

Phycological Trailblazer

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Nordal Wille

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The life story and accomplishments of the Norwegian botanist-phycologist [Jordan] Nordal [Fischer] Wille (Fig. 1) (28 Oct. 1858 - 4 Feb. 1924) are certainly worth a re-telling. In a tribute to him on the 150th anniversary of his birth, Jørgensen & Vaalund (2008) called him the "most important promoter of botany in Norway in the last century". His contributions were significant mostly in terms of freshwater green algae. But he also studied other groups of algae including seaweeds, and he was very knowledgeable of flowering plants. Wille's birth was a bit of a surprise for his parents in that his Mother delivered him when she was 47 years old (Jørgensen & Vaalund, 2008). He had a difficult time growing up, afflicted with asthmatic bronchitis and bullied by his fellow students. But fortunately for him, he found his salvation in the sciences, and it helped that he was very bright. With a deep interest in geology, fossils, and botany, he was invited to participate in field trips. In 1878 he earned a scholarship to do research on freshwater algae. One of his earliest papers was an

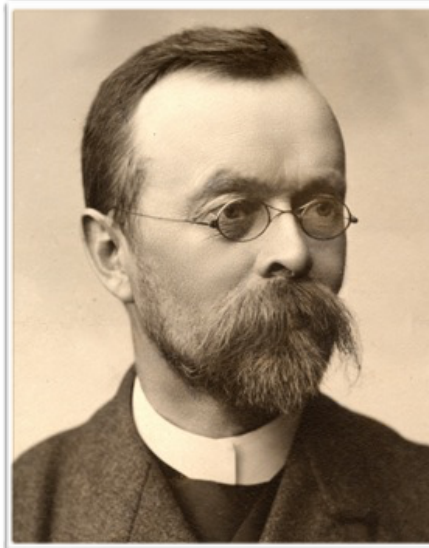


Fig. 1. Nordal Wille. [From the internet.]

account of the fusion of gametes in the subaerial alga *Trentepohlia umbrina* (Wille, 1878).

Wille's early mentoring was from several people. Because Wille was the only person then in Norway interested in freshwater algae, he contacted the Swedish phycologist Veit Wittrock, and in 1878 Wille went to Stockholm and became Wittrock's student (Stafleu & Cowan, 1988). Despite a great age gap, the two developed a solid working relationship and friendship. In 1881 Wille went to Copenhagen and studied with Eugenius Warming and then in 1882 on to Berlin, where he studied with Simon Schwendener. He also spent time working with Axel Blytt in Oslo. But after completing his education, there was no position open in Norway for him. So Wittrock offered him a position (as Regnellian Curator) in Stockholm in 1883. Wille's thesis work,

done at the Biological Station in Kristineberg, Sweden, was on the anatomy of algae in relation to their function. He was the first person to receive a doctoral degree in botany (in 1885) from the Royal Frederic University (later the University of Oslo). He next became a deputy professor in Stockholm (in 1886), but a serious quarrel with the mathematician Gösta Gittag-Leffler prevented Wille from achieving full professorship there (Jørgensen & Vaalund, 2008).

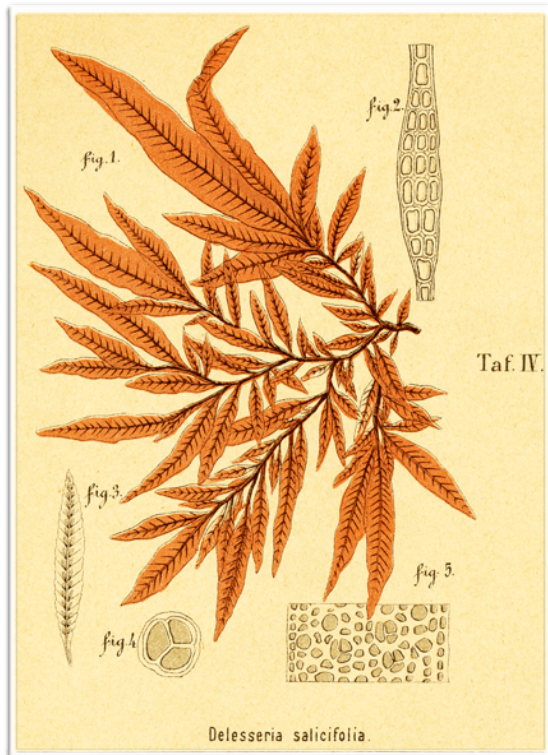


Fig. 2. *Delesseria salicifolia* Reinsch [now *Paraglossum salicifolium*]. Based on a collection made by Wille on South Georgia, Feb. 1883 [Reinsch, 1890, pl. IV.]

Wille participated in the German “Transit of Venus” Expedition of 1882-1883. The “Transit of Venus” is the celestial event when Venus crosses the sun, and this German expedition observed the 1882 transit of Venus on the grounds of Trinity College in Hartford, Connecticut. The chief astronomer left an inscribed stone marker so that the location of the main instrument would be known to future generations. But the marker was moved in 1959 to make way for the construction of a new building. There is a plaque on the library of Trinity College commemorating their visit. This expedition involved Wille’s making collections of both terrestrial algae and benthic marine algae in the subantarctic island of South Georgia. Reinsch worked up the macroalgal collections made by Wille, with many new species

described (Reinsch, 1888). Later, Reinsch (1890) had a more detailed account with plates (some in color) depicting Wille’s collections (Fig. 2).

