

A short summary of the long history of biogeochemistry in the Department of Ecology & Evolutionary Biology at Cornell.....

Biogeochemistry is the scientific discipline that deals with the biological controls on environmental chemistry and with the geochemical controls on the structure and function of ecosystems. The discipline has a long history of combining theory with practical application, and biogeochemists have played a central role in our understanding of global change and large scale pollution issues such as acid rain and ocean dead zones. The discipline came into prominence in the 1980s, but the roots at Cornell run far deeper.

The term biogeochemistry was first coined by the Russian scientist Vladimir Vernadsky in 1926. Within just a few years, G. Evelyn Hutchinson, who was one of the earliest practitioners of the discipline in the United States, was developing biogeochemistry as part of his teaching at Yale and writing a variety of biogeochemical papers. Hutchinson used “biogeochemistry” in the title of his papers as early as 1943, and biogeochemistry formed the basis of volume 1 of his famous *Treatise on Limnology* (1957). Jack



Vallentyne trained as a biogeochemist under Hutchinson, earning his Ph.D. at Yale in 1952, and joined the faculty at Cornell in 1957.

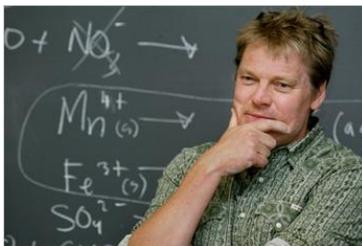
Vallentyne was one of the original faculty members in the Section of Ecology & Systematics (which later became the Department of Ecology & Evolutionary Biology) at Cornell when the Section was formed in 1964. Vallentyne taught the Advanced Biogeochemistry Seminar Course in Cornell (one of the first courses in biogeochemistry at any university in North America) at a pub in downtown Ithaca, over pints of beer. He left Cornell in 1966 to become the head of the eutrophication unit of the new Freshwater Institute of Canada’s Fisheries and Oceans, where among other things, he established the Experimental Lakes Area , which he hired Dave Schindler to lead.

Gene Likens was hired to fill the line vacated by Vallentyne’s departure. Likens joined the faculty in the Section of Ecology & Systematics in 1969 and remained at Cornell until 1983, when he departed to become the founding Director of the Institute of Ecosystem Studies in Millbrook, NY. Likens is one of the leading influences on the discipline of biogeochemistry over the past several decades, known for his pioneering work on acid rain and on the biogeochemistry of the Hubbard Brook Experimental Forest. His book with Yale Professor Herbert Bormann, *Biogeochemistry of a Forested Ecosystem* (originally published 1977, with later editions in 1995 and 2013) is a classic. Biogeochemistry was a central part of the courses Likens taught at Cornell, including Limnology and the graduate core course in Communities and Ecosystems.



In 1985, Bob Howarth joined the faculty at Cornell to help fill the void in biogeochemistry left by Liken’s departure. Just the year before, in 1984, Howarth had founded the journal *Biogeochemistry*, and

he served as the Editor-in-Chief for the next 20 years. At first at Cornell, Howarth continued to teach the graduate core course in Communities and Ecosystems that Gene Likens and Robert Whitaker had started, but with other major changes in the departmental curriculum, Howarth started teaching a new graduate course, Principles of Biogeochemistry, and an undergraduate class with a major biogeochemical focus, Ecosystem Biology, in 1988. These courses have been taught at Cornell continuously since, and the graduate course has been required for all Ph.D. students in the Biogeochemistry Program now for 18 years. As a step towards galvanizing biogeochemistry across the diverse departments and colleges at Cornell, Howarth together with his long-term colleague Roxanne Marino (who earned her Ph.D. with Gene Likens) also started the biogeochemistry seminar series in 1988. This series, which has run continuously now for 25 years, is held late Friday afternoons, with beer served afterwards, a tradition that flows from Valleryne's recognition of the value of mixing intellectual and social pursuits. Under Howarth's leadership, Cornell received its first graduate training grant for the Biogeochemistry Program in 1995.



An additional faculty line in biogeochemistry became available when Howarth was awarded an endowed professorship, and Lars Hedin joined the faculty in 1994. Hedin helped lead the biogeochemistry program for many years and co-taught both Principles of Biogeochemistry and Ecosystem Biology with Howarth. Hedin left Cornell in 2001 to join the faculty at Princeton.

Christy Goodale replaced Hedin on the faculty in the Department of Ecology & Evolutionary Biology in 2003 and has been at Cornell since then. She has joined Howarth as the co-instructor for the graduate class in Principles of Biogeochemistry and the undergraduate Ecosystem Biology class. Goodale has also taken on leadership in the biogeochemistry program as Project Director on the latest training grant from NSF for Cross-Scale Biogeochemistry and Climate, awarded in 2012.

