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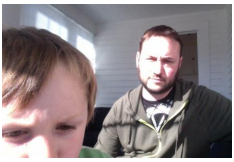
Editorial

Next time you are planning a conference, you will need to decide: where should it be held? As this month's editor, I recommend you choose somewhere stunningly beautiful. You heard it in *The Reasoner* first.

In particular, I recommend Rio de Janiero, where in April I was lucky enough to attend the Fourth World Congress on Universal Logic, at the foot of Sugarloaf Mountain on the Brazilian coast:

This was a 10-day mega-event with hundreds of participants from all around the world. There was a school, a "secret speaker", and workshops on all kinds of innovative and inspiring directions in logic. There were also little monkeys gambolling in the nearby trees, and the cuisine included more barbecued skewered chicken hearts than I am accustomed to.

Mainly, I saw that this is a great time to be doing logic in Brazil.



Notably, non-classical logic. And that's due, at least in part, to some seminal figures. Back in the early 1960s, Newton C.A. da Costa at the Federal University of Curitiba independently began working on what is now called paraconsistent logic—formal systems that tolerate inconsistency. While it would take many in the world decades to notice the possibility of paraconsistency, da Costa made inroads into a hierarchy of new logics, and began applying them to mathematics, physics, and philosophy. His bold contributions, among others, set a precedent for supporting a flourishing logic program in Brazil, and I'm happy to report that legacy is still clearly visible today.

This month's guest, Professor Walter Carnielli, is today one of the main forces behind the continuing strength of logic in the area. Once upon a time, Walter was a student of da Costa and today carries on—among many projects—the tradition of paraconsistent logic. I asked him some questions about life, logic, and everything.

Professor Carnielli is the director of the Centre for Logic, Epistemology and the History of Science at the State University of Campinas (UNICAMP) in Brazil. Since the 1980s, his work has been on combinatorics, the semantics and proof theory of multi-valued and paraconsistent logics, and the combining of different logics.

Zach Weber
Philosophy, Otago

Features

Interview with Walter Carnielli

ZW: How did you get started in logic?

WC: In the beginning of high school, I had a young teacher who was doing his PhD in logic. One day it was raining heavily and only a few kids came to class. I asked him to explain to us in two sentences what a "PhD thesis" was. He explained his work on induction, with a few examples. I don't think the other students were paying any attention, but I found it astonishing how one could dominate the infinite, proving things that I thought would take an eternity, just with a few steps!

I asked for more, and he and the physics teacher gave me some combinatorial problems to work. We'd previously had some lectures on very elementary logic—truth-tables, simple arguments and the like—and I found it very impressive how combinatorics and logic had similar methods. At the same time we had a lot of geometry drawing, solving problems with lines, planes, triangles, etc.

The main hint—this took years to understand—was always "suppose the problem solved, and then solve it".

It worked, but I was always puzzled: how can you suppose a problem solved, and then solve it? What if it were in principle not solvable? Later, very later on, I knew of Pappus' analytic method, where he refers to "what is sought as if it has been achieved", but it all sounded mysterious, connected somehow to infinity, that only higher minds could really understand. I decided, very immodestly, to be closer to those higher minds by studying mathematics.

ZW: And what keeps you going?

WC: I can only say that this intuition still remains in my work, and that [high] schools like that do not exist any more.

ZW: So now you are the teacher yourself, the Director the CLE.

WC: Yes. The CLE (Centre for Logic, Epistemology and the History of Science) is the only research institution I know about where members of other universities, and other countries, can elect the Director and influence the research policy.

The CLE was officially established in 1977 at the State University of Campinas (UNICAMP), though in existence since 1976. It was thought to be the first interdisciplinary research centre in Latin America aimed at bringing together scientists from various branches of scientific and philosophical knowledge. Now CLE has members from Brazilian and foreign universities, and has conferences, lectures and courses. The CLE also publishes journals and it hosts the Brazilian Logic Society (SBL).

ZW: Much of your own research has been on paraconsistent logic. How do you view the relationship between non-classical logics and classical logic?

WC: I think the expression "classical logic" is no more than a *façon de parler*. Formal or symbolic logic as a whole is just a mathematical model of natural language and reasoning, whether or not it incorporates any tools or theories that carry the label "non-classical". There is no rivalry between "classical" and "non-classical" logics.

What is—improperly—called by many people "classical logic" is simply a collection of principles and laws considered to be inherited from Aristotle. But Aristotelian logic and modern logic, in the tradition of Frege, Russell, Whitehead, and Wittgenstein, etc., do not coincide. A substantial difference, among others, is that Aristotelian logic and modern logic strongly differ in the question of existential import. So we might talk about traditional logic as a counterpart of modern logic, and contemporary logic is better regarded as universal logic.

ZW: So it's all just 'logic', if viewed from a high enough perspective?

