# The Reasoner

## Contents

## Guest Editorial

John Corcoran is an eminent logician, philosopher, mathematician, linguist, and historian of logic. He has been member of the IBM Research Center's Linguistics Group and teacher of logic at the Universities of California, Pennsylvania, Michigan, and Buffalo. He created a long tradition of original research and interdisciplinary communication through seminars and colloquiums. He lead the "Buffalo Syllogistic Group" for over 40 years, being a great teacher not only for the clearness of his ideas but also for transmitting a democratic educational ethos. I came upon his work on Aristotle in the framework of my research program on Aristotelian Informatics and I realized that I had met his name some years earlier when I had borrowed from the University Library of Patras his edition of George Boole's "Laws of Thought".

Athanasios Christacopoulos
Hellenic Open University

## Features

### Interview with John Corcoran

Athanasios Christacopoulos: First of all I must say that it is an honour to have an interview with one of the leading personalities in logic. I would like to begin our conversation with your first scientific interests: those that shaped your way to research on logic –mathematical, historical, and philosophical– till the moment you said to yourself "I have something new to say".

John Corcoran: This sort of question would get different answers, all tentative, at different times. Today, I think back to the late 1960s. My first published paper "Three logical theories", offers rationales for logical-system properties such as weak completeness, strong completeness, deductive completeness, various forms of compactness, consistency, and soundness, and the like.

I wrote early drafts of what became "Three logical theories" for my graduate logic courses. One goal was to take the alienating and intimidating *mumbo-jumbo hocus-pocus* out of logic. I wanted to begin the process of demystifying logic. I tried to connect my students to the reality of what logic is about so they could get traction and be able to unmask the authoritarian charlatans hiding behind pompous jargon. I wanted to help them see logic as a dynamic, growing field answering to felt human needs. To overcome alienation students must see themselves as self-confidently creating logic for their own individually felt purposes.

Other things that gave me confidence that there were important projects for me in logic were my observations (1) that Russell-type logicism was based on misunderstanding and rationalization and (2) that Łukasiewicz-type interpretations of Aristotle overlooked (and kept readers from seeing) central points such as that logic, specifically Aristotle's logic, is about proof. I saw very clearly that Russell and Łukasiewicz were concerned to gain converts by intimidation and obfuscation instead of seeking clarity and truth. Why should they seek what they thought they already had? The more I realized that my views were in the minority the more confidence I had in my vocation. Needless to say, the fact that I had studied and conferred with some the most competent and accomplished logicians in the world did not hurt.

AC: Do you believe that truth or proof sets one free?

JC: There are several points of resonance with my writings here. Tarski and I discussed the slogan "Truth will set you free". We did not pass over the point that the slogan is addressed to people who are not free. Tarski's view was that it was misleading and misguided if not plain false: he thought that freedom was a prerequisite for being able to gain knowledge of truth. From his perspective the slogan has things backward. Tarski's slogan would be more like "Freedom will bring you truth".

With full appreciation and agreement, I took a complementary tack. My view was that the slogan was misleading and misguided for another reason too. It implies that possession of (belief in) truth can somehow break the chains of intellectual bondage. My view is that belief can be bondage and that doubt is essential for intellectual freedom. This might have been the downfall of Russell and Łukasiewicz. I touched on these points in several places including "Farewell letter to my students", "Inseparability of logic and ethics", and "Investigation of knowledge and opinion", written with my friend and former student, Professor Idris Samawi Hamid, the Islamic scholar.

Further resonances with my epistemological writings arise from considering the expression, not as a slogan, but in its historical context as a philosophical statement: "You will know the truth and the truth will set you free". The first clause presupposes some of the most basic premises of my epistemology: e.g., that truth is distinct from knowledge, that truth is prior to knowledge, that knowledge requires knowers whereas truth doesn't – to mention three. Given the first clause, the second could be taken to mean "knowledge will set you free", which is close to the enlightenment motto "knowledge is power."

The expansion of "truth will set you free" to "truth or proof will set you free" resonates with Tarski's classic essay "Truth and proof", which I have cited several times. It also calls to mind the Peter Andrews book "Truth through proof", which I reviewed. The lessons of the Tarski essay, well learned by Andrews – who probably did not need Tarski's instruction to supplement what he got from his teacher Alonzo Church– is that knowledge of truth is gained though proof: Proof is not manipulation of meaningless syntactic symbols, as the manipulists, or strict formalists, would have it. Beyond that is Tarski's technical point that some arithmetic truths are unprovable: because arithmetic provability is arithmetically definable whereas arithmetic truth, although intuitively clear, is not arithmetically definable.

