

The 1996 Simon Newcomb Award

Kenneth Ford & Patrick Hayes

Simon Newcomb was a distinguished astronomer and computer¹ who “proved” that heavier-than-air flight was impossible. His proofs are ingenious, cleverly argued, quite convincing to many of his contemporaries, and utterly wrong.

The Simon Newcomb Award is given annually for the silliest published argument attacking AI. Our subject may be unique in the virulence and frequency with which it is attacked, both in the popular media and among the cultured intelligentsia. Recent articles have argued that the very idea of AI reflects a cancer in the heart of our culture and have proven (yet again) that it is impossible. While many of these attacks are cited widely, most of them are ridiculous to anyone with an appropriate technical education.

The following arguments were nominated, often several times, for the 1996 Simon Newcomb Award:

- Selmer Bringsjord for the “Argument from Infinitary Expertise.”
- Sir John Eccles for the “Mysterious Loom Theory.”
- Jerry Fodor for the “One System May Never Give Rise to a More Powerful One” Argument.
- Stuart Hammerhoff for the “Gravitational Theory of Consciousness.”
- Neil Postman for the “Metaphor Gone Mad” Criticism.
- Keith Sutherland for the “Symptom-of-Modernism” Criticism.

In addition, Noam Chomsky, Maurice Wilkes and Joe Weizenbaum were nominated for lifetime achievement awards.

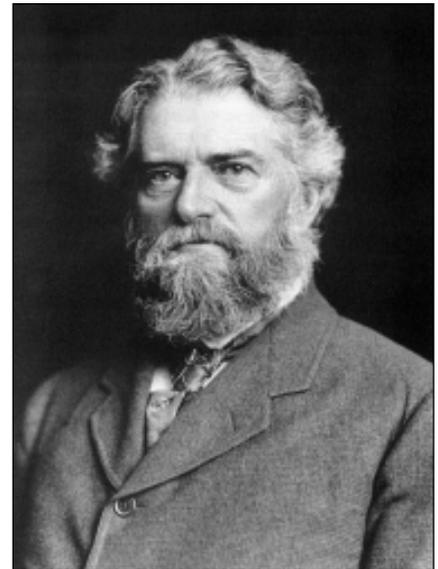
Many of these are worthy candidates, but after much deliberation, the Award Committee has selected the “Argument against AI from

Infinitary Expertise” as the silliest argument directly attacking AI.

This argument has the rhetorical advantage of using concepts from a rather obscure and technical branch of formal logic, but the idea is quite simple. There are mathematical concepts—including some pertaining to infinitudes—which humans can apparently reason about quite confidently. It can be shown that no finite language can fully ‘capture’ these concepts (in a rather technical sense of ‘capture’: roughly, any finite language will have nonstandard models.) But computers are finite: therefore, computers will never be able to fully ‘grasp’ these concepts (in the same technical sense). Therefore, AI is impossible since computers cannot have “infinitary expertise.”

The obvious problem with this argument is that humans are finite too. Bringsjord (to appear) responds to this objection by observing that since these concepts can be captured by a language with infinitely long sentences and infinitely long proofs (the infinitary logic $\mathcal{L}_{\omega_1\omega}$), and the metatheory of $\mathcal{L}_{\omega_1\omega}$ can only be properly expressed (in this same technical sense) in $\mathcal{L}_{\omega_1\omega}$ itself, that therefore “...the sort of mathematical expertise needed for carrying out such proofs requires that one reason *with* a ‘language of thought’ that parallels $\mathcal{L}_{\omega_1\omega}$ itself.” (emphasis in original). Its not quite clear what “parallels” means here, but the argument works only if the language of thought is taken to be infinitary; that is, that humans do their thinking with infinitely long sentences.

Bringsjord helpfully gives a sketch of the proof of a theorem (Scott’s isomorphism theorem) which can only be proved using $\mathcal{L}_{\omega_1\omega}$ because the proof “involves (among other things)



constructing infinitely long conjunctions.” The astute reader will notice, however, that the proof is printed on a finite page using a finite number of characters, and that what it really involves is describing infinitely long conjunctions. As Bringsjord himself takes pains to explain, one can describe something infinite without oneself actually *being* infinite.

There is a rather deep issue in the philosophy of mathematics lurking here, but Bringsjord comes to the wrong conclusion. It is indeed true that finite languages cannot, in a certain technical sense, fully ‘capture’ such intuitive mathematical concepts as infinity. (This doesn’t mean they cannot describe them at all, however.) The almost universal conclusion among philosophers of mathematics is that such intuitive notions as ‘infinity’ must always be understood as relative to the resources of the reasoner. From the outside, as it were, I can ‘see’ that your theory of the infinite has nonstandard interpretations, just as you can ‘see’ this about mine. This seems to be paradoxical only if we apply it to ourselves: but such circularity is well-known to be a source of paradox. (Each of us can stand on the other’s shoulders, but nobody can stand on their own shoulders.) Working mathematicians do not need to be routinely concerned with these philosophical subtleties, so Bringsjord appeals to the naive “bread and butter” platonism which



makes mathematical intuition seem like revealed truth. This is rather like relying on naive realism to provide a proper account of perception.

Further discussion of these matters deserves a book-length discussion in the philosophy of mathematics, which would take us beyond the spirit of these Awards. Suffice it to say that the argument, stripped of its sophisticated clothing, amounts simply to the claim that human mathematicians have infinitely long sentences in their heads. This is a genuinely new argument. Penrose, an earlier recipient of the Award, asserts that mathematicians have "direct access" to infinite Platonic things, but he doesn't venture to claim that one small head can actually contain an infinite piece of mental text.

For all these reasons, as well as the

evident silliness of the argument, we are especially pleased to award the 1996 Simon Newcomb Award to the logician, philosopher, programmer and novelist, Professor Selmer Bringsjord.

The Simon Newcomb Award Committee wishes to thank all those who have expressed encouragement and support (including *Dr. Dobb's Journal*) and especially those who made nominations for this year's award.

Submission Requirements

Nominations are welcomed for the 1997 Simon Newcomb Award. Please send nominations by email to phayes@ai.uwf.edu and kford@ai.uwf.edu. Since the Award is to be given for a particular argument, nominations should give a brief description of the argument, a reference to its place of publication, and the name and affiliation of the nominee. Permission of the nominee is not required.

An argument can win an Award only once, so repetitions of previous award-winning arguments are not acceptable unless they display some new significant variation on the original theme. If it is necessary to explain why the argument is silly, it may not be silly enough. The best arguments are those that a graduate student in computer science might find hilarious. And finally, silly arguments within AI are not eligible for the award, only attacks on AI. Obviously, it would not be practical to give an award for every silly argument in AI.

Bibliography

Bringsjord, S. (to appear). "An Argument for the Uncomputability of Infinitary Mathematical Expertise," in Feltoich P., Ford K. and Hoffman R., eds., *Expertise in Context*. Menlo Park, CA: AAAI Press. (A version is also available at: <http://www.rpi.edu/~brings/inf.exp.3b.ps>)

Note

1. In the late 19th century, the ability to perform numerical computations quickly and accurately was a rare skill requiring native talent and many years of teaching and training; computers were respected intellectual craftsmen.

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ISBN 0-262-62110-X

450 pp., index. \$39.95 softcover

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