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§1

EDITORIAL

I am delighted to be the guest editor of this issue of *The Reasoner*. I will open this issue with an interview to John Woods, a Canadian philosopher who has written extensively on topics such as abductive logics, logics of practical reasoning, legal reasoning, and fallacy theory (he is the Woods of the so-called Woods-Walton approach to the logic of fallacious reasoning).

As John made immediately clear in our conversation, for him logic is a service discipline. Real agents constantly violate the principles of correct reasoning. But it would be a mistake to equate such failure with a shortfall of rationality. As he puts it in the first of his “Eight

Theses Reflecting on Stephen Toulmin”: “The validity standard is nearly always the wrong standard for real-life reasoning”. This means that reasoning should be judged only with respect to the cognitive task of the agent performing it and her cognitive resources.

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In our conversation, we spoke about his views on logic as formal reasoning, and touched on some of the subjects to which he contributed. So I will now let John to tell you about his intellectual history and his philosophy, sure that you will be captured by his narrative talent as much as I was.



[Gabriella Pigozzi](#)

Computer Science and Communication, Luxemburg

§2

FEATURES

Interview with John Woods

[John Woods](#) is Director of the Abductive Systems Group in the Department of Philosophy at the University of British Columbia, and the Charles S. Peirce Professor of Logic in the Group of Logic and Computation at King’s College London. He is also Adjunct Professor of Philosophy and President Emeritus at the University of Lethbridge.

Gabriella Pigozzi: First of all, thank you for agreeing to be interviewed!

John Woods: Thank you, Gabriella, for suggesting it. I'm delighted to be chatting with a former London colleague, and a co-author of a paper that I like a lot.

GP: Can you tell us about your intellectual history?

JW: My first brush with logic was as a First Year undergraduate at the University of Toronto. About five weeks of the year-long introductory course in philosophy was set aside for logic. We read Angus Sinclair's little book on the syllogistic. It was not a user-friendly book, lacking any indication of what motivated Aristotle's theory of the syllogism. I mentioned this, in passing, to a Fourth Year housemate, and he urged me to go to the source. "Read *On Sophistical Refutations*", he said "You won't be sorry".

How right he was. *Soph. Ref.* was an absolute eye-opener. Aristotle was interested in producing a wholly general theory of argument. He was especially interested in four kinds of arguments, which he called "refutations", "demonstrations", "instruction arguments" and "examination arguments". As the name implies, *Soph. Ref.* was about refutations. Aristotle was convinced that a necessary but not sufficient condition of producing a refutation of an opponent's thesis is obtained by constructing a non-circular derivation of the contradictory of his thesis from premisses that are neither redundant nor inconsistent. Derivations of this sort he called "syllogisms". So a logic of syllogisms would be needed. It would not be a full theory of refutation. But it would be its theoretical core.

I learned two invaluable lessons from *Soph. Ref.* One is that, in the hands of its founder, logic was a service discipline. It was needed for a comprehensive theory of argument. The other is that the arguments which Aristotle wanted to illuminate are those of the everyday sort. So logic is an applied theory of ordinary argument and reasoning. I relearned a similar lesson three years later, when I became aware of the logicism of Frege and Russell. Logicism asserts that all of arithmetic can, without relevant loss, be re-expressed in the pure logic of deduction. Logicism wouldn't have had a chance of being true if the logic to which arithmetic is supposed to reduce were the old logic. A new logic would be needed, one that is purpose-built for logicism. So, once again, we see that logic is a service discipline, and an applied one.

GP: You're Director of The Abductive Systems Group in the Department of Philosophy at the University of British Columbia and you're the Charles S. Peirce Professor of Logic at King's College London.



How did you become interested in abduction?

JW: In an early paper on fallacies, co-authored with Douglas Walton, we observed that there are lots of actual cases in which an argument has the gross form of affirming the consequent—one of the formal fallacies—which in fact aren't deductive arguments at all, but rather what Gilbert Harman calls "inference to the best explanation". What is striking about these cases is that, although they are deductively invalid, they are so on purpose. I mean, when you make an argument of this kind, you aren't intending that your premisses entail your conclusion, but rather that they provisionally license its conjecture. I don't recall just now whether Harman mentioned that inference to the best explanation is a form of what Charles Peirce calls "abduction", but I became aware of the connection soon enough, if not then.

Not long after that, Doug and I were working on the *ad ignorantiam* fallacy. Here, too, it struck us that typically these weren't arguments that aimed at deductive strictness, but rather were what computer scientists would one day call "autoepistemic arguments", underlain by an abductive structure.

So that was twice that abduction raised its head, yet it wasn't until much later that it occurred to me to look at abduction in a detailed and systematic way. I had been vaguely aware that abduction was amounting to something in computer science circles, and of course it was also a hot topic for Peirce scholars. But I didn't know this literature, and one day, in the late nineties, I asked Dov Gabbay about it. Before I knew it, Dov had signed us up to teach a two-week mini-course on abduction at the ESSLLI 2000 meetings in Birmingham. It was necessary to prepare a text for the course, and I rushed to put something together. Talk about boot-strapping! But somehow the work got done, and it served as the basis of a major revision for a course on abduction that I was to teach in 2001 in Groningen, where I was the Vonhoff Professor.

Atocha Aliseda was also in Groningen at the time, working with Theo Kuipers. Atocha had written her Ph.D thesis on abduction, under the supervision of Johan van Benthem. In it she develops a very nice semantic tableaux approach, and I was greatly apprehensive that I would have nothing to say about the subject that would be remotely better, or even interesting. In the end, thank goodness our main idea fell out. Dov and I would say that the chief feature of abductive inference is that it is a response to an ignorance problem, and that it has two interesting properties. One is that it doesn't remove the ignorance. The other is that it serves as a rational basis for provisional action. So whereas deduction is truth-preserving and induction is likelihood-enhancing, abduction is ignorance-preserving.

GP: Traditionally, logic studies the principles of correct reasoning. However, a significant part of your work

focuses on fallacies and errors. Why is the study of fallacious reasoning important? What do we learn from it that we would not possibly learn by investigating correct forms of reasoning?

JW: Charles Hamblin's *Fallacies*, which appeared in 1970, is one of the landmark works of late twentieth century logical theory. Hamblin was a technically sophisticated logician, with an excellent grasp of the history of the subject. This book is, among other things, a rebuke to the logic community for having given up on the fallacies project. The concept of fallacy was introduced into logic by its founder, in the book that I mentioned reading as a First Year student. I was much taken with Hamblin's *cri de coeur*, and thought that I might turn my hand to Hamblin's challenge. In the period between 1972-1985, some twenty-five papers appeared, co-authored with my sometime student, Doug Walton. Our original intention was to knock off this project in about two years. It is now thirty-seven years later, and the job is still not finished.

You ask a very important question. Why can't we say what's needed about fallacious reasoning by reciting the principles of correct reasoning, and defining a fallacy as a form of reasoning that violates any of these rules? If this were the right way to go, then a deductive fallacy would be anything violating a deductive rule, and an inductive fallacy would be anything violating inductive rule. So fallacy theory would already be subsumed by our best logics of deduction and induction, wouldn't it?

It strikes me that there are two things wrong with this approach. First, a fallacy is not just an error of reasoning. It is also an error that people in general are disposed to commit with a notable frequency—fallacies are, so to speak, seductive and universal—and they exhibit high levels of post-diagnostic recidivism—they are hard to stop committing even when their erroneousness is pointed out to us. So a theory of fallacies must take account of all these features, not just the error-part of the story.

The other thing that needs to be taken note of is what might be called the "relativity of error". Recall that when we were speaking a minute or so ago about the so-called fallacies of affirming the consequent and *ad ignorantiam*, I suggested that when these are not intended as deductive or inductive arguments, their failure to meet deductive or inductive standards can hardly qualify as an error. In those cases in which they are intended as abductive arguments, it simply doesn't matter that they are deductively invalid and inductively weak. What wants emphasizing is that there is no such thing as the correct rules of reasoning, full stop. Something is good reasoning only in relation to the target it sets and the standards required for its attainment.

GP: In your work on the logics of practical reasoning, you consider real agents and take a resource-bound and task-oriented approach. How realistic is it to define a

unified logic for practical agents?

