "Progressive Logic." In, 1-45. Available at <https://www.academia.edu/50161463>  
"An argument is commonly taken to be circular when the truth of its conclusion is presupposed by its premisses. But exactly what is meant by such an account is not at all clear. For there is a sense in which the truth of the conclusion of any deductively valid argument is presupposed by its premisses. Thus if there is to be a significant distinction between those valid arguments that are circular and

those that are not, then some basis must be found for distinguishing between the trivial kind of presupposition and one that is more substantive." (p. 1)

12. Fine, Kit. 2021. "A Theory of Partial Truth." In. Available at <https://www.academia.edu/9827534>  
 "I develop a theory of partial truth within the framework of truth-conditional content developed in two earlier papers (Fine [2015a] and [2015b]). It will be helpful, though not essential, to have these two other papers at hand, and especially the first, while reading the present paper. The paper should have interest both as an account of partial truth and as a partial vindication of the truth-conditional framework within which it is developed. For without something like the present framework, it is hard to see how a reasonable alternative account of partial truth might be developed. The concept of partial truth is intimately related to the concept of partial content, since we naturally suppose that a proposition is partially true when some part of it is true. The connection between the two concepts can also be put to work in the opposite direction, since we may provide a semantics for the logic of partial content by appeal to partial truth (as in §9 of Fine [2015]). There is also a close connection with the concept of verisimilitude. For a proposition will be partially true when it has 'more truth' than a proposition that is not partially true; and the investigation of the concept of partial truth may, in fact, serve as a useful prolegomena to the investigation of the more complicated concept of verisimilitude.  
 (...)  
 I begin with an informal introduction to some of the main ideas and conclude with a formal appendix. The introduction and appendix can in principle be read in isolation from the other though they are best read together. The most extensive previous treatment of the topic that I know of is in Humberstone [2003]; and a related account of partial truth is given in §1.3 of [2014]. The major difference from Humberstone is that he stipulates the truth-tables for a logic of partial truth while I derive them from an underlying account of partial truth; and the major difference from Yablo is that I provide an account of partial truth directly in terms of truthmakers and not indirectly through the notion of partial content." (p. 1)  
 References  
 Fine K. [2014] 'Truthmaker Semantics for Intuitionistic Logic', *Journal of Philosophical Logic* 43.2, pp. 549-77 (2014); reprinted in *Philosophers' Annual* for 2014.  
 Fine K., [2015a] 'A Theory of Truth-Conditional Content - I', to appear  
 Fine K., [2015b] 'A Theory of Truth-Conditional Content - II', to appear  
 Fine K., [2015c] 'Angelic Content', to appear  
 Humberstone L., [2003] 'False Though Partly True - An Experiment in Logic', *Journal of Philosophical Logic* 32: 613-665.  
 Yablo S., [2014] 'Aboutness', Princeton: Princeton University Press.
13. ———. 2021. "Quine on Essence." In, 1-11.  
 Available at <https://www.academia.edu/49952637>  
 "There are already many excellent detailed accounts of Quine's views on *de re* and *de dicto* modality, and my principal concern in the present chapter is not to add to them or to survey the field but to point to certain general features of Quine's views which, in the fog of detail, may easily be overlooked." (p. 1, a note omitted)
14. Fine, Kit, and de Rosset, Louis. 2021. "A Semantics for the Impure Logic of Ground."  
 Available at <https://www.uvm.edu/~lrossette/impure.pdf>  
 "This paper establishes a sound and complete semantics for the impure logic of ground. Fine [2012a] sets out a system for the pure logic of ground, one in which the formulas between which ground-theoretic claims hold have no internal logical complexity; and it provides a sound and complete semantics for the system. Fine [2012b, §§6-8] sets out a system for an impure logic of ground, one that extends the rules of the original pure system with rules for the truth-functional

connectives, the first-order quantifiers, and  $\lambda$ -abstraction. However, it does not provide a semantics for this system. The present paper partly fills this lacuna by providing a sound and complete semantics for a system GG containing the truth-functional operators that is closely related to the truth-functional part of the system of [Fine, 2012b].(1)" (p. 1)

(1) The main differences between the two systems are that we now only allow finitely many formulas to occur to the left of the ground-theoretic operator and that we have added the Irreversibility Rule, which should have been part of the original system.

References

K. Fine. Guide to Ground. In Benjamin Schnieder and Fabrice Correia, editors, *Metaphysical Grounding: Understanding the Structure of Reality*, pages 37-80. Cambridge University Press, 2012b. reprinted online in 'Philosophers Annual' for 2012 (eds. P. Grim, C. Armstrong, P. Shirre, N-H Stear).

15. Fine, Kit, and Bacon, Andrew. 2022. "The Logic of Logical Necessity." In *Saul Kripke on Modal Logic*, edited by Weiss, Yale and Padró, Romina, 1-43. Dordrecht: Springer.

Volume not yet published.

Available at <https://www.researchgate.net/publication/353273273>

Abstract: "Prior to Kripke's seminal work on the semantics of modal logic, McKinsey offered an alternative interpretation of the necessity operator, inspired by the Bolzano-Tarski notion of logical truth. According to this interpretation, 'it is necessary that A' is true just in case every sentence with the same logical form as A is true. In our paper, we investigate this interpretation of the modal operator, resolving some technical questions, and relating it to the logical interpretation of modality and some views in modal metaphysics. In particular, we present an hitherto unpublished solution to problems 41 and 42 from Friedman's *102 problems*, which uses a different method of proof from the solution presented in the paper of Tadeusz Prucnal."

References

Harvey Friedman. One hundred and two problems in mathematical logic. *Journal of Symbolic Logic*, 40(2):113-129, 1975.

Tadeusz Prucnal. On two problems of Harvey Friedman. *Studia Logica*, 38(3):247-262, 1979

### Selected studies on the Philosophy of Kit Fine

- Correia, Fabrice. 2005. *Existential Dependence and Cognate Notions*. München: Philosophia Verlag.  
Contents: Preface 3; Introduction 7; 1. Preamble; 13; Introductory Break 35; 2. Simple Dependence: Presentation, and Rejection of Some Accounts 39; 3. Metaphysical Grounding 53; 4. Simple Dependence: The Foundational Approach 65, 5. Some Other Notions of Existential Dependence 89; 6. A Cognate Notion: Supervenience 131; Appendix 151; Bibliography 151; List of Figures 165; List of Symbols and Notations 167; List of Named Propositions, Conditions and Rules 169; Index 171.  
"This is a work in analytic metaphysics. Its main purpose is to clarify a notion of central importance in metaphysics since Aristotle, to wit the notion of existential dependence. All currently available analyses of the notion are examined and then rejected, and a new account is defended. This work is the first comprehensive one on the topic. The first chapter is devoted to introducing and explaining some notions which are crucial for the central parts of the work, namely the notions of existence, necessity, (individual and plural) quantification and essence. In chapters 2 and 4 focus is made on the relation of "simple" existential dependence, the

relation which holds between two objects when the first cannot exist without the other. Three accounts of simple dependence - each endorsed by some contemporary philosophers, among them Kit Fine, E. Jonathan Lowe, Kevin Mulligan, Peter Simons and Barry Smith - are presented and then rejected. A new account, inspired by suggestions by Fine and Lowe, is defended. According to that account - the "foundational" account - simple dependence is to be defined in terms of a relation called *grounding*, which is presented in chapter 3. Chapters 5 and 6 deal with relations belonging to the family of simple dependence, among others (i) generic dependence, (ii) various forms of temporal dependence, and (iii) supervenience, a complex dependence relation largely invoked in current debates on the philosophy of mind. It is shown that foundationalist accounts of these notions - i.e. accounts framed in terms of grounding - are superior to other existing accounts. These chapters also contain some applications of the foundational conception of dependence, in particular a characterization of substances and a formulation of the distinction between two well known conceptions of universals, the Aristotelian and the Platonician conception. The last part of the work is a technical appendix where one can find, among other things, a system for the logic of essence, which is proved to be sound and complete with respect to a possible world semantics."

"The notion of metaphysical grounding is close to a notion Fine introduces in [Fine, 2001] (§5) and which he calls 'ground'. In Fine's sense, the proposition that A is grounded in the propositions that B, C,... iff its being the case that A consists in nothing more than its being the case that B, C,... According to Fine, grounding propositions explain what they ground. Fine's notion of ground is strictly stronger than metaphysical grounding: I wish to leave room for the view that the existence of a set is explained by, but does not merely consist in, the existence of its members. And it is likewise strictly stronger than logical grounding.

It is also close to Bolzano's notion of grounding. (2) One difference is that Bolzano takes this notion to express a relation between propositions or pluralities of propositions, construed as genuine, mind-independent entities. (3) For my part, as I previously stressed, I leave aside the question as to whether statements of ground point to propositions, facts or states of affairs. A second difference lies in that Bolzano takes it that causal connections give rise to facts of grounding: for every causal fact, a proposition describing some relevant features of the effect is grounded in a proposition describing some relevant features of the cause. (4) This presumably does not hold of metaphysical grounding. Bolzano's notion of grounding is perhaps equivalent to the "logical sum" of all qualified notions of grounding." (p. 56)

(2) [Bolzano, 1973], §§ 168-177 and §§ 198-221.

(3) §§ 19ff. and §§ 168-177.

(4) § 201.3.

References

[Bolzano, 1973] B. Bolzano. *Theory of Science*, Dordrecht: D. Reidel.

