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The 2009 Annual Conference of the Australasian Association for Logic took place at the University of Melbourne, Australia, on July, 11–12, 2009. The conference was organized by Ross Brady of La Trobe University, with the help of Graham Priest, Greg Restall, Conrad Asmus and Aaron Guthrie, of the University of Melbourne, and Su Rogerson of Monash University. The program consisted of contributed talks of 40 minutes and 60 minutes in length. Tributes were given to Professors Robert Meyer and Len Goddard, both recently deceased.

Abstracts of the invited and contributed talks that were presented at the conference follow.

For the Organizing Committee
ROSS BRADY

Abstracts of contributed talks

► CONRAD ASMUS, *Laws that lie: physics and logic*.
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I argue that more attention should be paid to the similarities and connections between the philosophy of science and the philosophy of logic. I will demonstrate that there are important insights from the philosophy of science which logicians and philosophers of logic can utilise in their theorising. I will go on to demonstrate a particular example of this. In ***How the laws of physics lie***, Cartwright argues that physical theories can either be explanatory or accurate but not both. I will demonstrate how a similar position can be developed in the philosophy of logic, giving rise to a novel argument for logical pluralism.

► J. C. BEALL, *Truth, necessity and abnormal worlds*.
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A theory of truth answers both 'nature' and 'logic' questions. On the former front, questions concern the 'nature', if any, of truth. On the latter front, questions—with truth-theoretic paradoxes in the forefront—concern the logic of 'true'. In ***Spandrels of truth*** (Oxford, 2009), I answer the former question along deflationary lines, and the latter question along 'dialetheic' lines. In short: 'true' is a see-through device introduced for expressive

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purposes; and liar-like sentences are spandrels of the device that give us true sentences with true negations. A suitable paraconsistent logic (in the B-ish vicinity) keeps us from absurdity; and a suitable (i.e., suitably deflationary) philosophy of truth keeps us from grimacing at contradictions.

Work is not done after answering both the 'nature' and 'logic' questions. Room must be made for other philosophically important notions. One such notion is alethic modality, and in particular *alethic necessity* (and, derivatively, possibility). This is particularly pressing in light of the worlds-involving—and, in particular, abnormal-worlds-involving—formal semantics of the underlying (B-vicinity) logic of the target truth theory (-ies).

My task, in this talk, is to add a plausible (say, S5-ish) necessity operator to the target truth theory (-ies). While the solution is relatively straightforward, there are a few surprising obstacles along the way. This talk records some of the difficulties and advances a solution.

► ROSS BRADY, *The consistency and completeness of arithmetic, based on a logic of meaning containment*.

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I first sketched a proof of the simple consistency of arithmetic by finitary methods, where the arithmetic is based on a logic MCQ of meaning containment. I used the method of metavaluations to establish metacompleteness of this arithmetic. From this result, the consistency is immediate, whilst an extended Priming Property can also be established. These two results are in stark contrast with Gödel's second and first theorems, respectively. Completeness with respect to a content semantics is to be investigated later. I very briefly contrasted the axiomatic development of this arithmetic with that of classical Peano arithmetic.

► MARTIN BUNDER, *Uniqueness of normal proof criteria*.

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Aoto, Tatsuta and I have all claimed the following result: A theorem α of H{æ} has a unique proof if no atom has one or more positive and two or more negative occurrences in α (the PNN condition). Aoto has a long complex proof of this. Tatsuta defines a number of interesting criteria, leading to subsystems of H{æ}, as aids to his proof, but many of his results concerning these are wrong, as I will show. I have a shorter proof of his result, explained at an earlier AAL. In this talk I will look at some criteria like Tatsuta's as well as minimality and PNN and see how these are related to each other and to uniqueness of normal proof.

► SAM BUTCHART AND SUSAN ROGERSON, $\mathsf{A}_{\rightarrow}$ *more adorable*.

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In this paper we consider the implicational fragment of Abelian logic, $\mathsf{A}_{\rightarrow}$, as a formula logic and as a consequence relation. We show that although the Abelian groups provide an algebraic semantics for the formula logic, they do not for the consequence relation. We then investigate both the formula logic and consequence relation with respect to algebraizability, in the sense of Blok and Pigozzi [1]. We show that while the formula logic is algebraizable, the consequence relation is not.