WC: If there is anything to the name "classical" logic, it is the logic considered adequate for the needs of most mathematics. Mathematics, at least in its practice, does not involve past or future tenses, hermeneutics, counterfactual reasoning, adverbs, modali-

ties, adjectives, degrees, etc. Other views, not so immune to philosophical perspectives and interpretations, may require more subtle distinctions—and that is the point where the so-called "non-classical logics" come into being.

But then, the "non-classical" logics themselves turn out to apply to mathematics. It is a philosophical standpoint that justifies intuitionistic and constructive mathematics, inconsistent mathematics, paraconsistent set theories, fuzzy set theories, relevant arithmetic, etc. In the limit, new mathematical objects benefit when the classical/non-classical distinction is left behind: it is well-known that there are topoi (in topos theory) that don't verify the law of excluded middle, and the mathematician who understands this contemporary view does not feel bewildered.

ZW: I can see this viewpoint reflected in some of your formal work. Can you tell us about the Logics of Formal Inconsistency?

WC: I've worked on the formalization of the distinction between consistency and non-contradiction, which led to the LFIs. In syntactic terms, this is done simply by adding the meta-theoretical notions of consistency and inconsistency at the object level, by adding to the language new connectives with the intended meaning of "is consistent" and "is inconsistent", and some axioms relating the notions of consistency and inconsistency with negation.

A wide concept of paraconsistency emerges, which embodies several others: only a contradiction about a consistent subject matter leads to explosion. A contradiction about something which we are not sure behaves consistently does not cause any deductive explosion.

This makes paraconsistent logic completely free of any metaphysical assumptions such as existing real contradictory objects in the world, or any influence by Hegel. It is not contrary to Aristotle, when we take seriously his famous remark about believing contradictions in the Book Γ of *Metaphysics*: we can say the words, but cannot really believe what we saying.

ZW: I think some of us can say the words and believe what we are saying... But this leads to my next question: on possible translation semantics. What are they?

WC: A possible-translation interpretation consists of multiple scenarios, so that a semantics for a "complex" logic can be seen as an appropriate combination of logics with simpler semantics. Intuitively, a "complex" logic is decomposed into the simpler logics. In the general case, the decomposition of the "complex" logic is mediated by a collection of translations into the simpler logics preserving soundness. The class of admissible translation mappings then gives a characterization (completeness) of the "complex" logic.

I introduced the idea of possible-translations semantics in 1990, restricted to the use of finite-valued factors. Other special cases of possible-translations semantics are the society semantics, better adapted to many-valued logics. The work of my colleagues and collaborators João Marcos and Marcelo Coniglio greatly contributed to obtain some deep properties on this semantics.

Philosophically, possible-translations make it possible to give a semantics for a logic which did not have a known semantics, or to give an alternative semantics to it, by means of a bunch of less complex, already understood, other logics. Several many-valued logics can be decomposed into bivalued factors, and several paraconsistent and

paracomplete logics can be decomposed into three-valued factors, for instance. This can be done even if the original logics are not characterizable by finite-valued semantics or have only non-truth functional bi-valued semantics. So possible-translations semantics restores the truth-functionality of some logics, as much as it can be recovered.

Possible-translations semantics are used as one of the universal tools for composing and decomposing logics (see *Analysis and Synthesis of Logics: How to Cut and Paste Reasoning Systems*, by W.A. Carnielli, M.E. Coniglio, D.M. Gabbay, P. Gouveia, and C. Sernadas), for algebraizing logics, and for reasoning about quantum systems as shown in the work of the group of Amilcar Sernadas.

ZW: What are you working on now?

WC: I am now involved with expanding a new method of proof for general logic by means of manipulating polynomials over specific fields. The resulting structure is a ring. Polynomial ring calculus can be given to any finite-valued logic, to modal logics and to several paraconsistent logics, even if they are not characterizable by finite logic matrices. This research line is important because logic has been seen as related to Boolean algebras, whereas Boolean rings seem the most appropriate setting for generalization. Though Boolean algebras and Boolean rings are interdefinable structures, they are not isomorphic. Following this thread may lead to a revival of the original approach by Boole and Leibniz concerning the unity of Logic and Algebra, lost in the present days.

I am also involved with the task of showing how paraconsistent logics would permit us to see the foundations of mathematics from the vantage point of sets, and give arguments immune to certain problematic issues involving contradictoriness. For instance, is the proof of independence of the Axiom of Choice and the Continuum Hypothesis from ZF still valid in a paraconsistent scenario? Questions like this are sure to have a deep effect on Philosophy of Mathematics, but they require understanding models of paraconsistent set theory and new formulations of forcing, not yet available.

Reasoning with or under contradictions, and splitting concepts thought to be inseparable such as contradiction and inconsistency, are already current topics in logic (e.g., in paraconsistency), but how could this be incorporated into the mathematical practice? Euler and other founders of calculus used infinitesimals very fruitfully, and many non-standard, or "non-classical", constructions have entered mainstream mathematics.