In 1889 Wille became the botanist at the College of Agriculture at Aas, which is 50 km south of Oslo; today it is the Norwegian University of Life Sciences. Wille married the daughter of the Director in 1891, and they had a son. But Wille’s wife died in 1908 after a long illness, and the son, Hans Georg, was later to commit suicide. In 1911 Wille remarried, but that wife died of the influenza pandemic in 1917. He married for the third time the next year, 1918, and his wife, 30 years younger, whom he had met on a train, bore him a daughter (Else Ingeborg) in 1920. During the darker periods later in Wille’s life, this daughter was to become a ray of sunshine (Jørgensen & Vaalund, 2008).

Wille was appointed professor of botany at the Royal Frederick’s University in Christiania [Oslo] in 1893, a position he would hold through 1924. He mentored a number of students, including H.H. Gran, H. Printz, and K.M. Strøm (phycologists or oceanographers) as well as half a dozen others working on terrestrial topics. After Wille’s tenure at the Biological Station in Kristineberg, he planned for a new biological station at Drøbak, at the Oslofjord. That became a reality in 1894, and Wille served as its first director. One of his responsibilities as professor in Oslo was being Director of the Botanical Garden. At the time that he took it over, it had become very run-down and overgrown with vegetation. But he worked hard to turn it into a model farm. When Axel Blytt died in 1898, Wille became director of the Botanical Museum, and he planned to move the Museum from the University to Tøyen and thus to join the garden and the museum in one place. The Museum was completed in 1915. Also in that year Wille (1915b) published his thoughts on how

vascular plants immigrated into Norway following the Ice Age. His primary idea was that the way to understand the distribution was to study the methods in which plants spread in the present time rather than by proposing vague and unprovable hypotheses of past events.

Fig 3. *Penicillus capitatus*.
[Wille, 1897a, fig. 93.]



new genus of snow algae *Chionaster*, with the type *C. nivalis* (Bohlin) Wille. Although Wille regarded *Chionaster* as a green alga, it is now treated as a fungus (Hoham, 1976; Nedbalova et al. 2008; Lukavsky & Cepák, 2010). Wille described *Ulva californica* in the "Phycotheca Boreali-Americana" of Collins et al. (1899). Wille (1899, 1900b) was credited by Setchell & Gardner (1920) with using the nuclear condition to distinguish *Spongomorpha* from *Acrosiphonia*, the former genus being restricted to species with uninucleate cells and

Wille (in Warming, 1884) is credited with the recognition and validation of the class name Chlorophyceae. Evidence of Wille's stature as an authority on green algae is that he was invited to write many chapters on the Conjugatae, Chlorophyceae, and Characeae in the prestigious "Die natürlichen Pflanzenfamilien" of Engler & Prantl (Wille, 1897a), a well illustrated compendium of the genera (Fig. 3). This work was an immense success at the time. A supplement was later published (Wille, 1909b-1910a), where Wille validated the class names Siphonocladophyceae and Chaetophorophyceae (Wille, 1909b). He established several new genera of green algae: *Elakatothrix* (Wille, 1898), *Pseudendoclonium* (1901a), *Pseudotetraspora* (Fig. 4) (1906a), *Pseudopringsheimia* (1909b), *Pseudulvella* (1909b) and *Wittrockiella* (1909a). He described *Chlorogloea* (1900a), a new genus of Cyanobacteria. Wille's (1909b) *Monocilia*, however, is a later synonym of *Heterococcus* Chodat. He also described a new genus of red algae, *Vanhoeffenia* (Wille, 1924), from the Kerguelen Islands, but Bourrelly (1970) thought that it was likely synonymous with *Chrootheca*. Wille (1903b) established the

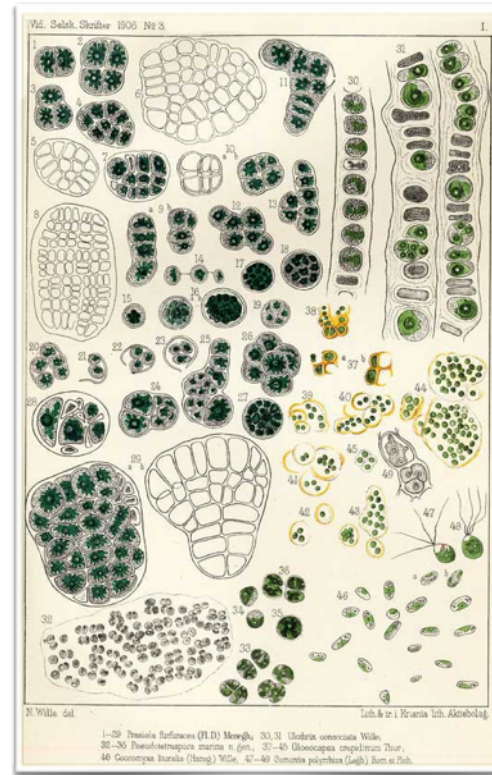


Fig. 4. Plate 1 from Wille (1906a): 1-29 *Prasiola furfacea*; 30-31 *Ulothrix consociata*; 32-36 *Pseudotetraspora marina*; 37-45 *Gloeocapsa crepidinum*; 46 *Coccomyxa littoralis*; 47-49 *Gomontia polyrhiza*.

