

Phycological Trailblazer

No. 6

F. R. Kjellman

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Frans Reinhold Kjellman (1846-1907) deserves to be counted in the ranks of "phycological trailblazers" by dint of his participation in several voyages of exploration, the most significant being the 'Vega' expedition of 1878-80. Indeed he was as much an explorer as a phycologist. Kjellman was born at Torsö, Sweden, on Nov. 4th, 1846. He was a student in Uppsala and in 1872 completed his thesis in philosophy, earning the doctorate degree. He was thereupon appointed to the position of Docent in Botany at the University of Uppsala. He was promoted to Extraordinary Professor of Botany in 1883 and then, on the retirement of Prof. T. M. Fries in 1900, he was named Professor of Botany and Practical Economy, a post which he held until his death in 1907. It was especially by means of his many travels that Kjellman was able to expand his scientific horizons. His botanical interests centered mainly on the algae, but he also worked on other groups. His first paper, in 1872, treated Scandinavian members of the Ectocarpaceae and Tilopteridaceae in the brown algae.

Kjellman's first sea adventure was at the age of 25, just after earning his Doctor of Philosophy. He accompanied A. E. Nordenskiöld

on a voyage aboard the 'Polhem' to Spitsbergen. The plan was to have about half of the group overwinter on Spitsbergen. Kjellman was in the group that was to evacuate before the winter set in. His group started the homeward trip on Sept. 16th, 1872, and was immediately hit by a ferocious storm from the north, which filled Wijde Bay with immense icebergs, totally blocking the entrance of the Bay (Jackson, 1908). Forced to stay put, the group quickly constructed winter quarters in Mossel Bay (79° 53' N lat.; 16° 4' E long.) on the north coast of Spitsbergen and prepared for the long winter of 1872-73, with a mean temperature of -14.5°C. in Dec. and -22.7°C in Feb. During that overwintering, which

Kjellman later referred to as "involuntary and unpremeditated," he did use his time to advantage. Dredge collections were made despite the ocean surface ice reaching a thickness of 1.5 m. One observation was that the Arctic Ocean had a much richer algal flora than previously thought. Other discoveries were that the algal composition during the winter was the same as that of the summer and autumn and that this flora continued to grow and flourish during the winter despite the darkness on the sea floor and water temperatures in the range of -1°C to +1.8°C. (Kjellman, 1875a). He had ample opportunity to follow "almost day by day" the

development of 27 species of macroalgae, belonging to various classes and families, and observed that 22 species became reproductive, with carpospores, tetraspores, eggs, or green or brown zoospores, depending, during the entire or part of the winter. He postulated that development during the months of "an almost absolute darkness to the human eye" must be

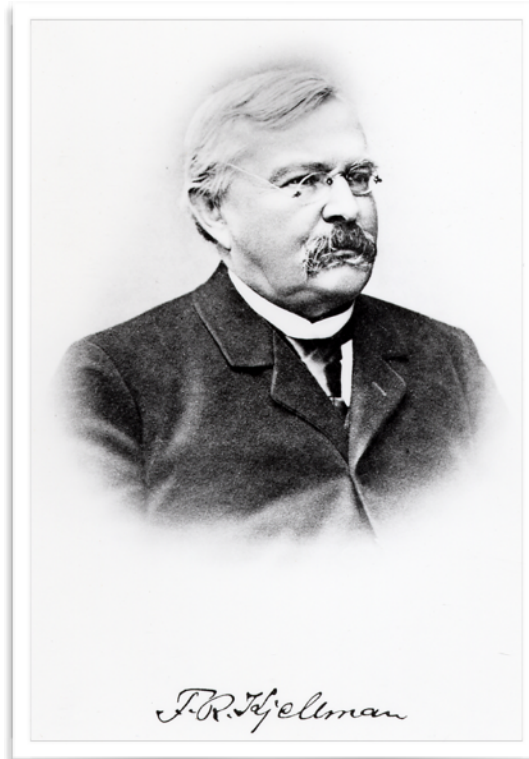


Fig. 1. F. R. Kjellman, frontispiece from his
1906 'Festkrift'



Fig. 2. *Diploderma amplissimum* [= *Wildemanina amplissima*] and *Porphyra abyssicola* [= *W. abyssicola*]. [Pl. 17 in Kjellman, 1883].

dependent on "nutriments stored up in reserve during the preceding period of light" (Kjellman, 1883b). Certain species bore their reproductive organs only during the summer months. It was not until Aug. 1st of 1873 that the ice had sufficiently melted to permit the two ships to head back to Sweden. Two years later Kjellman (1875c) published a popular account of this voyage.

Starting in 1874 Kjellman devoted much of his time to exploring the west coast of Sweden, paying special attention to the life histories and the distributions of the algae. He was able to see differences in the floristic compositions of the littoral, sublittoral, and eulittoral regions (Kjellman, 1877c).