{Fine, K, 2001] K. Fine, "The Question of Realism", *Philosophers Imprint*, 1(1): 1-30.

2. Dumitru, Mircea, ed. 2020. *Metaphysics, Meaning and Modality: Themes from Kit Fine*. New York: Oxford University Press.

Contents: Acknowledgements IX; List of Contributors XI; Mircea Dumitru:

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I. Metaphysics

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- Bibliography of the Publications of Kit Fine 503;  
Index 509-519.
3. Rieber, Steven. 2002. "A Defense of Indeterminism." *Acta Analytica* no. 17:75-82. Abstract: "My goal is to defend the indeterminist approach to vagueness, according to which a borderline vague utterance is neither true nor false. Indeterminism appears to contradict bivalence and the disquotational schema for truth. I agree that indeterminism compels us to modify each of these principles. Kit Fine has defended indeterminism by claiming that ordinary ambiguous sentences are neither true nor false when one disambiguation is true and the other is false. But even if Fine is right about sentences, his point does not seem to generalize the utterances. What the indeterminist needs -- and what ordinary ambiguity does not provide -- is an ambiguous utterance where what is being said is indeterminate between two different propositions. I will show that such cases exist. These cases imply that the modifications that indeterminism makes to bivalence and the disquotational schema are required independently of indeterminism, in fact independently of vagueness."
4. Suster, Danilo. 2005. "The Modality Principle and Work-relativity of Modality." *Acta Analytica* no. 20:41-52. "If we accept Fine's theory then modal properties, contrary to the modal principle, are not an independent guide to constitutive properties of an artwork. Rather, they depend on a prior decision on the identity of a work. Of course, all essential properties are necessary, so those modal intuitions that track the nature of the object in question still remain a guide to essentiality. But in the first part of my comment I expressed a fear that even those modal intuitions are not a reliable guide, they do not fix something objective and unique. Individual essences are murky properties and I am afraid that our appreciative engagement with a work of art cannot offer

- objective answers about them. My scruples could be read as scruples about contextualism in general and not directed specifically to Davies' proposal. (\*) Anyway, maybe this is the price we have to pay when we evaluate ontological proposals on the basis of their fit with a more comprehensive philosophical framework that makes sense of our artistic practice as that practice is 'codified' upon rational reflection." (p. 52)  
[David Davies, *Art as Performance*, Oxford, Blackwell 2004.]
5. Sosa, David. 2010. "The Fine Line." *Analysis* no. 70:347-358.  
Critical notice of Kit Fine, *Semantic Relationism* (2007).  
"The purpose of Fine's book is to show how the guiding idea, the 'semantic relationism' of the title, helps with deep puzzles in philosophy of language and mind. Russell's antinomy of the variable, Frege's puzzle in both a linguistic and a cognitive version, and Kripke's puzzle about belief are said to be solved adequately only by adopting his relationism. But the book is also a defence of 'referentialism' in philosophy of language. Fine holds that the fundamental semantic relations that need to be added to the assigned intrinsic values in our overall semantic theory, especially the relation he calls 'coordination', can do much of the work of sense. A relationist referentialism 'can secure many of the advantages of the Fregean position without being committed to the existence of sense'.  
In this selective review, I will not evaluate how Fine's line on these matters fares overall. There's a risk of unfairness in that, since part of any view's success can be measured only holistically, by balancing whatever disadvantages it might have with such emergent features as its unifying power and generality, and the consistency of its successes (as against its failures). Having signalled this, however, I will focus on just a few specific passages, and raise some corresponding issues and concerns." (p. 347)
  6. deRosset, Louis. 2015. "Better Semantics for the Pure Logic of Ground." *Analytic Philosophy* no. 56:229-252.  
Abstract: Philosophers have spilled a lot of ink over the past few years exploring the nature and significance of grounding. Kit Fine has made several seminal contributions to this discussion, including an exact treatment of the formal features of grounding [Fine, 2012a]. He has specified a language in which grounding claims may be expressed, proposed a system of axioms which capture the relevant formal features, and offered a semantics which interprets the language. Unfortunately, the semantics Fine offers faces a number of problems. In this paper, I review the problems and offer an alternative that avoids them. I offer a semantics for the pure logic of ground that is motivated by ideas already present in the grounding literature, and for which a natural axiomatization capturing central formal features of grounding is sound and complete. I also show how the semantics I offer avoids the problems faced by Fine's semantics."  
References  
Kit Fine. The Pure Logic of Ground. *Review of Symbolic Logic*, 5(1):1–25, March 2012a.
  7. Correia, Fabrice, and Rosenkranz, Sven. 2012. "Eternal Facts in an Ageing Universe." *Australasian Journal of Philosophy* no. 90:307-320.  
Abstract: "In recent publications, Kit Fine devises a classification of A-theories of time and defends a non-standard A-theory he calls fragmentalism, according to which reality as a whole is incoherent but fragments into classes of mutually coherent tensed facts. We argue that Fine's classification is not exhaustive, as it ignores another non-standard A-theory we dub dynamic absolutism, according to which there are tensed facts that stay numerically the same and yet undergo qualitative changes as time goes by. We expound this theory in some detail and argue that it is a serious alternative to the positions identified by Fine."
  8. Simons, Peter M. 2008. "Modes of Extension: Comments on Kit Fine's 'In Defence of Three-Dimensionalism'." In *Being: Developments in Contemporary Metaphysics*, edited by Le Poidevin, Robin, 17-22. Cambridge: Cambridge University Press.

- "The debate between 3- and 4-dimensionalists is one of the most lively and pervasive in current metaphysics. At stake is a glittering prize: the correct metaphysical analysis of material things and other objects commonly thought to persist in time by enduring. Since we count ourselves among such objects the outcome of the debate is of more than merely academic interest to us. Obviously the ramifications of the debate, even of the points raised by Kit Fine, go far beyond what I can discuss here, so I shall simply select some salient issues and comment on them from my own somewhat heterodox point of view." (p. 17)
9. Cook, Roy T., and Ebert, Philip. 2004. "Discussion Note: Kit Fine's *Limits of Abstraction* ." *British Journal for the Philosophy of Science* no. 55:791-800. "Kit Fine's recent *The Limits of Abstraction* , an extended version of his [1998] paper, contains four chapters. The first two deal with philosophical aspects of abstraction, while the latter two provide the formal framework for a general theory of abstraction. Here we focus on the philosophical material, and, given the depth and complexity of the material, cannot attempt even a superficial summary of the entirety of the philosophical material. Thus, we content ourselves with sketching the contents. Two particular issues will then be examined in greater detail."
  10. Evinine, Simon J. 2009. "Constitution and Qua Objects in the Ontology of Music." *British Journal of Aesthetics* no. 49:203-217.  
Abstract: "Musical Platonists identify musical works with abstract sound structures but this implies that they are not created but only discovered. Jerrold Levinson adapts Platonism to allow for creation by identifying musical works with indicated sound structures. In this paper I explore the similarities between Levinson's view and Kit Fine's theory of qua objects. Fine offers the theory of qua objects as an account of constitution, as it obtains, for example, between a statue and the clay the statue is made out of. I argue that Fine's theory does not adequately characterize the constitution relation and that the problems it faces extend to Levinson's account of musical works as indicated structures. I develop an alternative theory of constitution, based on the notion of being made out of. This approach to constitution enables me to offer an account of musical works as abstract objects that are constituted by sound structures. I argue that my account has several advantages over the Levinson/Fine approach."  
References  
Jerrold Levinson, ' What a Musical Work Is ' , *Journal of Philosophy* , vol. 77 (1980), pp. 5 – 28.  
Kit Fine, ' Acts, Events and Things ' , in *Sprache und Ontologie* (Vienna: Hoelder-Pichler-Tempsky, 1982) (for the theory of qua objects in general)  
Kit Fine, ' The Problem of Non-Existents. I. Internalism ' , *Topoi*, vol. 1 (1982) pp. 97 – 140 (for its application to literary works and, as he notes in passing, to musical works as well.)
  11. "The Philosophy of Kit Fine." 2007. *Dialectica. International Journal of Philosophy* no. 61:3-200.  
The papers in this special volume were presented at a conference entitled 'Fine Philosophy – the Philosophy of Kit Fine' which took place at the University of Geneva on the 3rd, 4th and 5th of July 2005.  
Guest editor: Kevin Mulligan.  
Contents: Kit Fine: Introduction 3; Paul Horwich: The Quest for Reality 5; Kit Fine: Response to Paul Horwich 17; Fraser MacBride: Neutral Relations Revisited 25; Kit Fine: Response to Fraser MacBride 57; Fabrice Correia: (Finean) Essence and (Priorean) Modality 63; Kit Fine: Response to Fabrice Correia 85; Alan Weir: Honest Toil or Sheer Magic? 89; Kit Fine: Response to Alan Weir 117; Kathrin Koslicki: Towards a Neo-Aristotelian Mereology 127; Kit Fine: Response to Kathrin Koslicki 161; Manuel García-Carpintero: Bivalence and What Is Said 167; Kit Fine: Response to Manuel García-Carpintero 191; Bibliography of Kit Fine 195–200.

