

REVIEW: Eckart Menzler-Trott's  
*Logic's lost genius: The life of Gerhard Gentzen*

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Received by Greg Restall

Published September 15, 2008

<http://www.philosophy.unimelb.edu.au/ajl/2008>

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Menzler-Trott, Eckart *Logic's lost genius: The life of Gerhard Gentzen*, translated by Craig Smoryński and Edward Griffor (from *Gentzens Problem*, Birkhäuser Verlag), (History of Mathematics, vol. 33) American Mathematical Society and London Mathematical Society, 2007; 440 pp., USD\$89.00. ISBN : 9780821835500.

REVIEW

Natural deduction now features in virtually every first course in formal logic. In general it does not bear Gentzen's name and this may account for that name not being a household word, indeed being oft forgotten, even in philosophical circles. But natural deduction is Gentzen's very great legacy to philosophy – and to mathematics and computer science too. This style of system does indeed seem natural, echoing the way that we structure arguments in natural language. Yet this formalization took a long time to appear. In the mid-nineteenth century, Boole had introduced a very mathematical style for logical arguments about what are now called 'sets'. He used the same style as Leibniz had done centuries before, though it is not known if Boole knew Leibniz's work. Frege introduced a typographically cumbrous and complicated-looking formalism for predicate calculus in the late nineteenth century. Later the mathematician Hilbert introduced a variant of Russell's system and mathematicians used and still largely use such Hilbert-style systems. But it was Gentzen who did the analysis and invented, or should I say, extracted, the style of natural deduction system that is now so familiar.



a major interest of theoretical computer scientists and is heavily deployed in Lawrence Paulson's Isabelle theorem prover based in Cambridge.

Such usefulness was, sadly, not known to Gentzen. Other sadness also permeated Gentzen's life, especially his death, which was a result of Czech, not German, imprisonment. However, his life in Nazi Germany was very troubled. Gentzen was not a Jew; he was baptized an evangelical and joined the Nazi party in 1933, later being discharged from the Wehrmacht in 1942 on the grounds of ill health. His involvement with the Nazis did not seem to interfere with his mathematics, rather his difficulties were in getting a succession of jobs. However the Nazis took far more interest in the nature of mathematics than politicians usually do, and since there were so many excellent Jewish mathematicians, the discipline was particularly vulnerable. (Menzler-Trott gives an exhaustive account of Nazi views on the nature and rôle of mathematics.) In 1945 Gentzen and others were arrested in Prague and put into 'protective custody'. As a German, he was reviled by the Czechs and the unhealthy conditions of his imprisonment led to his death.

The book under review relates all of the above, and much more. The last third of this book is devoted to technical appendices including welcome translations of three of Gentzen's papers, which describe his philosophical motivation and exhibit a genuine concern for mathematical practice. Smoryński presents his view of Hilbert's programme and Hilbert's ultimate triumph over Brouwer, but many of us would question whether Hilbert really was the winner: constructive (or effective) mathematics is flourishing and is essential for computing. I am more inclined to agree with Gentzen's style: on p. 365 (retaining his italics) Gentzen says that to consider the continuum a mathematical fiction or a reality 'is a matter of taste; for mathematical *practice* it has hardly any significance.' The last forty pages of the book are taken up with a technical description of Gentzen's mathematical achievements by Jan von Plato, an appendix which I find difficult to assess. This reviewer is familiar with, and uses, Gentzen's techniques, so finds van Plato's account much simplified; I am not convinced a more casual reader would find it easy to follow.

Gentzen's life is dealt with by presenting a large number of documents (in English translation) that weigh down upon the reader, though having them available will be extremely useful for future scholars. One reads school reports and letters of recommendation but these seem a hindrance rather than a help in providing insights into Gentzen's life and motivations. The translation, mostly by Craig Smoryński, leans more to a word-for-word translation than a literary one and Germanisms sometimes intrude. 'Because one could produce him internationally.' on p. 124 is one of the more startling sentences and 'ordinary' (p. 46) seems an inadequate translation of 'Ordinarius' as applied to a professor. The index is of names only, which seems a pity.

So Eckart Menzler-Trott's book is a book for all libraries; it is not bedtime reading. But Eckart Menzler-Trott is right: Gentzen was a genius, though his abilities are hard to communicate. His wonderfully simple 'natural deduction' is his memorial.

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