In 1875-1876 Kjellman participated as botanist on an expedition which has come to be regarded as very significant in terms of polar research. Again Nordenskiöld was the planner of this expedition. Kjellman was on board the hired Norwegian whaler 'Pröven,' which left

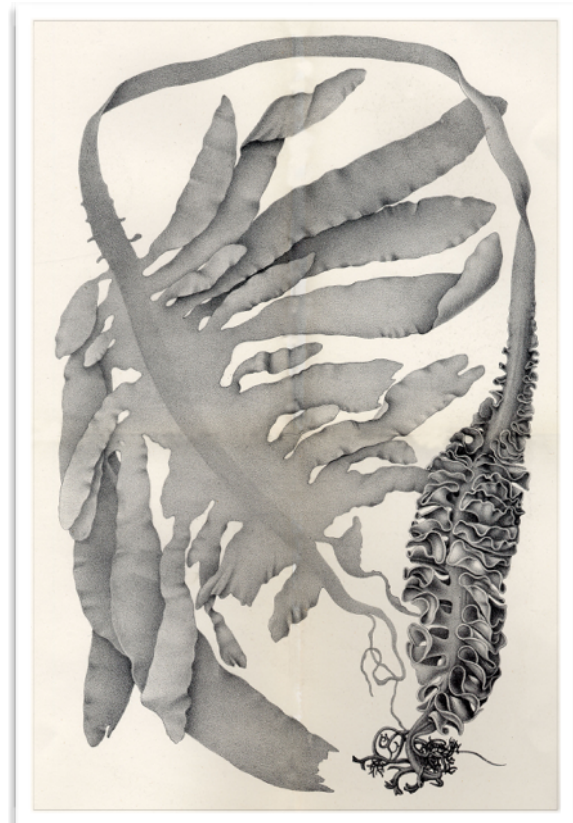


Fig. 3. *Ulopteryx pinnatifida* (Harv.) Kjellm. In Kjellman & Petersen 1885, pl. 11 [= *Undaria pinnatifida* (Harv.) Suringar]

Trömsö on July 8th. The 'Pröven' passed through the Kara Sea and, unimpeded by ice, reached the mouth of the Yenisei, which was the first time any vessel from the Atlantic reached this point. The expedition was divided at that point; Nordenskiöld gave command of the ship to Kjellman, who returned via the Kara Sea, reaching Trömsö by Oct. 5th. Kjellman's phycological contribution was to reveal that the Kara Sea was not barren of a marine flora because of its decreased salinity but rather shared elements with the floras of Novaja Semlija, Spitsbergen, the Arctic, and the Ochotsk Sea.

Then in 1878, Kjellman participated as botanist on Nordenskiöld's 'Vega' expedition, which circumnavigated Asia (Nordenskiöld, 1881; Hovgaard, 1882). The 'Vega' weighed anchor from Göteborg on August 19th, and by Sept. 28th the ship was locked in ice at Pitlekaj on the coast of Siberia, where it would remain until the following July 28th. From this remote

spot Kjellman continued to make botanical observations, providing new data on plant life of this little-known region of the Arctic Circle. Kjellman's comprehensive treatment of the marine algae of the Arctic Sea was published in Swedish (1883a) and English (1883b) versions. This work contains a complete account of the literature dealing with algae of the Greenland and Arctic American shores. He treated a total of 259 species, many of which were newly described (Fig.2).

The 'Vega' came down through the Bering Strait in July of 1879, making a stop at Port Clarence on the Seward Peninsula of Alaska. Kjellman made collections of both phanerogams and algae, and in late July-early August he made additional collections on the northwest side of St. Lawrence Island in the Bering Sea. The algae from these sites were worked up by Kjellman in his paper "Om Beringhafvets Algflora" (1889). In two publications (1883b, 1889) Kjellman described a total of nine new species of *Alaria*. His research from this period onward was devoted entirely to the algae. Among his contributions are the "Handbok" (1890b) and his accounts of families of brown algae in Engler & Prantl's *Die natürlichen Pflanzenfamilien* (1891-1893, 1893c). Marine algal genera treated by Kjellman include *Adenocystis* (1889a), *Acrosiphonia* (1893a), *Myelophycus* (1893b), and *Galaxaura* (1900). His studies on the flora of Japan included the description of six new species of *Porphyra* (1897b) and an account of the kelps (Kjellman & Petersen, 1885); his *Ulopteryx* (Fig. 3), however, was predated by *Undaria* of Suringar 1873.

Kjellman was significant in modernizing the study of botany in Sweden. From his own rich background of field experience he succeeded in opening up avenues of teaching and lines of thought on such areas as plant phylogeny, organography, physiological anatomy, plant dispersal, invasive alien species, and the various types of plants, such as hydrophytes, xerophytes, and lianas (Jackson, 1907). At the age of 60, Kjellman (Fig. 1) was honored by his former and current students

with a "Festkrift" (1906), which included articles on algae by Borge, Kylin, Skottsberg, and Svedelius. Kjellman's collections are primarily deposited at Uppsala, but duplicates are located in Leiden, Stockholm, and elsewhere. Additional biographical information can be found in DeToni (1907), Hulten (1940), Jackson (1908), and Svedelius (1907, 1908a, b).

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