Before wrapping up my answer, I would like to remind myself and your readers of three points I have made several times. First, belief can be an obstacle to finding a proof because one of the marks of proof is its ability to resolve doubt. Second, we usually don't try to prove propositions we don't believe or at least suspect to be true. Third, the attempt to find proof often leads to doubts we otherwise never would have had. If you have a treasured belief you would hate to be without, do not try to prove it.

There are many other rich veins in this goldmine of a question.

AC: How did you get interested in Aristotle's logic? And what led you to master the daunting Łukasiewicz treatise? And why were you so suspicious of the Łukasiewicz approach?

JC: When I was an undergraduate engineering-science student at Johns Hopkins University in the late 1950s, my first logic teacher had high praise for Aristotle and Boole. I had a scholarship that covered my undergraduate tuition and gave me credit in the University Bookstore to pay for my books, instruments, and supplies. At the end of one semester there was enough money left in the account for me to buy inexpensive editions of Aristotle's "Prior Analytics" and Boole's "Laws of Thought". I found these books fascinating but virtually impenetrable, except in broad outline.

In the late 1950s and early 1960s, I took several symbolic and mathematical logic courses. I never took a course in history of logic or in philosophy of logic. Without realizing it, I was formulating my own philosophy of logic, with no intention to become a historian of logic: I was a mainstream contemporary mathematical and philosophical logician. Nevertheless, over the years I would come back again and again to one or the other of these tantalizingly obscure masterpieces. Perhaps the honesty and modesty of the writing and its lack of posturing pomposity and partisan contentiousness were attractive.

I came to notice that Aristotle had a theory of demonstrations as logical deductions from experientially known axioms and that Boole had an interpretation of Aristotle's theory of deduction that made perfect sense to me, at least in broad outline. When he read Aristotle, Boole was a celebrated mathematician: self-taught and totally innocent of the corrupting influence of professional logicians and scholars. He was a sincere and gifted person with unusual maturity, independence, and common sense, not to mention his thirst for knowledge.

In answering your question I see for the first time that in broad outline Boole's interpretation of Aristotle was amazingly close to mine. Boole had Aristotle using rules of deduction to deduce categorical conclusions from categorical premises, no truth-functional combinations of categoricals and no propositional logic. What kept me from seeing this before was that Boole had no interest in explaining what Aristotle had done: Boole was obsessed with remaking Aristotle as an English algebraist much as Łukasiewicz was obsessed with remaking Aristotle as a Russellian logicist.

One thing that kept me moving more or less in the right direction was my dedication to letting Aristotle speak for himself to me. I followed this rule in studying other logicians including Boole and Łukasiewicz – two dedicated geniuses whose real work is still undervalued and not understood.

Although I had spent many hours with Aristotle and Boole,

and although I found Łukasiewicz unconvincing and untrustworthy, it did not occur to me that I had anything to say about Aristotle until 1970 when I discovered Aristotle's natural-deduction system.

This brings me to the last part of your three-part question: why were you so suspicious of the Łukasiewicz approach? I could write an essay on this. But I will limit myself to two points. First, his treatise did not engage with the readers or respect their autonomy as Boole's did. Łukasiewicz wanted to browbeat his readers into accepting his views. Second, Łukasiewicz said that Aristotle never revealed the purpose of the Analytics. Aristotle's first sentence says that the Analytics concerns proof, demonstrative knowledge of truth. Łukasiewicz was so blinded by his own convictions that he could not see what was there in plain sight.

AC: With regard to reception of your work, what were your biggest disappointments and what were your most pleasant surprises?

JC: Every scholar should be asked this question.

Of my many disappointments, two stand out: the delayed acceptance my discovery of Aristotle's natural-deduction system and the almost total ignoring of my work on string theory. Of course I am talking about acceptance by the community of scholars, not by journals. The editor of the journal to which Aristotle's natural-deduction system was sent promptly rejected it with a short note saying there is no such thing as natural deduction. In contrast "String theory" was promptly accepted in a long letter that said, among other things, that the footnotes alone gave a useful survey of the history and philosophy of the subject.

