

The correspondence between Moritz Pasch and Felix Klein

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Abstract

The extant correspondence, consisting of ten letters from the period from 1882 to 1902, from Moritz Pasch to Felix Klein is presented together with an English translation and a short introduction. These letters provide insights into the views of Pasch and Klein regarding the role of intuition and axioms in mathematics, and also into the hiring practices of mathematics professors in the 1880s.

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1. Introduction

If one is interested in an historically informed understanding of the development of mathematical ideas, it is vital to look beyond the published works and to take other sources, like unpublished manuscripts, drafts, and letters, into account. Correspondence can be a particularly rich source of insights, since, on the one hand, letters are usually not meant for publication and thus allow for more candid and tentative formulations. On the other hand, the relationship between the correspondents has a major effect on the content of letters and historians can learn about this relation from what is written, how it is written, and from what was left out. The information gleaned from letters allows us to get a glimpse into the intellectual, personal, and social lives of their authors.

In the case where a mathematician has been a prolific letter-writer, like Leibniz or Gödel, and the correspondence has been preserved in its entirety, it constitutes a gold mine for historians of mathematics. In many other cases, however, the available source material is scarce, fragmented, or simply non-existent. Circumstances often allowed only a small portion of the correspondence to be preserved. Nevertheless, the lack of evidence for an extensive body of letters cannot immediately be taken as evidence that there never was any such in the first place, because it could have been destroyed in the course of time or lost, waiting to be rediscovered in the future.

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Below is presented a German transcription together with an English translation of the known extant correspondence between Moritz Pasch (1843–1930) and Felix Klein (1849–1925), which consists of ten letters from Pasch to Klein from the period 1882–1902.¹ If considered in the context of the other known correspondence of these authors, the relative weight of these letters for the historical scholarship on Klein and Pasch is very different. To give a first impression of this imbalance, the *Kalliope Verbundkatalog Nachlässe und Autographen* database² lists 306 items addressed to Klein and 1785 from Klein, where each item can contain several manuscripts or letters; in comparison, only 13 items from Pasch are listed (two of these contain the letters translated below) and none to him. In other words, for each listed item from Pasch, there are over 160 items to or from Klein! Here are two factors that may have contributed to this discrepancy. First, from 1877 to 1924 Klein was editor of the *Mathematische Annalen* (from vol. 10 to 92), which became one of the most prestigious mathematical journals during this time. In this capacity he dealt with submissions for publication, referees, and general administrative issues. Indeed, three of the letters from Pasch were prompted by him submitting articles for publication to Klein. Second, Klein actively cultivated many contacts with other mathematicians and scientists and he was very much involved in improving the standing of mathematics and mathematics education at national and international levels. This knowledge about the professional and personal situation of many mathematicians is one reason why Pasch approached him for guidance when the second chair in mathematics at the University of Giessen became vacant in 1886. Later, in 1896/97 Klein became the most important consultant for the Prussian Ministry of Education (*Kultusministerium*) with regard to appointments of mathematics professors [Tobies, 1987, 41]. Klein reported to have destroyed his correspondence in the fall of 1878 [Tobies and Rowe, 1990, 8], but he seems to have kept most of it from after this incident and it has been preserved in the archives at the University of Göttingen. Given the availability and the content, parts of Klein's correspondence have already been published: for example, selections of the correspondence with Hilbert, consisting of 129 letters from 1886 to 1918 [Frei, 1985], and a selection of 186 letters between Klein and Adolph Mayer from the period 1871–1907 [Tobies and Rowe, 1990].

The state of affairs is very different in the case of Pasch. His *Nachlaß* at the University of Giessen, where he taught from 1870 until 1911³ contains only a handful of short notes. This is consistent with the information given by Pasch's son-in-law, Clemens Thaer, to Heinrich Scholz that Pasch had the habit of destroying his correspondence after having replied to it [Frege, 1976, 169]. This makes it extremely difficult to gauge the original extent of Pasch's correspondence. To get a rough idea of it, we have to look for the letters that Pasch wrote in the estates of the recipients. One would expect a promising starting point to be those mathematicians who shared Pasch's main research interests, e.g., in axiomatics and geometry. But, unfortunately, the yield is rather thin. In Hilbert's *Nachlaß*, for example, we find only two postcards from Pasch (from 1888 and 1913), which are thank-you notes for the sending of a publication and for Hilbert's contribution to the celebration of Pasch's 70th birthday. Pasch's correspondence with Gottlob Frege, which consists of five letters and a postcard from Pasch to Frege, but no extant item from Frege to Pasch [Frege, 1976, 169–174], contains the beginnings of interesting discussions. However, these are not continued due to the fact that Pasch was often occupied with other duties, as he frequently laments (this is also a common theme in the letters to Klein). It is also interesting to note that five of these items are prompted by Frege's sending of his writings to Pasch. In the *Nachlaß* of Max Dehn, who wrote a long article on the history of geometry that was appended to the second edition of Pasch's lectures on geometry in 1926, only one short letter can be found. Of the colleagues that Pasch mentions in his autobiography [Pasch, 1930], either there seems to be no extant *Nachlaß*, e.g., of Jakob Rosanes, whom Pasch refers to as 'his friend', or no correspondence from Pasch could be found, as in the case of Kronecker and Weierstrass. The following

¹ For some biographical background, see Pasch [1930], Engel and Dehn [1934], and Tobies [1981].

² Online: <http://kalliope.staatsbibliothek-berlin.de>.

³ He continued to live in Giessen until his death in 1930.

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