Circularity and Failure: a Response to Martin Cooke

Martin Cooke in 'On the cause of the unsatisfied paradox', in *The Reasoner* 7(6): 69, addresses the paradox of Eldridge-Smith's 'unsatisfied predicate' and suggests that permitting satisfaction and truth to come in degrees—hence, rejecting Bivalence—may offer an escape from the contradiction involved.

This is the version of the 'unsatisfied predicate' Cooke uses: assume Peter Eldridge-Smith's 'favourite predicate' is 'doesn't satisfy Peter Eldridge-Smith's favourite predicate'. One can easily derive that, for all x, x satisfies that predicate iff x doesn't. That's the paradox.

Cooke argues that implicit in the biconditional is an all-or-nothing conception of satisfaction, naturally associated with an all-or-nothing conception of truth. If we allow satisfaction to come in degrees, we should rather infer that, for all x, x satisfies Peter

Eldridge-Smith's favourite predicate *as much as x* doesn't. Similarly, the Liar sentence would be *as true as* it is false. The innovation is that we relate truth to falsity or satisfaction to lack thereof by means of 'as much as' instead of 'if and only if'.

Let me briefly illustrate how a theory of degrees of truth or satisfaction could behave. If, for instance, we let satisfaction and truth move back and forth inside the interval [0, 1]—letting 0 mean definite falsity or definite lack of satisfaction and 1 definite truth or definite satisfaction—, then:

1. For all x, x .5-satisfies Peter Eldridge-Smith's favourite predicate.

2. The Liar sentence is .5-true.

Now let me argue against this approach.

Bivalence is anchored to the Law of Excluded Middle (LEM), which is extremely intuitive: states of affairs must be or not be the case. A proposition is the statement that a particular state of affairs is the case; hence, it must be true or false. Propositions are the primary truth-bearers. Sentences are derivative truth-bearers: they are not true or false *per se* but only as provided with interpretations that make them express propositions.

I believe that proponents of degrees of truth are confounding truth with other conditions like accuracy or degree of acceptance by a community of speakers. 'There are six billion people' may be deemed reasonably accurate though not absolutely so. It has a reasonable *degree of accuracy*. 'Men 181 cm tall are definitely tall' may be accepted as true by many speakers but not all. It surely has a respectable *degree of acceptance*. But this has ultimately little to do with truth and falsity proper.

It seems to me that Cooke is overlooking all along the fact that the primary truth-bearers are propositions, not sentences, and that there is little or no reason to believe the Liar sentence to express a proposition. Similarly, the primary terms of satisfaction relations are not predicates *qua* linguistic objects but the properties or conditions expressed by them. And we have little reason to assume that Peter Eldridge-Smith's favourite predicate actually succeeds in expressing a property or condition, as we have in general little reason to believe that objects whose existence entails contradiction can exist or that objects circularly 'defined' are successfully defined. Surely in both cases we confront failed attempts at constructing an object (a proposition, a property), attempts that fail due to circularity in definition.

Cooke goes on to propose a paradox of denotation. He sets forth this expression: 'the things that are not now being referred to' and seems to be suggesting the same treatment for the ensuing paradox: everything would be as referred to thereby as not. But again, why should we assume that the quoted expression effectively refers to anything at all? Note that the unsatisfied predicate, the Liar sentence and the reference of that expression are all defined in terms of themselves. Obviously, it is the fact that they are defined in terms of themselves that makes it possible for them to be defined *not only in terms of themselves but also in contradiction with themselves, as other than themselves*.

All such constructions proceed as though the object that is being defined were previously given and available to the very speech defining it; that presumed availability is then harnessed to define the object by reference to itself and as other than itself. That's the old trick.

Now it appears to me most natural to think that if it is the case that an object can be defined into self-contradiction if it can be defined in terms of itself, then it simply cannot be defined in terms of itself. If that implies, as paradoxes seem to show, that we should reject the possibility that an object be defined in terms of itself, this is neither too much to ask for nor too high a price to pay. It is just what logic and common sense have been avowing for thousands of years, namely, that circularity makes certain constructions fail: proofs, definitions and surely other kinds of stipulations.

Laureano Luna
I.E.S. Doctor Francisco Marín

Where the Evidence is Not Needed

Michael Antony (2010: "Where's The Evidence?", *Philosophy Now* 78) wonders why the so called 'New Atheists' (for example, Dawkins or Hitchens) employ evidential principles to argue that religious belief is irrational, but they are unwilling to apply these same principles to atheism and accordingly, they contend that given the absence of compelling evidence in favour of the existence of God, atheism ought to be preferred by default. In particular, in Antony's reconstruction, New Atheists contend that they do not need evidence for their position because among other things:

1. You cannot prove a negative.

2. Absence of evidence is evidence of absence.

In his paper, Antony attempts to undermine (1) and (2) as part of his project of concluding that "the New Atheists have no good reason to treat their atheism differently from how they treat belief in the divine" (page 21). In contrast to Antony, I am inclined to endorse both of them. Thus, I will show where he goes wrong.