When I started publishing on Aristotle in the early 1970s, I naively thought the Corcoran-Smiley approach would be quickly accepted, after a short period in which Łukasiewicz supporters would argue vigorously against it, only making its merits and Łukasiewicz's flaws more evident. But over fifteen years passed before Aristotle's natural-deduction system got significant recognition, largely due to Robin Smith's adoption of it for his 1989 translation of Prior Analytics.

As far as string theory is concerned, the sad story still lacks a belated but happy ending. I now see that this work began in the late 1950s long before I joined the Department of Linguistics and the Department of Computer and Information Science at the University of Pennsylvania in the mid-1960s. String theory is the mathematics underlying human and machine manipulation of symbols, uninterpreted syntactic characters. Philosophically, string theory undermines the philosophy called "manipulism", or "strict formalism", by exhibiting the contentual mathematics that formalism presupposes. Students and colleagues in both departments realized the foundational importance of the subject and joined me in working on it. My 1974 paper "String theory" is co-written with two of my University of Pennsylvania PhDs, one from Linguistics, William Frank, and one from Computer and Information Science, Michael Maloney. This paper is the first to treat this subject since the two ground-breaking works in the 1930s: one by Tarski and one by Hermes. This paper builds on, combines, and unifies the Tarski and Hermes approaches. In fact, it shows that the two approaches, though conceptually distinct, lead to definitionally equivalent theories. Unfortunately, it is still almost without readers as is also the case with the passages on string theory by Tarski and Hermes.

Of my many pleasant surprises, one stands out far above all others: my paper 2015 "Existential import today", co-written with the young Iranian logician Hassan Masoud. Shortly after it was published in *History and Philosophy of Logic*, it gained first place on its journal's most-read list with over 1500 readers. At the moment it is still first with over 6000 readers, the second place paper has yet to reach 1500. With all appropriate modesty and giving much credit to the energy, dedication, and creativity of my co-author, I am very happy with the paper and I think it has a lot to teach logic students and their professors.

Thank you, Athanasios, for your energy and initiative.

AC: Thank you very much John, from the depths of our heart and our logic.

## NEWS

### The Generalized Theory of Evolution Conference, 31 January–3 Feburary

The conference, which took place from January 31st to February 3rd, 2018, at the Center for Logic and Philosophy of Science, Heinrich-Heine University, Düsseldorf, attracted academics from a wide array of disciplines and nationalities to critically engage the subject of evolutionary theory and its generalization.

With seven keynote lectures and a total of thirty-five talks delivered from the fields of Anthropology, Biology, Economics, History, Philosophy, Politics, Psychology, Sociology, and Technology Studies, the conference provided an expanded context for lively and high-level exchange across disciplinary boundaries. Although most of the scholars in attendance seemed broadly united by a common commitment to a Darwinian analysis of cultural phenomena, there also appeared a strong and vocal body of intellectuals for whom a generalization of evolutionary theory entailed not an extension of its prototypical processual characteristics to new explanatory frontiers, but rather an elaboration and formalization of the diverse mechanisms underlying adaptive transformations in biological systems. The defining attribute displayed by the make-up of the conference was unquestionably its profound heterogeneity. The various contributions differed not merely along the axes of experimental and theoretical work, as well as qualitative and quantitative methodologies, but exhibited more fundamental disparities and disagreements between the different outlooks.

The conference was initiated on January 31st with a keynote by world-renowned analytic philosopher Daniel Dennett, presenting on a memetic approach to cultural evolution and the gradual de-Darwinization of human culture. Alex Mesoudi, a prominent voice in the contemporary study of cultural evolution, began the following day with a presentation of experimental data in support of a Darwinian interpretation of cultural transformation. He outlined the possibility of synthesizing the social sciences through a process modelled on the Modern Synthesis, yet also added the caveat that not all cultural phenomena can be described equally well under a general selectionist paradigm. Using insights from game theory, computational modeling, and the mathematics of memetic evolution, Gerhard Schurz, who holds the chair of Theoretical Philosophy at the Heinrich Heine University of Düsseldorf, provided a systematic juxtaposition of the descriptions of nature and culture within a generalized theory of evolution. An inves-

