

Bill Muir: Plant Pathologist, Teacher, Botanist, Naturalist

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Acknowledged excellence in teaching is a rare quality attained by relatively few involved in plant pathology or other sciences. These rare individuals achieve excellence where their contributions to the discipline are measured in the people influenced rather than in academic research papers. Impact for such persons is measured through the influence they have on the lives of others, including future professionals. The end result of the teacher's effort and the student's struggle is to find a professional identity that will, in its own right, be meaningful to them and to society. Thus, it is fitting that outstanding teachers in plant pathology be identified and their contributions recognized. Dr. William "Bill" H. Muir, professor of botany at Carleton College, a small liberal arts school in Northfield, Minnesota, is such a person.

The Plant Pathologist

Because Carleton is an institution that contributes relatively little in agricultural sciences, Dr. Muir's contributions are even more amazing. Bill received his Ph.D. in plant pathology from the University of Wisconsin in 1955, working under the direction of Prof. A. C. Hildebrandt and Prof. A. J. Riker. Since 1957, he has been a member of the Carleton College faculty.

An approximate count reveals that Dr. Muir influenced at least 19 students to pursue graduate degrees in some area of plant pathology. Astonishingly, 0.5% of the registrants attending the 72nd annual meeting of the American Phytopathological Society in Minneapolis in 1980 were graduates of Carleton College and directly influenced by Professor Muir. Additionally, Dr. Muir has influenced approximately 55 other students to pursue academic, industrial, and business careers in almost every discipline of botany.

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Since 1968, Bill Muir has been totally blind because of diabetes. His teaching therefore has been a "team approach" with the help of his superb wife Elizabeth, "Lib," whom he met as an undergraduate at Allegheny College in Pennsylvania. His philosophy has always been to motivate students to work independently while offering strong encouragement and exhibiting a willingness to help them. One of the first projects that a student undertakes is to make potato-dextrose agar, beginning with the peeling and boiling of potatoes.

The Teacher

Professor Muir's ability to motivate students is demonstrated by his influence on his first student, Dr. James Van Etten, now professor of plant pathology at the

University of Nebraska. Van Etten was a sophomore and prospective chemistry major at Carleton College when he first met Bill Muir, then a new faculty member on campus. Van Etten wanted to learn about yeast, a subject about which he knew nothing. Dr. Muir, in only a few minutes, convinced him that he should take a botany course because yeast belonged in the plant kingdom. Before this, James Van Etten had no intention of taking such a course. Dr. Van Etten writes: "He made the course very exciting (or maybe it was that he was excited about it) and he really sparked an interest in me. As I remember, he continuously pointed out aspects of plant science that needed investigation. I then took mycology and plant physiology from Bill my junior year. Since I was the only person signed up for the courses, they consisted of reading a textbook on each subject and fooling around in a lab (a corner of his office). That is, I transferred a few fungi, tried to infect some plants, and attempted to grow some plants in tissue culture. There was nothing formal about this, and I don't believe that much was accomplished except that I found it interesting. However, Bill was always encouraging and he seemed to be interested in what I was doing. Bill was always a hardworking individual (he used to average about 16 hours a day in his office). I know that there were many times that he worked all night preparing a lecture. However, tired as he might be, he never lost his sense of humor." Recently, Dr. Van Etten coined the name "muiridin," to honor Dr. Muir, for a protein isolated from dormant spores of the fungus *Botryodiplodia theobromae* (J. Bacteriol. 138:650-652).

Today, Dr. Muir continues to carry a full teaching load. When it became apparent in 1964 that he was losing his vision, Lib attended all his lectures to tape them, take notes, and prepare for his coming handicap. She unselfishly spends 70 hours a week assisting in his laboratory and classroom work, helping with editing and with correcting papers and taping texts and references. He frequently presents two consecutive lectures without the aid of notes. He does not know braille inasmuch as it is not



Part of the extensive plant collection in the Carleton College greenhouse is examined by Bill and Lib Muir.



In a laboratory class, Bill and Lib Muir discuss with a student the coenocytic mycelium of a Phycomycete.



While cutting wood to heat the Muirs' cabin in northern Minnesota, Bill is interrupted by an inquisitive chickadee.

touch and smell, he can identify hundreds of plant species in this 2,500-square-mile wilderness in northern Minnesota. In 1971, he became staff botanist at the Wilderness Field Station of the Associated Colleges of the Midwest, located in the Boundary Waters. Dr. Muir, with Lib and their four children, was a part of the Field Station program for five summers, teaching a wilderness field course in botany. Later he became chairman of the executive committee that oversees the activities of the Field Station.

The Botanist

Bill and Lib frequently attend seminars in plant pathology, physiology, botany, genetics, and cell biology at the University of Minnesota. They maintain a number of associations with his friends and colleagues, including those in the Department of Plant Pathology at the University of Minnesota, a 1-hour drive from the Carleton campus. Microbial cultures and medium recipes are exchanged, but the relationships are much more substantial. He regularly brings his systematics, plant physiology, and mycology classes to the St. Paul campus. These visits usually consist of a day of arranged lectures with six to eight University faculty who describe their own research interests and related work. Bill

and Lib regularly attend symposia on the campus. Their presence at social functions attached to these meetings is welcomed and enjoyed by friends. A colleague at the University of Minnesota has written that "The staff at the University feel fortunate to have friends and colleagues, such as Bill and Libby Muir, who are so involved and interested in the scientific and teaching activities on campus."

