THE BULLETIN OF SYMBOLIC LOGIC
Volume 3, Number 3, Sept. 1997

AUSTRALASIAN ASSOCIATION FOR LOGIC 31ST ANNUAL CONFERENCE

CO-SPONSORED BY THE ASSOCIATION FOR SYMBOLIC LOGIC

University of Queensland, Brisbane, Australia, July 5–8, 1996

The 31st Annual Conference of the Australasian Association for Logic was held at the University of Queensland (Brisbane), from July 5th through 8th, 1996. The conference was organized by the 1995/96 AAL President, Ian Hinckfuss. A special tribute was made to the memory of Richard Sylvan (formerly Routley), who died a few weeks before the conference. He was one of the most influential figures in Australasian logic and was the immediate past President of the AAL. The 1997 conference will be held from July 4–6, 1997, at the University of Auckland, New Zealand, and will be organized by Rod Girle.

Abstracts of contributed talks follow.

For the ASL Committee on Logic in Australasia
MARTIN BUNDER, CHAIR

Abstracts of contributed talks

► STEPHEN BARKER, *Assertion, sentence meaning and truth*.
Philosophy Department, University of Melbourne, Vic 3052, Australia.

A key tenet of orthodox linguistic theorising is that a fundamental distinction needs to be made between the theory of sense—semantics in the narrow sense—and the theory of force or speech-act structure and interpretation. I argue against this tenet, sketching an alternative view according to which pragmatics and speech-act theory make up the whole of meaning theory.

► ROSS BRADY, *Simple consistency of higher-order predicate theory*.
Philosophy Department, Latrobe University, Vic 3083, Australia.

We extend the range of quantification to include predicates and sentences, adding axioms and rules for the expanded logic, to yield a higher-order predicate theory. Instead of using Russell's theory of orders, we use the logic DJdQ, a weak relevant logic capturing the notion of meaning containment, to rid the theory of paradoxes and enable simple consistency to be proved. We introduce three forms of Comprehension Axiom, one for sentences, $\exists p\,(p = A)$, one for predicates and one for individuals, $\exists y\,\forall x\,(Dyx = A)$, where '$D$' is a 2-place relation for denotation. We also have an extensionality rule for predicates and for individuals. We prove simple consistency using a transfinite sequence of transfinite sequences of 3-valued matrix models. We finish with a brief discussion of the solutions to the Liar Paradox, the Paradox of Heterologicality, and Berry's, Konig's and Richard's Paradoxes.

1079-8986/97/0303-0005/$1.40

▶ STUART BROCK, *The ubiquitous problem of empty names*.
Philosophy Department, Princeton University, Princeton, NJ 08544, USA.

It is often suggested that sentences containing empty names are not well accounted for by the direct reference theorist, whereas descriptive theories can handle them with ease. In this paper I argue that, contrary to popular philosophical opinion, sentences containing an occurrence of a non-referring name present a problem for everyone. Or almost everyone: maybe some varieties of descriptivism can cope easily with empty names, but such theories are in the worst trouble otherwise. The more reasonable varieties of descriptivism—those that have at least some hope in the competition with direct reference theories—are those that try to respect the evidence for rigidity of names. It is my contention that any theory that respects this evidence will be in trouble accounting for the semantics of empty names.

▶ MARTIN BUNDER, *Simple proof-finding algorithms for intuitionistic implicational and weaker logics*.
Mathematics Department, University of Wollongong, NSW 2522, Australia.
E-mail: m.bunder@uow.edu.au.

The natural-deduction style proof of a theorem of Intuitionistic Implicational logic can be expressed as a closed lambda term in "long normal form". The Ben-Yelles algorithm which finds such lambda terms, if there are any, by constructing these from the outside inwards is extremely efficient and has been implemented by A. Dekker in Brouwer 0.6.0. A new algorithm which constructs such lambda proofs from the inside outwards, and is even more efficient, will be demonstrated.

Similar algorithms work for BCI, BCK, BB′IK and several other logics. They also work for the logics BCIW ($=$R$\rightarrow$) and BB′IW ($=$T$\rightarrow$), but there is no clear bound to the procedure in these cases.

▶ DON FAUST, *Evidence and negation*.
Tenaga Nasional Berhad, Kuala Lumpur, Malaysia and Department of Mathematics & Computer Science, Northern Michigan University, Marquette, MI 49855, USA.
E-mail: dfaust@nmu.edu.

Evidence Logic (EL) [1] is conceptually antecedent to Classical Logic and provides a foundational framework for the representation and processing of gradational confirmatory and refutatory evidential knowledge. Further, the representational breadth of EL provides for the partial illumination of a number of the problematic aspects of negation. We shall discuss EL generally and then present three results. First, part of Aristotle's ruminations about contraries is modeled by a finitely axiomatised extension of EL whose Boolean Sentence Algebra (BSA) is characterised. Second, the 'differentiation theory of meaning' of the Navya-Nyaya logicians of India (c. 400–1000 AD) is modeled in EL. Third, part of the Dempster-Shafer approach to the handling of uncertainty in Artificial Intelligence is modeled by a finitely axiomatised extension of EL whose BSA is characterised. In fact, one sees thereby how part of the recent Dempster-Shafer approach is a generalisation of the work of Aristotle.

