

**Thiele, Rüdiger**

**Hilbert's twenty-fourth problem.** (English) Zbl 1031.01011  
*Am. Math. Mon.* 110, No. 1, 1-24 (2003).

This article is based upon the author's discovery in a notebook in Hilbert's mountainous Nachlass in Göttingen of a note about a '24th problem' that he had thought of including in his famous lecture of 1900 on mathematical problems, which contained only 23 in its final form. Apparently he was going to propose the general analysis of proofs in mathematics, especially from the point of view of their simplicity. The author dates this note to 1901. It does not contain a statement for the eventual omission of the problem from the list. One reason may be the realisation that it was not really a problem in a proper sense (though the same point can be made for several of the published 23!). He may also have realised the philosophical deep water that he was entering with this reliance upon simplicity, which is a notoriously complicated notion to work with in a general way. Hilbert's allusions to simplicity in his published paper are of a preliminary kind.

In the early 1900s Hilbert was beginning to develop his interest in the foundations of mathematics, which will flower, especially from the late 1910s onwards, as metamathematics' (but not formalism', a word which he never used to derive his stance because it does not do so). In the section part of his paper the author reviews Hilbert's work in this area up to the 1930s. He also reviews work done on the complexity of computations, and cases where proofs of quite different kinds are offered of a theorem and where simplicity is especially hard to assess. Mention might have been made of a Göttingen dissertation written under the direction of Hilbert's successor Hermann Weyl, giving a metamathematical analysis of the shortening of proofs: *S. Mac Lane*, *Abgekürzte Beweise in Logikkalkül*, Dissertation, Göttingen, Hubert (1934); repr. in *Selected papers*, New York: Springer (1979; [Zbl 0459.01024](#)).

Reviewer: [Ivor Grattan-Guinness \(Bengeo/Herts\)](#)

**MSC:**

[01A60](#) History of mathematics in the 20th century  
[03-03](#) History of mathematical logic and foundations  
[03F07](#) Structure of proofs

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