Phycological Trailblazer No. 12 Niels Foged

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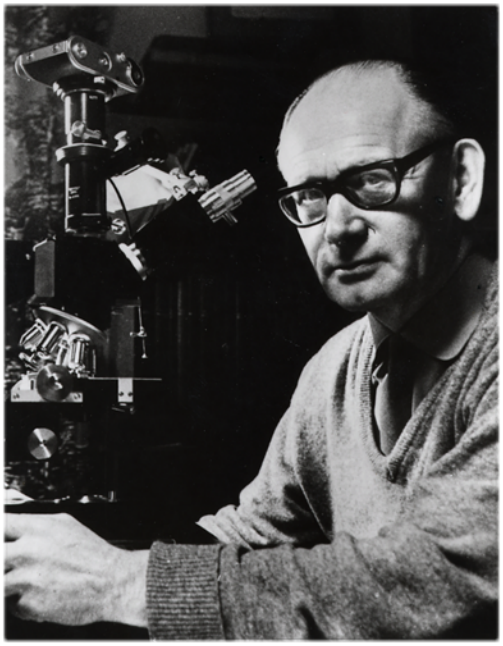
Niels Foged became an internationally recognized authority of diatoms, but he took up the study of diatoms under unusual circumstances, namely, when he was imprisoned during World War II. It was at this time that he was forced to live under an assumed name under threat of execution. He had been a courageously active participant in the resistance movement in Denmark, and his activities resulted in his almost being killed in his own home. But before we get to the dramatic movement in his life, let us start at the beginning.

Niels Foged was born on the 5th of February, 1906, the eldest son on a farm in Jutland in northern Denmark. As a student at the Gymnasium in Randers, he took a wide range of courses, including natural history, chemistry, and geography. He completed these studies in 1928 by passing the cand. mag. examination. In 1930, he started lecturing in general biology at the old Cathedral School (Katedralgym-nasium) in Odense, where he would remain until 1971 when he retired but remained active publishing the results of his studies on diatoms.



Niels Foged at age 60.

What led to his taking up the study of diatoms? Well, when Denmark was overrun and occupied by Germany in the Second World War, Foged was active in the resistance movement, becoming a regional leader. He had always held strong interests in social issues, and he took action to oppose the Nazi regime by means of the written word and well-thought-out arguments—never by weapons.

An interest in science was also latent. For a period of one year, he rode his bicycle every month to visit sites where the six Funen watercourses intersected the roads. He took regular water samples to determine the water chemistry. Max Møller, a pharmacist and an active diatom researcher, was responsible for turning Foged's attention to diatoms. Møller encouraged Foged to bring back water samples so that he might check on what types of diatoms were present. This interaction between these two friends later influenced Foged to look at diatoms himself.

It was on these bicycle tours that Foged used the opportunity of being out in the countryside to distribute anti- Nazi leaflets to people he knew. Foged's former pupils and colleagues were familiar with his strongly critical attitude toward the German occupation. But disaster struck following the killing of a Nazi collaborator in Odense. This episode occurred on March 3, 1944. The infuriated Nazis sought retaliation by looking to kill a well-known anti-Nazi.

Two days following the collaborator's death, four persons forced their way into the home of Foged and his wife Lotte. The house maid had unwittingly opened the door, and the four intruders entered the room where Foged was sitting with his 11-year-old daughter, together looking at a book featuring exotic animals. Mrs. Foged was also in the room. One of the four intruders was a fellow Dane who

asked Foged to follow the group outside. But Foged answered that he saw no reason for doing so, that he had no secrets from his wife and that whatever they wanted to tell him could be said there in the room.

Impatiently, one of the others pulled Foged's daughter aside and at the same time used a revolver to shoot Niels Foged twice in the chest. One of the bullets passed through a lung and ended up in the chair where he had been sitting. The other bullet lodged beneath the skin of his back. Two additional bullets were fired, both entering books on the shelves behind him because Foged succeeded in fending off the gun. A struggle ensued, Foged holding the intruder with the gun in the doorway as a shelter from the others. But at last the assailant managed to fire off another bullet. This one entered Foged's left temple, but fortunately at an angle, such that the bullet glanced off and ended in the floor. As abruptly as the intruders had appeared, they as quickly fled. Mrs. Foged was frozen with shock at the suddenness of what had just transpired, but a loud cry from her husband brought her back to reality. She raced to the phone to call both the police and the family physician. An ambulance arrived to take the badly wounded Foged to the hospital, accompanied by his wife and daughter. They had departed before the physician, a good family friend, arrived on the scene. He found the other Foged daughter, who was only a year-and-a-half, at home with the maid. He drove the very distraught maid back to her parents, and he took the baby to his own home to be taken care of.