1) It is irrational to demand a proof of God's non-existence, says the New Atheist, because negative existentials cannot be proven. However, according to Antony, it is false that you cannot prove a negative existential in any plausible sense of *proof*. In mathematics, negative existential propositions can be proven. Likewise, in the empirical realm, "it is easy to prove the non-existence of many things: for example, that there is no pomegranate in my hand, or no snow-capped mountains in the Sahara Desert" (page 19).

Antony is right about mathematical non-existence, but like the New Atheists, I think the problem of God's existence is empirical; and in the relevant *empirical* sense of *provable*, it is not true that *unrestricted* negative empirical existential claims *are* provable. In order to prove the sentence "God does not exist", I would have to refute the sentence "God exists", but as Popper (1958: "On the Status of Science and of Metaphysics", *Ratio* 1(2), 268–269) argues:

> A strict or pure existential statement applies to the whole universe, and it is irrefutable simply because there can be no method by which it could be refuted. For even if we were able to search our entire universe, the strict or pure existential statement would not be refuted by our failure to discover

> the required [object], seeing that it might always be hiding in a place where we are not looking.

It should now be clear that Antony's examples are irrelevant. While "God does not exist" is unrestricted (or "a strict or pure existential statement"), "there is no pomegranate *in my hand*" and "there are no snow-capped mountains *in the Sahara desert*" are restricted claims. On the other hand, it is true that many positive existentials are difficult to prove, but if Popper is right, then the difference between positive and negative existentials is not a matter of degree (more or less difficult to prove), but a matter of kind. It might be difficult, possibly unfeasible, to prove the existence of extraterrestrial intelligence in the universe, but to prove its non-existence is outright impossible.

2) Following Michael Scriven's *Primary Philosophy* (1966) and Norwood Hanson's "What I Don't Believe" (1967), New Atheists seem to be implicitly committed to the *Hanson-Scriven Thesis*, or "HST": "When there is no good reason for thinking a [positive existence] claim to be true, *that* in itself is good reason for thinking the claim to be false" (Hanson, 1966. Quoted by Antony, his addition in brackets).

In spite of the fact that HST seems to work well for Pegasus, for example, it is rejected by Antony who concludes that the New Atheists select their examples conveniently, and that they ignore the relevant counterexamples. As a result, they generate the false impression that HST is true, and in this way "suggests that religious belief, because it lacks strong evidence, must be judged to be just as ridiculous as the Tooth Fairy or goblins" (page 21). But how does Antony reject HST? This is what he writes:

> Consider the claim that earthworms have a primitive form of consciousness. There is little evidence for this, certainly no strong evidence. Nevertheless, many consciousness researchers believe it. [...] Or consider string theory. Again, there is nothing that could properly be called strong evidence for it, yet many physicists believe it. [...] Yet if we were to take HST seriously, given that there's no strong evidence for any of the above propositions, we would rationally have to conclude that the *negations* of the propositions are true: that earthworms are *not* conscious, [...] and that string theory is *false*. But that is absurd! These negative conclusions can be believed (indeed, many people do believe them) but there is no reason to suppose that they *must* be believed (pages 20-21).

But, as Hanson makes clear, HST is meant to apply only to positive existentials like "There exists an earthworm with a primitive form of consciousness", and not to positive universals like "Earthworms have a primitive form of consciousness" (Antony seems to be aware of the importance of this distinction as his addition in brackets shows). In other words, HST takes as input a positive existential and, in suitable epistemic conditions, yields as output a negative existential. Finally, let us consider string theory. "There exists a theory that unifies general relativity with quantum mechanics" seems to have the correct logical form. It is a positive existential claim. Moreover, it seems also empirically verifiable: by looking into an encyclopedia, for example. Likewise, I can use an encyclopedia to verify the past existence of dinosaurs. But in this sense, also mathematical truths would be empirically verifiable. So in the relevant sense, the claim

in question is not empirical. Thus, HST cannot be applied to it. Obviously, scientific theories need supporting empirical evidence. However, scientific theories are not empirical entities (they are universal laws), and in his essay, Hanson makes clear that God's existence is an empirical issue and that HST applies only to empirical claims.

Giovanni Mion
Istanbul Technical University

News

Logic, Rationality and Interaction, 9–12 October

The fourth edition of the LORI workshop took place the second week of October 2013 in Hangzhou, China. During four days, the participants had the opportunity to discuss different topics on the interface of logic, mathematics, philosophy and computer science.

