Brunswick’s Second Mathematical Star: Richard Dedekind (1831-1916)

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Does your hometown have any mathematical tourist attractions such as statues, plaques, graves, the café where the famous conjecture was made, the desk where the famous initials are scratched, birthplaces, houses, or memorials? Have you encountered a mathematical sight on your travels? If so, we invite you to submit an essay to this column. Be sure to include a picture, a description of its mathematical significance, and either a map or directions so that others may follow in your tracks.

Brunswick - or Braunschweig, as the beautiful town I live in is called in Germany - is the home not only of one first-rate mathematical star, but of two. The first undoubtedly is Carl Friedrich Gauss (1777-1855), who was born here and spent the first 31 years of his life in his hometown except for his years of study at the University of Göttingen. Much has been written about Gauss and much more will be, but little has been done on our second star, Richard Dedekind. A first attempt was made on the occasion of Dedekind’s 150th birthday in 1981 by Gehrke and Harborth in a small booklet [1]. A second attempt followed in 2007 when the local chamber of industry and commerce (IHK Braunschweig) financed a book project [2] in which the life and the mathematical achievements of Dedekind could be described for a wider public audience.

Dedekind was born on October 6th, 1831, into the family of a wealthy attorney and Professor at the Collegium Carolinum in Brunswick, Julius Levin Ulrich Dedekind and his wife Caroline Marie Henriette Dedekind, née Emperius. Richard’s maternal grandfather Johann Ferdinand Friedrich Emperius was ‘Hofrat’, Professor at the Collegium Carolinum, and later director of the ducal museum. When the French conquered Brunswick and stole important pictures from his museum, he was brave enough to travel to Paris in 1815 and to bring most of the stolen goods back with his own hands.

The Collegium Carolinum, named for its founder Duke Carl I, was located in the center of Brunswick at 41 Bohlweg and was a kind of ‘pre-university’. The university of the duchy of Brunswick was the one in Helmstedt, but it was closed in 1810 by the brother of Napoleon Bonaparte, Jerome, in favour of Göttingen. In order to be able to study at a university, young men had to study at the Collegium Carolinum first - schools did not prepare pupils for advanced learning. Those were the days when Professors lived with their families in official residences within the universities. Hence, young Richard enjoyed an academic atmosphere from the beginning of his life. Not only that, in the quadrangle of the Collegium, artists painted and sculpted, and many a musician played and taught. All his life, Richard was a brilliant musician himself (piano as well as cello), and he had the gift of perfect pitch.

Richard was the youngest of four children in the family; his oldest sister, Julie1 Marie Sophie, who was well known in later life as a poet and author. The next in line was his sister Johanne Louise Mathilde Navarine, who died prematurely at 32, and finally his brother, Karl Julius Adolf, who became a well respected attorney and advanced to the position of president of the regional court in Brunswick.

1I have taken the liberty to underline the names that the Dedekinds called each other.
Richard enrolled as a student of the *Collegium Carolinum* on May 2nd, 1848, where he studied mathematics and physics and soon started to give private lectures on mathematical topics. Here he made a lifelong friend, Hans Zincke, called ‘Sommer’ (the ‘Hans-Sommer-Straße’ in Brunswick is named after him), who was interested in music as well as in mathematics.

Easter 1850, Richard Dedekind enrolled at the University of Göttingen as a student of mathematics. He attended lectures of Wilhelm Weber, Johann Benedict Listing, Moritz Abraham Stern, and Gauss. In the winter of 1851/52, Dedekind attended Gauss’s lectures on the method of least-squares, about which he wrote a nice report in 1901. He still played the cello as well as the piano and became a member of the student league ‘Brunsviga’, which his brother Adolf had founded some years before. After four semesters, he submitted his dissertation in 1852 on the theory of Euler’s integrals, and he became Gauss’s last doctoral student.

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**Figure 1.** Richard Dedekind at 37, at 55, and at 72 on March 6th, 1904.

**Figure 2.** The Collegium Carolinum.

**Figure 3.** Richard’s sisters Julie (left) and Mathilde.

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**THOMAS SONAR** was born in Germany in 1958. He studied mechanical engineering first, and then he studied mathematics. He earned his Ph.D. at the University of Stuttgart under Wolfgang Wendland and Bill Morton from Oxford, and he earned his habilitation in Darmstadt with Willi Törmig. After teaching three years at the University of Hamburg, he joined the faculty of the Technical University of Brunswick. His research areas are numerical analysis, partial-differential equations, computational fluid dynamics, and the history of mathematics. His book “3000 Jahre Analysis” was published by Springer in 2011. Thomas and his family enjoy life in Brunswick, a modern city with many medieval buildings, and they like to hike in the heathland north of the city.

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