Even though the doctors succeeded in saving Foged's life in the hospital, he was still very much in jeopardy. It turned out that there was an order from the forces of occupation that Foged should be executed. Some loyal police stayed outside his hospital room 24 hours a day, but as soon as Foged could muster the strength, he was spirited out of the hospital by the Danish police, who transferred him, under a false name, into the relative safety of the infirmary of the large prison in Nyborg. Only the chief warden and a single nurse knew of his true identity. Niels managed to print more leaflets in the prison cellar. There was a tunnel connecting it with the cellar of a nearby bank, from which others of the resistance could fetch these leaflets for distribution.

During this time, the Germans were misled into thinking that Niels Foged had escaped into Sweden across the Öresund by publishing this false fact in illegal newspapers. Mrs. Foged was able to visit him in the prison for 1 to 2 hours at intervals of 4 to 6 weeks. She brought to him some of his treasured books from home—among these was a Hustedt treatise on diatoms. So set the stage for Foged's remarkable phycological career, in prison and under a pseudonym for safety's sake. He set about to translate the Hustedt book into Danish at the same time copying all of the figures.

The prisoners were looked after by a tuberculosis specialist, Dr. Helms, who had been the chief of a large sanatorium on the south coast of Funen. He and his wife, also a physician, invited Foged to stay in their home if he had to leave the prison. In September when the Nazis took over command of the Danish prisons and imprisoned all the Danish police, this possibility became a necessity. Before leaving the prison, the police provided Foged with a false identity card. During the occupation, every citizen had to carry such an identity card with him. Mrs. Foged was also provided with her own false identity card by a person in the resistance movement. In prison, the superintendent of the police made the suggestion that Foged should allow his beard to grow. He was still recognizable to people who knew him, but the beard was meant to be a silent warning for others not to use his name. If he encountered, say, a former pupil, Foged would immediately shake hands with him, saying, "Hello, my name is Jörgen Larsen."

During Foged's first two weeks in the home of the Helms, he quickly devoured all the books in their library. He also was aware that the Helms had a microscope in their laboratory that was used to study the saliva of tuberculosis patients. But the microscope was used for only a few hours each day. So Foged was permitted to use it for the rest of the day to study diatoms. His pharmacist friend back in Odense prepared

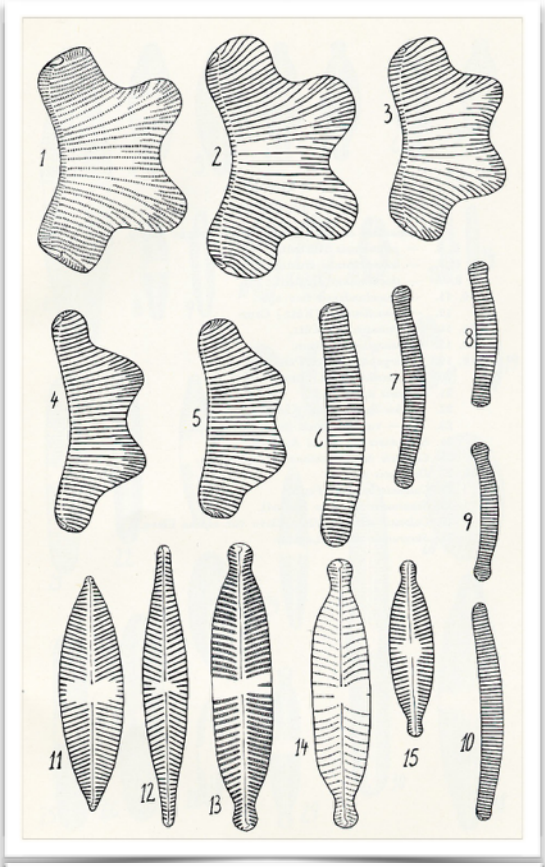


Fig. 1. Species of *Eunotia*, *Navicula* and *Cymbella* (in Pl. III of Foged, 1955).

slides of diatoms for Foged, and Mrs. Foged carried the slides to the Nakkebölle Sanatorium. So it was at this time and in a rather inauspicious way that the career of this world renown diatomist began.