JW: There is an interesting project promoted by Jean-Yves Beziau and others. It is to find a sound unification of logic within what they call Universal Logic (not to be confused with Universal Algebra). This is an exciting idea, and it seems to me that it will certainly fail or it might succeed depending on what we take a unifying logic to be. If we are looking for an existing logic into which all others go on pain of simply being discarded, then the quest is hopeless. But if we're trying to find a new formal and theoretical framework within which logics in all their rich multiplicities can find a principled place, well, that's a different story entirely. One of the reasons that I'm drawn to the quite general idea that the goodness of reasoning is conditioned by what reasoning agents are interested in, what they are capable of, and what they have the resources for, is that there seems to be a place within that framework for virtually all the important logics of this Golden Age that we're still in. The point is that none of them will be canonical overall. The logic of how NASA should reason is going to be significantly different from the logic of how Joe Blow should reason. For one thing, NASA considerably outreaches Joe Blow in the relevant resources. It has a huge advantage in information, time and computational capacity.

GP: Notions like proof, inference, and relevance are everyday concepts to both lawyers and logicians. However, there has been very little interaction between these two communities. You have been working on logic and law: how would you explain such little exchange between these disciplines? Are they using the same terminology to talk about essentially different things? If this is not the case: What can logicians learn from the legal practice and how can lawyers profit from a logical perspective?

JW: I come from a family of lawyers. My father was a lawyer and two of my three children are lawyers. I have a lawyer son-in-law and a lawyer brother-in-law. One of my nephews is a lawyer, as is a first cousin. When I went to the University of Toronto, it was to do a degree in political science, followed by a degree in law. It was intended that upon being called to the bar, I would join my father in his practice. All that changed in the first few weeks of term. When I travelled home for Thanksgiving—which is in mid-October in Canada—I announced that I would be a logician. My mother was rather angry, and my father's heart quietly broke.

My first excursion into theoretical jurisprudence came about when Dov and I were writing our big book on abduction—*The Reach of Abduction: Insight and Trial*, which came out in 2005. I had known for a long time that what lawyers call a "theory of the case" or "theory of the evidence" is an hypothesis which, if true, would best explain the evidence. But now that abduction had entered my life in a big way, I saw that a theory

of the case is an inference to the best explanation. And that is abduction.

This is rather astonishing, because, as mentioned earlier, abduction is ignorance-preserving. In the common law tradition, the criminal proof standard is “proved guilty beyond a reasonable doubt”, and what does the proving is the prosecutor’s theory of the case. This is abduction. And because abduction is ignorance-preserving, it doesn’t prove its conclusion. It only licenses its conjecture. So how in the world is it possible for the criminal proof standard ever to be met? Answering that question was one of the tasks of *The Reach of Abduction*, and we did so in ways that involved a considerable reconceptualization of the idea of legal proof. This, if you like, is something that lawyers could learn from logicians.

You also rightly ask whether the reverse might also be true. The short answer is Yes. Dov and I have recently been tracking how the concept of probability works in legal contexts. In some situations, it is the standard Bayesian notion nearly enough. But there are also lots of contexts—judgment on the balance of probabilities is one—in which probability is nothing that any probability theorist to date has ever turned his mind to. This is chiefly because—or so we think—that in these contexts it is not a probability measure that is in play, but rather a *plausibility* measure, never mind the name that lawyers give it. If this is right, there is much about legal probability that demands working out in a logic of plausibility. And this, we think is something that logicians can learn from lawyers—that is, that often enough the lawyer’s probability is the logician’s plausibility.

GP: What are the issues/problems/questions you’re currently working on and/or that you plan to work in the near future?

JW: Dov and I have been writing our omnibus work, *A Practical Logic of Cognitive Systems*, for the better part of ten years. So far, two volumes have appeared, one on relevance and the other on abduction, as mentioned. I am presently writing my part of volume three, *Seductions and Shortcuts: Error in the Cognitive Economy*, and expect to have it off my desk by the end of the summer. In it we will present a logic of error which, among other things, will subsume what we hope will be judged a comprehensive theory of fallacious reasoning. One of the main theses of the book will be that, upon reflection, it can be seen that the traditional *list* of fallacies is not in the extension of the traditional *concept* of them. That is, none of the traditional fallacies is a fallacy in the traditional sense. This is a rather radical claim. But, if true, it would explain why fallacy theory has been in such rotten shape these past 2400 years!

A further major interest of mine is the logic of fiction. In 1974 I published a little book of the same title, and it has had a reasonable shelf-life. But there is too much wrong with that early account to let stand. So I’m trying

to make amends in a new book in progress, tentatively entitled *Sherlock’s Member: New Perspectives in the Semantics of Fiction*. I expect to have a mature version by the end of 2010.

Dov and I are also massively involved in editing two big Handbook projects, one an eleven volume treatment of the history of logic, and the other—with Paul Thagard—a sixteen volume treatment of the philosophy of science. I am managing editor of both projects, and I sometimes wonder what could have possessed me to take them on! If all goes well, we’ll be free and clear by the end of 2010, after a total of twelve years of effort. Then I will sleep like a baby for about a year. Perhaps longer.

Internet, page ranking, and Sorites-like reasonings

In discussions about vagueness and Sorites-like arguments, a rather limited set of examples is presented over and over again. Either two ships are transformed into one another (if that is the case, of course) by moving planks about or we move from red to yellow by looking pair-wise at a set of strips such that each pair has the same colour (or at least that is what we are willing to say) or we pull hairs out of beards till they disappear (though we conclude otherwise) or we prove by mathematical induction that all natural numbers are small (aka the famous Wang paradox). Here I would like to present a new example that (a) is very “modern”—it involves the Internet and Google—so that students might be attracted to it, (b) has thereby a direct relevance since the example is used in real life on a daily basis, and (c) it presents some philosophically interesting features.

An important ingredient to present the example concerns page rankings on the Internet as it is done by Google. I will only use the basic formula to illustrate my point and leave the sophistications for another occasion. Details can be found in Amy Langville & Carl Meyer (2006: *Google’s PageRank and Beyond. The Science of Search Engine Ranking*, Princeton University Press). The definition of the ranking of a page on the Internet, is this:

$$r(P_i) = \sum_{P_j \in B_{P_i}} \frac{r(P_j)}{|P_j|}$$

where $r(\cdot)$ stands for the page ranking, B_x for the set of all pages that point to page x and $|P|$ for the number of links going out from page P . This last element is meant as a correction: suppose a page is pointing to your page, but it also points at a mass of other pages, then this pointer is not worth much. One interesting aspect of this definition is its impredicative nature: you need page rankings to calculate a ranking of a particular page. I will not go into the details, but this definition

implies an iterative procedure where an equal distribution is taken as starting point—if there are n pages, then the start ranking is $1/n$ —and then new values are calculated until an equilibrium is reached (if such can be proved to exist). These values are then mapped onto the natural numbers and that defines the rank of the page.

Consider the following (easy) example: suppose we have n pages P_1, P_2, \dots, P_n , that are all connected to one another, so every page points to and is pointed at by $n - 1$ other pages (or the number of connections $k = n(n - 1)$). The starting values will be $r(P_1) = r(P_2) = \dots = r(P_n) = 1/n$. Since for each page P , $P = n - 1$ and for each page x , B_x counts $n - 1$ members, it follows that the values will remain the same, so all pages have ranking $1/n$ and all get rank 1.

If we are talking about the Internet, then n in the above example is in the order of (at least) 10^{10} and k some powers more.

How does the Sorites paradox come about in this context? The (vague) property I will look at, is “to be a listing of all page ranks of the Internet at a specific moment.” In the very same way that we do not want a beard to become something else by removing one hair, we do not want the page rankings to change when one connection in the network is removed. In other words, the listing has to be insensitive to some degree. Removing or adding one connection on that vast scale should not produce a different ranking. In slightly more formal terms, if $A(\alpha, k)$ stands for “ α is a listing of all page ranks of the Internet, when the number of connections is k ”, and if K stands for a specific natural number, corresponding to the total number of connections of the whole of Internet. Then the argument is this:

- (a) $A(\alpha, K)$
- (b) $(\forall k > 0)(A(\alpha, k) \supset A(\alpha, k - 1))$

Hence

- (c) $A(\alpha, 0)$.