tigation into the spontaneous emergence of meaningful communication using game theory as well as computational and mathematical modeling was offered by Brian Skyrms, Distinguished Professor of Logic and Philosophy of Science and Economics at the University of California, Irvine and a Professor of Philosophy at Stanford University, on the morning of the third day. Ruth Mace's analysis of kinship and residence patterns in Africa and China demonstrated the power of Niko Tinbergen's four foundational questions in ethology for explaining cultural phenomena, drawing on her work as Professor of Evolutionary Anthropology at the University College London. The final day of the conference started with the keynote lecture of Thomas Reydon, Professor for the Philosophy of Biology at Leibniz Universität Hannover, who addressed the requirements for applying a generalized evolutionary theory to a specific domain, focusing on the concept of population within the philosophy of biology. Eva Jablonka, co-author with Marion Lamb of the seminal Evolution in Four Dimensions and a key proponent of the extended evolutionary synthesis, presented an evolutionary-developmental approach to the study of culture—applying Conrad Waddington's concept of an epigenetic landscape to explain the within and across-generational inheritance of cultural characteristics ranging from religious practices to economic disparity.

Many overarching themes threaded through the conference proceedings, forming, if not a concrete and unified whole, at least a set of family resemblance conditions which brought the many keynote and contributed talks together. One such topic of primary importance was a discussion of the benefits, limitations, and applications of a memetic approach to cultural evolution, with both critiques and developments of work by Richard Dawkins, Susan Blackmore, and Daniel Dennett featured in presentations by Michael Schlaile, Martin Boudry, and Steije Hofhuis, and Dennett himself, among others. Another motif, which appeared both visually and conceptually prominent throughout the many keynote and contributed talks, was that of the Darwinian Spaces model—a graphical representation of the multidimensional gradients of evolvability and De-Darwinization, including fidelity of inheritance, smoothness of fitness landscape, and covariance of fitness differences with disparities in intrinsic properties–originally introduced by Peter Godfrey-Smith, and later adapted by Dennett towards modeling cultural evolutionary processes. It was readily apparent from the rhetoric of the conference that the notion of multiple simultaneous modes or dimensions of evolution, as proposed by Eva Jablonka and Marion Lamb, had not only made waves, but indeed shifted the tides within the biological sciences from a reductionist, gene-centric dogma to a more inclusive and pluralistic approach. Lying just below the surface of many of these discussions, though explicitly addressed in few, such as the talk of Çağlar Karaca, were questions relating to the fundamental metaphysical basis of evolutionary theory. Thinkers of the likes of John Dupré and Nancy Cartwright have provided noteworthy historical contributions to these issues, probing the nature of the core ontology undergirding the biological sciences, and the status of process, probability, and causality therein.

The role of self-organization in evolution, a notion which came to prominence in the late 20th century thanks to work of Stuart Kauffman, was made the subject of analyses by Karaca, Yoav Soen, and Nicola Bertoldi. Many also questioned the role of contingency in evolution, a subject which has been hotly disputed among biologists since it was brought to light by the late Stephen J. Gould. A second topic of much contention in the evolutionary sciences is the levels of selection debate, introduced by Richard Lewontin, and renewed by David Sloan Wilson and Elliott Sober, which was also seen to play out in the talks of Alex Aylward, Lorenzo Baravalle, Caleb Hazelwood and Lane DesAutels, and Philippe Huneman. On the centennial of the birth of the modern synthesis, the reverberating impacts of nearly a century's worth of critiques and substantial revisions, lobbied first by Conrad Waddington, later by Stephen J. Gould and Niles Eldredge, and most recently by Massimo Pigliucci and Kevin Laland, were keenly felt. The extended evolutionary synthesis was a prominent focus amongst the contributed talks, featuring in the presentations of Fermín C. Fulda, Mathias Gutmann, Hazelwood & DesAutels, Íñigo Ongay de Felipe, and Francesco Suman. Tensions between various conceptions of organismality and individuality arose during the proceedings, including the distinction between biological individuals, evolutionary individuals, and symbiotic holobionts, a topic broached by Hazelwood & DesAutels, as well as discussions relating to the categorization of replicators and organisms and their respective roles in the evolutionary process, which featured in the talks of Daniel Dennett, Mel Andrews, and Yoav Soen. From the commonality of references to the work of Mary Jane West-Eberhard and Eva Jablonka, and the recurrent motif of Conrad Waddington's epigenetic landscape, it was plain that the role of developmental plasticity in the biological sciences had become elevated to a new primacy within the field. Overarchingly, the successes of the modern synthesis and Neo-Darwinism, and their extension to super-biological domains, were both exalted and interrogated with commendable scholarly rigour. The richness and diversity of the research presented at the conference far exceeded that which may be subsumed under these broader topics, and can be painted only in broad brushstrokes. The contributions varied widely both in theoretical approach, as evidenced by the signalling games introduced in a talk by Rafael Ventura and the use of graph theory for the formalization of a causal interactionist population concept by Karim Baraghith, as well as in the phenomena investigated, from the evolution of dance analyzed by Pedro Atã & João Queiroz, to the witch hunts explained as memetic phenomena by Maarten Boudry and Steije Hofhuis, up to Özlem Yılmaz' presentation on plant stress physiology.