While a graduate student, Bill Muir was the first scientist to successfully grow plant tissue cultures from single cells. This was accomplished by using a filter-paper-raft nurse-culture technique. Over 2,000 single cells of marigold (crown gall origin) and 500 cells of tobacco were isolated from liquid cultures and transferred to filter paper squares placed over established tissue cultures. From both types of tissue, about 8% of the cells grew and divided to produce small colonies that could be transferred directly to agar medium. This research was a substantial contribution to the area of plant tissue culture and helped open the way for research in the modern technology of protoplast fusion and subsequent plant regeneration.

Prof. J. C. Walker, in the letter of recommendation that led to Bill Muir's employment at Carleton, said, "He has shown exceptional originality in his tissue culture research, particularly with reference to improvement of techniques for the initiation of single-cell cultures. I am certain that his inquiring attitude will always keep him active at the frontier of science."

Dr. Muir's biological interests are many, however. At the time Dr. Muir received his Ph.D. from the University of Wisconsin, Professor Walker wrote: "Muir's background and training have given him a much broader base in biology than most of our majors in plant pathology. He has an inquiring mind and wide interests. At the same time, he is able to concentrate and pursue a problem to a satisfactory conclusion."

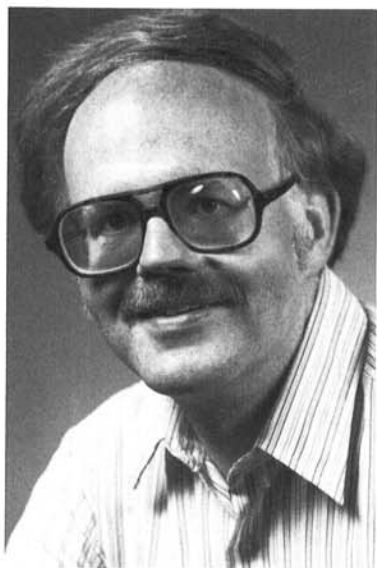
Since that time, Dr. Muir has continued research with support from several National Science Foundation grants. He also has research interests in the morphogenesis and cytology of ferns, scouring rushes, and boreal plant ecology. He is a consultant to the City of Northfield on the control of Dutch elm disease and developed a control program that has been implemented. He also has acted as an editorial reviewer for *Science* and the *American Journal of Botany* and has served on National Science Foundation committees convened to review grant applications.

The Naturalist

Dr. Muir, an avid outdoorsman, is a distant relative of the famous 19th-century naturalist John Muir. On weekends, he and his family retreat to

recommended for diabetics because they often lose their fingertip sensitivity.

Professor Muir's teaching has not been limited to the formal classroom. He has an intense interest in the Boundary Waters Canoe Area, an area he had never visited before becoming blind. Through



John H. Hill

Dr. Hill, professor of plant pathology in the Department of Plant Pathology, Seed and Weed Sciences, is responsible for research in plant virology at Iowa State University, Ames. He received a B.A. from Carleton College, working under Dr. Muir. Later, he received an M.S. at the University of Minnesota and a Ph.D. from the University of California, Davis. He has been on the staff at Iowa State since 1972.



Laura E. Sweets

Dr. Sweets is an assistant professor and extension plant pathologist in the Department of Plant Pathology, Seed and Weed Sciences at Iowa State University. She graduated from Carleton College with a B.A. and Honors in Independent Study for a project done at the Wilderness Field Station for Dr. Muir. She went on to receive an M.S. and a Ph.D. in plant pathology at the University of Minnesota.

their primitive cabin, often accessible only by snowshoe and toboggan in winter. They built the cabin, called "Lycopodium Lodge," during the winter of 1976. It has no running water, and Bill tells us that "light is provided for those inferiors who need it by kerosene lamps." Heating Lycopodium Lodge is done exclusively by wood, which Bill fearlessly splits.

Since 1971, Bill and Lib have paddled 2,300 miles in canoes and crossed 428 portages carrying Duluth packs. He writes: "Before becoming blind, I had never taught a wilderness field course in botany. To do so, though, seemed a bit more realistic than trying to isolate single cells under a microscope that I couldn't even find, let alone see!"

The Muirs have worked for the continued preservation of the Boundary Waters Canoe Area as a wilderness area. Dr. Muir has testified before committees of the United States House and Senate advocating the continued preservation of the area. He believes it is the wilderness area most accessible to the handicapped in the United States. His interest in

opportunities for the handicapped is further illustrated by his opening address for the 1979 National Science Foundation conference on the handicapped for the eastern United States. His appearance on television and the publicity in the popular press have served to reorient public attitudes toward the blind, according to Joni Johnson, Director of the Communication Center for the Minnesota State Services for the Blind.

Handicap—a 'Relative Thing'

Bill Muir does not view any of his accomplishments as unusual. He believes his accomplishments are "just part of the job." Motivation in teaching or research is a major driving force for Bill's achievement of excellence, and his continuing accomplishments demonstrate this. His industriousness and ingenuity were demonstrated early. An associate from his graduate school days recalled: "During his graduate school days, he acquired an old beat-up car. Parts were collected from wrecked cars in the junkyards to restore the engine to first-class working condition. Bill pounded

out the dents and sanded and painted the body. He installed seat covers and re-covered the insides of the doors with new plastic material. He had a smooth-running, sharp-looking car with little outlay of cash. After all, a graduate student's stipend was \$110 a month or \$1,320 a year in 1952."

Bill believes being handicapped is a "relative thing—when it comes to climbing Mount Everest, 9,999 of every 10,000 persons are handicapped." Bill writes: "Lib and I have figured that we can be an example for our students, as well as for our children and even adults. Most folks will encounter hard times at some point along the way. What will determine how they will react? Partly, that will be determined by their previous experiences and observations. If we did not lie down and quit, perhaps our example could be of aid in strengthening the resolve of others."

Dr. Bill Muir is an outstanding example and inspiration to all students, teachers, and researchers in plant pathology. Truly, he and Lib have achieved excellence.