The conclusion is clearly absurd, while the premisses are quite acceptable, so we do have a typical Sorites-situation.

Apart from its actuality and practical use, what is so interesting about this example? Let me mention just three aspects:

1. Intuition does not come into play. Think of the beard example. We know that it would be silly to claim that n hairs on a person’s chin form a beard and $n - 1$ do not. The Internet case involves no such intuition at all. One can easily imagine a situation where the loss of one connection does affect the listing and a situation where such an event does not.

2. A well-known solution to the beard paradox is to use a many-valued logic, such that the statement “A beard consists of 0 hairs” get truth-value 0, the statements “A beard consists of k hairs”, gets truth-value 1, for $k \geq K$, where K is a fixed number, and, for $1 \leq k < K$, the statement “A beard consists of n hairs”, gets truth-value n/K . Many reject this solution as it does not confirm with our daily practice, for we do not count hairs to decide whether someone has a beard. The interesting feature of the example here is that this criticism does not apply, since Google *does* calculate the rankings using an exact formula. In fact, it is the only procedure available to produce the rankings.
3. There is a strong contextual element present, that, more precisely, shows up in the complexity of the relation between α and k . In terms of the expressions used above, consider $A(\alpha, k)$ and $A(\beta, m)$. It is not the case that $\alpha = \beta$ implies $k = m$ and also not the case that $k = m$ implies $\alpha = \beta$. What is of importance is not merely the number of connections but also the way the connections are distributed. This implies that given a network with k connections, it is perfectly possible that removing one connection has no effect on page rankings, whilst removing another does. This example shows a complexity that is lacking in the standard examples. It also shows that it is not a necessity to search for solutions to the problems of vagueness and vague identity, that are too uniform. At least for this example a uniform solution will clearly not do.

There are many more questions to be asked, so much is clear. To finish, here is one I have no answer to: given an arbitrary network, what is the maximum of connections that can be removed without affecting the page rankings? I would not be surprised if it turns out that undecidability is lurking around the corner here.¹

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Sentences and Propositions

Martin Cooke in ‘Liars, Divine Liars and Semantics’ (*The Reasoner* 2(12):4-5) argued against Patrick Grim, thinking there was no essential difference between sentential and propositional formulations of his puzzles. In particular he found a problem with (4) = ‘God doesn’t

¹I wish to thank my colleagues of the Department of Computer Science, who asked me as a member of a selection committee, where the selected candidates were asked to present a lecture-as-if-for-students on ... page ranking.

believe that (4) is true' and took it that a parallel problem arose with (4*) = 'God doesn't believe that (4*) ever expresses a true proposition.' I pointed out in 'Supposed Liars, Divine Liars and Semantics' (*The Reasoner*, 3(1):3-4) first that Cooke had allowed a point that Dale Jaquette had made, that 'Liar sentences ... do seem to be saying, not only that they are not true, but also, if less obviously, that they are ... true'. But that means that one cannot immediately derive that the one and only proposition (4*) expresses is the obvious one that God doesn't believe that (4*) ever expresses a true proposition. So Cooke's problem with (4) does not directly carry over to (4*).

Now, in 'Divine liars: the devil's in the details' (*The Reasoner*, 3(2):6-7) Cooke considers the sentence (4**) = 'God doesn't believe that the modern English sentence (4**) could ever express any true proposition literally', and challenges me to find 'what other proposition could have been expressed by ... (4**) ... literally' than that God doesn't believe that the modern English sentence (4**) could ever express any true proposition literally. But his new clarification of the main point in his original paper itself provides a much more general way of doing this than the way I had suggested with his (4*), drawing on the thoughts of Jaquette. The point also answers X.Y. Newberry at the end of his 'Divine Liars' (*The Reasoner*, 3(2):7-8).

The point hinges on being careful to separate out sentences from propositions, and thereby avoid a crucial use-mention confusion. For Cooke now wants to say (as I understand him) that it is questionable whether the quoted '(4)' in 'God does not believe that (4) is true' needs to refer to that very sentence, even when the sentence is given that number, i.e. when (4) = 'God does not believe that (4) is true'. He says 'Grim had presumed without comment, let alone justification, that those two instances of '(4)' could be the same proper name'. But that is clearly a very big presumption. For it is not the sentence itself, only the proposition it makes within the externally given context of the supposed numeration system that involves reference to the sentence given. With a different numeration system for sentences *the very same sentence* might make a quite different proposition than that God does not believe that sentence (4) *here* is true.

But Cooke is not always too clear about the required sentence-proposition distinction, so maybe a repetition of the point would be valuable in a case where he has missed it. In his original article, for instance, he made a point rather similar to the one I drew from Jaquette. He said: 'Let B = 'This sentence is not (now) true' ... B does not seem to be senseless, of course, it seems to be saying that B is not true ... However, insofar as B is asserting that, it is asserting the opposite of that'. But *the very same sentence* may be used with reference to many different sentences. So the sentence B itself says neither

that B is true, nor the opposite, and for the same reason as before: because the demonstrative 'this sentence' has as much a variable referent, dependent on the further, pragmatic context as the '(4)' did above. Given a self-referential interpretation (which is something additional to the syntactic identity) sentence B would say that B was not (at the time of utterance) true. But the same sentence might be given a non-self-referential interpretation, and then make quite a different proposition.

The point, of course, shows that it is not a sentence as such that can be true or false, but instead some proposition it might make in a context of use. And so it resolves the paradox in this and similar cases. For it means that sentence B is definitely not true, and so that what is true is that sentence B is not true, i.e. that what sentence B says on a self-referential interpretation is true. But *what sentence B says on a self-referential interpretation* is not the sentence itself (indeed identification of the two would involve a category mistake) and so it does not follow, contradictorily, that sentence B is true.

I have made further points supporting all this in 'There is no question about it!' *The Reasoner*, 1(6):4, and 'Horwich versus Tarski.' *The Reasoner*, 2(9):7-8. In the former I discussed questions and commands involving the demonstrative 'this', which were intended to be self-referring. I pointed out that the associated sentences were not *in themselves* self-referring, since the same sentences could be used with reference to quite different sentences.

To get the intended self-referential sense, therefore, one has to move to indirect speech locutions, and it is then evident that there are no intractable problems, because of the circularity of the definitions then involved. The point also applies in the propositional case where, with 'This is not true', an attempt is made to refer not to the sentence itself, but to the supposed proposition then expressed.

This latter point relates to the material in the further piece on Horwich's Equivalence Schema, which applies to propositions, and its differences from Tarski's Truth Schema, which applies to sentences. The learned here might remember that Tarski had not thought much about indexicals, since Rudolf Carnap said (1963: 'Intellectual Biography' in P. Schilpp (ed.) *The Philosophy of Rudolf Carnap*, Open Court, La Salle, p. 60): 'I wondered how it was possible to state the truth-condition for a simple sentence like "this table is black". Tarski replied, "This is simple: the sentence 'this table is black' is true if and only if this table is black"'. Even Horwich, who has thought about propositions more than most, in (1998: *Truth*, 2nd Ed., Clarendon, Oxford, p. 100) tries to keep indexical declarative sentences (along with all others exhibiting ambiguity and context sensitivity) within the purview of 'the disquotation schema'. He does so by inventing a device, which with 'this table is black', for example, would make 'this ta-

ble', when merely quoted on the left hand side of the Truth Schema, have the same referent as when unquoted on the right hand side. But it is not the *sentence* 'this table is black' that is then said to be true, it is the *proposition* it makes on the supposed occasion of utterance. It is not that 'this table is black' is true if and only if this table is black, but that *that this table is black* is true if and only if this table is black. Horwich has in this way been led to think that there are closer parallels between sentences and propositions than in fact there are, and in particular he has been led to believe that propositions fall foul of Liar-type paradoxes, just like sentences. But they do not, as I have shown in the second of the above pieces, where the relevant distinctions between sentences and propositions have been made more clear.

