



Harlan P. Banks

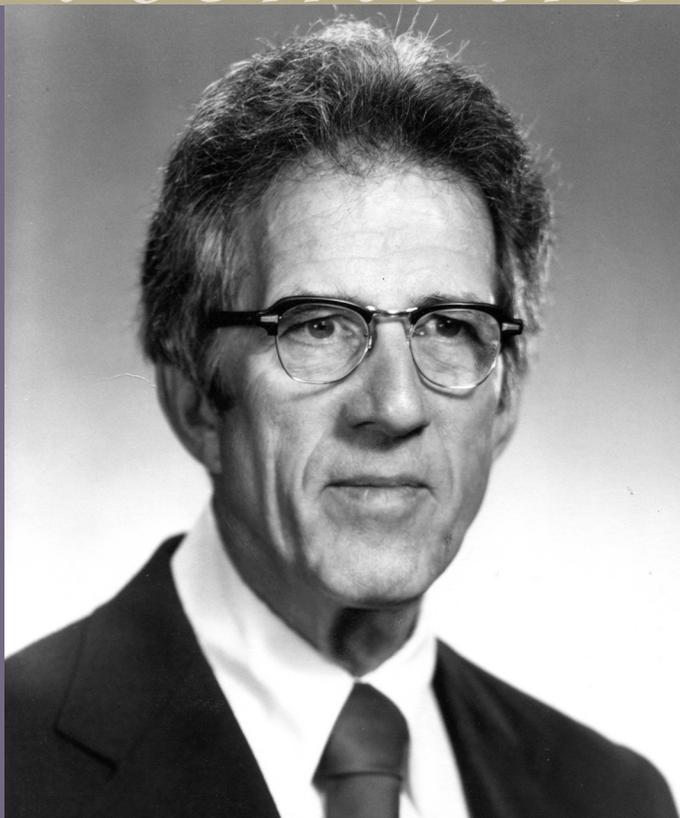
1913–1998

BIOGRAPHICAL

Memoirs

*A Biographical Memoir by
David L. Dilcher*

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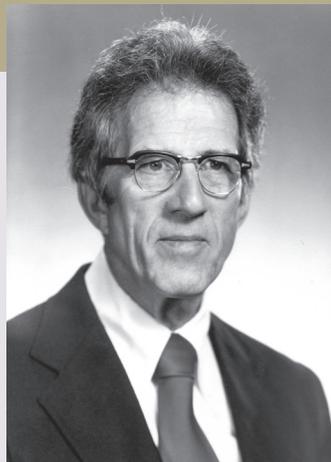
HARLAN PARKER BANKS

September 1, 1913–November 22, 1998

Elected to the NAS, 1980

Harlan Banks was a revolutionary paleobotanist who made early land plants, their relationships, and their evolution the focus of his research. Although many fossil plant specimens had been collected and studied by previous scientists, Banks learned through meticulous research that the earlier findings were rife with fossil remains that had been incorrectly reconstructed and poorly understood. He then set in motion a paradigm shift in the study of early land-plant fossils and how we organize these data into some coherent stories of these plants' evolution.

Banks earned a bachelor's degree from Dartmouth in 1934 and a Ph.D. from Cornell in 1940. He then took a position at Acadia University, in Wolfville, Nova Scotia, where he progressed from instructor to associate professor. He moved to the University of Minnesota in 1947 but then returned to Cornell in 1949. He became a full professor the following year. He headed Cornell's Department of Botany from 1950 to 1961 and then joined the Section of Genetics, Development and Physiology in the newly organized Division of Biological Sciences. In his final year before retirement in 1978 he held the post of Liberty Hyde Bailey Professor.



Photography by Cornell University

Harlan P. Banks

By David L. Dilcher

Harlan Parker Banks was born on September 1, 1913, in Cambridge, Massachusetts. In his youth he was influenced by having spent many summers at a camp in the New Hampshire woods. He planned on a career in forestry, but upon his graduation from Dartmouth in 1934 the United States was in the midst of the Depression. There was no work for him in that field, so he took an instructorship in botany at Dartmouth. There he came under the influence of Carl L. Wilson, who introduced him to the wonderful discoveries from the world-famous Rhynie Chert fossil flora in Scotland and its influence upon ideas of the nature of early land plants. This opened an area of potential research in his mind, and Wilson also steered Harlan to a Ph.D. program at Cornell, where he met Professor L. C. Petry. Petry was involved in work on early land plants from New York

State and the Gaspé Peninsula in Canada, areas that later were to become the backbone of Banks's research on Devonian age land plants.

