ROCK STARS

Walther as young professor in Jena 1895 around the time of publication of his facies law.

Johannes Walther (1860–1937): More than the law of facies correlation

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Most geologists know of the German geoscientist Johannes Walther as the author of the law of facies correlation, published in German in 1894 and translated into English and explained by Gerard Middleton in 1973. The law explains that sedimentary facies seen conformably overlying each other in outcrops were formed at the same time beside each other. More than 100 years later, this law is central to facies stratigraphy and especially to sequence stratigraphy, both scientifically and practically (petroleum geology). Other than his facies law, not much is known about the life and career of this extremely productive geoscientist, particularly outside of Germany. A closer look shows that Walther accomplished much more than the formulation of his facies law, contributing significantly to marine geology, paleoecology, and paleoclimatology.

Several circumstances contributed to Johannes Walther's successes, including an early interest in the natural sciences, the influence of Ernst Haeckel from his teenage years, lots of reading, intensive traveling and field work, networking, the realization of the potential of marine geology, and dedication that at times turned into ambition.

Johannes Walther was a child of the monarchy. He was born in 1860 in Neustadt, Thuringia, then located in the dukedom of Saxony-Weimar-Eisenach (1871–1918 part of the German empire). Johannes' father was the local minister who had a keen interest in the natural sciences and planted this seed in his son's mind. At age 12, young Johannes met the geology professor Adolf von Koenen (1837–1915) of Göttingen, who took him along when mapping the Thuringian Rhön Mountains. At age 15, Johannes started to visit university classes of the famous and, later in life, controversially disputed biologist Ernst Haeckel (1834–1919) at the nearby university in Jena. Haeckel was a prominent follower of Darwin who spread evolutionary theory in Germany and the continent. These experiences were the sparks that inspired Johannes' interest in studying biology and geology. However, a major problem for him was an unidentified illness that included severe headaches that prevented him from passing the abitur, the precondition to university studies. Haeckel's intervention with the Duke of Saxony-Weimar-Eisenach allowed Walther to study natural sciences at the university in Jena without the school-exit exam. He started his studies in 1879, concentrated on biology, and finished in 1882 with a Ph.D. in zoology under Haeckel and the anatomist Oscar Hertwig (1849–1922). During his time in Jena, Walther also met his lifelong friend, Carl Duisberg (1861–1935), a chemist who would later become an influential industrialist and the head of Bayer and IG Farben. It is noteworthy that Walther did not join a student dueling corporation, which was quite common during those days, but was one of the cofounders of the student society of natural sciences at the university in Jena.

Because the geosciences in Jena were represented only by one professor of mineralogy, Walther left for Leipzig, where he studied under geologists Hermann Credner (1841–1913), Ferdinand von Richthofen (1833–1905), and Ferdinand Zirkel (1838–1912) and the marine zoologist Carl Chun (1852–1914). Walther continued his geoscientific studies in Munich with the paleontologist Carl von Zittel (1839–1904) and the geologist Carl Wilhelm von Gümbel (1823–1898). In the letters to his friend Duisberg during these early postdoctoral years, Walther

Walther (second from left, sitting) in the Egyptian desert with G. Schweinfurth (holding onto tent post) in 1888.


Walther as a postdoc during field work in Tunisia in 1884.

explained how he spent his time visiting classes, but also dedicated quite some time to reading geoscientific literature, and regularly went on field trips. It is also interesting to learn that Walther engaged in networking in that he visited most of the well-known geologists and paleontologists of his time in Germany, Austria, and Switzerland. The letters to Duisberg show a young man who was absolutely dedicated to his science, but who also confessed that sometimes his ambition left hardly any time for activities other than in the geosciences. Whereas his friend Duisberg married and founded a family early on, Walther would marry only in 1899, at the age of 39, when he had been a tenured professor for five years.

It was during the early postdoctoral years that Walther also started his first research project, which led him to Anton Dohrn's (1840–1909) marine research station in Naples, Italy. It must have been the collective influence of Haeckel, who studied the radiolaria of the Challenger Expedition (1872–1876); of Chun as the leader of the Valdivia Deep Sea Expedition (1898–1899); and of Gümbel, who investigated the sediments of the Gazelle Expedition (1874–1876), that got Walther interested in marine geology. As a postdoc, Walther also visited Sir John Murray in Edinburgh, who had published the scientific results of the Challenger Expedition, thereby establishing oceanography as a science.