On the invited lectures, Leitgeb dealt with the alleged incompatibility between logics of beliefs and subjective probability (e.g., the lottery paradox) by choosing an adequate threshold t such that the agent believes in a proposition A if and only if A's probability is greater or equal than t.

An interesting discussion arose during Liao's presentation on abstract argumentation theory, where arguments are only abstract entities that can attack and be attacked. Since the abstraction does not pay attention to the actual structure of the argument, it is not clear if the attacks are on the validity of the argument, on its conclusion or on some of its premises. Even more, some arguments might not be valid, and thus their influence over the final outcome could be weaker. A more realistic approach could be obtained by taking into account the arguments' structure.

Among the contributed talks, some works explored classic concepts from a different perspective. Baltag et al. presented a topological framework in which the notion of knowledge is taken as a primitive, and then the notion of belief corresponds to what the agent considers possible to know. Velazquez-Quesada explored a neighbourhood setting in which explicit knowledge is the primitive and implicit knowledge is defined as what the agent will know in some state reachable via model operations. Also in the neighbourhood setting, Sano and Ma studied two methods for representing public announcements and a method for representing product updates. Alechina et al. studied preference change by treating a set of preferences as a theory and then defining operations of minimal contraction and minimal revision, and Rodenhauser formalised a discussion on minimal revision in a framework that allows the representation of different belief revision policies.

Some other works explored epistemic phenomena in groups of agents. Smets considered the different 'issues' different agents might be interested in, defining in this way new group epistemic notions that lie between common knowledge and distributed knowledge. There were also approaches formalising group epistemic phenomena in groups, as the study of informational cascades (Rendsvig) and the study of public and private beliefs exemplified by the representation of pluralistic ignorance (Christoff and

Hansen). Finally, alternative approaches to announcements were introduced (van Ditmarsch et al.).

Sequent calculi were present, such as that for multi-modal logic with interaction between modalities (Gratzl) and that for propositional logics with ambiguous interpretations of some connectives (Kuijer).

Deontic logic also featured, with Ju and Liang's logic based on Boolean modal logic (with histories as semantic model) for dealing with imperatives, Dong and Li's logic for dealing with norms involving 'complex' actions, and Sun's discussion on the relationship between input/output logic and the theory of joining systems.

On multi-agent interaction, Goranko and Turrini studied the effects of pre-play negotiations on the equilibrium of normal form games and Agotnes et al. studied Boolean Games in which the agents' goals can also be epistemic states. Some works extended previous proposals: Liu et al. presented a logic for reasoning about strategies in extensive games in which the players can only see part of the game tree, and Cui and Luo provided a unified framework for exploring the epistemic rationale behind four 'iterated elimination' algorithms. Finally, Harjes and Naumov presented the notion of cellular games and studied whether it is possible to predict one player's Nash equilibria strategy from the other player's strategy.

Fernando Velazquez Quesada
University of Seville

Inductive Logic and Confirmation in Science, 17-18 October

Over a balmy pair of late-October weekdays, researchers gathered at the University of Kent's Paris campus to discuss inductive logic and confirmation.

Branden Fitelson presented joint work with David McCarthy on the topic of comparative confidence. His talk introduced adequacy conditions for relations depicting rational epistemic comparisons and presented an impressive array of positive and negative facts about how they can be represented numerically. For example, it was shown that avoiding a relation that is 'strongly strictly dominated', making additional errors on top of another's in all possible worlds, entails representability by a 'plausibility measure' that tracks logical entailment.

Several talks added an interesting historical perspective to the discussion. Molly Kao shed light on science's affinity for theories that unify seemingly unrelated phenomena by analysing the support lent to the 'quantum hypothesis' by a series of heterogeneous experiments that seemed to agree about the value of Plank's constant. Jonah Shupbach argued that investigations into Brownian motion provide insight into the way scientists test whether a phenomenon is robust.

Tom Sterkenburg, Einar Dunger Böhn and Teddy Groves sought to extract novel insights from historical philosophical debates. Solomonoff's work on information theory, Quine's kind-based solution to the paradoxes of confirmation and Carnap's explicatory approach to inductive logic all deserve renewed attention, they contended.

Presenting joint work with Roberto Festa, Gustavo Cevolani showed that many popular definitions entail the 'Matthew condition' according to which a piece of ev-

idence that two hypotheses give the same likelihood always confirms the hypothesis with greater unconditional probability more than the less probable one. However, scientific practice sometimes seems to defy the Matthew condition. For example, the return of Halley's comet seemingly lent greater weight to the theory that Newton's laws of motion apply throughout the universe than the logically weaker and therefore more unconditionally probable theory that they only apply in the Solar system.

David Miller gave a qualified argument in favour of a definition of confirmation not based on the conditional probability $p(h \mid e)$, but the number $q(h, e) = p(\neg e \mid \neg h)$ which, he noted, both generalises deducibility and takes the value 0 when e is a logical truth. These advantages notwithstanding, professor Miller added, science does not really require any measures of confirmation.