In its very title, the Generalized Theory of Evolution conference alluded to the potential for a unifying theoretical framework of both life and social sciences. Yet the proceedings proved, above all else, a remarkable forum in which to observe the plurality of scientific enquiry. Within the space of four days one saw the scientific process in operation on many simultaneous levels, conducting its explorations with an arsenal of heterogeneous conceptual and empirical tools, and serving manifold purposes, all united under the pursuit of establishing the explanatory scope of evolutionary theory.

Mel Andrews
Tufts University
Elmo Feiten

## Calls for Papers

Pluralistic Perspectives on Logic: special issue of *Synthese*, deadline 1 June.
Agency and Rationality: special issue of *MANUSCRITO*, deadline 30 June.

# What's Hot in . . .

## Medieval Reasoning



Within the historiography of logic broadly constructed, it is not uncommon for scholars to keep an eye on the contemporary debates and endeavours that are connected – either by lineage or by analogy – to the focus of their research in their field of expertise. Most historians of philosophy have a solid competence at least on the periods of the history of philosophy neighbouring their own; however, it is not as common for historians to be aware of other traditions that are not commonplace in our Western curricula or directly connected to the one they are investigating – even when they should be, because some of the debates in those other traditions mirror the ones that they are studying, and the differences might be intrinsically interesting and informative. This is not an ideal state of things, but it's nobody's fault: no one can know everything. Nonetheless, particularly in the history of logic and reasoning, encouraging comparative approaches, along with diachronic and synchronic conversations about core concepts across different traditions could turn out to be particularly interesting, even enlightening.

Therefore, we are pleased to announce the first meeting of the *American Symposium on the History of Logic*, to be held at the University of California, Los Angeles, from May 24th to 27th 2019. This Symposium is conceived as a meeting of specialists on different traditions in the History of Logic.

Each meeting will focus on a specific issue central to logic, with the aim of offering a comparative picture of its treatment throughout history. The intent is to bring together contributions particularly on:

○ Sanskrit and Eastern logic (Ancient, Medieval, Early Modern);

○ Ancient, Late Ancient and Byzantine Greek logic;

○ Syriac and Arabic logic;

○ Medieval Latin logic;

○ Renaissance, Early Modern and Modern Western logic.

For the upcoming meeting, we invite contributions focusing on accounts of *Validity throughout History*, with particular regard to the aforementioned traditions. Presentations should be 40 min long (plus 20 min discussion). Proposals should be submitted to ashistoryoflogic@gmail.com as anonymous abstracts (max 500 words) and a separate document containing the author's information, by September 15, 2018. Decisions will be communicated by November 1. We particularly encourage submissions by scholars from underrepresented groups in academic philosophy.

Selected papers will be considered for publication in the conference proceedings. For further information, contact: Graziana Ciola; (grazianaciola@g.ucla.edu); Milo Crimi (mcrimi@humnet.ucla.edu); Calvin Normore (normore@humnet.ucla.edu).

Graziana Ciola
Philosophy, Scuola Normale Superiore, Pisa

## Mathematical Philosophy



Reasoning about games has taught us much about social problems concerning interactions of self-interested agents. The relevance of self-interest and the resulting complicated social interactions are all over the news. They have also attracted interest in the philosophy of science journals, e.g., Zollman (2013: Network Epistemology: Communication in Epistemic Communities, Philosophy Compass, Volume 8, Number 1, 15-27), Holman and Bruner (2015: The Problem of Intransigently Biased Agents, Philosophy of Science, Volume 82, Number 5, 956-968) and Romero (2016: Can the behavioral sciences self-correct? A social epistemic study, Studies in History and Philosophy of Science Part A, Volume 60, 55-69), the methodology of medical inference Lundh et al. (2017: Industry sponsorship and research outcome, Cochrane Library, Number 2, Art. No.: MR000033) and – of course – The Reasoner, e.g., Osimani (2018: What's hot in Mathematical Philosophy: The Reasoner, Volume 12, Number 2, 15-16) and Sanjay Modgil's column.