12. Correia, Fabrice. 2007. "(Finean) Essence and (Priorean) Modality." *Dialectica. International Journal of Philosophy* no. 61:63-84.  
 Abstract: "In Fine 1994, Kit Fine challenges the (widespread) view that the notion of essence is to be understood in terms of the metaphysical modalities, and he argues that it is not essence which reduces to metaphysical modality, but rather metaphysical modality which reduces to essence.  
 In this paper I put forward a modal account of essence and argue that it is immune from Fine's objections. The account presupposes a non-standard, independently motivated conception of the metaphysical modalities which I dub Priorean. Arthur Prior never endorsed that very conception, but in some respects his own views on the topic are so close to it, and different from all (most?) currently accepted views, that the label 'Priorean' is perfectly appropriate."  
 References  
 Fine, K. 1994, 'Essence and Modality', *Philosophical Perspectives* 8, pp. 1–16.
13. García-Carpintero, Manuel. 2007. "Bivalence and What Is Said." *Dialectica. International Journal of Philosophy* no. 61:167-190.  
 Abstract: "On standard versions of supervaluationism, truth is equated with supertruth, and does not satisfy bivalence: some truth-bearers are neither true nor false. In this paper I want to confront a well known worry about this, recently put by Wright as follows: 'The downside . . . rightly emphasized by Williamson . . . is the implicit surrender of the T-scheme'. I will argue that such a cost is not high: independently motivated philosophical distinctions support the surrender of the T-scheme, and suggest acceptable approximations."  
 References  
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 Wright, C. 2004, 'Vagueness: A Fifth Column Approach', in J. C. Beall, *Liars and Heaps*, Oxford: Oxford University Press, pp. 84–105.
14. Horwich, Paul. 2007. "The Quest for Reality." *Dialectica. International Journal of Philosophy* no. 61:5-16.  
 Abstract: "A widespread concern within philosophy has been, and continues to be, to determine which domains of discourse address real, robust, not-merely-deflationary facts, and which do not. But a threat to the legitimacy of this concern (together with the claims provoked by it) is the extreme lack of consensus amongst philosophers on the question of how to tell whether or not a given domain is oriented towards 'robust reality'. The present paper criticizes Kit Fine's attempt to settle that question. This discussion is followed by some considerations suggesting that there is no good answer to it, that (as the 'quietists' maintain) the notion of 'robust reality' is defective and ought to be abandoned."
15. Koslicki, Kathrin. 2007. "Towards a Neo-Aristotelian Mereology." *Dialectica. International Journal of Philosophy* no. 61:127-159.  
 Abstract: "This paper provides a detailed examination of Kit Fine's sizeable contribution to the development of a neo-Aristotelian alternative to standard mereology; I focus especially on the theory of 'rigid' and 'variable embodiments', as defended in Fine 1999. Section 2 briefly describes the system I call 'standard mereology'. Section 3 lays out some of the main principles and consequences of Aristotle's own mereology, in order to be able to compare Fine's system with its historical precursor. Section 4 gives an exposition of Fine's theory of embodiments and goes on to isolate a number of potential concerns to which this account gives rise. In particular, I argue that (i) Fine's theory threatens to proliferate primitive sui generis relations of parthood and composition, whose characteristics must be stipulatively imposed on them, relative to particular domains; (ii) given its 'superabundance' of objects, Fine's system far outstrips the (arguably) already inflated ontological commitments of standard mereology; and (iii) there is a

legitimate question as to why we should consider Fine's primitive and sui generis relations of parthood and composition to be genuinely mereological at all, given their formal profile. These three objections lead me to conclude that we ought to explore other avenues that preserve the highly desirable, hylomorphic, features of Fine's mereology, while avoiding its methodological and ontological excesses."

#### References

Fine, K. 1999, 'Things and Their Parts', *Midwest Studies in Philosophy* 23, pp. 61–74.

16. MacBride, Fraser. 2007. "Neutral Relations Revisited." *Dialectica. International Journal of Philosophy* no. 61:25-56.  
Abstract: "Do non-symmetric relations apply to the objects they relate in an order? According to the standard view of relations, the difference between  $aRb$  and  $bRa$  obtaining, where  $R$  is nonsymmetric, corresponds to a difference in the order in which the non-symmetric relation  $R$  applies to  $a$  and  $b$ . Recently Kit Fine has challenged the standard view in his important paper 'Neutral Relations' arguing that non-symmetric relations are neutral, lacking direction or order. In this paper I argue that Fine cannot account for the application of non-symmetric relations to their relata; so far from being neutral, these relations are inherently directional."
17. Weir, Alan. 2007. "Honest Toil or Sheer Magic?" *Dialectica. International Journal of Philosophy* no. 61:89-115.  
Abstract: "In this article I discuss the 'procedural postulationist' view of mathematics advanced by Kit Fine in a recent paper [\*]. I argue that he has not shown that this view provides an avenue to knowledge of mathematical truths, at least if such truths are objective truths. In particular, more needs to be said about the criteria which constrain which types of entities can be postulated. I also argue that his reliance on second-order quantification means that his background logic is not free of ontological commitment and that his doctrine of 'creative expansion' only makes sense from a radically anti-realist perspective."  
{\* Fine, K. 2005, 'Our Knowledge of Mathematical Objects', in: T. Z. Gendler and J. Hawthorne eds., *Oxford Studies in Epistemology* Vol. 1, Oxford: Clarendon Press, pp. 89–109.]
18. Hinzen, Wolfram. 2003. "Constructive versus Ontological Construals of Cantorian Ordinals." *History and Philosophy of Logic* no. 24:45-63.  
Abstract: "In a recent paper, Kit Fine offers a reconstruction of Cantor's theory of ordinals. It avoids certain mentalistic overtones in it through both a non-standard ontology and a non-standard notion of abstraction. I argue that this reconstruction misses an essential constructive and computational content of Cantor's theory, which I in turn reconstruct using Martin-Löf's theory of types. Throughout, I emphasize Kantian themes in Cantor's epistemology, and I also argue, as against Michael Hallett's interpretation, for the need for a constructive understanding of Cantorian 'existence principles'."
19. Kuhn, Steven T. 2006. "Review of *Modality and Tense: Philosophical Papers*, by Kit Fine." *International Philosophical Review* no. 46:492-502.  
"Fine sees himself as defending two very plausible views--that the distinction between the necessary and the contingent is intelligible and that merely possible worlds are not real in the same sense as the actual world--against pervasive philosophical orthodoxies that deny them. I can't resist noting that his own theories occasionally lead him to views that seem implausible: Ordinary objects (or at least sequences of them) have logical form, abstract objects may exist contingently. A formula of the form [A if and only if the proposition expressed by A is true] may be false. "Being" should to be distinguished from existence and (as was noted above) there is a sense in which the fountain of youth exists. There are good reasons to embrace the view that reality contains contradictory facts. It is a testament to Fine's meticulous examination of the issues involved and his skill in communicating it that

- many of these positions seem quite plausible, and all of them far less implausible, after the book is read." (p. 502)
20. Correia, Fabrice. 2000. "Propositional Logic of Essence." *Journal of Philosophical Logic* no. 29:295-313.  
 Abstract: "This paper presents a propositional version of Kit Fine's (quantified) logic for essentialist statements, provides it with a semantics, and proves the former adequate (i.e. sound and complete) with respect to the latter."  
 "The present paper can be considered as a companion to Kit Fine's papers 'The Logic of Essence' and 'Semantics for the Logic of Essence'. (1) In the first paper Fine presents a logical system for quantified essentialist statements, E5. (2) In the second he presents a semantics for a variant of the system, and proves this system adequate (i.e. sound and complete) with respect to that semantics. I propose here a Kripke-style semantics for E5 $\pi$ , a propositional counterpart of E5, and prove the adequacy of the latter with respect to the former.  
 There are many, more or less natural, more or less interesting, ways to extend E5 $\pi$  (or one of its cousins) to a system of quantified logic of essence. E5 $\pi$ , together with its semantics, is intended to constitute the core of subsequent, more expressive, logics of essence. So, the study of E5 $\pi$  per se, regardless of possible quantificational extensions, is of great interest.  
 Another interesting point about the present study lies in the fact that the completeness proof given here is much simpler than the one Fine gives for his quantificational system.  
 The reader is strongly urged to take a look at Fine's papers on the logic of essence, if only because no detailed comparison between Fine's material and mine will be offered." (p. 295)  
 (1) At the time I worked on the present paper only the first of Fine's papers was available to me. I became acquainted with 'Semantics for the Logic of Essence' after obtaining the results presented here.  
 (2) Fine aims at developing such a system in response to his own objections to the standard modal contruals of essence. See his 'Essence and Modality'.
21. Kremer, Philip. 1989. "Relevant Predication: Grammatical Characterisations." *Journal of Philosophical Logic* no. 18:349-382.  
 Abstract: "This paper reformulates and decides a certain conjecture in Dunn's *Relevant Predication 1: The Formal Theory* (*Journal of Philosophical Logic* 16, 347-381, 1987). This conjecture of Dunn's relates his object-language characterisation of a property's being relevant in a variable x to certain grammatical characterisations of relevance, analogous to some given by Helman, in *Relevant Implication and Relevant Functions* (in *Entailment: The Logic of Relevance and Necessity*, vol. 2, by Alan Ross Anderson, Nuel Belnap, and J. Michael Dunn et al.)  
 In the course of the investigation this paper also investigates Kit Fine's semantics for quantified relevance logics, which appears in his appropriately titled *Semantics for Quantified Relevance Logic*."
22. Mares, Edwin D., and Goldblatt, Robert. 2006. "An Alternative Semantics for Quantified Relevant Logic." *Journal of Symbolic Logic* .  
 Abstract: "The quantified relevant logic RQ is given a new semantics in which a formula  $\forall x A$  is true when there is some true proposition that implies all x-instantiations of  $A$ . Formulae are modelled as functions from variable-assignments to propositions, where a proposition is a set of worlds in a relevant model structure. A completeness proof is given for a basic quantificational system QR from which RQ is obtained by adding the axiom EC of 'extensional confinement':  $\forall x(A \vee B) \rightarrow (A \vee \forall xB)$ , with x not free in A. Validity of EC requires an additional model condition involving the boolean difference of propositions. A QR-model falsifying EC is constructed by forming the disjoint union of two natural arithmetical structures in which negation is interpreted by the minus operation."  
 "Kit Fine [10] showed that the quantified relevant logic RQ is incomplete over Routley and Meyer's relational semantics with constant domains. In its place he