Juergen Landes gave a talk on scoring rules in which he contrasted epistemic and statistical concepts of strict propriety. The latter, according to which agents minimise their expected losses by announcing the correct probability function, is a sensible condition, assuming that such a function exists, whereas the former seems trickier to motivate.

Jan-Willem Romeijn finished the conference with a talk attempting to unite inductive-logical and statistical perspectives on uncertain reasoning. Drawing on work by Gaifman and Snir, it was shown how statistical hypotheses can be defined in inductive logical terms according to their observational consequences, as sets of random data-streams with specified frequencies.

Each talk provoked interesting discussions which continued long after the end of the offical proceedings. All agreed that it had been a productive and enjoyable few days.

A second workshop on inductive logic and confirmation in science will be organised by Jonah Schupbach and held in Salt Lake City, Utah, in the autumn of 2014.

Teddy Groves
University of Kent

Calls for Papers

Belief Change and Argumentation Theory: special issue of *Annals of Mathematics and Artificial Intelligence*, deadline 15 November.
Trust, Argumentation, & Technology: special issue of *Argument and Computation*, deadline 15 December.
Presuppositions: special issue of *Topoi*, deadline 15 May 2014.
Virtues & Arguments: special issue of *Topoi*, deadline 1 September 2014.

What's Hot in ...

Uncertain Reasoning

Embrace uncertainty. That's the take-home message of the 2013 'Sir Karl Popper Memorial Lecture' delivered last 15th October at the LSE by Helga Nowotny. The lecture, titled "The Cunning of Uncertainty" is available in a podcast from the LSE website.

Nowotny, president of the European Research Council, takes the audience through a fascinating tour across *Wissenschaft* during which she dispenses plenty of pointers to one central idea: the pursuit of knowledge needs to embrace, rather than fear, uncertainty. The lecture starts by recalling how archeological evidence, in the form of items relating to oracles, prophecies or predictions, suggests that the "craving for certainty" is constitutive of human beings. This craving is summoned in the spirit of the Enlightenment and is well reflected in the current strive for "governance by numbers". This, Nowotny warns, may lead us blindly to "piling up of false certainties".

So we must embrace uncertainty. And the first conceptual step towards doing so consists in freeing our minds from the wrong idea that risk is synonymous with danger. This equation, according to Nowotny, heavily influences how society as a whole currently perceives uncertainty, promoting a fear of the unknown that deprives us, both individually and collectively, of the welcome consequences of facing risks. The fundamental role played by serendipity in scientific progress is Nowotny's key example. So we should not aim at eliminating the risks arising from uncertainty, for doing so would deprive us from the possibility of creating new knowledge, both in the form of scientific progress and of technological innovation. Embracing uncertainty, trial and error, learning from mistakes, are therefore concepts with which the general public should start being conversant.

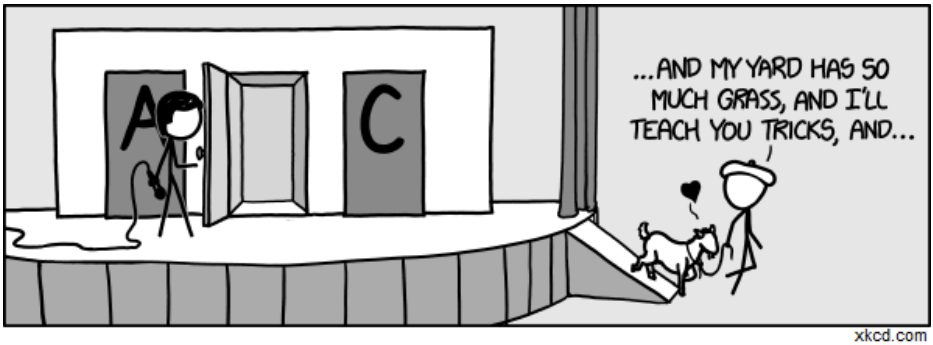
This is clearly all very flattering to uncertain reasoners. Yet the implementation of the *embrace uncertainty* programme seems to be facing a difficult problem. Society as a whole doesn't seem to be at ease with the fact that scientists, in most matters of public importance, just don't hold absolute certainties. Take the case of the scientists who have been found guilty of misleading the population in connection with the earthquake which devastated L'Aquila in 2009 (more on this in my December 2012 column). Earthquakes are widely believed to be unpredictable, and yet the *Commissione* in L'Aquila was under enormous political pressure to announce, as they did, that there was no imminent danger of a major event taking place and that it was safe, for the public, to stay in their homes. The scientifically honest advice would have been 'we don't know', but it isn't hard to imagine that scientists are involved in policy-making to produce more definitive answers than that. How hard will it be to overthrow governance by numbers?