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Divine liars: a question

'There is no a priori reason to assume that two different tokens of the same type mean the same thing.' X.Y. Newberry ('Divine liars,' *The Reasoner*, 3(2)). We might, for example, use any word to convey a merely analogical meaning. And for all that tokens of the same type as 'the sun is in the Milky Way' are usually literally true, that one expressed a literally false thought (about a chocolate bar). But even so, natural languages rely for their utility on different word-tokens being commonly known to have similar meanings. That's why I find *C* and *D*—which are tokens of '*C* is not true' (ibid)—rather puzzling. The famous paradox of *C* may well be resolved (ibid) by noticing that the former is (demonstrably) nonsense and the latter (consequently) true. But even so one might wonder how *C* and *D* could differ so much in what they mean, the natural presumption being that the words of *D* mean the same, there, as they do in *C*.

Some philosophers (e.g. Tarski) conclude, from their puzzlement, that the meaning of 'true' differs between *C* and *D*. And the natural clarification procedure is indeed to identify an equivocal term, to replace its uses with more univocal terms. But the ordinary concept of literal truth seems too minimal, too bony for 'true' to be able to equivocate, especially under such a slight change in context. The contexts of *C* and *D* differ most obviously in the labels given to those tokens, and so it's perhaps more plausible that the meaning of '*C*' is what differs between *C* and *D*. Perhaps; but perhaps still puzzling because name-tokens mean, as a rule, whatever their maker intended them to refer to, and it's conventional to use different letters to refer to different objects, within a paper. And while intended reference can some-

times fail, it's also puzzling how the differing contexts of those tokens could give rise to such a difference in their meanings. The naming of an object isn't normally the sort of activity that could change its content (not outside the pages of a Harry Potter book).

Of course, if the '*C*' within *C* was referring to *C* then that would be a relatively abnormal naming practice, names being most naturally given to pre-existing things; which brings me to my question. For simplicity—and not because other sorts of self-reference can't be similarly puzzling (ibid)—let '[4***]' name the sentence-type of the following sentence-token (of modern English): No omniscient being believes that a token of the sentence-type [4***] could be expressing a literal truth during March 2009 AD. Even if no-one else names a sentence-type '[4***]' this month (as seems likely), a traditional theist will want the token of '[4***]' within that token of [4***] to be failing to refer to [4***]. That's because, if that token was so referring, then—unless no one was omniscient—its truth would clearly imply its untruth and its untruth its truth. A theist might conclude that theism ensures that that token doesn't so refer, and I'm wondering how reasonable such a conclusion could be. Perhaps it depends upon whether—and if so, when—such self-reference could succeed (as well as how reasonable her theism was, and so forth)?

Saul Kripke famously argued ('Outline of a theory of truth,' *J. Phil.*, 72 (1975), 693) that such self-reference could succeed, as follows. First name with 'Jack' the following, un-interpreted sequence of marks: 'Jack is short.' Then interpret that sequence as an English sentence. The obvious meaning for it to have is that that sequence is short, which is simply true. The self-reference in [4***] was, *prima facie*, more like that of *C*, which is (demonstrably) nonsense. But on the other hand, if no one is omniscient then the obvious meaning for [4***] to have is—like Jack's—simply true. Some may therefore think that if vicious semantic circularity arises only if there is an omniscient being, then we should blame the former on the latter. But I've already rejected the very similar argument that the vicious circularity of *C* arises only if 'true' isn't equivocal. Now, we naturally value generality and simplicity in an explanation, so perhaps the plausibility of our hypothetical theist's resolution of [4***] depends upon the embedded token of '[4***]' failing to refer to [4***] whether or not there's any omniscient being. On the other hand, omniscient beings usually exist (or fail to exist) of metaphysical necessity, so such a requirement might be like wanting some conclusion to hold whether or not Fermat's Last Theorem is true. So (in short), I'm still wondering.

Martin Cooke

On Omnipotence: Second Thoughts

In (2008: ‘The Paradox of Omnipotence: Not for an omnipotent God’, *The Reasoner*, 2(12)), I argued that the paradox of omnipotence or of the stone, fails to consider that a stone which God cannot lift is in principle unliftable. And thus, an omnipotent being is no less exempt from being able to lift such a stone, than he is from performing any impossible feat. The paradox, as may be remembered, contends that whether God can or cannot create a stone is inconsistent with him being omnipotent.

The proposed solution, however, fails to account for the relevance of God’s creative power. For if the unliftability of the stone blocks the legitimacy of expecting an omnipotent being from his being able to lift the stone, then of what relevance can the existence of such a stone be? And, why would the creation of such a stone be a problem?

It seems clear that the presence of an unliftable stone would pose a challenge to the omnipotence of God irrespective of our understanding of his disability. For God would then be *faced* with a stone that he cannot lift. We might say that the stress in the problem with the unliftable stone is not in its unliftability but in its existence. Hence there cannot be such a stone.

Alex Blum

Philosophy, Bar-Ilan University

Logical Relations between Sensation and Belief

In epistemology, *foundationalism* and *coherentism* are the two basic theses concerning the justification of beliefs. Roughly, and with respect to the variety that is found within each of these positions, foundationalism requires each justified belief to be supported by a finite, inferential chain that terminates with something that does not require further justification. Coherentism rejects this requirement and maintains that a belief is justified by virtue of belonging to a coherent epistemic state. The following Premise Principle is discussed by James Pryor (2005: There is Immediate Justification, *Contemporary Debates in Epistemology*, 181–202) and has been used to bolster coherentism by placing a heavy burden on foundationalism:

The only things that can justify a belief that P are other states that assertively represent propositions, and those propositions have to be ones that *could be used as premises* in an argument for P . They have to stand in some kind of inferential relation to P : they have to imply it or inductively support it or something like that.

Pryor (2005: 189–190) suggests that a significant amount of the appeal of the Premise Principle derives from claims that there are no non-arbitrary justifying relations of any sort, logical or otherwise, between facts about sensation and beliefs. We now argue that this is incorrect.

Ramsey (1931: Truth and Probability, *The Foundations of Mathematics and Other Logical Essays*, 156–198) notes that deductive logic admits two very different interpretations: it may be interpreted as a *logic of consistency* and as a *logic of truth*. Under the first of these interpretations deductive logic represents a set of prescriptions concerning states of full belief. Under the second of these interpretations deductive logic represents a set of laws that govern truth. While Frege (1967: *The Basic Laws of Arithmetic*, University of California, 12–13) also seems to acknowledge these two interpretations of deductive logic, it appears that Frege regarded the second interpretation as fundamental, the first interpretation being derived from the second on the assumption that we ought to pursue truth (Levi, 1997: The Logic of Full Belief, *The Covenant of Reason: Rationality and the Commitments of Thought*, 40–45). The primacy of such a logic of truth interpretation seems less compelling when one considers the possibility of extending it to other logics. For example, Ramsey (1931: 156–198) argues that probability logic cannot be interpreted as a logic of truth, but that it can be interpreted as a logic of consistency. More recently, Levi (1997: 40–69) argues that the logic of full belief cannot be interpreted as a logic of truth, but that it can be interpreted as a logic of consistency.

In light of its wider scope it seems reasonable to regard consistency, rather than truth, as the fundamental concept of logic. What exactly is a logic of consistency? Let us consider the example of deductive logic under this interpretation. The following remarks from Levi are instructive:

The laws of deductive logic are, I am suggesting, different from the laws of physics not only because they are true but because rational agents are committed by the standards of rational health to full belief that they are true. (Levi, p.41)

Each agent is committed to full belief in certain propositions. For rational agents the set of such propositions is closed under deduction. That is, for each agent X there is a set of propositions v_B^X such that if $\phi \in v_B^X$, then X is committed to full belief in ϕ . If X is a rational agent, then v_B^X satisfies all instances of the following condition:

$$\text{if } \Gamma \subseteq v_B^X \text{ and } \Gamma \vdash \phi, \text{ then } \phi \in v_B^X \quad (1)$$

where ‘ \vdash ’ is the derivability relation of deductive logic. Note that we are concerned with commitment

rather than performance, following Levi's *commitment-performance distinction* (Olsson, 2006: The Pragmatism of Isaac Levi, *Knowledge and Inquiry: Essays on the Pragmatism of Isaac Levi*, 14–16). It follows that satisfaction of all instances of **1** does not amount to a requirement that rational agents are logically omniscient. Rather, together these instances constitute a deductive closure requirement on v_B^X , the set of propositions to which X is committed.