- developed [9] an increasing domain semantics over which RQ is complete, and for which a model includes a set of frames which are related to one another by a number of relations and operators. This semantics is powerful and ingenious. But Fine's semantics is very complicated. Since it was produced it in the mid-1980s relevant logicians have wanted to simplify it. J. Michael Dunn and Greg Restall say [7, p 83]:
- [I]t must be said that while the semantic structure pins down the behaviour of RQ and related systems exactly, it is not altogether clear whether the rich and complex structure of Fine's semantics is necessary to give a semantics for quantified relevance logics.(1)
- To those of us who have seriously attempted to simplify Fine's semantics, it is becoming clear that the "rich and complex structure" is in a certain sense necessary. The elements of the theory seem to work in concert with one another and eliminating even one operator or relation seems to make the entire structure collapse. Thus, in order to create a simpler semantics for quantified relevant logic we need to take an alternative approach.
- In this paper, we take an alternative approach. (2)" (pp. 163-164)
- (1) Restall also says [14, p 5]: "The groundbreaking work of [9] is formally astounding but philosophically opaque".
- (2) After seventeen years of trying to modify Fine's semantics, Mares in particular is glad that an alternative has suggested itself.
23. Savitt, Steven. 2016. "Kit Fine on Tense and Reality." *Manuscript* no. 39:75-96. Abstract: "Kit Fine (2005, 2006) recently described and defended a novel position in the philosophy of time, fragmentalism. It is not often that a new (and even perhaps a radically new) option appears in this old field, and for that reason alone these two essays merit serious attention. I will try to present briefly but fairly some of the considerations that Fine thinks favour fragmentalism. I will also weigh the merits of fragmentalism against the view that Fine presents as its chief rival, relativism, as well as the merits of both against the view that he calls anti-realism. Along the way, we should pick up a clearer picture of fragmentalism itself." References  
Fine, K. "Tense and Reality" in his *Modality and Tense: Philosophical Papers* . Oxford: Oxford University Press, 2005.  
\_\_\_\_\_ "The Reality of Tense," *Synthese* 150: 399-414, 2006.
24. Almog, Joseph. 2020. "One Absolutely Infinite Universe to Rule Them All. Reverse Reflection, Reverse Metaphysics." In *Metaphysics, Meaning and Modality: Themes from Kit Fine* , edited by Dumitru, Mircea, 52-86. New York: Oxford University Press.  
"Three questions are to guide us. They are about the three segments in the title: the nature of the universe proper, reflection (up-to and down-from) the universe and the method with which to describe the metaphysics (as opposed to constructive justification epistemology) of the universe." (p. 52, a note omitted)
25. Bonardi, Paolo. 2020. "Coordination, Understanding, and Semantic Requirements." In *Metaphysics, Meaning and Modality: Themes from Kit Fine* , edited by Dumitru, Mircea, 360-367. New York: Oxford University Press.  
"Coordination is the central notion of Kit Fine's (1007) theory of meaning called *semantic relationism* .  
(...)  
The present manuscript attempts to answer the following question: What is coordination between proper names? Fine proposes two characterizations of this sort of coordination, which he also labels *representing as the same*: an intuitive test; and a technical definition. On the basis of the intuitive characterization, I will maintain that coordination (viz. representing as the same) is grounded in a notion of understanding distinct from the notion of linguistic competence. Whereas—as I will argue—we need a characterization of understanding in order to elucidate Fine's coordination, it

is unclear how to provide one: three *prima facie* appealing proposals to characterize it will be examined and then dismissed as intrinsically implausible or as incompatible with Fine's relational semantics. Not even his technical characterization of coordination, involving the notion of semantic requirement, will enable us to escape the impasse. Ultimately, the problem of determining what exactly coordination between names is will remain open." (p. 360)

26. Correia, Fabrice. 2020. "More on the Reduction of Necessity to Essence." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 265-282. New York: Oxford University Press.
- "Essence and Modality" has had a considerable impact on subsequent philosophical thinking about essence and modality. The paper argues that the traditional view that essence reduces to metaphysical modality is wrong. Many have found these arguments convincing and have accordingly abandoned the view. The paper also argues that the reduction goes the other way around, that is, that it is metaphysical modality which reduces to essence. Twenty years after the publication of "Essence and Modality," Kit Fine's reductive view has become widely recognized as one of the main contenders for a reductive account of metaphysical modality. There are several ways in which such a reductive account can be spelled out. In Correia 2012, I raised objections against one natural way of doing so, and developed an alternative account—the "rule-based" account—which relies on a brief suggestion Fine makes in Fine 1995a. The aim of the present chapter is twofold: first, I wish to strengthen the case for the rule-based account by criticizing alternative accounts, including some accounts based on other suggestions made by Fine, or inspired by material one can find in his work; and second, I wish to discuss certain objections to the rule-based account and suggest how they can be met." (p. 265)

#### References

- Correia, F. 2012. "On the Reduction of Necessity to Essence," *Philosophy and Phenomenological Research* 84: 639-53.
- Fine, K. 1995a. "Senses of Essence," in W. Sinnott-Armstrong (ed.), *Modality, Morality and Belief*, Cambridge: Cambridge University Press, 53–73.
27. Dumitru, Mircea. 2020. "Introduction: Kit Fine—A Philosopher's Philosopher." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 1-9. New York: Oxford University Press.
- "This book is the first edited volume on the philosophy of one of the most seminal and profound contemporary philosophers. Over the last forty-odd years, Kit Fine has been one of the most influential and original analytic philosophers. He has made provocative and innovative contributions to several areas of systematic philosophy, including philosophy of language, metaphysics, and the philosophy of mathematics, as well as a number of topics in philosophical logic, such as modal logic, relevance logic, the logic of essence, and the logic of vagueness. These contributions have helped reshape the agendas of those fields and have given fresh impetus to a number of perennial debates." (p. 1)
28. Forbes, Graeme. 2020. "Fine's New Semantics of Vagueness." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 164-179. New York: Oxford University Press.
- "My conclusion about Fine's discussion of the three formulations of Sorites reasoning, then, is that it is a very great strength of compatibilist semantics that it diagnoses a problem in each of the three, using the same formal apparatus, and other approaches which cannot do something like this are at an immediate disadvantage. However, I also think that the fuzzy logic analysis of the three formulations is overall equally as effective, in particular because it is independently plausible that embedding fixed-point negation in "it is the case" produces an operator expressing

- semantic negation. So the seductiveness of apparent  $\neg\Lambda$ -formulations is explained by revealing them to be  $\sim\Lambda$ -formulations." (p. 178, note omitted)
29. Godeon, Rosen. 2020. "What is Normative Necessity?" In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 205-233. New York: Oxford University Press.  
 "If the account I have sketched is cogent, you can now entertain an alternative to Strong Supervenience: the view that the normative supervenes on the natural as a matter of normative necessity. (This follows from the normative necessity of pure moral principles, together with the further assumption that all normative facts are ultimately grounded in pure principles plus nonnormative facts.) These views disagree about the modal classification of remote worlds—worlds in which act utilitarianism is true and the natural facts are just as they are, for example. Everyone agrees that such worlds are impossible in a sense. The open question concerns the interpretation of the modal word in this formulation. Having seen the alternative, are you confident that these remote worlds must be metaphysically impossible—ruled out by the *natures* of the moral properties and relations? If so, you see more deeply into these natures than I do." (p. 228)
30. Goldblatt, Robert. 2020. "Fine's Theorem on First-Order Complete Modal Logics." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 316-334. New York: Oxford University Press.  
 "In his PhD research, completed in 1969, and over the next half-dozen years, Kit Fine made a series of fundamental contributions to the semantic analysis and metatheory of propositional modal logic, proving general theorems about notable classes of logics and providing examples of failure of some significant properties." (p. 316)  
 (...)  
 "My interest here is in what was arguably the most influential contribution: the paper "Some Connections between Elementary and Modal Logic" (1975b), and in particular its Theorem 3, which will be referred to as *Fine's Canonicity Theorem*. It states that  
*any logic that is complete with respect to a first-order definable class of Kripke frames must be valid in its canonical frames.*" (p. 317)
31. Hale, Bob. 2020. "The Problem of Modality." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 234-246. New York: Oxford University Press.  
 "There is no doubt that one major reason why *de re* modality has seemed especially problematic lies in the broadly linguistic conception of the source of necessary truth which was widely accepted by analytic philosophers throughout the middle decades of last century, in spite of Quine's major onslaught on the notion of analytic truth or truth in virtue of meaning. Indeed, Quine himself—somewhat surprisingly, given his  
 misgivings about analyticity—finds the essentialism to which he thinks acceptance of *de re* modalities commits us unpalatable precisely because it clashes with the logical empiricist orthodoxy that all necessity is rooted in meanings." (p. 235)
32. Koslicki, Kathrin. 2020. "Essence and Identity." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 113-140. New York: Oxford University Press.  
 "4 Conclusion  
 My primary focus in this chapter has been on the question of how essentialists should attempt to meet Quine's demand for necessary and sufficient conditions for the crossworld identity of individuals. I examined six contenders for the role of crossworld identity principles: (i) an object's qualitative character; (ii) matter; (iii) origins; (iv) haecceities; (v) world-indexed properties; and (vi) form.  
 (...)  
 On balance, then, the sixth option deserves to be taken very seriously as a possible response to Quine's challenge, especially by neo-Aristotelians who are already