Foged's first publications appeared after the War and reported on the diatoms from the Funen water courses. His interest and knowledge of diatoms continued to mature, and he gradually expanded his investigations to diatom floristics across Europe and from around the world. The War years had transformed him from a high school lecturer into scientist with an international reputation. His having been shot in the head, though, had greatly reduced his hearing, and lecturing for more than two or three hours gave him severe headaches. He was allowed to have a reduced lecturing schedule, but he was still given his full salary.

Over the period from 1946 to 1987, more than 80 papers by Foged appeared. Despite his phycological interests being narrowed to diatoms, his focus on diatoms was extremely broad, ranging from fossil diatoms to extant species with wide distributions. He published on diatoms in human tissues and diatoms associated with death by drowning. His interests included airborne diatoms and diatoms in historic ship wrecks and from archeological sites. His studies showed a very wide geographical scope as well, not just Scandinavia. He traveled widely, making collections and publishing on diatoms from Spitsbergen, Greenland, Thailand, Lake Baikal in Siberia, Gambia, Senegal, Cuba, Alaska, Iceland, Viti Leva in the Fiji Islands, Sri Lanka, Australia, and New Zealand. Often these trips were made on "package tours," and he expressed his frustration when not enough time was allotted for his collecting. He also worked up collections from Norway, Ireland, Italy, Spain, Greece, Iceland, Ghana, Afghanistan, Egypt, Turkey, Jan Mayen Island in the Arctic Sea, and Renell Island in the Solomon Islands.

Lotte Foged was very much a part of Niels' scientific work. She did a great deal of translation, particularly early in his career, typed all his manuscripts, and kept his collections in order. She was the one who could efficiently locate a desired collection from the stack of boxes in the basement of their home. According to Gene Stoermer, who visited the Fogeds, Lotte Foged was also a most gracious hostess, who set an overflowing table in the grand Danish tradition. Niels' hearing deficit rendered him somewhat difficult to communicate with, but Lotte was always there to smooth the way.

Niels Foged's scientific contributions were recognized by the University of Odense in 1976 when they awarded him a doctor honoris causa as did the University of Uppsala in 1980. His name is also commemorated by the diatom genus *Fogedia* (Witkowski, et al., 1997). The following list is a selection of Foged's publications. A more complete list can be found in Håkansson (1988).

Foged, N. 1947a. Diatoms in water-courses in Funen. I. Stavis Å (The Stavis Brook). Dansk Bot. Arkiv 12(5): 1-40.