This column is about making teaching game theory fun (to us).

The Centipede Game has gained notoriety due to its ubiquity in philosophical courses on game theory. This game is played between two students taking turns. To start the game the teacher places a pile of cookies of her choice (no one in class is allergic to) in front of the two students. The aim of every student is to maximise the number of cookies she acquires. A student on move may either a) take one cookie and then it's on the other student to play or b) take two cookies and the game ends. When the game ends, the teacher quickly puts on a cookie monster mask, swoops in, and devours the remaining pile of cookies in one fell swoop.

The devouring teacher makes it clear that cookies left on the table are lost, because *someone* (I'm looking at you Jimmy!) took two cookies and ended the game. But surprise! the ""only rational play"" is to take two cookies on the very first turn.

The much-discussed backward induction proceeds as follows. If there are three or less cookies left, it is optimal to take two cookies and end the game. For $N \geq 4$: by the induction hypothesis on $N - 1$, if I only take one cookie now, then the other player will have $N - 1$ cookies in front of her and take two cookies ending the game. So, I take two cookies. The game ends on move one. Great news, teachers! just remember not to eat before class! Teachers caring for their waist line are

hence advised to not play the game after discussing backwards induction reasoning.

Much under-appreciated is the Pirate Game by Stewart (1999: A Puzzle for Pirates, Scientific American, volume 280, 98-99) in which a band of pirates has plunder (a pile of golden chocolate coins) to split; which can also be tackled using backward induction reasoning. Here are the rules: 1) The captain proposes a split of the plunder. 2) The pirates take a secret vote on the proposal. 3) If the proposal receives at least 50% yes votes (the captain has the deciding vote in case of a tie; abstaining is impossible), it is implemented. 4) If the proposal is voted down, the captain is fed to the sharks and the second in command is made the new captain; and we are back to 1).

Given that there is a complete, strict ordering of pirates which is public and that pirates do not honour any commitments in the booth, 'what is the rational way to play the Pirate Game?' you ask your students. While they are trying to figure it out, you play Skulls & Crossbones (Pirates of the Caribbean) and put on your favourite pirate hat and eye patch.

"Alrrrright mates" you eventually address the class, "what shall be done?" The good students might tell you that it matters how many coins ($C$) and how many pirates ($P$) there are or they might have come up with a clever proposal. The very good students point out that the problem is under-specified: the pirates' preferences are, as yet, unknown. With a stern look you turn to them "Arrrr, you want my job; I see. I shall be watching you closely. Here arrre their lexicographic preferences: i) survival, ii) maximise gold and iii) climb the ladder by tossing the captain over board."

Now the problem is fully specified and the backward induction delivers a unique solution which the reader can either workout herself or read the much under-appreciated Stewart (1999). For most bands of pirates, which are large compared to the plunder ($P > 2 \cdot C$), the captain is turned to shark food – no matter what he proposes. Intuitively, the captain does not have enough gold to bribe enough fellow pirates to secure his survival. For $P \leq 2 \cdot C$, the captain always survives.

Now it's time to put my readers to the test and see how well they can think outside the pirate ship. "Captain, your last raid failed, and all you've got are four measly gold coins to split and a lot of mean-spirited pirates on your ship. Be creative, how do you manage to survive?"

Here are a few things you might want to try: resign immediately, claim that plunder will be shared after the next raid, add coins from your private purse or divide every coin into hundredths. The last try is the one with the most upside. Furthermore, it shows that the Pirate Game is not invariant under a change of currency – unlike the backwards induction solution to the Centipede Game.

Technically speaking, this last question was asking: "under which condition does the backward induction solution not apply?" I asked my students this with respect to the centipede game. One of them, Hause von Hauff, guessed that the backward induction might not apply, if the number of coins on the table is hidden. I'm turning this one over to you, do you know if hiding the number of coins on the table makes a difference? More importantly, do your students know?

May your students take you to interesting places.