In the Gulf of Naples, Walther investigated fauna, flora, and sediments of shallow seamounts by dredging from a small vessel. He made the first sediment maps of these areas, described the distribution of modern carbonate-producing fauna and flora, and identified the importance of coralline algae as reef builders. He also realized the significance of bioerosion and made quantitative taphonomic experiments with crustaceans, mollusks, and echinoderms in aquaria. At the same time, he investigated Mesozoic and Cenozoic limestones in the Mediterranean realm, in the Calcareous Alps, and tried to compare modern and ancient facies. Guidance during his studies in the Alps was given to him by Edmund Mojsisovics von Mojsvár (1839–1907), an Austrian paleontologist and biostratigrapher who had intensively studied the Triassic reefs of the Dolomites. Walther's postdoctoral years lasted from 1882 through 1886 and found their end in habilitation, a precondition in several European countries in order to be appointed to a professorship. Walther's habilitation thesis of 1886 was a paleontological gem. It focused on the taxonomy, functional morphology, and paleoecology of Jurassic crinoids and included comparative taxonomic, embryologic, ecologic, and taphonomic studies of modern crinoids from the Mediterranean. The combination of geology and biology and the use of the actualistic method was characteristic of Walther and can be found in many of his publications. Another typical attribute was his artful illustrations in many papers, which can be seen as a parallel to his mentor Haeckel, who is famous for his scientific artwork.

After habilitation, Walther returned to Jena as a lecturer without salary at the university. In 1890, he was bestowed with the title of professor and was given tenure in 1894. From 1886 to 1906, when he left Jena for a chair at the university in Halle, Walther traveled extensively and conducted field work in Africa, Arabia, central Asia, North America, and several European countries. It has to be kept in mind that at the time international travel without airplanes lasted weeks to months. Field work was performed using the railway, horses, donkeys, or camels to get around. During his career, Walther would visit all continents except for Antarctica. His interest in marine geological studies led him to the coral reefs of the Sinai and southern India, where he identified the importance of antecedent topography for Quaternary reef building and where he developed the concept that a reef limestone consists of a framework with interstitial sediment. He estimated the ratio of framework and detrital sediment to be 2:3.

Walther's field work locations were ideal in that he could study modern and recently uplifted fossil reefs nearby. During these studies, Walther also became interested in the adjacent deserts as sedimentary environments. An early supporter of this path was the world traveler Georg Schweinfurth (1836–1925) whom Walther accompanied during several expeditions. Walther detailed the importance of wind for sediment transport and redeposition, and he used his modern observations to identify deserts in the fossil record. Along these lines, he also realized that climate in the geologic past must have changed repeatedly. As he could not call on the universal model of plate tectonics, Walther was trying to explain the spatial distribution of paleoclimate indicators by polar wandering. He also discussed Alfred Wegener's (1880–1930) hypothesis of continental displacement, but concluded that evidence for the theory must first be found on the bottom of the world oceans. The evidence was indeed found there, but not until the 1960s.

After Walther accepted the chair of geology and paleontology at the university in Halle, more time had to be spent on administration and development and extension of the geological institute and museum. Still, Walther continued his research and did field work in the Mediterranean, Asia, north Africa, North America, and Australia. His Australia trip had to be cut short owing to the outbreak of World War I. After the war, Walther saw the demise of the monarchy and the development of the Weimar Republic (1919–1933); as an emeritus, he experienced the early rise of National Socialism and the Third Reich.

During his tenure in Halle from 1906–1928, Walther fought for geology to be introduced to school education, acted as dean of the faculty of natural sciences, and, from 1924–1932, was the president of the Scientific Academy Leopoldina. During his last years, Walther published several articles on Johann Wolfgang Goethe (1749–1832), who was one of his heroes—yet another parallel to his mentor Haeckel.

Walther died from a stroke in 1937 at age 76. His legacy includes 110 scientific publications in journals, 10 textbooks, 25 doctoral students, five of whom later became university professors, and, to close the circle, his universally known law of facies correlation.

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