A Richer Picture of Mathematics

A Symposium in Honor of David E. Rowe

Mainz, 18-20 May, 2016

ABSTRACTS

Tom Archibald, Vancouver:

"Halmos and Dieudonné on Integration and Measure: a controversy at mid-century on method and application"

What is the correct way to define a measurable function? The proliferation of uses of theories of measure, and their importance   for a large number of related areas, posed many options for how to present the basics of the theory. Via an examination of various forms of the Lebesgue-Nikodym Theorem, on the one hand, and the use of measure in axiomatic probability, on the other, we examine different threads in the growing abstraction of analysis. These may be seen through the lens of two 1953 book reviews of work on measure and integration by Paul Halmos and Jean Dieudonné; the former decries the use of the definiendum as the definens, while the latter refers to methods that should be relegated to the Old Curiosity Shop of mathematics.

June Barrow-Green, Milton Keynes:

" 'knowledge gained by experience': Olaus Henrici—engineer, geometer and maker of mathematical models"

The (Danish-born) German mathematician Olaus Henrici (1840–1918) studied in Karlsruhe, Heidelberg and Berlin before making his career in London, first at University College and then, from 1884, at the newly formed Central Technical College where he established a Laboratory of Mechanics. Although Henrici's original training was as an engineer, he is better known as a promoter of projective geometry.   In my talk I shall explore connections between these two sides of Henrici's work.

Moritz Epple, Frankfurt:

„The dynamics of weak knowledge: Another look at ‚Topologie' and ‚analysis situs' in the 19th century"

Philosophy and history of science have usually considered scientific - and mathematical - knowledge as a cultural achievement of particular epistemological and institutional strength. However, in many historical situations knowledge is epistemologically lacking, fragile, socially marginal, or weak in other senses. In my talk I will reconsider the fragments of "Geometria situs" in Carl Friedrich Gauss' mathematical work and Johann Benedikt Listing's attempt to create "Topologie" in order to present a more general framework for studying weak knowledge.

Tinne Kjeldsen, Copenhagen:

„John von Neumann's minimax theorem in the beginning of game theory and a dispute about its importance"

John von Neumann proved the mini-max theorem for two-person zero-sum games establishing the existence of optimal strategies for the two players. Von Neumann presented the proof in a seminar in Gøttingen in 1926, and published the result in 1928. Earlier considerations about such games had been published by Emil Borel in the period 1821-1927, in which Borel first formulated a hypothesis that turned out to be in contradiction with the mini-max theorem. The two mathematicians approached the game problem in very different ways: Borel tried to find constructive solutions to two-person zero-sum games, examining specific examples, whereas von Neumann's work was more in the spirit of the modern axiomatic method. We will discuss the significance of their different approach to two-person zero-game for their development of a solution for such games. Von Neumann encountered the mini-max theorem in various disguises from 1928 to 1944 where he presented the theory of such games and the mini-max theorem in a quite different mathematical framework in his and Oscar Morgenstern's joint book on the theory of games and economic behavior. We will present these encounters in order to discuss the significance of the context in the judgement of the value of the mini-max theorem in relation to a dispute between von Neumann and Maurice Fréchet in 1953 about the importance of the minimax theorem.

Jesper Lützen, Copenhagen:

„Laurent Schwartz: Denmark, distributions and the Fields Medal"

Among his many trips abroad, Laurent Schwartz spoke with special fondness of his first journey to Copenhagen in 1947. This provided him with his first chance to present his new theory of distributions outside of France. He had been invited by Harald Bohr and Børge Jessen who had heard Schwartz present his theory at a meeting earlier the same year in Nancy in France. Bohr immediately saw the importance of Schwartz's ideas and began to lecture on it. In particular he spread the news of distributions when he traveled

around in the USA and Canada the following year. Moreover, as the head of the committee choosing the Fields medalists, Bohr made sure that one of the medals was awarded to Schwartz at the International Congress of Mathematicians in Cambridge Mass. in 1950.

Walter Purkert, Bonn:

„Felix Hausdorff als Philosoph und Literat"

Nach der 1895 erfolgten Habilitation auf dem Gebiet der Astronomie, die kein wissenschaftlicher Erfolg war, verließ Hausdorff die Astronomie und ging in Forschung und Lehre ganz zur Mathematik über. Doch auch hier hatte er sein Thema noch nicht gefunden; er versuchte sich zunächst mit je einer Arbeit auf fünf völlig verschiedenen Gebieten. Aber mehr noch als der mathematischen Wissenschaft hat er sich nach 1895 seiner zweiten Existenz gewidmet, seinen literarischen und philosophischen Neigungen. Unter dem Pseudonym Paul Mongre´ veröffentlichte er einen Band Aphorismen, ein erkenntniskritisches Buch, einen Band Gedichte, ein recht erfolgreiches Theaterstück und 16 Essays in führenden literarischen und kunstkritischen Zeitschriften. In der Hausdorff-Edition beansprucht dieses Werk zwei dicke Bände. Im Vortrag soll versucht werden, wenigstens einige Aspekte dieses Werkes anzudeuten, um vielleicht auch Lust zu machen, den Schriftsteller Mongre´ näher kennenzulernen.