More generally, let us assume that there is some set of variables $\{v_i\}_{i \in I}$ that accounts for all of the epistemically relevant features of agents. Note that we are not assuming anything about the types of things over which these variables range. In particular, we are not assuming that each of these variables ranges over a set of propositions. For each agent X let $\{v_i^X\}_{i \in I}$ represent the values of these variables with respect to X . A consistency requirement on the k th variable is a condition of the following form:

$$P(\{v_i\}_{i \in I}) \Rightarrow Q(v_k) \quad (2)$$

where P and Q are properties of the appropriate type. X satisfies such a condition just in case $P(\{v_i^X\}_{i \in I})$ implies $Q(v_k^X)$, i.e. just in case the material conditional $P(\{v_i^X\}_{i \in I}) \Rightarrow Q(v_k^X)$ is true. Note that we do not assume that P in (2) depends on every variable in $\{v_i\}_{i \in I}$. Thus, for example, the deductive closure requirement of (1) amounts to the requirement that X satisfies each condition of the following form:

$$P_{\Gamma, \phi}(\{v_i\}_{i \in I}) \Rightarrow Q_{\phi}(v_B) \quad (3)$$

where $P_{\Gamma, \phi}(\{v_i\}_{i \in I})$ asserts that $\Gamma \subseteq v_B$ and $\Gamma \vdash \phi$ while $Q_{\phi}(v_B)$ asserts that $\phi \in v_B$.

Given $J \subseteq I$ and $k \in I$, let $C(J, k)$ be the set of conditions of form (2) in which the antecedent depends only on variables in J and the consequent depends only on v_k . We may take the logical relation between J and k to be collection of those conditions in $C(J, k)$ that are satisfied by all rational agents. More precisely, if for each $i \in I$ we let V_i be the set of possible values for variable v_i and we let $C^*(J, k)$ be the set of those conditions in $C(J, k)$ that are satisfied by all rational agents, then the logical relation between J and k is the set of pairs $(\{a_j\}_{j \in J}, b)$, where $a_j \in V_j$ for all $j \in J$ and $b \in V_k$, that satisfy every condition in $C^*(J, k)$. In other words, $(\{a_j\}_{j \in J}, b)$ is in the logical relation between J and k just in case $P(\{a_j\}_{j \in J}) \Rightarrow Q(b)$ holds for all $P \Rightarrow Q$ in $C^*(J, k)$.

We may now apply this same approach to the target case: Let v_S be the variable that encodes the state of each agent's sensory apparatus. That is, for each agent X , the value v_S^X represents the state of X 's sensory apparatus. Again, we are not assuming that v_S ranges over a set of propositions. For example, v_S might range over the set of all possible states of the human nervous system. This is why we are concerned with the logic of consistency rather than the logic of truth: the logic of

truth is not well defined if we allow variables that range over things that are not propositions, but the introduction of such variables does not present an obstacle to defining a logic of consistency in the manner that is suggested in the previous paragraph. Following this suggested analysis, the logical relation between sensation and belief is determined by the set of those conditions in $C(\{S\}, B)$ that are satisfied by every rational agent. More precisely, if we let V_S (V_B) be the set of possible values for variable v_S (v_B) and we let $C^*(\{S\}, B)$ be the set of those conditions in $C(\{S\}, B)$ that are satisfied by all rational agents, then the logical relation between S (sensation) and B (belief) is the set of pairs (a, b) , where $a \in V_S$ and $b \in V_B$, that satisfy every condition in $C^*(\{S\}, B)$. In other words, (a, b) is in the logical relation between S and B just in case $P(a) \Rightarrow Q(b)$ holds for all $P \Rightarrow Q$ in $C^*(\{S\}, B)$. *The moral of the story is that the desired relation between sensation and belief does not present a problem if we follow Ramsey instead of Frege and understand logic in terms of consistency rather than truth.*

Jeffrey Helzner

Philosophy, Columbia University

§3

NEWS

More Precisely: The Math You Need to Do Philosophy, Broadview Press

As philosophy becomes more logically rigorous, it makes greater use of mathematics. An increasingly important part of philosophical method involves the construction of mathematical models. And many philosophical arguments depend on mathematical structures or results. But it's hard to find a good text to introduce you to the mathematics you need to do philosophy! Most math books are written for scientists or engineers. *More Precisely* is a mathematics book specifically for philosophers.

More Precisely shows how to apply mathematical tools in various branches of philosophy. The mathematical notations and concepts are introduced gradually. They are illustrated with examples taken from ethics, epistemology, metaphysics, philosophy of mind, philosophy of religion, and other branches of philosophy. The topics presented by *More Precisely* include: basic set theory; relations and functions; machines; probability (including Bayes Theorem); formal semantics (including possible worlds semantics and counterpart theory); utilitarianism; and infinity (including recursion as well as uncountability).

More Precisely is designed both as a text book and

reference book to meet the needs of upper level undergraduates and graduate students. It is also useful as a reference book for any philosopher working today. *More Precisely* also has a website, which will include exercises and supplemental material. You can learn more about *More Precisely* at <http://www.ericsteinhart.com>.

Eric Steinhart

Philosophy, William Paterson University

WHAT'S HOT IN ... ?

We are looking for columnists willing to write pieces of 100-1000 words on what's hot in particular areas of research related to reasoning, inference or method, broadly construed (e.g., Bayesian statistical inference, legal reasoning, scientific methodology). Columns should alert readers to one or two topics in the particular area that are hot that month (featuring in blog discussion, new publications, conferences etc.). If you wish to write a "What's hot in ... ?" column, either on a monthly or a one-off basis, just send an email to thereasoner@kent.ac.uk with a sample first column.

Disability and Chronic Illness, 30 January

Disability is studied by, among others, sociologists and those working in disability studies and politics. It has also been the subject of advocacy and activism and a topic of public debate. Chronic illness, on the other hand, has been studied by health sciences, nursing and medicine, but has not been politicised or debated to the same extent. It is normally thought that the concerns of disabled people and of those who are chronically ill are different. Those who are disabled can be perfectly healthy (e.g., someone who is blind and healthy); those who are ill are not necessarily disabled (e.g., well-controlled diabetes). This workshop explored the links and possible overlap between the two concepts, by bringing together people working in both areas, as well as service users, practitioners and activists.

The main focus of the workshop, attended by over 50 participants, was an analysis of the concepts of disability and chronic illness. This conceptual emphasis is the main focus of the multidisciplinary network, of which this workshop is part. The network, funded by the AHRC, is entitled The Concepts of Health, Illness and Disease and is managed by Dr Havi Carel (UWE) and Dr Rachel Cooper (Lancaster).

Disability and chronic illness were discussed by speakers from a variety of disciplines: history, disability studies, philosophy, social policy and linguistics. Gideon Calder (Newport) criticised the social model of disability and proposed Sen and Nussbaum's capability approach. Donna Reeve (Lancaster) discussed

what she calls 'psycho-emotional disabilism', the ways in which disabled people's physical disability is exacerbated by social attitudes towards them; for example, prying, rudeness, prejudice and lack of empathy. Reeve claimed that disability studies lacks a notion of the unhealthy disabled and that such a notion should be developed. Phillip Cole (Newport) discussed the politics of disability and the extent to which disability is a result of social attitudes and the interaction with a particular environment, rather than an intrinsic property of the disabled person.

Tessa Sanderson (UWE) reported on her empirical work in health psychology. She is part of a team developing a qualitative quality of life score for patients with rheumatoid arthritis. Sanderson spoke about the limitations of existing scores and how they mostly focus on disease activity, rather than on the patient experience of their condition. Vicky Long (Warwick) and David Turner (Swansea) spoke about the history of the concepts of chronic illness and disability. Andrew McGettigan (Central St Martins) spoke about chronic fatigue syndrome and the difficulties of medical professionals to classify it. Jonathan Charteris-Black (UWE) presented findings from linguistics, showing differences between men and women discussing illness. Finally, Julie Anderson (Manchester) spoke about the nature of disability and chronic illness from a historical perspective. For more information on the project and on forthcoming events: http://www.uwe.ac.uk/hlss/courses/philosophy/ahrc_chid_network.shtml.