[1] W. J. Blok and D. Pigozzi, *Algebraizable logics*, ***Memoirs of the American Mathematical Society***, vol. 77 (1989), no. 3.

► PATRICK GIRARD, *Ceteris paribus and infinitary modal logics*.
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Ceteris paribus logic (CPL) is a modal logic whose diamonds are restricted by sets of formulas Γ and are written as $\langle\Gamma\rangle\varphi$. When evaluating modal formulas at a state, the truth condition guarantees that the formulas contained in Γ retain their truth-value in accessible states. The role of the sets Γ thus captures the strict equality reading of ceteris paribus as "everything else being equal". The axiomatization of CPL depends on assumptions imposed on the sets Γ. If Γ is assumed to be finite, then the completeness of CPL can be reduced to that of basic modal logic via a translation into the basic modal language. A similar completeness result holds if Γ is allowed to be infinite, but this time via a translation into infinitary modal logic. CPL is thus situated in between basic and infinitary modal logics, analogously to propositional dynamic logic (PDL)—although independent from it. In this paper, I investigate various assumptions that can be made on the sets Γ, varying the position of the logic in between basic modal logic and its infinitary counterpart. I also explore completeness results which do not appeal to the full power of infinitary modal logic.

► RODERIC A. GIRLE, *Served with distinctions*.
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There is a tendency to read into ordinary language distinctions which arise in Logic. Three examples are considered. The first is an exemplar. It is the way in which the technical terminology from Aristotle's Syllogistic was mistakenly used to generate the Doctrine of Being. The second is the *de dicto/de re* distinction. There is discussion of the way in which the logical notion of *scope* has been used to reinforce the distinction. But the distinction itself is questionable. The third is the *proposition/commitment* distinction which has been generated by the procedural logic for persuasive dialogue. The distinction has led to the almost unsolvable problem of the relationship between belief and commitment. In each case it is not only the distinction which is of concern, but the way in which it has been read back into ordinary argumentation and analysis from the artificial languages of formal systems. This paper will discuss the "reading back" and the question of whether these artifacts of formal language are as important as assumed.

► ALLEN HAZEN, *The present situation of the philosophy of mathematics*.
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An impressionistic survey of recent developments in the foundations of mathematics, and speculative remarks about what tendencies in the philosophy of mathematics can draw comfort from them. Notably, the program suggested by Gödel of seeking to cultivate new intuitions leading to new axioms in set theory appears to have made significant progress. Academic philosophy of mathematics, occupying itself with, e.g., debates about "fictionalism", has taken very little notice of these developments.

► LLOYD HUMBERSTONE, *A conservative extension argument of Dana Scott*.
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This is a guided tour of pp. 257–261 of Scott, *Background to formalization*, in (H. Leblanc, editor), ***Truth, syntax and modality*** (North-Holland 1973). Scott claims, concerning two fundamental principles concerning implication (principles sufficing for the pure implicational fragment of intuitionistic logic, in fact) that any generalized (or 'multiple-conclusion') consequence relation satisfying these conditions is always extended conservatively by some similarly fundamental principles concerning conjunction and disjunction. At first sight, this claim appears to conflict with some examples of non-conservative extension in the literature, and we investigate, *inter alia*, whether such cases really do constitute counterexamples to Scott's claim.

► CHRIS MORTENSEN, *The Fork*.
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It is proposed that the analysis of inconsistent images should have three components: (a) a logical analysis, amounting to a proof that we have a paradox or contradiction; (b) a psychological or cognitive analysis, identifying those default mechanisms that are responsible for the appearance of impossibility; (c) a mathematical analysis, which serves to underpin the logic, and clears the way for separating images into separate classes for classification. Following this format, an account of The Fork (also known as Schuster's Fork or The Devil's Pitchfork) is proposed.

► GRAHAM PRIEST, *Is the ternary R depraved*?
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The ternary accessibility relation of Routley/Meyer semantics has had a rough philosophical ride. Critics have often argued that the relation is a merely formal device, with no philosophical significance. In this paper I will first discuss what it takes for semantic notions to be philosophically significant; that it, what it takes for a semantics to be more that "merely algebraic". I will then give an interpretation of the ternary accessibility relation which meets the appropriate requirements. The interpretation takes off from the thought that conditionals are functions of a certain kind.