- motivated for other reasons to take on board a hylomorphic conception of unified wholes. Many of these hylomorphists also accept a non-modal conception of essence and thus face the further difficult task, over and above what is required to meet Quine's challenge, of having to explain an object's *de re* modal profile in terms of facts about its essence. Haecceities and world-indexed properties are unlikely to be of much help with respect to this second challenge, while the forms of hylomorphic compounds are in fact well suited for this purpose." (p. 136)
33. Kroon, Fred, and McKeown-Green, Jonathan. 2020. "Ontology: What's the (Real) Question?" In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 13-37. New York: Oxford University Press.  
 "One way to philosophize is to ontologize: about physical objects, moral properties, properties, possibilities, numbers, sets, and much else. For Kit Fine, ontologizing differs from what happens in ordinary life when I affirm that there are chairs and from what happens at school when I explain that there is a prime number less than three.  
 (...)  
 Fine's most extensive treatment is to be found "The Question of Ontology" (Fine 2009) and related considerations are advanced in "The Question of Realism" (Fine 2001). In the first three, expository, sections of this chapter, we present Fine's ideas in the context of broader views that he elaborates in "What is Metaphysics?" (Fine 2012). Then we offer our responses." (p. 13)
34. Kuhn, Steven T. 2020. "Necessary, Transcendental, and Universal Truth." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 183-204. New York: Oxford University Press.  
 "The argument that Fine's puzzle, as originally formulated, provides evidence that Socrates' humanness is a transcendental, rather than a worldly, fact assumes that we are more reluctant to attribute necessity to propositions true because of the nature of individuals than to propositions true because of worldly circumstances, and that we find it still more difficult to attribute necessity to "hybrid" sentences. A simpler version of the argument, however, reaches the same conclusion under a more plausible understanding of the relation between necessary and transcendental truth. We may question Fine's emphasis on his two-premise puzzle and even, perhaps, his principal example of a transcendental truth. It is difficult to deny, however, the interest and importance of the worldly-unworldly distinction and Fine's thought about it. We should be grateful to him for bringing this, as many other neglected topics in metaphysics, into focus." (p. 203)
35. Mackie, Penelope. 2020. "Can Metaphysical Modality Be Based on Essence?" In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 247-264. New York: Oxford University Press.  
 "1 Introduction  
 In his hugely influential paper "Essence and Modality" (1994), Kit Fine argued that the then orthodox view that essence can be understood in terms of metaphysical modality is fundamentally flawed. He proposed, in its place, the view that all metaphysical modality has its source in the essences or natures of things, where the notion of a thing's essence or nature can be understood in terms of a broadly Aristotelian notion of real definition.  
 (...)  
 In spite of the attention that it has received, however, one aspect of Fine's revolutionary theory seems to me to have been surprisingly neglected. The theory appears to require that the relevant conception of real definition can itself be isolated without appeal to metaphysical modality. And I do not see how this requirement can be met. Hence I am genuinely puzzled about how an "essence-based" theory of metaphysical modality is possible. In this chapter, I explain my reasons for skepticism about this issue. I then briefly consider the implications of my argument for the relation between essence and metaphysical modality." (p. 247)

36. Moltmann, Friederike. 2020. "Variable Objects and Truthmaking." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 368-394. New York: Oxford University Press.  
 "This chapter will focus on a philosophically significant construction whose semantics brings together two important notions in Kit Fine's philosophy: the notion of truthmaking and the notion of a variable embodiment, or its extension, namely what I call a "variable object."  
 The analysis of the construction this paper will develop will be based on an account of clausal complements of intensional verbs that is of more general interest, based on truthmaking and the notion of a cognitive product, such as a promise or a belief, rather than that of a proposition. On that account, the clausal complement of, for example, promise will characterize satisfaction situations of the reported promise, and the clausal complement of believe will characterize the truthmakers of the reported belief." (p. 368)
37. Ostertag, Gary. 2020. "Fine on Frege's Puzzle." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 337-359. New York: Oxford University Press.  
 "Kit Fine's *Semantic Relationism* (SR) provides a novel defense of referentialism—novel, in part, because of the specific challenge to referentialism it addresses and in part because of the techniques it introduces in its defense. SR takes on a number of interrelated concerns, involving, principally, the interpretation of variables and the phenomenon of strict, or de jure, coreference. The purpose of the current chapter is to clarify, and place in a broader context, the problem of strict coreference and to provide a framework for understanding the proposed solution." (p. 337, a note omitted)
38. Percival, Philip. 2020. "Beyond Reality?" In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 38-51. New York: Oxford University Press.  
 "My focus is the divide between reality and that which is beyond reality. On what I call an "all-encompassing" view of reality, this is the divide between everything and nothing: reality encompasses everything, and beyond it there is nothing at all. Opposed to the all-encompassing view is what I call a "restriction" view of reality: reality is coincident with some kind of restriction on, or partition of, what there is; it is not the case that what resides beyond reality is nothing.  
 I have two main aims: to first classify restriction views of reality (§ 1), and then to assess a species of the restriction view that pertains to time and modality (§ 2)." (p. 38)
39. Sandu, Gabriel. 2020. "Indefinites, Skolem Functions, and Arbitrary Objects." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 98-112. New York: Oxford University Press.  
 "1 Introduction: Indefinites  
 Indefinites can occur in a nested sequence of quantificational phrases like  
 1. Every student read every paper that a professor recommended and also in combination with anaphoric pronouns as in  
 2. A man smiles. He is happy.  
 The nesting, on one side, and the anaphoric link, on the other, create an interpretational tension. The nesting favors a quantificational interpretation of the indefinites according to which they behave more like any other quantificational NP, for example they enter into scopal (dependency) relations with other quantificational phrases. But the presence of discourse anaphora creates some pressure to interpret the indefinites referentially in a way which makes their semantical behavior resemble more that of proper names." (p. 98)
40. Shalkowski, Scott A. 2020. "Essence and Nominalism." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 301-315. New York: Oxford University Press.

"Kit Fine has produced an extensive and rich body of work bearing on the philosophy of modality.

(...)

"What is less than usual, though, I will also argue that essentialism can be made safe for nominalists. Not only should we be unimpressed with philosophy that expands our ontology for the sake of eliminating modality, we should also be unimpressed with philosophy that expands the domain to admit the abstract when it is in the business of being completely sober, serious, and aiming at non-modal truth-telling.

Abstraction involves not arriving at principled, well-justified beliefs about abstract objects. It simply involves the failure to regard as important more and more features of (concrete) reality. One can hardly discover new ontology by caring less about—or by paying less attention to—the old ontology. The end result will be essentialism that is safe for nominalists." (pp. 301-302, a note omitted)

41. Urquhart, Alasdair. 2020. "Fine on Arbitrary Objects." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 87-97. New York: Oxford University Press.
- "Introduction
- Fine's remarkable theory of arbitrary objects has attracted less attention than it deserves. He expounded his theory in two papers (Fine, 1983; Fine, 1985a), and a monograph (Fine, 1985b). The aim of the present chapter is to provide a brief introduction to the theory, to discuss some of the historical background, and finally to sketch some connections with other areas in logic and philosophy. In the historical section, I shall try to elucidate the extent to which earlier writers anticipated Fine's theory, while in the last section, I attempt to expand on some of Fine's brief but suggestive remarks in his monograph." (p. 87)
- References
- Fine, 1983. Kit Fine. A Defence of Arbitrary Objects. *Proceedings of the Aristotelian Society, Supplementary Volume*, 15:55-77.
- Fine, 1985a. Kit Fine. Natural Deduction and Arbitrary Objects. *Journal of Philosophical Logic*, 14:57-107.
- Fine, 1985b. Kit Fine. *Reasoning with Arbitrary Objects*. Basil Blackwell. Aristotelian Society Monograph Series 3.
42. Wilson, Jessica. 2020. "Essence and Dependence." In *Metaphysics, Meaning and Modality: Themes from Kit Fine*, edited by Dumitru, Mircea, 283-300. New York: Oxford University Press.
- "I have offered certain counterexamples to Fine's essence-based account of dependence, which more generally pose a difficulty for some of the principles (e.g., Localization) that he takes to characterize the connection between essence and dependence. Still, it will not have been lost on anyone that my criticisms here accept and aim to implement exactly the methodology that Fine took to show that modal accounts of essence and ontological dependence are incorrect, and for the same reason—namely, that it is of the first importance to characterize the key metaphysical notions in such a way that they do not inappropriately exclude any intelligible applications of those notions." (p. 299)
43. Frances, Bryan. 2006. "The New Leibniz' Law Arguments for Pluralism." *Mind* no. 115:1007-1022.
- "Ordinary macroscopic material objects A and B coincide at a time if at that time they share the very same spatial regions and are made of the same underlying matter. Many philosophers hold that some easily possible or even actual material objects that coincide at a time are nonidentical, for example, a statue and the hunk of clay that it is materially coincident with. Following Kit Fine (2003), I will call those philosophers pluralists. Other philosophers, monists, think that there are no pairs of distinct coincident ordinary material objects.
- Some of the paradoxes of material constitution are frightfully difficult to solve, and it is almost always agreed that any response to them will be at least somewhat

counterintuitive, so the oddity of pluralism is not its refutation. (1) Fine (2003) has developed further than anyone else a new set of Leibniz's Law arguments for pluralism. Using Leibniz's Law to argue for pluralism is not new. Many find intuitive the idea that a statue but not the hunk of clay from which it is made cannot survive being flattened; by Leibniz's Law we can conclude that the statue is not the hunk of clay, or so it appears. The new arguments are intended to be superior to the familiar arguments in two ways: they do not rely on controversial modal and temporal intuitions, and they suggest serious errors in the monist's replies to the old Leibniz's Law arguments.