Volker Remmert, Wuppertal:

„Mathematics and its history in Mainz: the early years"

Erhard Scholz, Wuppertal:

"Cartan's exchange between Einstein and E/F Cosserat (1921–23), or: Why translative curvature is known as torsion"

Cartan called his translational curvature (added to the rotational reformulation of Riemann curvature) ``torsion'', apparently in allusion to E. and F. Cosserat's hypothetical torque momentum tension in generalized elasticity theory. This idea took shape in Cartan's study of Einstein gravity and its geometrical generalization in 1921/22. Cartan investigated the common structure of generalized elasticity theory and Einstein gravity in an intriguing interplay of 3 and 4 dimensional considerations from the point of view of Cartan's embryonic new geometry. In this talk I want to sketch this interplay.

Marjorie Senechal, Smith College, Northampton, MA:

"Yesterday today"

The history of mathematics has been a prominent feature of *The Mathematical Intelligencer* from its beginning 40 years ago, while the reasons for featuring it have evolved.   In this talk I will show how David Rowe, a contributor from (almost) the start and its history editor for the past 15 years, has guided readers from "yesterday yesterday" into "yesterday today" and toward "yesterday tomorrow."

Reinhard Siegmund-Schultze, Kristiansand:

„Adolf von Harnacks letzte Veröffentlichung 1930, eine Diskussion in der Zeitschrift ‚Die Koralle' und eine unveröffentlichte Reaktion von Richard von Mises"

Die populäre Berliner Monatszeitschrift „Die Koralle" veröffentlichte im August 1930 den Aufsatz „Stufen wissenschaftlicher Erkenntnis" des gerade verstorbenen Kirchenhistorikers und Gründers der Kaiser-Wilhelm-Gesellschaft, Adolf von Harnack (1851-1930). Die Zeitschrift nahm dies zum Anlass, zehn prominente deutsche Wissenschaftler um ihre Reaktionen zu bitten. Paul Forman (1971), der die an Harnack anschließende Diskussion anscheinend nicht verfolgt hat, sah in Harnacks Aufsatz ein Beispiel dafür, dass sich sogar die Verteidiger der modernen Naturwissenschaft allmählich die Argumente der lebensphilosophisch orientierten Angreifer zu Eigen machten. Richard von Mises (1883-1953), der bedeutende Berliner angewandte Mathematiker und Ingenieur, sah dies anscheinend ähnlich, was unter anderem Formans These zuwiderläuft, dass auch von Mises anpassungsbereit war. Von Mises´ kritische Replik wurde jedoch von der Zeitschrift nicht gedruckt, und sowohl der Nichtabdruck als auch die an Harnack anschließende Diskussion zeigen, dass zumindest „Die Koralle" eher an positiver Wissenschaftspropaganda, als an philosophischer Fundamentalkritik an moderner Wissenschaft oder deren Abwehr (durch von Mises) interessiert war.

Klaus Volkert, Wuppertal:

„Mathematics outside Göttingen: the case of Otto Wilhelm Fiedler"

In my talk I will provide some information on Otto Wilhelm Fiedler (1832 – 1912), the almost forgotten professor of descriptive geometry and geometry of position at the Zürich Polytechnic from 1867 to 1907. Fiedler proposed an interesting program of fusion, integrating descriptive and projective geometry into an organic system à la Jacob Steiner. At his beginning this program seemed to be a promising idea – not least because of Carl Culmann's (1821 – 1881) presence and influence at Zürich – but in the long run it disappeared completely from the scene. So it may be considered as an example of a *failed innovation* – a theme widely neglected in the historiography of mathematics in my opinion.

Scott Walter, Nantes:

„Science and technology in Göttingen's golden era: the first Wolfskehl lectures"

The spectacular rise of Göttingen as a scientific center in the early twentieth century is a curious historical phenomenon, which has attracted significant attention from historians (including David Rowe). My talk will briefly review historical thought on the rise (and fall) of Göttingen, and focus on one of the means by which Göttingen's star mathematician David Hilbert sought to extend the reach of his colleagues and students: the lecture series launched by Henri Poincaré in April 1909, at the behest of the Wolfskehl-Stiftung. Hilbert's role in organizing the Frenchman's visit to Göttingen is examined in light of his correspondence with Poincaré (Dugac, ed, 1986).