JUERGEN LANDES
Munich Center for Mathematical Philosophy (MCMP)

## Evidence-Based Medicine

In my previous column I noted that publication bias may be a reason to lower one's certainty that the purported effect of a drug is the right one. There are many ways in which such bias can occur, and one of them is not reporting results. This is a well acknowledged problem and a new initiative headed by the EBM Data Lab at University of Oxford aims to draw attention to this issue in the hope of enacting some positive change. This new initiative is the FDAAA compliance tracker. The FDA Amendments Act 2007 (FDAAA) requires certain clinical trial results (there are some exceptions written in to the law) in the US to be reported within 12 months of completion. The tracker downloads all trials on the largest online clinical trial registry (currently at 270,894 trials from 203 countries as of 12/04/2018), and then identifies which FDAAA eligible trials have not reported results within 12 months of completion. The trial information is then posted on the website for the public to access. Anyone interested in how the tool was designed can find the information here. Also on the website is information about how many trials are not reported and the potential fines these trials could acquire. The FDA can levy fines at $10,000 a day for non compliance and the tracker's estimate of potential fines is at $49,584,734; the grand total of fines claimed by the US government is at a whopping $0. Before I discuss why non-compliance is a problem for the effectiveness of EBM, and how the team intend this tool to be able to shape future practice, it is worth looking at how the researchers who have designed this tool are getting the word out. This is because the publicisation of the tool is central to their practical goals, and provides concrete examples of the negative consequences of non-reporting.

Ben Goldacre is spreading the word on Twitter, and he and another member of the group, Nick DeVito, are writing a weekly blog in the BMJ that will be exposing one unreported trial a week, detailing the trial itself and why its results could be important for clinical practice. So far the blog has discussed trials on: pre-emptive use of non-opioid analgesics for pain after molar surgery; whether doxycycline (a common antibiotic) or the current antibiotic standard of care is more efficacious for treating a specific bacterial infection after shoulder replacement surgery (a very common problem following this type of procedure); using ketamine to treat cocaine addiction.

The examples above indicate some of the important reasons why we should care about the withholding of trial results. Often results are withheld if they are negative results. This could be because whether a drug gets approved is dependent on showing positive results, and if funders have a financial interest in seeing the drug approved this may influence the decision to report or not. Decisions are usually made on the basis of a body of evidence, but if only positive results are reported the estimates arrived at in a systematic review will likely be skewed towards the positive side, thus misrepresenting the

true effect. Non-reporting can occur for more benign reasons - maybe negative results in the absence of other positive results are just considered not worth publishing, as researchers take the results to show that the treatment does not work. However, without knowing what the exact outcome of such studies are we may not be able to direct future research (the trial on ketamine as treatment for cocaine addiction is an example of this). Maybe there is a small effect that when combined with knowledge of the mechanisms of drug action can indicate which modifications need to be made to make the treatment efficacious. Routine clinical practice is also effected by non-reporting: clinicians are instructed to make decisions about patient care on the best available evidence. The two other examples both concern treatments that could significantly effect the routine care given for both procedures; in addition, the molar surgery trial could have implications for resolving the current opioid crisis in the US. A partial evidence base will mean clinicians are less well informed, and a larger amount of positive, negative or even neutral results (combined with any evidence of harms) will mean they are better informed.

Central to the team's attempts to ameliorate these problems by inducing change in reporting practice is the public nature of this project (in addition to the public engagement by twitter and blog, people can submit trials they think are overdue that the tracker hasn't spotted). One of the ways they see it working is incentivising researchers to publish their results. Anyone can easily find individual unreported trials, making the researchers leading the trials individually and publicly accountable. Some universities in the US have already used the tool to find out which of their own trials are not reported, so that they can comply. Unfortunately, not all trials are included in this tracker, and we are a long way from ensuring that all trials are registered. Further, ensuring reporting of results does not deal with the ways in which methodology and analysis can be manipulated to doctor results. However, this is still a great step towards the goal of making all results public so that any potential malfeasance can be clearly identified, rather than remaining only clouded in suspicion.

Daniel Auker-Howlett<br>Philosophy, University of Kent
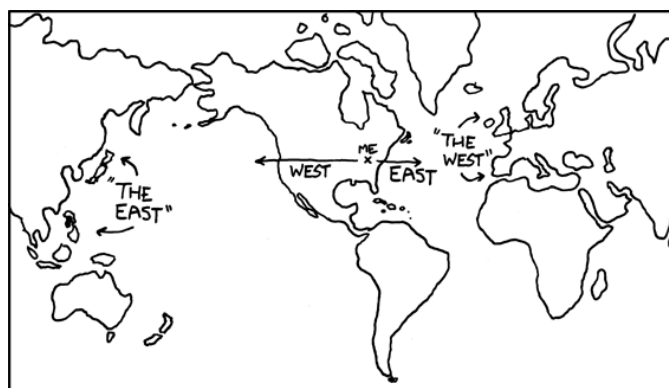


THIS ALWAYS BUGGED ME.