Hykel Hosni
Marie Curie Fellow, CPNSS, London School of Economics

Events

November

J&R: Justification and Reasons, University of Luxembourg, 1–2 November.



CHPS: 29th Boulder Conference on the History and Philosophy of Science, University of Colorado at Boulder, 1–3 November.
Arché / CSMN: 7th Arché / CSMN Graduate Conference, University of St Andrews, 2–3 November.
NKMTD: Naples-Konstanz Model Theory Days, Napoli, Italy, 6–8 November.
Madrid IV: Inferentialism in Epistemology and Philosophy of Science, Madrid, 11–13 November.
Risk Day: Risk and Reliability Modelling for Energy Systems, Durham University, 13 November.
ACML: 5th Asian Conference on Machine Learning, Canberra, Australia, 13–15 November.
Reduction and Emergence: Reduction and Emergence in the Sciences, LMU Munich, 14–16 November.
Philosophy of Medicine Roundtable: Columbia University, New York, 20–21 November.
SCAI: 12th Scandinavian Conference on Artificial Intelligence, Aalborg, Denmark, 20–22 November.
AICS: International Conference on Artificial Intelligence and Computer Science, Bayview Hotel, Langkawi, Malaysia, 25–26 November.
IYS: International Year of Statistics Conference, Luxembourg, 26–27 November.
CSE: Social Epistemology, Quebec, Canada, 29–30 November.
iCOG: Inaugural Conference of Network for Postgraduate and Early-career Researchers in Cognitive Science, University of Sheffield, 29 November–1 December.

December

PRIMA: 16th International Conference on Principles and Practice of Multi-Agent Systems, Dunedin, New Zealand, 1–6 December.
AIC: International Workshop on Artificial Intelligence and Cognition, Turin, Italy, 3 December.

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PT&P: Proof Theory and Philosophy, Groningen, 3–5 December.
TPNC: 2nd International Conference on the Theory and Practice of Natural Computing, Cáceres, Spain, 3–5 December.
AJCAI: 26th Australasian Joint Conference on Artificial Intelligence, Dunedin, New Zealand, 3–6 December.
PhiloSci21: Challenges and Tasks, Lisbon, Portugal, 4–6 December.
Explaining without Causes: Cologne, 6–7 December.
ICDM: International Conference on Data Mining, Dallas, Texas, 8–11 December.
LPAR: Logic for Programming, Artificial Intelligence and Reasoning, Stellenbosch, South Africa, 14–19 December.
OBayes: International Workshop on Objective Bayes Methodology, Duke University,

Durham, NC USA, 15–19 December.
Muskens Jubilee: Workshop in Honor of Reinhard Muskens, Tilburg University, 16 December.
Vagueness: University of Navarra, Pamplona, Spain, 16–17 December.
DialDam: 17th Workshop on the Semantics and Pragmatics of Dialogue, ILLC, University of Amsterdam, 16–18 December.
IICAI: 6th Indian International Conference on Artificial Intelligence, Tumkur, India, 18–20 December.
ISHPS: 14th Annual Conference of the Israeli Society for History & Philosophy of Science, Bloomfield Science Museum, Jerusalem, 22 December.

January

ISAIM: International Symposium on Artificial Intelligence and Mathematics, Fort Lauderdale, Florida, 6–8 January.
UUiEM: Understanding Uncertainty in Environmental Modelling, LSE, 8–10 January.
Conditional Thinking: Leeds, 14–15 January.
CGCPML: 7th Annual Cambridge Graduate Conference on the Philosophy of Mathematics and Logic, Cambridge, 18–19 January.

February

PHILOGICA: 3rd Colombian Conference on Logic, Epistemology, and Philosophy of Science, Bogota, 12–14 February.
Paraconsistency: 5th World Congress on Paraconsistency, Kolkata, India, 13–17 February.

March

WBEM: Workshop on Beauty and Explanation in Mathematics, Umeøa University, Sweden, 11–12 March.

April

AISB: 7th AISB Symposium on Computing and Philosophy: Is computation observer-relative?, Goldsmiths, London, 1–4 April.
EBL: 17th Brazilian Logic Conference, Petrópolis, Brazil, 7–11 April.
PSX4: Philosophy of Scientific Experimentation 4, Pittsburgh, PA USA, 11–12 April.
PhiloSTEM: 6th Midwest Workshop in the Philosophy of Science, Technology, Engineering, and Mathematics, Fort Wayne, Indiana, 11–12 April.
Mathematical depth: University of California, Irvine, 11–12 April.
TAMC: 11th Annual Conference on Theory and Applications of Models of Computation, Anna University, Chennai, India, 11–13 April.
PhML: Philosophy, Mathematics, Linguistics: Aspects of Interaction, St. Petersburg, Russia, 21–25 April.
PhDs in Logic: Utrecht, The Netherlands, 24–25 April.