Havi Carel

Politics, Philosophy and International Relations,
University of the West of England

Philosophy, Engineering and Technoethics, 6–8 February

The first workshop organized in Romania, on *Philosophy, Engineering and Technoethics*, on February 6–8, 2009, at "Stefan cel Mare" University, by Viorel Guliciuc was a fruitful one. See the [workshop's website](#), and the [photo gallery](#). The national and local media enthusiastically presented the event.

The tracks of presentations and discussion were various: philosophy of computing looking towards engineering; philosophical analysis of technology; theoretical reflections on engineering; Romanian inventors activity. That creates some difficulties in probing common assumptions for philosophy and engineering nowadays.

The success of the workshop was based on the quality of the foreign "workshoppers". During the opening ceremony, Peter Boltuc read the motivational letter addressed by Luciano Floridi to the organizers and partic-

ipants; meanwhile Alexandru Boboc presented the salutations of the Romanian Academy.

Raymond Turner brilliantly deployed a survey of some common central philosophical questions in computer science and in the philosophies of mathematics, language, science and engineering. Lorenzo Magnani had a seminal demonstration of his concept of moral mediator and previous research on epistemic mediators and manipulative abduction. Peter Boltuc presented with philosophical intelligence his concept of h-consciousness as being more like a new substance, of the kind that can be bioengineered, not just programmed on a computer. Colin Schmidt demonstrated that coercing Man's fabrication of himself will lead to appropriate vision for tomorrow's sciences of the artificial. Kuruvilla Pandikattu looked to the philosophical questions of biotechnology and its potentials for the Human Being itself.

The Romanian participants had presentations on the Romanian inventors (Dorel Cernomazu); on philosophy and technique (Alexandru Boboc); the MESIT principle and the key concepts used by Mihai Draganescu in *orthophysics: orthoexistence, orthobiont, intro-aperture, orthosense, orthotechnology* (Florin Munteanu); on biophotonics and neuro-semiotics (Traian Dinorel Stanciulescu); on artificial sight (Romeo Ionescu); on the SEI (substance-energy-information) model (George Ceausu); on the assumptions and meaning in the ontology of technology (Ionut Isac); on philosophical problems in measuring and instrumentation (Dan Milici); on the technological mentality (Bogdan Popoveniuc); on the Romanian National Inventic Institute (Boris Plahteanu); on theory of information between philosophy and engineering (Gheorghe Clitan).

The poster section had two presentations: Traian D. Stanciulescu and Aritia Poenaru, and Emilia Guliciuc. Viorel Guliciuc had a final one slide presentation on the common roots of philosophy and engineering.

The workshop had a peripatetic program, too: visits of the picturesque county of Suceava; pilgrimage to three World Heritage Modavian monasteries: Voronet, Moldovita and Sucevita (guidance of the orthodox nun Gabriela Platon); presentation of the bucovinian folk and traditional cloths (children of the Teodor Stefanely school, Cimpulung Moldovenesc, directed by Doina Timpau). Before the closing ceremony, some of the participants were awarded as honorary members of the *Romanian Society of Philosophy, Engineering and Technoethics*, that sponsored the workshop.

Viorel Guliciuc

“Stefan cel Mare” University, Suceava, Romania

Calls for Papers

JUST REASON: Special issue of the journal *Studies in Social Justice*, deadline 1 April.

INTUITIONISTIC MODAL LOGICS AND APPLICATIONS: Special issue of *Information and Computation*, deadline 31 May.

DERRIDA TODAY: Special Issue on “Deconstruction and Science”, 30 June.

CAUSALITY IN THE SCIENCES

A volume of papers on causality across the sciences
Deadline 1 July

EXPERIMENTAL PHILOSOPHY: Forthcoming issue of *The Monist*, deadline April 2011.

§4

INTRODUCING ...

In this section we introduce a selection of key terms, texts and authors connected with reasoning. Entries will be collected in a volume *Key Terms in Logic*, to be published by Continuum. If you would like to contribute, please [click here](#) for more information. If you have feedback concerning any of the items printed here, please email thereasoner@kent.ac.uk with your comments.

David Hilbert

David Hilbert, 1862-1943, was the progenitor of metatheory in logic and mathematics. He was among the most prominent mathematicians of his time. His achievements in mathematics include work on geometry, number theory, algebra and analysis; he also contributed to the theory of relativity. Hilbert shaped the direction of mathematical thought in the twentieth century, most famously by framing the Paris Problems: twenty-three open questions presented at the 1900 International Congress of Mathematicians.

In philosophy of mathematics, Hilbert is variously characterized as a formalist and as a finitist. While Hilbert's views contain elements of both formalism and finitism, neither of these terms effectively captures the subtlety of his thought. Some formalists hold that mathematical theories are best understood as uninterpreted systems. Some finitists reject all infinitary results. In contrast, Hilbert believed both that some mathematical statements were true of real objects and that transfinite mathematics was legitimate.

In the early twentieth century, philosophers of mathematics struggled to understand the ramifications of various oddities of set theory, including Cantor's paradox (arising from consideration of the set of all sets), the Burali-Forti paradox (arising from consideration of the

well-ordering of the ordinals), and Russell's paradox (arising from the assumption that every property determines a set). Intuitionists, e.g. Brouwer, concluded that the infinitary mathematics which leads to these paradoxes was illegitimate. Hilbert, in contrast, wished to establish finitistic foundations for infinitary mathematics.

Hilbert distinguished between real and ideal mathematical formulas. Real formulas are generally finitistic, and may be directly verified. Mathematical theories which included ideal elements were instead to be tested for their consistency. Unlike logicians like Frege, for whom the consistency of mathematics follows from the presumed truth of its axioms, Hilbert took the consistency of a set of axioms as sufficient evidence for mathematical legitimacy. Further, Hilbert took ideal formulas to be meaningless. Hilbert's emphasis on consistency and his claims about the meanings of ideal formulas have led people to consider him a formalist.

In addition to consistency, if one can show completeness, that every valid theorem is provable, then one could hope for a solution to all open mathematical problems. Hilbert tried to establish that mathematical theories were both consistent and complete by studying mathematical systems themselves. He thus founded the metamathematics and metalogic that characterize much of contemporary logical research.

Many logical theories are provably consistent and complete. In contrast, Gödel's incompleteness theorems struck a decisive blow against Hilbert's pursuit of these results for mathematics. Gödel's first theorem showed that, for even quite weak mathematical theories, a consistent theory could not be complete. Gödel's second theorem proved that the consistency of a theory could never be proven within the theory itself. We can only prove that mathematical theories are consistent relative to other theories.

Hilbert's views survive in Hartry Field's fictionalism, which emphasizes the consistency of mathematical theories; in Mark Balaguer's plenitudinous platonism, which asserts that every consistent mathematical theory truly describes a mathematical realm; and in defenses of limited versions of Hilbert's Programme.

Russell Marcus
Philosophy, Hamilton College

§5 EVENTS

MARCH

MODELS AND SIMULATIONS 3: Charlottesville, Virginia, 3–5 March.

WORKSHOP: Reasoning About Uncertainty, Institute for the Philosophy of Language, Lisbon, 3–6 March.

&HPS2: Integrated History and Philosophy of Science, University of Notre Dame, 12–15 March.

CAUSAL INFERENCE, STATE-OF-THE-ART: Cambridge, UK, 16–18 March.

FRONTIERS OF COMPUTATIONAL REASONING: Microsoft Research Cambridge, 19–20 March.

ADS: Agent-Directed Simulation Symposium, Part of the Spring Simulation Multiconference, San Diego, California, 22–27 March.

SPUC: The Science and Philosophy of Unconventional Computing, Cambridge, 23–25 March.

EVIDENCE, SCIENCE AND PUBLIC POLICY: Sydney Centre for the Foundations of Science, 26–28 March.

EACL: Computational Linguistic Aspects of Grammatical Inference, Athens, 30 March.

