

as mean \pm S.E.M. (standard error of the mean). Student's T-test was used for statistical analysis using the statistical package GB STAT (version 5.0).

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Walter Krösche (1882–1957) and the Mannich Reaction

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Walter Krösche was the Ph.D. student of Carl Mannich, with whom the latter published the school forming paper where the first 'Mannich reaction' has been described. For the first time biographic details and photos of Krösche are published here in a short biographic sketch.

Every chemistry student has to learn the Mannich reaction, and many who are working in that field of organic synthesis refer to the first paper entitled "Ueber ein Kondensationsprodukt aus Formaldehyd, Ammoniak und Antipyrin" ("About a condensation product of formaldehyde, ammonia, and antipyrine") published in 1912 in *Archiv der Pharmazie* (Mannich and Krösche 1912). This was the Ph. D. thesis of Walter Krösche (Krösche 1912). Whereas one can easily find information about Carl Mannich (Friedrich 1991; Böhme 1955), no information is available about Walter Krösche so far. Some lucky circumstances allowed me to discover a number of interesting details about the life of that remarkable man, which are published here.

Walter Krösche was born in Berlin October 8th, 1882 as son of the merchant Hermann Krösche. The family came from Schöttmar (now part of Bad Salzuflen) in Westphalia, Germany. He attended the Lessing Gymnasium (Berlin), a well known school, until the so-called *Obersecunda*, i.e., until year 11, which is two years before the German *Abitur*, the school-leaving examination preparing for University. After that he started an apprenticeship as pharmacist (*Apothekerlehre*) and served in pharmacies in Berlin, Lörrach near Basel (Switzerland), and Geneva (Switzerland) until Easter 1906. Then he started to study Pharmacy at Berlin University. In October 1906 he took leave for half a year to serve in the army (first half as so-called 'one year volunteer', *Einjährig-Freiwilliger*). September 29th, 1909 he graduated as a pharmacist and thereafter, Easter 1910, he started again university studies with the aim of getting a Ph.D. In parallel to these studies, at Easter 1911, he passed the *Abitur* at the *Siemens-Oberrealschule* (Charlottenburg, Berlin). In Prussia the *Abitur* was a necessary prerequisite for obtaining a Ph.D., but not for becoming a pharmacist (Friedrich and Müller-Jahncke 2005). July 24th, 1912 he was awarded a Ph.D., and in the doctorate certificate, issued in Latin, Walter Nernst is given as his promoter. Indeed, Walther Hermann Nernst



Fig. 1: Walter Krösche around 1920

(June 25th, 1864–Nov. 18th, 1941), the German physicist and Nobel laureate, and Ernst Otto Beckmann are given as the referees (*Referenten*) of the Ph.D. thesis. Beckmann (July 4th, 1853–July 13th 1923) had just recently moved from Leipzig to the newly founded *Kaiser Wilhelm Institut für Chemie*, Berlin (Lockemann 1928). December 19th, 1913, Krösche passed the state examination as food chemist. From October 1908 to 1913 Krösche worked as teaching assistant at the pharmaceutical institute of the University. From January to July 1914 he served the second half of his military service as volunteer pharmacist (*Militär-Apotheker*). In 1914 he was called to service in World War I in the position of staff officer (*Stabsoffizier*). As such he was in charge of sanitary depots in Düsseldorf, Straßburg (Alsace), and Preußisch Stargard (now Starogard Gdański, Poland). In 1919 he was released from army service, in 1920 he married, and in 1921 he returned to Starogard Gdański, which was already Polish at that time. There he took responsibility of the technical direction of the chemical factory “Ergasta”. At that time, it was rather unusual that a German moved to Poland, where he also had to learn Polish. He was known in his family as a great friend of Polish people. Following the German occupation of Poland, Walter Krösche could stay in his position at the factory until 1940, when he was fired by the new German director of the factory. In a handwritten CV, probably from the late 1940s, Walter Krösche wrote that he could not do anything against his sacking because of his political charges (“wegen meiner politischen Belastung”). Walter Krösche was remembered by some of his relatives (not his son) as a so-called *Edelkommunist* (noble communist, i.e., meaning a communist who was rich enough not to be materially moti-