When Harlan began his research, much of our understanding of early land plants was based on fossils that had been collected in the United States and Canada. The record consisted of a confused mix of poorly understood fossil remains and incorrect reconstructions. He thus entered into his research of early land plant evolution when it was full of mistakes, misinterpretations, and lack of direction. The potential for careful and detailed plant anatomical and morphological analysis of the fossil remains was tremendous and as yet unrealized. Harlan took full advantage of this opportunity.

Research Direction and Collaborations

Several factors in Harlan's research life set him on the path to success in his discoveries about the evolution of early land plants. He was at Cornell, which is located near excellent plant fossil-containing sedimentary rocks that were being excavated and exposed by the State of New York's building of new highways and also developing a system of water reservoirs, thus uncovering fossil-rich Early- and Middle-Devonian sedimentary strata. At the same time he was developing his research program, he recruited some excellent graduate students looking for research projects. Some of his graduate students (he had over 25) included Charles Beck, Fran Hueber, James Grierson, Pat Banamo, Larry Matten, Leeds Carluccio, Judy Skog, and Stephen Scheckler, all of whom worked on Devonian plant fossils.

Harlan had a Fulbright Research Fellowship in Liège, Belgium, in 1957-'58 and later was a Guggenheim Fellow in 1963, splitting his time between Liège and Cambridge, England. In Liège he worked with Suzanne Leclercq and Muriel Fairon-Demaret, while in Cambridge he worked with Dianne Edwards. In both places he was exposed to new techniques of fossil preparation. This included the degaging technique—working under a dissecting (low-magnification) microscope and using strong, sharp steel needles to remove sediment grain by grain to expose the fossil. A prerequisite for this work was (and is) an insistence on collecting part and counterpart of every fossil, because as Harlan often said, the three-dimensional character of a living plant lies in the matrix (Banks, 1972; Andrews, 1980).

When he returned to his laboratory at Cornell he taught his students these techniques and ways of thinking about extracting the maximum data from fossil plants. It involved accepting and doing the tedious work in the laboratory necessary to extract all the char-

acters of the whole preserved fossil plant, including the cuticle, vascular tissue, sporangia, and spores. This was in addition to collecting fossil plants in the field. Harlan worked hard to extract every detail of all the morphological characters that could be observed in each Devonian fossil plant. It was these data that revolutionized our understanding of Early Devonian land plants.

As his work progressed, he and one student, Fran Hueber (Hueber and Banks, 1968) found that the well-known reconstruction *Psilophyton princeps*, var. *ornatum* had been made up of fragments from two, or perhaps three, very different fossil plants. One had terminal *sporangia* and the other had lateral *sporangia*, early members of two very different lineages of early land plants. Harlan and his students published more than 150 papers on the detailed nature of several early land plants and also organized these plants' relationship to the evolution of the increasingly diversity of the Devonian land plant community.

Public Presence

Harlan published one book, *Evolution and Plants of the Past* (1964, 1970) in which he posed questions and hypotheses and emphasized evolution. His humor and his joy of research with the early Devonian plants of New York State was captured in an interview by Jane Brody, published in the *New York Times* Science Section November 28, 1978. She wrote:

When Harlan Banks hears of a dam or power plant about to be built or a road about to be cut through the Catskill hillsides, he races off to the site with the excitement of a little boy chasing a fire engine...."Since animals live on plants, the first land plants are undoubtedly important to the animal life that followed," Dr. Banks remarks. "Besides, these fossils are darned interesting. I study them because it's exciting to discover how things got to be what they are...."For many years, all early Devonian plants were thrown into one pot," Dr. Banks noted. "What I and others showed was that they didn't belong there." By separating the different groups, the true story of plant evolution became more apparent...An even more tedious method of analyzing fossils uses fine steel needles to chip off each grain of sand in the rock surrounding the fossil while looking through a dissecting microscope. "It means eight hours a day, seven days a week with no coffee breaks," Dr. Banks remarked. "But what you get is worth it—a complete fossil in three dimensions".... "The

method you use is dictated by the nature of the specimen and what you want to get out of it. If you have big enough specimen or lots of them, you can often use several different approaches," Dr. Banks said...."Within just 15 million years, a brief time evolutionarily speaking, forms evolved with recognizable similarities to modern land plants," Dr. Banks reported. Some of the early plants, although primitive by modern standards, grew into big trees....Although many fewer dams and power plants are being built these days, Dr. Banks is not worried about getting new material for his research. With some 40 cabinets loaded with mostly unstudied fossils of Devonian plants, he said, "I could go on for 10 years writing papers on the stuff I've already collected"....