[1] DON FAUST, *The concept of evidence*, ***The Journal of Symbolic Logic***, vol. 59 (1994), pp. 347–348, abstract.

▶ ALLEN HAZEN, *Another treatment of existential instantiation*.
Philosophy Department, University of Melbourne, Vic 3052, Australia.
E-mail: Allen.Hazen@muwayf.unimelb.edu.au.

Previous semantic accounts of Hilbert's epsilon calculus and of natural deduction systems like that of Quine's Methods of Logic have invoked either a choice function or "higher order" notions like Kit Fine's arbitrary objects. We explore an alternative approach making use of a simplified forcing construction: finite linearly ordered subsets of the domain serve as forcing conditions, but there is no need to define a generic set. The result proven is the familiar one that we can pretend (for proof theoretic purposes) that the variables of an interpreted first-order language range over the natural numbers, but since our proof does not involve a denumerable model, it is independent of the Lowenheim-Skolem theorem.

▶ ALLEN HAZEN AND DANIEL NOLAN, *A debate on hypergunk*.
Philosophy Department, University of Melbourne, Vic 3052, Australia.
Philosophy Department, RSSS Australian National University.
E-mail: Allen.Hazen@muwayf.unimelb.edu.au.
E-mail: danieln@coombs.anu.edu.au.

Is it conceivable, or metaphysically possible, that there should be some hypergunk? Hypergunk being defined as mereologically atomless stuff every piece of which has absolutely infinitely many (i.e., a proper class of) parts. Allen Hazen says *no*, and that to say yes is to misunderstand the schematic nature of set theory. Daniel Nolan says *yes*, and that to say no is to invoke a mysterious necessity putting an a priori limit on the size of the universe.

▶ IAN HINCKFUSS, *Presupposition and logical validity in arguments involving 'true' and its cognates*.
Philosophy Department, University of Queensland, St. Lucia, Qld 4072, Australia.
E-mail: Hinck@lingua.cltr.uq.oz.au.

In this paper I use 'presupposition' to mean a supposition that does not have to be introduced into a dialogue. Presuppositions, unlike logical necessities, may or may not be true. Such presuppositions can induce paradox, but so can other dialectical conventions. I use a study of the liar paradox to show that there is at least one presupposition of common dialogue which is false.

▶ LLOYD HUMBERSTONE, *What Fa says about a*.
Philosophy Department, Monash University, Vic 3168, Australia.
E-mail: Lloyd.Humberstone@arts.monash.edu.au.

It is a commonplace observation that there is no such thing as *the* property predicated of an individual by a sentence containing a name of that individual. The uniqueness presupposition here fails, and this paper explores the extent to which it does fail.

▶ DOMINIC HYDE, *Vagueness, paracompleteness and paraconsistency*.
Australian National University, Canberra, ACT 0200, Australia.

A duality between supervaluation logics and subvaluation logics provides grounds for thinking that paraconsistent approaches to vagueness are as efficacious as those paracomplete logics preferred by conservative logicians for dealing with the phenomenon of vagueness. In a nutshell, truth value gluts will be shown to be as viable as truth value gaps.

▶ LESLEY ROBERTS, *Maybe, maybe not: A probabilistic semantics for FDE and LP*.
Philosophy Department, University of Queensland, St. Lucia, Qld 4072, Australia.
E-mail: lroberts@lingua.cltr.uq.oz.au.

In this paper I present a probabilistic semantics for First Degree Entailment and LP. I detail a probability calculus and quantify over all probability functions satisfying the axioms to define logical truth and semantic consequence. The semantics for the natural deduction system of FDE is presented first, it is then an easy step to modify it and prove soundness and completeness for LP.

▶ JOHN SLANEY, *KD45 is not a doxastic logic*.
Automated Reasoning Group, Australian National University, Canberra, ACT 0200, Australia.
E-mail: jks@arp.anu.edu.au.

The modal logic KD45 is frequently presented as the standard account of the logic of belief for a single agent, where perhaps that agent is viewed as having the doxastic properties of a deductive database.

However, KD45 is absurdly strong for such a reading. Specifically,

- K, D and 5 together are incoherent, even as an account of the theory of a trivial database.
- K and 5 together make nonsense of the motivating concepts of belief and introspection.
- K and D together contradict certain simple empirically observable facts.

It is therefore unacceptable that KD45 should continue to be paraded as any kind of doxastic logic. This paper recommends that the objections to KD45 be taken seriously and that the "standard" account be revised accordingly. It is suggested that such a revision will force a major shift in the theory of epistemic and doxastic logic.