UK-CIM: UK Causal Inference Meeting (UK-CIM): Causal Inference in Health and Social Sciences, University of Cambridge, Cambridge, 28–29 April.
MAICS: 25th Modern Artificial Intelligence and Cognitive Science Conference, Gonzaga University, Spokane, WA, USA, 26–27 April.

Courses and Programmes

Courses

Modes of Technoscientific Knowledge: Chalet Giersch, Manigod, France, 19–25 January.
Groningen Winter School: Faculty of Philosophy, University of Groningen, 27–28 January.
Epistemic Game Theory: EPICENTER, Maastricht University, 12–23 May.

Programmes

APhil: MA/PhD in Analytic Philosophy, University of Barcelona.
Doctoral Programme in Philosophy: Language, Mind and Practice, Department of Philosophy, University of Zurich, Switzerland.
HPSM: MA in the History and Philosophy of Science and Medicine, Durham University.
Master Programme: in Statistics, University College Dublin.
LoPhiSC: Master in Logic, Philosophy of Science & Epistemology, Pantheon-Sorbonne University (Paris 1) and Paris-Sorbonne University (Paris 4).
Master Programme: in Artificial Intelligence, Radboud University Nijmegen, the Netherlands.
Master Programme: Philosophy and Economics, Institute of Philosophy, University of Bayreuth.
Master Programme: Philosophy of Science, Technology and Society, Enschede, the Netherlands.
MA in Cognitive Science: School of Politics, International Studies and Philosophy, Queen's University Belfast.
MA in Logic and the Philosophy of Mathematics: Department of Philosophy, University of Bristol.
MA Programmes: in Philosophy of Science, University of Leeds.
MA in Logic and Philosophy of Science: Faculty of Philosophy, Philosophy of Science and Study of Religion, LMU Munich.
MA in Logic and Theory of Science: Department of Logic of the Eotvos Lorand University, Budapest, Hungary.
MA in Metaphysics, Language, and Mind: Department of Philosophy, University of Liverpool.
MA in Mind, Brain and Learning: Westminster Institute of Education, Oxford Brookes University.

MA in Philosophy: by research, Tilburg University.
MA in Philosophy of Biological and Cognitive Sciences: Department of Philosophy, University of Bristol.
MA in Rhetoric: School of Journalism, Media and Communication, University of Central Lancashire.
MA programmes: in Philosophy of Language and Linguistics, and Philosophy of Mind and Psychology, University of Birmingham.
MRes in Cognitive Science and Humanities: Language, Communication and Organization: Institute for Logic, Cognition, Language, and Information, University of the Basque Country, Donostia, San Sebastian.
MRes in Methods and Practices of Philosophical Research: Northern Institute of Philosophy, University of Aberdeen.
MSc in Applied Statistics: Department of Economics, Mathematics and Statistics, Birkbeck, University of London.
MSc in Applied Statistics and Datamining: School of Mathematics and Statistics, University of St Andrews.
MSc in Artificial Intelligence: Faculty of Engineering, University of Leeds.

MSc in Cognitive & Decision Sciences: Psychology, University College London.
MSc in Cognitive Science: University of Osnabrück, Germany.
MSc in Cognitive Psychology/Neuropsychology: School of Psychology, University of Kent.
MSc in Logic: Institute for Logic, Language and Computation, University of Amsterdam.
MSc in Mathematical Logic and the Theory of Computation: Mathematics, University of Manchester.
MSc in Mind, Language & Embodied Cognition: School of Philosophy, Psychology and Language Sciences, University of Edinburgh.
MSc in Philosophy of Science, Technology and Society: University of Twente, The Netherlands.
MRes in Cognitive Science and Humanities: Language, Communication and Organization: Institute for Logic, Cognition, Language, and Information, University of the Basque Country (Donostia San Sebastian).
Open Mind: International School of Advanced Studies in Cognitive Sciences, University of Bucharest.
PhD School: in Statistics, Padua University.

Jobs and Studentships

Jobs

Associate Professor: In Philosophy of Science, University of Geneva, until filled.
Post-doc Position: in Set Theory, Torino University, until filled.
Post-doc Position: on the project "Rational reasoning with conditionals and probabilities", MCMP, LMU Munich, until filled.
Junior Faculty Position: in Analytic Philosophy, Stanford University, deadline 1 November.
Senior Faculty Position: in Analytic Philosophy, Stanford University, deadline 1 November.
Professor: at Arché, St. Andrews, deadline 10 November.
Lecturer: in Logic and Epistemology, Philosophy, Birkbeck, 15 November.
Assistant Professor: in Philosophy of Social Science, MCMP, LMU Munich, deadline 20 November.
Postdoc Positions: on "Science beyond scientist" project, VU Amsterdam, deadline 15 December.

Studentships

Student Assistant: on the project "Rational reasoning with conditionals and probabilities", MCMP, LMU Munich, until filled.