The new arguments are a welcome addition to the literature, as the traditional Leibniz's Law arguments for pluralism have already been very thoroughly examined. However, it seems to me that the monist has plausible responses to the new arguments. I agree with Fine that monism is probably false, but I do not see how the new arguments mount a good case against it." (pp. 1007-1008)

(1) I do not mean to imply that the problems of coincidence are the only problems of material composition. Even more serious composition problems are found when investigating the questions 'Under what conditions does composition happen?' and 'When taking atoms away from a pumpkin, when does one no longer have a pumpkin?' Indeed, without a satisfactory solution to the latter problems, I do not see how we can be confident regarding our responses to the material coincidence problems.

#### References

Fine, Kit 2003: 'The Non-Identity of a Material Thing and Its Matter'. *Mind*, 112, pp. 195–234.

44. King, Jeffrey C. 2006. "Semantics for Monists." *Mind* no. 115:1023-1058.  
 Abstract: "Assume that the only thing before you is a statue made of some alloy. Call those who think that there is one thing before you in such a case monists. Call those who think there are at least two things before you in such a case pluralists. The most common arguments for pluralism run as follows. The statue is claimed to have some property P that the piece of alloy lacks (or vice versa), and hence it is concluded that they are distinct. Most often, the predicates employed in such arguments to express the crucial property are predicates expressing 'temporal properties', such as existing at a certain time; or 'modal properties', such as possibly being spherical; or 'constitution properties', such as being made of a certain sort of material. In a recent paper, Kit Fine has noted that such predicates suffer from various defects that make it possible for the monist to plausibly resist the relevant versions of the pluralist's arguments. For this reason, Fine considers a number of predicates that do not suffer from these defects, and constructs new versions of the above argument using them. Fine argues that any attempt on the monist's part to resist his versions of the argument force the monist to adopt implausible positions in the philosophy of language. As against this, I argue that the monist has perfectly plausible responses to Fine's arguments that require the monist to adopt only quite reasonable positions in the philosophy of language."
45. Tallant, Jonathan. 2013. "A Heterodox Presentism: Kit Fine's Theory." In *New Papers on the Present: Focus on Presentism*, edited by Ciuni, Roberto, Miller, Kristie and Torrengo, Giuliano, 281-306. Munich: Philosophia Verlag.  
 Abstract: "Kit Fine ([Fine 2005]) has articulated a position according to which reality is fragmented. In this paper I will refer to this view as 'Heterodox Presentism'. I want to try and do two things. First, I want to try and undermine the arguments presented by Fine in favour of Heterodox Presentism and show that the view is unmotivated—in part by the fact that it fails to meet some of the standards that Fine sets for it. The second target aim is to offer some very informal and sketchy remarks as to how we might better construe the 'standard' view of realism, or 'presentism' to which Fine objects—the view that I will define here as 'only present objects exist'. As we shall see, my own view of presentism differs quite substantially from this pithy slogan."

46. Burgess, John P. 2004. "Book Review: Kit Fine. *The Limits of Abstraction* . Clarendon Press, Oxford, 2002." *Notre Dame Journal of Formal Logic* :227-251. "Kit Fine's long article [13], introducing his distinctive take on neo-Fregeanism, has now been expanded into a short book of the same title. (For those familiar with the article version, the philosophical material from it appears as chapter 1 in the book, and the technical material as chapters 3 and 4. According to the book's preface, "The major change is the addition of a new part on the context principle." This addition constitutes chapter 2 of the book. There is also an index of technical terms, which would have been more useful if it had been arranged alphabetically.) The present review of that book is divided into three parts of unequal length. The long introduction Section 2 surveys recent neo-Fregeanism. Then Section 3 summarizes Fine's technical contributions, which presumably are what is of primary interest for readers of the present journal. The brief conclusion Section 4 touches on more purely philosophical issues.
- References  
[13] Fine, K., "The limits of abstraction," pp. 503–629 in *The Philosophy of Mathematics Today (Munich, 1993)* , edited by M. Schirn, Oxford University Press, New York, 1998.
47. Correia, Fabrice. 2006. "Generic Essence, Objectual Essence, and Modality." *Noûs* no. 40:753-767.  
Abstract: When thinking about the notion of essence or of an essential feature, philosophers typically focus on what I will call the notion of objectual essence. The main aim of this paper is to argue that beside this familiar notion stands another one, the notion of generic essence, which contrary to appearance cannot be understood in terms of the familiar notion, and which also fails to be correctly characterized by certain other accounts which naturally come to mind as well. Some of my objections to these accounts are similar to some of Kit Fine's compelling objections to the standard modal account of (objectual) essence (Fine 1994). In the light of these objections, Fine advances the view that it is metaphysical necessity which has to be understood in terms of essence, rather than the other way around, and takes essence to be unanalyzable. When formulating his view, Fine had only objectual essence in mind (or had both concepts in mind, but assumed that the generic is a special case of the objectual), and for that reason, I will argue, his account fails. I will suggest that Fineans should modify their view, and take it that metaphysical necessity is to be understood in terms of the two notions of essence—a view I myself find appealing.  
Finally, I will end up with suggesting a further move which reduces the objectual to the generic, making metaphysical necessity reducible to generic essence alone—a move with which I myself have some sympathy."
- References  
Fine, K. (1994) "Essence and Modality", *Philosophical Perspectives*, 8: 1-16.
48. Asay, Jamin. 2017. "Run Aground: Kit Fine's Critique of Truthmaker Theory." *The Philosophical Quarterly* no. 67:443-463.  
Abstract: "Kit Fine, the leading proponent of the metaphysical project of grounding theory, has offered a number of potentially devastating objections to truthmaker theory, the branch of metaphysics dedicated to exploring the ontological grounds for truths. In this paper, I show what presuppositions about truthmaker theory Fine's objections are based upon, and why they are false. I discuss four objections that Fine raises, and demonstrate how truthmaker theorists may respond to them. I then showcase the positive contribution that truthmaker theory can make to metaphysics, including its ability to speak to a core metaphysical topic (the ontological grounds for truths) that Fine's approach to grounding must ultimately remain silent on. I conclude by exploring what I take to be the best option when it comes to understanding how truthmaking and grounding fit together."
49. Shapiro, Stewart. 2004. "The Nature and Limits of Abstraction." *Philosophical Quarterly* no. 54:166-174.

"To what extent can abstraction principles serve as a foundation for a branch of mathematics? Like logicism, neo-logicism is an epistemological enterprise. The neo-logicist claims that basic arithmetic principles can become known on the basis of a derivation from Hume's principle. But of course the epistemic status of the conclusion of a deduction is closely tied to the status of its premises. Thus one key batch of philosophical issues concerns the epistemic status of acceptable abstraction principles, like Hume's principle. Are they analytic, or otherwise knowable a priori? Fine explores a number of options, and finds them wanting, some more so than others.

One natural possibility is to think of Hume's principle as a definition. But definitions come in many flavours. An 'orthodox' definition is a linguistic device to identify an item - object, property, function, etc. - which is already in the range of the bound variables of the language or theory in use. There are two types of orthodox definitions. An explicit definition stipulates that a new linguistic term is to be equivalent to a given expression. Abstraction principles do not have the form of explicit definitions. For example, Hume's principle does not provide a single expression that is equivalent to the 'number of' operator." (p. 168)

(...)

"There is gold in these pages, but it is often difficult to mine. The book contains a number of annoying typographical and other minor errors. In most (but not all) cases, I was able to figure out what was meant, sometimes with effort. Part of the difficulty in reading this book can be traced to the fertile mind of its author. Fine explores many highways, byways and alleyways. For example, the philosophical material deals with intensional and extensional equivalence and with abstractions whose relations are contingent as well as necessary. On several occasions, distinctions are made and discussed for a while, and then dropped, sometimes with a remark that it does not matter. On the technical side, the book deals with both standard models and non-standard Henkin models. The play with predominantly logical abstractions is a result of Fine's admirable desire for his results to be as strong as possible, but the extra detail required for this introduces a wealth of intricacy that will challenge all but a diligent reader. The second half of the book is full of new technical terms and abbreviations, and it is easy to get lost in the linguistic jungle. The only help the reader gets in this regard is an 'index of first occurrence of formal symbols and definitions'. Unfortunately, this is arranged in the order in which these terms occur in the book, not in alphabetical order. So the reader who needs to look up a forgotten notion or symbol must look through seven entire columns of terms.