Harlan had an engaging nature with everyone he met, especially with students and his colleagues. He was well recognized for the enthusiastic lectures he gave at Cornell, throughout the United States, and around the world. He taught an Introductory Botany class at Cornell for which he received awards and was part of several Bioscience and National Science Foundation-sponsored summer institutes at various campuses. He was an invited speaker at about 70 American universities and colleges and about 20 overseas venues. He delivered the Paleobotany Lecture for the Peabody Museum's Centennial in 1966, the French Lecture at Pomona College in 1971, the Rubey Lecture at U.C.L.A. in 1976, the Case Lecture at the University of Michigan in 1981, and the Waller Lecture at Ohio State University in 1982.

He gave the President-Elect address to the Botanical Society of America (1968) and a Plenary Lecture to the International Botanical Congress held in Leningrad in 1975. He once told me that the evolution of the modern day pinecone can be shown by the fossil record to be the product of a step-by-step reduction from a whole complex branch system of Paleozoic gymnosperms. He declared that this was much more exciting than, say, the evolution of the modern horse from a small three-toed *Eohippus* and that it should be taught in all evolution classes. He felt that we needed to tell people stories of plant evolution, with some enthusiasm, based upon the fossil record.

Honors

Several of his students and postdoctoral assistants shared with me some aspects of their experiences with Harlan. Pat Banamo wrote,

I have never seen (before or since) someone take hold of an audience and mesmerize them the way that he could. It didn't matter the age of the group or topic. He could always work his magic and excite any crowd." Muriel Fairon, a postdoc from Belgium, wrote "I followed his lectures in Paleobotany and discovered an amazing teacher. They were demonstrations of how to ask the good questions and find the right answers. They were entertaining but always more serious and profound than it seemed just then, giving you something of substance to think about later. No wonder the lecture room was always full." From Dianne Edwards, F.R.S., I heard: "Harlan Banks was the reason I became a Palaeobotanist. He came to Cambridge (1964) and gave a lecture on Psilophyton, at a time when I was selecting a PhD field. I immediately decided on Lower Devonian Palaeobotany...

His student Judy Skog remembers that Harlan “was one of the paleobotanists to emphasize stratigraphy and that his students took lots of Geology courses. He was a very dynamic person and was called HPB by his students, not Dr. Banks.”

Harlan was honored as a corresponding member of the Société Géologique de Belgique and in 1969 elected president of the Botanical Society of America, for which he had been treasurer (1964-1967) and vice President (1968). He received the Botanical Society of America Merit Award (1975), and he served the International Organization of Paleobotany as vice president (1964-1969) and president (1969-1975). He was honorary vice president of the XII International Botanical Congress held in Leningrad (1975). He was elected to the National Academy of Sciences in 1980, was a member of the U.S. National Committee for the International Union of Biological Sciences (sponsored by NAS) 1977-1983, and was presented the Paleontological Society Medal in 1987.

A Personal Story

Harlan had a good sense of humor and once told me a story about when he was teaching at a summer institute at Western Kentucky State University. One weekend afternoon he drove down to the nearby community of Puryear, Tennessee, which was the site of a clay pit with excellent Eocene angiosperm leaves. While he was collecting in the clay pit, a young boy came by and joined him. The young lad found a beautifully preserved fossil flower. Harlan had not been so productive, or lucky, despite all his knowhow and had only found leaves. When they finished collecting, Harlan took the boy up to the town of Puryear and bought him an ice cream cone, which he exchanged for the beautiful fossil flower. Perhaps this Eocene-age flower could still be found in the Cornell Paleobotany teaching collection.

After his retirement he and his wife moved to a retirement complex near Dartmouth College while remaining active in Paleobotany. He remained involved with the International Union of Biological Sciences, he was an active member of the National Academy of Sciences, traveled nationally and internationally attending meetings and giving lectures. He published 11 papers during this time. About one year before his death he traveled to Cambridge, Massachusetts to give a lecture to the New England Botanical Club. He died on November 22, 1998, at his retirement home in New Hampshire. He was survived by his wife, Rosamund (Kit) Shurtleff Banks and their daughter, Jane Angstrom.

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