► GREG RESTALL, *Proofs for Bradwardine's theory of truth*.
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Bradwardine's analysis of the truth predicate is insightful and interesting. He analizes the predicates 'is true' and 'is false' in terms of a more fundamental concept, that of *signification*. For every statement 'p', there is a predicate '$x : p$', to be read as 'x signifies that p', or more straightforwardly, 'x says that p.' Furthermore, we can quantify into statement position, and so, the truth predicate 'Tx' may be defined as '(for some p)$(x : p)$ and (for every p)(if $x : p$ then p)'.

In this talk I will (a) introduce Bradwardine's theory; (b) explain how it treats the paradoxes of self reference; (c) sketch a sequent system for a version of the theory; and (d) explore some of its properties.

► HARTLEY SLATER, *Ontological discriminations*.
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Russell held that 'a exists', where 'a' is a logically proper name, was necessarily true. By contrast his account of 'The F exists' allowed this to be contingent, since, on his Theory of Descriptions, it did not assert the existence of an individual, but merely the instantiation of some uniquely identifying properties. The present paper refines Russell's distinction in several ways, first by providing what Russell merely gestured at, namely explicit, formally defined logically proper names. These are provided by using Hilbert's epsilon terms. But following from this it is seen that Russell's intention with regard to 'The F exists' is better expressed 'A unique F exists', leaving the former to be assimilated into the non-contingent category, through interpreting its subject phrase 'The F' non-attributively. The paper closes with an exhibition of similar discriminations that are available with higher-order subjects, such as properties, numbers, and facts. That leads to a resolution of the opposition between Platonic and Aristotelian theories of universals. In particular it shows the superiority of referential propositional quantification over Prior-type propositional quantification. There is a major difficulty with the latter, not often noted, which referential propositional quantification very easily overcomes.

► ANDREW WITHY, *Concision begets relevance*.
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I identify and prove a dualistic relationship between families of deductive systems that formalise Grice's Maxims of Concision and Relevance within propositional logic. Formalising Concision over disjunction provides a preference order on the assertibility of formulae. When the logical closure of the premises is restricted to the most disjunctively concise formulas, the resulting system is equivalent to RAD, an existing deductive system for formalising Grice's Maxim of Relevance over disjunction. The systems are then extended to the remaining propositional connectives, whilst maintaining the theorem that maximal concision provides maximal relevance. RAD and its extensions have strong similarities to Relevant logics, but also a few key differences, as they model efficient ways of communicating the relevant implications of the premises, rather than deriving all consequences of the premises. Instead, they closely resemble 'relevant' connectivist systems proposed by Smiley, Von Wright, and Schurz, and the logic of Sperber and Wilson's Relevance Theory, and provide a motivation other than entailment for exploring their claims of relevance.

► EDWARD N. ZALTA, *A defense of logicism*.
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In this talk, I extend the argument in the paper *What is neologicism?* co-authored with Bernard Linsky (***The Bulletin of Symbolic Logic***, vol. 12 (2006), no. 1, pp. 60–99). Linsky and I argued that if the notion of reduction used by the original logicists is weakened, a new [sic] form of neologicism emerges that can be generally applied to arbitrary mathematical theories. In the present talk, however, I develop positive arguments for thinking: (1) that the notion of reduction assumed by the early logicists is the wrong notion of reduction given their epistemological motivations and goals; (2) that the notion of "ontological reduction" defined in *Neo-logicism? An ontological reduction of mathematics to metaphysics* (***Erkenntnis***, vol. 53 (2000), no. 1–2, pp. 219–265) allows one to attain the epistemological goals driving logicism; (3) that when the comprehension principle for object theory is replaced by the equipotent abstraction principle, the resulting system is a logic, given that we accept that second-order logic under general Henkin models is indeed a logic; and thus (4) logicism is true—since arbitrary mathematical theories are ontologically reducible in the logic of object theory, mathematics is reducible to logic.