

Historical documents shed new light on the contributions of Alexander Herzberg to coastal hydrogeology

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ABSTRACT

Alexander Herzberg's (1901) publication "Die Wasserversorgung einiger Nordseebäder [The water supply of some North Sea spas]" is one of the cornerstones of coastal hydrogeology. It contains the fundamental equation of hydrostatic equilibrium, currently known as the Ghyben-Herzberg principle (Drabbe and Badon-Ghyben 1898) and is the first to depict a correct graphical representation of the geometry of a freshwater lens. He also described the presence of the transition zone discussed problems of over-abstraction and its consequences (Houben and Post, 2017). Herzberg's concept was quickly taken up in several textbooks (e.g. Keilhack 1912) and journals, not only in Germany, but also abroad (e.g. d'Andrimont, 1901-1902, Ribbius, 1903).

The main findings of the 1901 paper had already been summarized in a short note published by an anonymous member of the audience of a lecture by Herzberg in Berlin in 1890 (Anonymous 1890), but the authors discovered a report from 1888 of Herzberg's work in the State Archives of Lower Saxony (Niedersächsisches Landesarchiv) in Aurich, which describes his work on the island of Norderney and already contains the concepts and images used in his later publications (Herzberg 1888). The archives also hold copies of the contracts between Herzberg's company and the Prussian state, which had promoted the water supply scheme for the island. Detailed letters on the topic of water supply of Norderney are also present, giving a unique insight into the handling of the matter at that time.

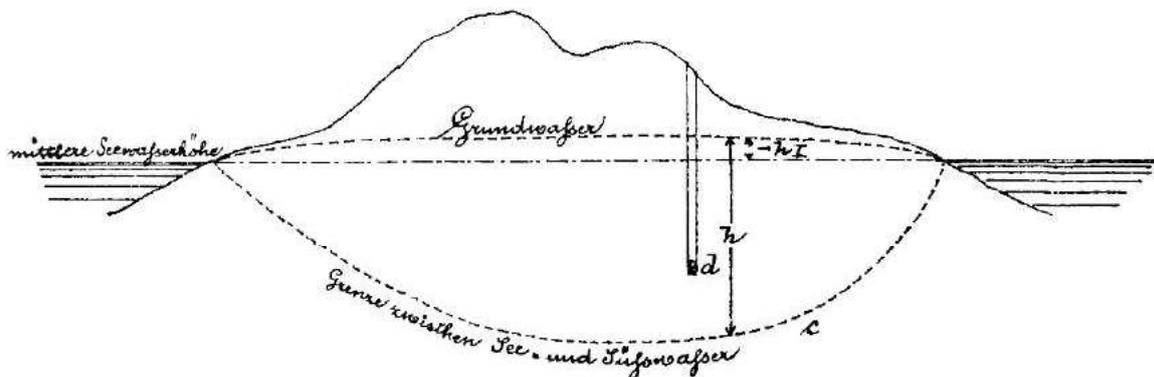


Figure 1. Sketch of a freshwater lens from Herzberg's (1888) report. Mittlere Seewassershöhe = mean sea level, Grundwasser = groundwater, Grenze zwischen See- und Süßwasser = boundary between sea and freshwater. Source: Niedersächsisches Landesarchiv Aurich, NLA AU Rep. 16/3, Nr. 1212.

Alexander Herzberg (1841-1912), graduated with a civil engineering degree from the Royal Crafts Institute Berlin in 1863. He joined the consulting company Börner & Co., Berlin, in 1876. He became a co-owner of the company in the year 1892, then "Börner & Herzberg für Wasserversorgungs-, Kanalisations-, Gas- und elektrische Beleuchtungsanlagen". He was a key promoter and planner for the installation of many water supply and sewage systems in Germany and abroad. He was involved in several engineering and hygienic associations.

Based on his exploits, he was appointed the honorary title “Baurat” in 1894, and became a honorary member of the German Association of Engineers in 1902 and the Royal Sanitary Institute in London in 1912. His company also obtained the distinction of Purveyor to the Royal Court. In the framework of his work for the Prussian Ministry of Agriculture, he was tasked with the improvement of the water supply and sewage system of the island of Norderney, a popular spa resort of this time. His work on this island led to the influential 1901 publication.

Due to its age, difficulties in access and the language barrier, the original Herzberg’s 1901 publication is probably much more often cited than read (231 citations are recorded in the Scopus database). Therefore, an annotated translation has been published in *Hydrogeology Journal* (Houben 2018).

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