# Events

## May

**PMII**: Perception, Mental Imagery and Inference, Ruhr University, Bochum, 14–15 May.
**KBE**: Knowledge, Belief, Evidence, University of Oxford, 21–23 May.
**MMM**: Modern Modeling Methods, University of Connecticut, 21–24 May.
**E&U**: Explanation and Understanding, Ghent University, 23–25 May.
**PoSW**: Philosophy of Science Workshop, University of Bergen, 24–25 May.
**ICAIBD**: International Conference on Artificial Intelligence and Big Data, Chengdu, China, 26–28 May.
**CPoP**: Current Philosophy of Psychology, Institute of Philosophy of the Czech Academy of Sciences, Prague, 31 May–1 June.

## June

**EoM**: Epistemology of Metaphysics Workshop, University of Helsinki, 1 June.
**PoMMSE**: Philosophy of Medicine Meets Social Epistemology, Hanover, Germany, 7–8 June.
**HaSE**: Workshop on History and Scientific Explanation, KU Leuven, Belgium, 15–16 June.
**RiPTW**: Reasoning in a post-truth world: a look at dual-process models, Utrecht, the Netherlands, 20–21 June.
**AtC**: Approaches to Contradictions, University of Leeds, 22 June.
**CMP**: Computational Modeling in Philosophy, The Munich Center for Mathematical Philosophy, 22–23 June.
**Logical Geometry and its Applications**: Vichy, France, 25 June.

## July

**AAoL**: Australasian Association of Logic Meeting, Victoria University of Wellington, 6–7 July.

# Courses and Programmes

## Courses

**LUCG**: Logic, uncertainty and games, Como, 9–13 July.
**SIPTA**: 8th School on Imprecise Probabilities, Oviedo, 24–28 July.

## Programmes

**APhil**: MA/PhD in Analytic Philosophy, University of Barcelona.
**Master Programme**: MA in Pure and Applied Logic, University of Barcelona.
**Doctoral Programme in Philosophy**: Language, Mind and Practice, Department of Philosophy, University of Zurich, Switzerland.
**Doctoral Programme in Philosophy**: Department of Philosophy, University of Milan, Italy.
**LogiCS**: Joint doctoral program on Logical Methods in Computer Science, TU Wien, TU Graz, and JKU Linz, Austria.

**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 and 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.

**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, Science and Society**: TiLPS, 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 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.

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### MA in Reasoning

A programme at the University of Kent, Canterbury, UK. Gain the philosophical background required for a PhD in this area. Optional modules available from Psychology, Computing, Statistics, Social Policy, Law, Biosciences and History.

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**MSc in Cognitive & Decision Sciences**: Psychology, University College London.

**MSc in Cognitive Systems**: Language, Learning, and Reasoning, University of Potsdam.

**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 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 Sebastián).

**Open Mind**: International School of Advanced Studies in Cognitive Sciences, University of Bucharest.

**Research Master in Philosophy and Economics**: Erasmus University Rotterdam, The Netherlands.

## Jobs and Studentships

### Jobs

**Post-doc**: in Theoretical Philosophy, Stockholm University, deadline 5 May.

**Fellow**: in Philosophy and Physics, London School of Economics, deadline 10 May.

**Post-doc**: in Philosophy of Medicine, University of Sydney, deadline 13 May.

**Post-doc**: in Social Epistemology of Argumentation, VU University Amsterdam, deadline 20 May.

**Senior Lecturer**: in Theoretical Philosophy, Philosophy of Science/Epistemology, Stockholm University, deadline 7 June.

### Studentships

**PhD position**: in Computational Statistics, Delft University of Technology, deadline 1 May.

**PhD position**: in philosophy of science/ epistemology / philosophy of mind/cognitive science, Tilburg University, deadline 15 May.

**3 PhD positions**: in ethics of science/philosophy of science, two at Leibniz Universität Hannover, one at Bielefeld University, deadline 20 May.



Plato was the first true philosopher.