CSIE: World Congress on Computer Science and Information Engineering, Los Angeles/Anaheim, 31 March–2 April.

APRIL

SPARSITY IN MACHINE LEARNING AND STATISTICS: Cumberland Lodge, UK, 1–3 April.

FOUNDATIONS OF MATH: New York University, 3–5 April.

MATCHING AND MEANING: Automated development, evolution and interpretation of ontologies, Edinburgh, 9 April.

TOO FUNKY: an international workshop on sympathy and emanation, Leiden Institute of Philosophy, The Netherlands, 10–11 April.

EUROGP: 12th European Conference on Genetic Programming, Tübingen, Germany, 15–17 April.

SEMANTICS AND PHILOSOPHY IN EUROPE: Institute of Philosophy, University of London, 16–18 April.

AISTATS: Twelfth International Conference on Artificial Intelligence and Statistics, Clearwater, Florida, 16–19 April.

ESANN: 17th European Symposium on Artificial Neural Networks Advances in Computational Intelligence and Learning, Bruges (Belgium), 22–24 April.

SYMPOSIUM: Games, Argumentation and Logic Programming, University of Luxembourg, 23–24 April.

PHILOSOPHICAL METHODOLOGY: AHRC Project on 'Intuitions and Philosophical Methodology' at the Arché Philosophical Research Centre, University of St. Andrews, 25–27 April.

PAKDD: The 13th Pacific-Asia Conference on Knowledge Discovery and Data Mining, Imperial Queen Park Hotel, Bangkok, Thailand, 27–30 April.

SCIENTIFIC REALISM REVISITED: London School of Economics and Political Science, 28–29 April.

MAY

FOUNDATIONS OF MATHEMATICS: Philosophy and Foundations of Mathematics—Epistemological and Ontological Aspects, SCAS, Uppsala, 5–8 May.

LOGIC OF JOHN DUNS SCOTUS: 44th International Congress on Medieval Studies at Western Michigan University, 7–10 May.

AAMAS: The Eighth International Joint Conference on Autonomous Agents and Multi-Agent Systems, Budapest, 10–15 May.

ACL2: International Workshop on the ACL2 Theorem Prover and Its Applications, Northeastern University, Boston, 11–12 May.

MSDM: Multi-agent Sequential Decision-Making in Uncertain Domains, AAMAS, Budapest, 11 or 12 May.

PHILOSOPHER'S RALLY: University of Twente campus, Enschede, the Netherlands, 12–13 May.

PHILANG: International Conference on Philosophy of Language and Linguistics, Łódź, Poland, 14–15 May.

PHILOSOPHY AND COGNITIVE SCIENCE: The XIXth edition of the Inter-University Workshop, Zaragoza, 18–19 May.

BENELEARN: 18th Annual Belgian-Dutch Conference on Machine Learning, Tilburg University, 18–19 May.

UR: Uncertain Reasoning, Special Track of FLAIRS, Island, Florida, USA, 19–21 May.

AI: The twenty-second Canadian Conference on Artificial Intelligence, Kelowna, British Columbia, 25–27 May.

SCIENCE AND VALUES—THE POLITICISATION OF SCIENCE: Center for Interdisciplinary Research (ZiF), Bielefeld, Germany, 25–30 May.

CSHPS: The Canadian Society for History and Philosophy of Science, annual conference as part of the Congress of the Humanities and Social Sciences (CFHSS), Carleton University, Ottawa, 26–28 May.

SECOND FORMAL EPISTEMOLOGY FESTIVAL: Causal Decision Theory and Scoring Rules, University of Michigan, 29–31 May.

JUNE

IRMLÉS: Inductive Reasoning and Machine Learning on the Semantic Web, Heraklion, Crete, 1 June.

ARGUMENT CULTURES: Ontario Society for the Study of Argumentation, Windsor, Canada, 3–6 June.

O-BAYES: International Workshop on Objective Bayes Methodology, Wharton School of the University of Pennsylvania, Philadelphia, PA, 5–9 June.

PHILOSOPHY OF PROBABILITY II: Graduate Conference, Centre for Philosophy of Natural and Social Science, London School of Economics, 8–9 June.

CNL: Controlled Natural Languages, Marettimo Island, Sicily, 8–10 June.

GROUPS AND MODELS: Cherlin Bayrami, Bilgi University, Istanbul, Turkey, 8–12 June.

CARNEGIE MELLON SUMMER SCHOOL: Logic and Formal Epistemology, Department of Philosophy at Carnegie Mellon University, Pittsburgh, PA, 8–26 June.

CONFERENCE: Formal methods in the epistemology of religion, KU Leuven (Leuven, Belgium), 10–12 June.

TOWARD A SCIENCE OF CONSCIOUSNESS: Hong Kong, 11–14 June.

SOCIETY FOR PHILOSOPHY AND PSYCHOLOGY: Indiana University, Bloomington, 12–14 June.

NA-CAP: Networks and Their Philosophical Implications, Indiana University in Bloomington, 14–16 June.

NAFIPS: 28th North American Fuzzy Information Processing Society Annual Conference, University of Cincinnati, Cincinnati, Ohio, 14–17 June.

ICML: The 26th International Conference On Machine Learning, Montreal, Canada, 14–18 June.

SPSP: Society for Philosophy of Science in Practice, University of Minnesota, Minneapolis, 18–20 June.

FORMAL EPISTEMOLOGY WORKSHOP: Carnegie Mellon University, 18–21 June.

UAI: The 25th Conference on Uncertainty in Artificial Intelligence, Montreal, Canada, 18–21 June.

NON-CLASSICAL MATHEMATICS: Hejnice, Czech Republic, 18–22 June.

PRAGMATISM & SCIENCE CONFERENCE: Center for Inquiry Transnational, Amherst, NY, 19–20 June.

WOLLIC: 16th Workshop on Logic, Language, Information and Computation, Tokyo, Japan, 21–24 June.

LOGICA: The 23rd in the series of annual international symposia devoted to logic, Hejnice (northern Bohemia), 22–26 June.

JULY

TWO STREAMS IN THE PHILOSOPHY OF MATHEMATICS: Rival Conceptions of Mathematical Proof, University of Hertfordshire, Hatfield, UK, 1–3 July.

EDM: Educational Data Mining, Cordoba, Spain, 1–3 July.

ECSQARU: 10th European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty, Verona (Italy), 1–3 July.

E-CAP: Computing and Philosophy, Universitat Autònoma de Barcelona, 2–4 July.

METAPHYSICS OF SCIENCE: University of Melbourne, 2–5 July.

TWO WEEK SYMPOSIUM: Proof Theory and Constructivism, School of Mathematics, Leeds, 3–16 July.

SET THEORY MEETING: in Honour of Ronald Jensen, Mathematical Research and Conference Center, Bedlewo, Poland, 5–10 July.

TARK: Twelfth Conference on Theoretical Aspects of Rationality and Knowledge, Stanford University, 6–8 July.

CALCULEMUS: 16th Symposium on the Integration of Symbolic Computation and Mechanised Reasoning, Ontario, Canada, 6–7 July.

INFORMATION FUSION: 12th International Conference, Grand Hyatt, Seattle Washington, 6–9 July.

TABLEAUX: Automated Reasoning with Analytic Tableaux and Related Methods Oslo, Norway, 6–10 July.

SPT: Converging Technologies, Changing Societies, 16th International Conference of the Society for Philosophy and Technology, University of Twente, Enschede, The Netherlands, 8–10 July.

IC-EpsMSO: 3rd International Conference on Experiments / Process / System, Modelling / Simulation / Optimization, Athens, Greece, 8–11 July.

INTERDISCIPLINARY SOCIAL SCIENCE: University of Athens, Greece, 8–11 July.

ARCOE: Automated Reasoning about Context and Ontology Evolution, Pasadena, 11–12 July.

IJCAI: 21st International Joint Conference on Artificial Intelligence, Pasadena, CA, 11–17 July.

ISHPSSB: International Society for the History, Philosophy, and Social Studies of Biology, Emmanuel College, St. Lucia, Brisbane, Australia, 12–16 July.

LOGIC AND HERESY IN THE MIDDLE AGES: Leeds Medieval Congress, 13–16 July.

