

## George Boolos

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It is a great honor to play this special role in honoring the memory of our sorely missed colleague George Boolos, who died of cancer May 27, 1996, after an illness of about six months. Many of us counted him as a friend and feel his loss very personally. So many of his good friends are here that I have to assume that the only sensible reason for me to have been accorded this honor is seniority. But in fact I am far from being the longest standing of George's friends in our field, and I am not confident of being the longest standing of those present here.

We are here to commemorate George Boolos in a way he would have wished to be commemorated, by continuing the work in the fields to which he dedicated his own career. Those of us who knew him will not be able to stop ourselves from trying to imagine what sharp comments he would offer on our efforts and what in the way of a finely crafted talk, with penetrating mathematical and philosophical analysis, he would have offered to the latest gathering of the fraternity.

As many of you know, one of George's last professional acts was to plan and arrange for the publication of a collection of his philosophical essays. It is appearing under the title *Logic, Logic, and Logic* [3]. By that title, George surely wanted to tell us something. The identification that governed all the others in his professional work was that of logician. George wanted to stress that in collecting his philosophical work, which was done very much from the point of view of a logician, which is not to say that George was only a logician. It was for a thesis in mathematical logic that he received MIT's first philosophy Ph. D in 1966. And he continued to work in that field for the rest of his life. To do justice to George's self-identification, we should begin with his logical work. But I won't try to give an account of his content. In any event, in a brief account I could not improve on what has already been published by Warren Goldfarb [4].

Boolos's work in mathematical logic straightforwardly falls almost entirely into three categories: early work belonging to the research program pursued by his teacher, Hilary Putnam, on hierarchies of sets of integers, provability logic, and exposition. But one should add work that was published mostly in philosophical papers:

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the technical work needed to understand the constructions of logicians of the past, particularly Frege, and issues that their work gives rise to.

Boolos was probably the leading expositor of his time of mathematical logic for a philosophical readership, although his writing deserved to be and surely was read more widely than by philosophers and their students. In particular, his textbook with Richard Jeffrey, *Computability and Logic* [5], must have been used in many courses taken by mathematics and computer science students. His teaching inspired writing not just of an expository character but also research. He had a natural gift for presenting things elegantly and clearly and, as Vann McGee has remarked, for breaking proofs down into small and thus relatively easy steps. I never saw George in action in the classroom, but he must have exhibited some of the personal qualities his friends admired: his wit, love of clever twists and puzzles, enthusiasm for logic and philosophy. He must have worked very hard to develop his gifts in teaching and writing.

For the last twenty years of his life, the logical research that George did was almost entirely in provability logic, the study of modal logics where the modal operator or operators are interpreted in terms of provability in a formal system. George made a number of significant contributions to this field.<sup>1</sup> But over and above that, I think it can be said that it was through him that it became a *field*. The work of the 1970s and 80s was done mostly in America, Italy, the Soviet Union, and The Netherlands. George was in contact with all the workers and several of them became his friends. He wrote the first general exposition on the subject, *The Unprovability of Consistency* [1]. But the field moved too fast for him to rest with that. And so when it came to be time to prepare a new edition of that book, he produced what he himself described as a new book, *The Logic of Provability* [2].

Anyone who has worked both in philosophy and mathematical logic knows that it requires a difficult balancing act to keep both philosophical work and logical research afloat. Of the philosopher-logicians more or less of my own generation, none managed this balancing act better than George. He continued to be active in research in logic to the end of his life, while all the time participating fully in the community of philosophers and making contributions to philosophy. Only those who have tried know how difficult that feat was.

Reflecting on the logical content of his philosophical writings brings to light how deep George's identification as a logician went. Boolos made great contributions to the understanding of Frege's philosophy of arithmetic by the work he did analyzing the mathematical arguments in Frege's work, and it was his example and influence that led Richard Heck to carry this investigation further. Mastery of the logic is a major factor giving an exemplary clarity to his contributions to the debate on the neo-Fregean program initiated by Crispin Wright. It is the same drive toward understanding the mathematical content of historical texts that is manifested in one of my favorites among his papers, "The advantages of honest toil over theft," which is mostly about Russell and involved a lot of digging in that unreadable monument, *Principia Mathematica*.

A conclusion we can derive from George Boolos's career is that a fruitful combination of genuine philosophy and serious logic is possible in our own time. Logic has in some way lost status in the philosophical world.<sup>2</sup> It can no longer live just on the capital it accumulated from the philosophical movements that taught that logic is

the essence of philosophy. Even in the philosophy of mathematics it does not have quite the central position it had a generation ago. Good reasons can be cited for this diminished place of logic or for the reluctance of young philosophers to be logicians. But we should not forget that logic has played a fundamental role in philosophy and philosophical education pretty continuously since Aristotle. Boolos's own example showed what a continuing engagement with logical research can do for a philosopher, in the philosophy of mathematics, in illuminating points about language, in understanding historical figures. I think his example shows that sometimes logic *is* philosophy. And if logic in philosophy must now live by its wits, we have in George Boolos's career an example of how that might be done.

## NOTES

1. See [4] and the Afterword by John P. Burgess in [3].
2. Many logicians in philosophy, Boolos included, have observed this with concern. One of the losses the subject suffered from his illness and death is that as President of the Association for Symbolic Logic, he would have been the natural leader of an effort to understand this predicament and to begin to do something about it.

## REFERENCES

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