That said, this is a deep and penetrating book. It should be required reading for anyone with more than a casual interest in neo-logicism, or abstraction principles generally. No one can claim to be an expert on these philosophical and logical matters until they have mastered the arguments and ideas contained in this work." (pp. 173-174)

50. Wildman, Nathan. 2013. "Modality, Sparsity, and Essence." *Philosophical Quarterly* no. 63:760-782.  
Abstract: "Rather infamously, Kit Fine provided a series of counter-examples which purport to show that attempts to understand essence in terms of metaphysical necessity are 'fundamentally misguided'. Here, my aim is to put forward a new version of modalism that is, I argue, immune to Fine's counter-examples. The core of this new modalist account is a sparseness restriction, such that an object's essential properties are those sparse properties it has in every world in which it exists. After first motivating this sparseness restriction, I proceed to show how the resulting sparse modalism circumvents Fine's original counter-examples. After dismissing a potential problem concerning the membership relation, I conclude that, as at least one form of modalism is viable, the project of understanding essence in terms of metaphysical necessity is not so fundamentally misguided after all."
51. Forbes, Graeme. 2008. "Critical Review of Kit Fine's 'Modality and Tense'." *The Philosophical Review* no. 117:275-287.

- "In this critical review I discuss the main themes of the papers in Kit Fine's *Modality and Tense: Philosophical Papers* . These themes are that modal operators are intelligible in their own right and that actualist quantifiers are to be taken as basic with respect to possibilist quantifiers. I also discuss a previously unpublished paper of Fine's on modality and existence."
52. "Symposium on Kit Fine's book *The Limits of Abstraction* ." 2005. *Philosophical Studies* .  
Contents: Kit Fine: Précis [of " *The Limits of Abstraction*" ] 305; Stewart Shapiro: Sets and Abstracts – Discussion 315; Alan Weir: On Kit Fine's ' *The Limits of Abstraction*' – Discussion 333; Jamie Tappenden: On Kit Fine's ' *The Limits of Abstraction*' – Discussion 349; Kit Fine: Replies 347-395.
53. King, Jeffrey C. 1991. "Instantial Terms, Anaphora and Arbitrary Objects." *Philosophical Studies* :239-265.  
In recent work, Kit Fine has sought to resurrect the view that variables in mathematics refer to indefinite or, as he calls them, arbitrary objects. (3) Indeed Fine holds that instancial terms figuring in universal generalization and existential instantiation in systems of natural deduction, and some anaphoric pronouns in natural languages, refer to arbitrary objects as well. As against this, I intend to argue that the arbitrary objects account, like the theories of indefinite numbers that preceded it, obscures rather than highlights the distinctive features of the various expressions it claims to handle; and that there is another view of the semantics of these expressions which is preferable to the arbitrary objects account. (4)  
The plan of the present essay is first, to sketch Fine's theory of arbitrary objects; second, to sketch an alternative to Fine's account; third, to argue that Fine's arguments in support of arbitrary object theory also support the alternative; and finally, to argue that this alternative is preferable to arbitrary object theory." (p. 240)  
(3) See 'A Defence of Arbitrary Objects' (henceforth, DAO), *Proceedings of the Aristotelian Society* Supplementary Volume 57, 1983, pp. 55-77; 'Natural Deduction and Arbitrary Objects' (henceforth, NDAO), *Journal of Philosophical Logic* 14 (1985) 57-107; and *Reasoning with Arbitrary Objects* Aristotelian Society Series Volume 3 (henceforth, RAO), Basil Blackwell, Oxford, 1985.  
It may seem provincial of me to limit my attention to Fine's view and the alternative I intend to discuss, given the existence of sophisticated theories of anaphoric pronouns such as that outlined in Hans Kamp's 'A Theory of Truth and Semantic Representation' (in *Formal Methods in the Study of Language* , J. Groenendijk, T. Janssen, M. Stockhof (eds.), Mathematisch Centrum, Amsterdam, 1981, pp. 277-322). But Kamp's theory is incapable of handling much of the data that is at issue here. For example, that theory is incapable of handling the anaphoric pronoun in the following discourse  
Every female professor has a computer. She is financially responsible for it.  
(I intend 'a computer' to have narrow scope with respect to 'Every female professor').  
Kamp's rules of DRS [Discourse Representation Theory] construction prevent the construction of what Kamp calls a complete DRS for this discourse; and one must construct a complete DRS for a discourse for Kamp's semantics to handle the discourse. (In particular, Kamp's rule CR3 (p. 311) prevents substituting the "discourse referent" introduced by the processing of 'a computer' for 'it' in the second sentence, in effect preventing anaphoric connection between 'it' and 'a computer'; similarly for 'Every female professor' and 'she'.) More importantly, even if the rules were changed in order to allow the construction of a complete DRS for this discourse, the semantics would not come out right. For the value of the pronoun 'it' in the second sentence depends on the value of the pronoun 'She' in the sense that the truth of the sentence requires that for any female professor we choose (value of 'She') there must be a computer (value of 'it') such that the professor is financially responsible for the computer. Kamp's semantics does not include a device for keeping track of such dependence between the values of pronouns.

- This lack prevents Kamp's theory from handling instantial terms in natural deduction and English arguments, and variables in mathematics as well. But this is just the sort of data that is the subject of this essay.
54. Shapiro, Stewart. 2005. "Sets and Abstracts – Discussion." *Philosophical Studies* no. 122:315-322.  
 "Kit Fine's *The Limits of Abstraction* (2002) is loaded with interesting and important model-theoretic results about abstraction principles. I propose to explore the bearing of these and related results on the philosophical goals of neo-logicism. I presuppose familiarity with the main themes of the book, at least as outlined in the précis published here.(1) Section 1 below analyzes particular results concerning abstraction principles, indicating consequences for acceptability of the neo-logicist program, at least as that program is articulated in the Fine study. Section 2 explores the role of set-theoretic meta-theory generally in foundational programs like that of neo-logicism (and logicism). What is an advocate of neo-logicism, or a neutral outsider, to make of the whole enterprise of model theory as based on set theory? What is a mathematician watching the neo-logicist development from the outside to make of neo-logicism?" (p. 315)  
 (1) K. Fine, Précis [of "*The Limits of Abstraction*" ], *Philosophical Studies* , 122, 2005, pp. 305-313.
55. Tappenden, Jamie. 2005. "On Kit Fine's '*The Limits of Abstraction*' – Discussion." *Philosophical Studies* no. 122:349-366.  
 "The best place to begin these comments is to say that I found this to be a wonderful book - genuinely thrilling to read. It is a challenge for me to find a contribution that hasn't been already advanced many times, since the core topics - reference to abstract objects, say, or impredicativity, to choose two among many - have received so much intense attention in recent decades. I'll try not to just repeat arguments that I already know are in the literature. Also, since many other people are in a better position than I am to comment on the technical side of the general theory of abstraction. I will refrain from comment, except to indicate my enthusiasm. Looking to a general account rather than remaining content with *ad hoc* justifications of this or that abstraction principle is clearly a crucial step to understanding the issues. Finally. I will have little that is critical to say, because I'm in broad agreement with those of the central reflections in *The Limits of Abstraction* on which I may have something novel to contribute. (1)" (p. 349)  
 (1) This is not to say I agree across the board, only that those disagreements I have – on impredicativity, for example – are for reasons that are completely unoriginal.
56. Weir, Alan. 2005. "On Kit Fine's '*The Limits of Abstraction*' – Discussion." *Philosophical Studies* no. 122:333-348.  
 "Kit Fine's *The Limits of Abstraction* is a magisterial study of the philosophical and technical issues raised by the neo-Fregean or neo-logicist project of founding mathematics on abstraction principles. The current interest in neo-logicism was largely generated by Crispin Wright, in his *Frege's Conception of Numbers as Objects* , and carried forward by Wright and others such as Bob Hale and Neil Tennant. Whatever one thinks of the philosophical plausibility of the project, it has been fortunate to attract the attention of superb logicians such as George Boolos and now Kit Fine, who have unearthed a wealth of interesting mathematical logic from its technical foundations.  
 Fine writes not as a committed, card-carrying neo-Fregean (see, for example, p. 46) but more as a sympathetic bystander concerned to see how much light can be cast on mathematics from that perspective. This discussion, then, is not a critical review of Fine's book; rather I want to ask whether his work, in particular his 'General Theory of Abstraction', can be used by neo-Fregeans to rescue themselves from objections which have been made to their position." (p. 333)
57. Forbes, Graeme. 1993. "But *a* Was Arbitrary...." *Philosophical Topics* no. 21:21-34.