the latter genus with multinucleate cells. Ström (1924) was later to refer to Wille's "highest exactness in observation and description" and that Wille was "the universally recognized master of our science" (Fig. 5).

Wille also participated in some expeditions. He joined a geological excursion to the Caucasus and Turkestan in the autumn of 1897. He collected 130 samples of freshwater algae, and these were later worked up by Ström (1920). Wille worked up the collections made by others, brought back from such places as South America, the Antarctic, the Faroes, and the Arctic (Jørgensen & Vaalund, 2008). One example is his paper on freshwater algal collections



Fig. 5. Wille at the lab bench. [From the internet.]

brought back by the Austrian missionary J. Menyhardt from Zambesi, South Africa (Wille, 1903a). He worked up the algae brought back from the mountainous regions of Central Asia by the Swedish explorer Sven Hedin, describing them (Wille, 1907),

including *Hedinella pamirica* gen. et sp. nov. of the Ulotrachaceae (Wille, 1922a).

Over his 40+ years of his professional career Wille was involved with many forms of general education, including giving speeches on gardening. He was "keenly interested in politics and agriculture" (Ström, 1924) and an early advocate for the improvement of social conditions. Wille pursued the passage of laws for more environmental protection in Norway and gave an important speech on this topic in 1904. A consequence of his success was that such a protection law was passed as early as 1910 (Jørgensen & Vaalund, 2008). Most of the other countries in Europe did not have such laws until after World War II. Wille was also concerned about the lack of housing around 1910, and he agitated for the creation so-called garden cities in the outskirts of Oslo to house both working-class families and for the middle class. He believed that more green belts were needed for the production of oxygen, and that "a green, healthy environment leads to good manners for the people." He was ahead of his times.

At the invitation of Nathaniel Britton, Director of the New York Botanical Garden, Wille was given the opportunity to spend three months in Puerto Rico collecting

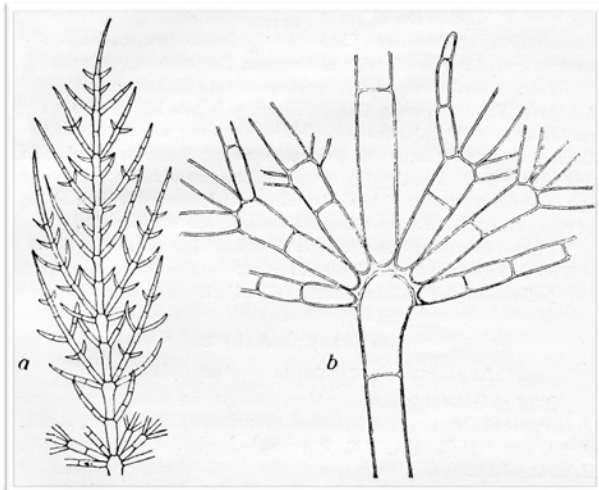


Fig. 6. *Willeella ordinata* Børgesen [now *Cladophora ordinata* (Børgesen) C. Hoek [Fig. 4 in Børgesen (1930)]]

freshwater algae. Starting in late Dec. of 1914 Wille traveled throughout the island, making collections and making observations. Wille (1915a) reported on his preliminary observations of the algae, mostly at the generic level. After Wille's death, Dr. Britton was able to enlist Nathaniel L. Gardner to work up the more than 2,000 collections and to produce a very detailed account that included 3 new genera and 214 new species of freshwater Cyanobacteria (Gardner, 1927), an impressive treatment.

Starting around 1905 Wille's health had begun to decline, and so he requested to be replaced as professor. Gran got that position. But after his 10 years of planning for a new Sciences building, a falling out happened between Wille, who wanted the building to be located at Tøyen, and Gran, who favored Blindern to be the location. Eventually, by 1920, the Blindern alternative was chosen for the new University area. It was a crushing defeat for Wille, who essentially retreated into obscurity after that time. His spirit had been broken (Jørgensen & Vaalund, 2008). He died four years later. But he left behind a legacy of significant work on the algae. Strøm (1924), Wollenweber (1924), and De Toni (1925) compiled his many publications.

Schmidle (1900) based his new genus *Willea* on *Crucigenia irregularis* Wille (Wille, 1898). Børgesen (1930) named the new genus *Willeella*, based on the new species *W. ordinata* Børgesen (Fig. 6) and originally assigned it to the green algal family Anadomenaceae. But van den Hoek (1982) later relegated this taxon to the level of a Section within *Cladophora*.

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