Fig. 2: Walter Krösche around 1950

vated). However, the truth is that he was not a communist but a member of the social democratic party. Given his social origin and status, this was also something rather unusual at that time. July 1st, 1942 he assumed the direction of the *Bismarck-Apotheke* in Bromberg (now Bydgoszcz, Poland). In January 1945, as a result of the advancing front in World War II, he left Bromberg and moved to Thale (Harz Mountains) where he assumed the direction of the *Hubertus-Apotheke*. In August 1945 he gave up pharmacy business and started a private teaching school, where he taught German, English, French, Polish, Russian, Latin, Greek, physics, chemistry, and mathematics. Since Thale was situated in Eastern Germany, where the social democratic and the communist parties were united to form the SED, he automatically became a member of that new party. However, while teaching Soviet officers German language, he made the statement that Hitler and Stalin were just the same, i.e., equally bad, he was immediately expelled from that party. Walter Krösche died November 2nd, 1957, in Berlin. Walter Krösche left his wife and two sons. Fig. 2 shows him in the last years of his life.

Böhme writes in his obituary for Mannich (Böhme 1955) that the accidental observation of an instability of solutions containing both antipyrine salicylate and hexamethylene tetramine published by Carl Mannich (1912) prompted the thorough investigation, lateron published together with Krösche (Mannich and Krösche 1912). Since the announcement of the incompatibility was published by Mannich alone, one could conclude that he made that observation. However, that publication in *Apotheker-Zeitung* appeared in the July issue of 1912, i.e., almost at the end of the Ph.D. work of Krösche, i.e., when Mannich already knew much more about the new reaction. The journal *Apotheker-Zeitung* (Friedrich and Müller-Jahncke 2005) was not a scientific journal to communicate new findings, but rather a journal strongly related to pharmaceutical practice. Thus, this was the right place to tell the pharmacists that the simultaneous administration of antipyrine and hexamethylene tetramine is not advisable because the two compounds will react under the action of gastric acid. Even if the observation was made by somebody else, Mannich would not have seen a reason to publish the observation together with that person because that short notice was only intended as practical information for phar-

macists. Today it is impossible from the sources to come to any conclusion about the priority of the observation. It could have been Mannich, which is probable, but it could have been also Krösche or any other student in Mannich's laboratory. As the publication of the extended investigation in *Archiv der Pharmazie* (Mannich and Krösche 1912) is literally identical with the Ph.D. thesis of Krösche (1912) it is obvious that Krösche had a substantial share in the published research. It is interesting to read that Krösche, at the end of his thesis, at first place acknowledges Professor Hermann Thoms for having given him his vivid interest and benevolence during his studies. Thoms (1859–1931) was an outstanding pharmacist and founder of the Germany society of pharmacists. Carl Mannich, the Ph.D. adviser of Krösche has left Berlin to accept an appointment as professor in Göttingen on September 15th, 1911. Hence it follows that Krösche has only worked one and a half year together with Mannich, and he had to work later without him. Since Mannich was not anymore in Berlin when Krösche finished his thesis, Nernst and Beckmann were his referees (*Referenten*). The CV of Walter Krösche has many similarities with that of his Ph.D. adviser Mannich, and also with that of his referee Beckmann: They all started a pharmacist apprenticeship, finished school with the *Obersecunda*, later made their *Abitur*. Mannich and Krösche both studied additionally food chemistry, and all three were *Einjährig-Freiwillige*, Mannich and Krösche both split their army service and served the second half as *Militär-Apotheker*. While Mannich followed a University career, Krösche went to industry and later worked as pharmacist. The life of Walter Krösche is a typical example for a German of the 19th century, who had a strong interest in science, and who had to go the long way via a pharmacy apprenticeship, because that was regarded as a solid base for material security.

Mannich had a very wide range of scientific activities [Friedrich 1991, Böhme 1955]; however, his name will be always first connected with the reaction type that he introduced together with Walter Krösche. Hence it is a matter of historic justice also to remember Krösche who stood at the cradle of this reaction, and whose work is still referenced when new developments of the Mannich reaction are published (e.g., Enders et al. 2005).

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