- “I offer a philosophical defense of Gentzen-style quantifier rules which explains why they are sound without employing any such notion as “arbitrary name” or “arbitrary choice”. I argue that while Fine’s arbitrary object semantics directly justifies reasoning in which we seem to appeal to arbitrary objects, a parallel with standard vs. non-standard analysis, in which arbitrary objects are like infinitesimals, suggests that the Gentzen approach is more fundamental.”
58. "Book Symposium - Kit Fine, *Semantic Relationism* ." 2010. *Philosophy and Phenomenological Research* no. 81.  
Scott Soames: Coordination problems 464; Kit Fine: Comments on Scott Soames 'Coordination Problems' 475; Krista Lawlor: Varieties of Coreference 485; Kit Fine: Reply to Lawlor's 'Varieties of Coreference' 496; Paul Hovda: Semantics as Information about Semantic Values 502; Kit Fine: Comments on Paul Hovda's 'Semantics as Information About Semantic Values' 511-518.
59. Hovda, Paul. 2010. "Semantics as Information about Semantic Values." *Philosophy and Phenomenological Research* no. 81:502-510.  
Abstract: "I suggest that the core ideas of Kit Fine's *Semantic Relationism* are the notion of semantic requirement and the notion of manifest consequence, the non-classical logical relation associated with semantic requirement. Surrounding this core are novel “relational” systems of coordinated sequences of expressions, relational (as opposed to intrinsic) semantic values, coordinated propositions, and coordinated content. I take Fine to take the periphery to be reducible to the core (but see below). I will make some primarily exegetical remarks about the two core ideas, and then make more critical remarks about the periphery. I should say that I find the book, as a whole, illuminating and, for the most part, convincing. I hesitantly suggest that the core constitutes an important and novel model for thinking about semantics (and representation in general), while the periphery might result from an attempt to force the new model into the old mold."
60. Lawlor, Krista. 2010. "Varieties of Coreference." *Philosophy and Phenomenological Research* no. 81:485-495.  
Conclusion: "Does a comprehensive theory of language and cognition require primitive semantic relations? Fine thinks so, and I agree. Will incorporating primitive semantic relations have the result that traditional semantics will need to be dramatically re-written? Again, plausibly Yes—our understanding of compositionality, to take one instance, may have to be more subtle. Is strict coreference the right primitive in such a comprehensive theory? No, I think not—the semantic pro-form is a better primitive, because it affords a more general theory. Naturally I've pressed criticisms here, but I greatly appreciate this book. We have Fine's work to thank for turning a powerful spotlight on coreference phenomena, illuminating how central they are in thought and language, and forcing us to think harder about how to understand them." (p. 495)
61. Sider, Ted. 2013. "Replies to Dorr, Fine, and Hirsch." *Philosophy and Phenomenological Research* no. 87:733-754.  
Reply to Kit Fine, *Fundamental Truth and Fundamental Terms* , (2013).  
"Kit Fine's paper raises important and difficult issues about my approach to the metaphysics of fundamentality. In chapters 7 and 8 (\*) I examined certain subtle differences between my approach and his. Our approaches are kindred because they share the assumption that fundamentality-theoretic concepts are not to be defined modally, and that some such concepts are themselves to be adopted as conceptually primitive. (1) But they differ over which concepts are to be adopted, and over how those concepts behave."  
(\*) of Ted Sider, *Writing the Book of the World* , New York: Oxford University Press, 2011.  
(1) This is not to say that all the approaches regard the concepts as *metaphysically* primitive.

62. Soames, Scott. 2010. "Coordination problems." *Philosophy and Phenomenological Research* no. 81:465-474.  
 "Although 'Rxx' and 'Rxy' are both applications of a two-place predicate to a pair of terms, 'Rxx' resembles a one-place predicate in that all one needs to evaluate it is an assignment to 'x'. A similar point applies to the sequences 'Fx', 'Gx' and 'Fx', 'Gy' – even though neither is a one-place predicate. Kit Fine's semantic relationism aims to extract a common idea uniting these comparisons, and to use it to provide a Millian solution to Frege's Puzzle." (p. 463)
63. Deng, Natalja. 2013. "Fine's McTaggart, Temporal Passage, and the A versus B-Debate." *Ratio* no. 26:19-34.  
 Abstract: "I offer an interpretation and a partial defense of Kit Fine's 'Argument from Passage', which is situated within his reconstruction of McTaggart's paradox. Fine argues that existing A-theoretic approaches to passage are no more dynamic, i.e. capture passage no better, than the B-theory. I argue that this comparative claim is correct. Our intuitive picture of passage, which inclines us towards A-theories, suggests more than coherent A-theories can deliver. In Finean terms, the picture requires not only Realism about tensed facts, but also Neutrality, i.e. the tensed facts not being 'oriented towards' one privileged time. However unlike Fine, and unlike others who advance McTaggartian arguments, I take McTaggart's paradox to indicate neither the need for a more dynamic theory of passage nor that time does not pass. A more dynamic theory is not to be had: Fine's 'non-standard realism' amounts to no more than a conceptual gesture. But instead of concluding that time does not pass, we should conclude that theories of passage cannot deliver the dynamicity of our intuitive picture. For this reason, a B-theoretic account of passage that simply identifies passage with the succession of times is a serious contender."
64. Gorman, Michael. 2005. "The Essential and the Accidental." *Ratio* no. 18:276-289.  
 Abstract: "The distinction between the essential and the accidental is nearly always understood in modal terms. After criticizing some recent writings by Kit Fine that question that understanding, I develop a theory according to which whether a given feature of a thing is essential turns on whether it is explained by other features of that thing. The theory differs from the modal view by leaving room for features that are accidental even though their bearers cannot exist without them. The theory has the additional advantage of being open to the results of scientific theory."  
 "Fine tries to explain essence in terms of definition but proceeds as if we already know the real definitions of things. I propose that we travel in the opposite direction and say that a good definition of something is a statement of its essence, i.e., a statement of its fundamental characteristic(s). In other words, we first inquire into a thing's essence, and then, once we know its essence, we can define it. If we do not yet know a thing's essence, then we are not able to state its real definition, although we might be able to formulate a substitute by invoking some necessary accident that all and only things of that type possess. Such substitutes can be extremely useful. For example, suppose we become convinced that a hydrogen atom's having exactly one proton is explained by some other fact about it, while being unsure what that other fact might be. In such a situation we would be unsure of the definition of hydrogen, but we would still be able to make a lot of progress investigating the characteristics of 'atoms with exactly one proton'.(22)" (p. 289)  
 (22) On substitutes for definitions see Aquinas, *Summa theologiae* I, q. 29, a. 1, ad 3. Oderberg connects essence with definition and also makes a point closely related to my remarks about substitutes, namely, that a grasp of proper accidents is the best means to grasping something's essence; see 'How to Win Essence Back', pp. 36-8, 40.  
 References  
 David S. Oderberg, 'How to Win Essence Back from Essentialists', *Philosophical Writings*, XVIII (Autumn 2001), 27-45.

65. deRosset, Louis. 2014. "On Weak Ground." *Review of Symbolic Logic* no. 7:713-744.  
 Abstract: "Though the study of grounding is still in the early stages, Kit Fine, in "The Pure Logic of Ground", has made a seminal attempt at formalization. Formalization of this sort is supposed to bring clarity and precision to our theorizing, as it has to the study of other metaphysically important phenomena, like modality and vagueness. Unfortunately, as I will argue, Fine ties the formal treatment of grounding to the obscure notion of a weak ground. The obscurity of weak ground, together with its centrality in Fine's system, threatens to undermine the extent to which this formalization offers clarity and precision. In this paper, I show how to overcome this problem. I describe a system, the logic of strict ground (LSG) and demonstrate its adequacy; I specify a translation scheme for interpreting Fine's weak grounding claims; I show that the interpretation verifies all of the principles of Fine's system; and I show that derivability in Fine's system can be exactly characterized in terms of derivability in LSG. I conclude that Fine's system is reducible to LSG."
66. Bird, Alexander. 2009. "Essences and Natural Kinds." In *The Routledge Companion to Metaphysics*, edited by Le Poidevin, Robin, Simons, Peter, McGonigal, Andrew and Ross, P. Cameron, 497-506. New York: Routledge.  
 "Essentialism as applied to individuals is the claim that for at least some individuals there are properties that those individuals possess essentially. What it is to possess a property essentially is a matter of debate. To possess a property essentially is often taken to be akin to possessing a property necessarily, but stronger – although this is not a feature of Aristotle's essentialism, according to which essential properties are those properties a thing could not lose without ceasing to exist. Kit Fine (1994) takes essential properties to be those that an object has in virtue of its identity, while other essentialists refer (as Fine also does) to the nature of an object as the source of its essential properties.  
 It is sometimes important to distinguish the essential properties of a thing and the "full" essence of a thing. The latter is the set of the essential properties of a thing, when that set necessarily suffices to determine the thing's identity. One might hold that something has essential properties without agreeing that it has an identity-determining essence.  
 (...)  
 "In this chapter I shall first outline certain claims and arguments concerning essentialism concerning individuals (second section). I shall then (third section) introduce the notion of a natural kind in more detail before discussing natural kind essentialism (fourth section)." (pp. 497-498)  
 References  
 Fine, K. (1994) "Essence and Modality," in J. Tomberlin (ed.), *Philosophical Perspectives*, vol. 8 of *Logic and Language*, Atascadero, CA: Ridgeview, pp. 1–16.
67. San Ginés, Aránzazu. 2014. "On Skolem Functions, and Arbitrary Objects. An Analysis of a Kit Fine's Mysterious Claim." *Teorema. Revista Internacional de Filosofía* no. 33:137-150.  
 Abstract: "In 1985, in his book *Reasoning with Arbitrary Objects*, Kit Fine observed and stressed three, in his opinion, important differences between A-objects and Skolem functions. The present paper rests on one of them. According to Fine, there is some kind of dependence relationship between objects that cannot properly be represented by any function. We will analyze this claim from the perspective of natural language, and discuss the improvement that the use of arbitrary objects seemingly provides over Skolem functions in dealing with dependence."