____. 1947b. Diatoms in water-courses in Funen. II. Lindved Å (The Lindved Brook). Dansk Bot. Arkiv 12(6): 1-31.
____. 1947c. Diatoms in water-courses in Funen. III Odense Å (The Odense Brook). Dansk Bot. Arkiv 12(6): 33-71.
____. 1948a. Diatoms in water-courses in Funen. IV. Vindinge Å (The Vindinge Brook). Dansk Bot. Arkiv 12(9): 1-30.
____. 1948b. Diatoms in water-courses in Funen. V. Braende Å (The Braende Brook). Dansk Bot. Arkiv 12(9): 31-55.
____. 1948c. Diatoms in water-courses in Funen. VI. Conclusions and general remarks. Dansk Bot. Arkiv 12(12): 1-110.
____. 1949. Diatoms in the salt bog of Langemose in East Funen. Dansk Bot. Arkiv 13(6): 1-31.
____. 1952a. Diatoms in trumpet-formed catching-nets of *Neureclipsis bimaculata* L. in Sweden. Botaniska Notiser 1952: 1577-184.
____. 1952b. The distribution of freshwater diatoms in Norway. A preliminary report. Nytt Mag. f. Bot. 1: 107-123.
____. 1953a. Diatoms from West Greenland. Meddelelser om Grönl. 147(10): 1-86.
____. 1953b. Diatoms transported by the southern cormorant, *Phalacrocorax carbo-sinensis*. Bot. Tidsskr. 50:63-74. [In Danish, with English summary.]
____. 1954a. En interglacial diatoméjordaflejring i Øst- Fyn. [An interglacial deposit of freshwater diatom earth in the eastern Funen.]. Meddelelser Dansk Geologisk Forening 12: 541-547. [English summary.]
____. 1954b. Diatoms in one trumpet-formed catching net of a Trichoptera larva. Flora og Fauna 60. [In Danish, with an English summary.]
____. 1954c. On the diatom flora of some Funen lakes. Folia Limnologica Scandinavica No. 6. 75 pp., pls. I-III.
____. 1955. Diatoms from Peary Land, North Greenland collected by Kjeld Holmen. Meddelelser om Grønland 128(7): 1-90, pls. I-XIV.
____. 1957. The diatom flora of some Danish springs. Part 1. Strandkaer, the Mols-Laboratory. Nat. Jutland 6/7: 1-84.
____. 1958. The diatoms in the basalt area and adjoining areas of archean rock in West Greenland. Meddelelser om Grønland 156(4): 1-146.
____. 1959. Diatoms in Afghanistan. V.S. Biol. Skrifter 11: 1-95, 13 pls.
____. 1960a. Notes on diatoms I. *Gomphocymbella ancyli* recent in Denmark and Eire. Botanisk Tidsskrift 55: 282-288.
____. 1960b. Notes on diatoms II. *Cymbellonitzschia diluviana* in Denmark, Northern Ireland, and Iceland. Botanisk Tidsskrift 55: 289-295.
____. 1962a. Notes on diatoms III. *Asterionella ralfsii*. Botaniska Tidsskrift 58: 68-71.
____. 1962b. On the diatom flora in interglacial Kieselguhr at Hollerup in East Jutland. Geological Survey of Denmark, II. Series, No. 84: 1-51.
____. 1964. Freshwater diatoms from Spitzbergen. Tromsø Museum Skrifter 11: 1-159, 22 pls.
____. 1966. Freshwater diatoms from Ghana. Biol. Medd. Biol. Skr. 15: 1-169, 25 pls.
____. 1968a. The freshwater diatom flora of the Varanger Peninsula, North Norway. Acta Borealia A. Scientia 25: 1-64.
____. 1968b. Some new diatoms from Alaska. Nova Hedwigia 16: 1-20, 3 pls.
____. 1969. Diatoms in a postglacial core from the bottom of Lake Grane Langsø, Denmark. Meddelelser fra Dansk Geologiske Forening 19: 237-256.
____. 1971a. Freshwater diatoms in Thailand. Nova Hedwigia 22: 267-270, 13 pls.
____. 1971b. Diatoms found in a bottom sediment sample from a small deep lake on the Northern Slope Alaska. Nova Hedwigia 21: 923-1035, 23 pls.
____. 1972. The diatoms in four postglacial deposits in Greenland. Meddelelser om Grønland 194: 1-66, 16 pls.
____. 1973. Diatoms from Southwest Greenland. Meddelelser om Grønland 194: 11-184, 29 pls.
____. 1974. Freshwater diatoms in Iceland. Bibliotheca Phycologica 15: 1-118 pp., 36 pls.
____. 1975. Some littoral diatoms from the coast of Tanzania. Bibliotheca Phycologica 16: 1-127.

____. 1978. Diatoms in Eastern Australia. Bibliotheca Phycologica 41: 1-146, 48 pls.
____. 1980. Diatoms in Öland, Sweden. Bibliotheca Phycologica 49: 1-98, 48 pls.
____. 1981. Diatoms in Alaska. Bibliotheca Phycologica 53: 1-317, 1 map, 64 pls.
____. 1982a. Diatoms in human tissues. Greenland ab. 1460 A.D.-Funen 1981-82 A.D. Nova Hedw. 36: 345-379.
____. 1982b. Diatoms in Asklepieion, Pergamon, Turkey. Nova Hedw. 36:587-620.
____. 1984. Freshwater and littoral diatoms from Cuba. Bibliotheca Diatomologica 5: 1-242, 1 map, 60 pls.
____. 1985. Diatoms in Kos and Kalymnos, two Greek islands in the Aegean. Bibliotheca Diatomologica 10b: 1-105.
____. 1986a. Diatoms in Gambia. Bibliotheca Diatomologica 12a: 1-153, including 25 pls.
____. 1986b. Diatoms in the Volo Bay, Greece. Bibliotheca Diatomologica 12b: 1-67, including 13 pls.
____. 1987. Diatoms from Viti Levu, Fiji Islands. Bibliotheca Diatomologica 14: 1-195.
____. 1993. Some diatoms from Siberia especially from Lake Baikal. Diatom Research 8: 231-279.
Håkansson, H. 1988. Obituary. Niels Aage Johannes Foged 1906-1988. Diatom Research 3: 169-174.
Witkowski, A., D. Metzeltin, H. Lange-Bertalot, & G. Bafana. 1997 *Fogedia* gen. nov. (Bacillariophyceae) a new naviculoid genus from the marine littoral. Nova Hedwigia 65: 79-98.

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