DMIN: International Conference on Data Mining, Las Vegas, USA, 13–16 July.

ICAI: International Conference on Artificial Intelligence, Las Vegas, USA, 13–16 July.

ICLP: 25th International Conference on Logic Programming, Pasadena, California, 14–17 July.

ISIPTA: 6th International Symposium on Imprecise Probability: Theories and Applications, Durham University, 14–18 July.

ISSCSS: First Graduate International Summer School in Cognitive Sciences and Semantics, University of Latvia, Riga, 16–26 July.

AIME: 12th Conference on Artificial Intelligence in Medicine, Verona, Italy, 18–22 August.

ViC: Vagueness in Communication, Bordeaux, France, 20–24 July.

IWSM24: 24th International Workshop on Statistical Modelling, Cornell University in Ithaca, NY, USA, 20–24 July.

LMSC: Workshop Logical Methods for Social Concepts, Bordeaux, France, 20–31 July.

ICCB: Eighth International Conference on Case-Based Reasoning, Seattle, Washington, 20–23 July.

CASE-BASED REASONING IN THE HEALTH SCIENCES: The Eighth International Conference on Case-Based Reasoning (ICCB-09), Seattle, Washington, USA, 21 July.

HISTORY OF SCIENCE AND TECHNOLOGY: XXIII International Congress of History of Science and Technol-

ogy: Ideas and Instruments in Social Context, Budapest, Hungary, 28 July–2 August.

LOGIC COLLOQUIUM: Sofia, 31 July–5 August.

AUGUST

CADE-22: 22nd International Conference on Automated Deduction, McGill University, Montreal, 2–7 August.

LOGIC AND MATHEMATICS: University of York, 3–7 August.

SCIENCE IN SOCIETY: University of Cambridge, United Kingdom, 5–7 August.

MEANING, UNDERSTANDING AND KNOWLEDGE: 5th International Symposium of Cognition, Logic and Communication, Riga, Latvia, 7–9 August.

LICS: Logic in Computer Science, Los Angeles, 9–11 August.

FSKD: 6th International Conference on Fuzzy Systems and Knowledge Discovery, Tianjin, China, 14–16 August.

LGS6: Logic, Game Theory, and Social Choice 6, Tsukuba Center for Institutes, Japan, 26–29 August.

PASR: Philosophical Aspects of Symbolic Reasoning in Early Modern Science and Mathematics, Ghent, Belgium, 27–29 August.

EANN: Artificial Neural Networks in Engineering, University of East London, 27–29 August.

PRACTICE-BASED PHILOSOPHY OF LOGIC AND MATHEMATICS: ILLC, Amsterdam, 31 August–2 September.

SEPTEMBER

FOUNDATIONS OF UNCERTAINTY: Probability and Its Rivals September, Villa Lanna, Prague, Czech Republic, 1–4 September.

TRENDS IN LOGIC VII: Trends in the Philosophy of Mathematics, Goethe-University Frankfurt, 1–4 September.

UC: 8th International Conference on Unconventional Computation, Ponta Delgada, Portugal, 7–11 September.

MECHANISMS AND CAUSALITY IN THE SCIENCES

University of Kent, Canterbury, UK, 9–11 September

PHLOXSHOP II: Humboldt-Universität, Berlin, 9–11 September.

MoS: Grand Finale Conference of the Metaphysics of Science AHRC Project, Nottingham, 12–14 September.

ISMIS: The Eighteenth International Symposium on Methodologies for Intelligent Systems, University of Economics, Prague, Czech Republic, 14–17 September.

FroCoS: Frontiers of Combining Systems, Trento, Italy, 16–18 September.

PROGIC

4th Workshop on Combining Probability and Logic, special focus: new approaches to rationality in decision making, Groningen, The Netherlands, 17–18 September

ICAPS: 19th International Conference on Automated Planning and Scheduling, Thessaloniki, Greece, 19–23 September.

ASCS: The 9th conference of the Australasian Society for Cognitive Science, Macquarie University, Sydney, 30 September–2 October.

OCTOBER

JOINT ATTENTION: Developments in Philosophy of Mind, Developmental and Comparative Psychology, and Cognitive Science, Bentley University, Greater Boston, 1–3 October.

THE HUGH MACCOLL CENTENARY CONFERENCE: Boulogne sur Mer, 9–10 October.

CASE STUDIES OF BAYESIAN STATISTICS AND MACHINE LEARNING: Carnegie Mellon University, Pittsburgh, PA, 16–17 October.

BREAKING DOWN BARRIERS: Blackwell Compass Interdisciplinary Virtual Conference, 19–30 October.

EPSA: 2nd Conference of the European Philosophy of Science Association, 21–24 October.

RR 2009: Third International Conference on Web Reasoning and Rule Systems, 25–26 October.

NOVEMBER

ACML: 1st Asian Conference on Machine Learning, Nanjing, China, 2–4 November.

AICI: The 2009 International Conference on Artificial Intelligence and Computational Intelligence, Shanghai, China, 7–8 November.

EPISTEMOLOGY, CONTEXT, AND FORMALISM: Université Nancy 2 France, 12–14 November.

SPS: Science and Decision, Third Biennial Congress of the Societe de philosophie des sciences, Paris, 12–14 November.

M4M-6: 6th Workshop on Methods for Modalities, Copenhagen, Denmark, 12–14 November.

ISKE: The 4th International Conference on Intelligent Systems & Knowledge Engineering, Hasselt, Belgium, 27–28 November.

DECEMBER

ICDM: The 9th IEEE International Conference on Data Mining, Miami, U.S.A., 6–9 December. **MBR:** Abduction, Logic, and Computational Discovery, Campinas, Brazil, 17–19 December.

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JOBS

LECTURER IN STATISTICS: UCL Department of Statistical Science, deadline 6 March.

TWO MELLON POSTDOCTORAL FELLOWSHIPS: in Philosophy at Oxford, 6 March.

POSTDOCTORAL FELLOWSHIP IN SEMANTICS: Faculty of Philosophy & Faculty of Linguistics, Philology, and Phonetics, University of Oxford, 6 March.

FACULTY POSITION: Cognitive Science Program, The Central European University (CEU) in Budapest, Hungary, 13 March.

POSTDOCTORAL MELLON TEACHING FELLOW: AOS: Experimental Philosophy, Lewis & Clark College, Portland, OR, Review of application begins, 1 April.

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COURSES AND STUDENTSHIPS

Courses

HPSM: MA in the History and Philosophy Philosophy of Science and Medicine, Durham University.

MASTER PROGRAMME: Philosophy of Science, Technology and Society, Enschede, the Netherlands.

MSC IN MATHEMATICAL LOGIC AND THE THEORY OF COMPUTATION: Mathematics, University of Manchester.

MA IN REASONING

An interdisciplinary programme at the University of Kent, Canterbury, UK. Core modules on logical, causal, probabilistic, scientific, mathematical and machine reasoning and further modules from Philosophy, Psychology, Computing, Statistics, Social Policy and Law.

MSC IN COGNITIVE & DECISION SCIENCES: Psychology, University College London.

MASTER OF SCIENCE: Logic, Amsterdam.

SUMMER INSTITUTE ON ARGUMENTATION: University of Windsor, Canada, contact **H.V. Hansen** or **C.W. Tindale**, 25 May–6 June.

SUMMER SCHOOL IN LOGIC AND FORMAL EPISTEMOLOGY: Canergie Mellon University, 8–26 June.

NN: Summer School in Neural Networks in Classification, Regression and Data Mining, Porto, Portugal, 6–10 July.

ACAI: Advanced Course in Artificial Intelligence, School of Computing and Mathematics, University of Ulster, Northern Ireland, 23–29 August.

Studentships

[THREE-MONTH STUDENTSHIPS IN PARIS](#): Ontological structure and Semantic Structure, Until filled.

[PHD POSITION](#): IDSIA, Lugano, Switzerland, deadline 20 March.

[PHD POSITION](#): TiLPS/Tilburg, deadline 1 April.

[PHD SCHOLARSHIP IN LOGIC](#): University of Groningen, The Netherlands, deadline 1 May.