DOCUMENTS OF THE GENERAL FACULTY

REPORT OF THE MEMORIAL RESOLUTION COMMITTEE FOR JACK EDGAR MYERS

The special committee of the General Faculty to prepare a memorial resolution for Jack Edgar Myers, professor emeritus, molecular cell and developmental biology, has filed with the secretary of the General Faculty the following report.

Sue Alexander Greninger, Secretary
The General Faculty

IN MEMORIAM
JACK EDGAR MYERS

Jack Myers' academic and research contributions to The University of Texas at Austin and the scientific world span more than a half a century. Jack made fundamental discoveries in the mechanism of photosynthesis. He was a remarkable teacher of children, college students, and graduate students.

He was born July 10, 1913, in the family farmhouse in Boyds Mills, Pennsylvania. The farm environment gave him many marvelous experiences with a barn full of cows and horses, a pond for fishing, and a general store. At the age of four he wandered into the local blacksmith shop where, he later recounted, "the men had their own melodious version of the English language in which cussing was developed into an art form." His parents, Gary Cleveland Myers and Caroline Clark Myers, both child psychologists, informed him that the new words he had learned were only to be used in the shop. But the country environment flavored his English for the rest of life. Many decades later, at the University when he didn't like someone's suggestion in a zoology department faculty meeting, he would announce that it was a "piss-poor idea." He described his early schooling as "soggy" up to the age of 12 when three excellent teachers "ignited the spark of excitement in my learning." His interest in science then took off.

Jack attended Juaniata College in Pennsylvania where he had the good fortune to enter a stimulating chemistry program. He graduated in 1934 with a B.S. in chemistry and then entered graduate school at Montana State College in Bozeman where his uncle, Frank Cotner, was a mycologist and professor. A year later he earned an M.S. degree with a thesis he termed "ho-hum" on the effects of irrigation on the composition of garden plants. His uncle ignited his interest in spiral bacteria found in roadside ditches, which had never been obtained in pure culture. This challenge resulted in Jack's first publication: an account of methods for isolation and identification of these *Spirillae*. He then was offered a teaching assistant position in the botany department of the University of Minnesota where they needed a person with a chemical background. The choice was easy because Evelyn De Turck, whom he had met at Juaniata and was then courting, had been offered a teaching assistantship in psychology. They were married a year later.

George Burr, Jack's new mentor, laid out a program for him that included physical chemistry, thermodynamics, plant physiology, and photosynthesis, a program completely lacking in classical botany and not favored by Burr's colleagues. Jack emphasized this training because of his belief that graduate education "was not a place where one size fits all."

It was Burr who introduced Jack to photosynthesis "even though the machinery was hidden inside a green box." Jack had come across a paper from 1890 by Beijerinek that illustrated green algal cells from a culture grown in the dark. This was astonishing because it was well known at the time that chlorophyll was only produced in the presence of light. This anomaly presented Jack with a challenge: how did the cells produce chlorophyll in the dark? Were the cells capable of carrying out photosynthesis? Jack built the manometric apparatus of Warburg to measure the photosynthetic production of oxygen, and this led to the discovery that the bright light he was using, four times as bright as the sun, inhibited oxygen production, a phenomenon later termed photoinhibition. Oxygen production only occurred at low light intensities. A prolonged induction period was required in order for oxygen production to occur. In Jack's words, "I had made a discovery. I knew something unknown to anyone else in the world. That had been my romantic vision of the fruit of research. And it has not changed in the sixty years since."

Jack was awarded a National Research Council Post-doctoral Fellowship in 1939 to work on the nature of the photosynthetic induction period with E.D. McAlister at the Smithsonian Institution in Washington. They constructed instrumentation that permitted the simultaneous measurement of the fluorescence of chlorophyll within the photosynthetic cells resulting from illumination and the uptake of carbon dioxide. These experiments showed clearly that there must be two different processes: first fluorescence and then carbon dioxide fixation. However, he found that the induction period in the *Chlorella* algal cells was variable and depended on culture conditions. This led to the invention of a controlled-culture system. The growth of the cells was monitored by a photocell that controlled a valve that let in just enough fluid medium to keep the cell density constant. He used this system continuously: "my constant companion for more than fifty years." Indeed, his mass culture methods remain in constant use today.

The electrophysiologist, E.J. Lund, persuaded Jack to come to the zoology department where he was building a group in general physiology. Jack was particularly pleased that the department had a machine shop because he built his own instruments and was skilled in glassblowing and electrical and mechanical devices. A major initial goal was to determine the ratio of CO_2 uptake to O_2 produced during the initial induction period. His first graduate student, Marian Cramer, set out to do this with the newly-constructed Warburg apparatus by using two separate vessels, a technique requiring careful calibration in the dark. The first experiment was to measure this ratio, the respiratory quotient, well known to be 1.0. But Marian obtained 1.6. This observation led to the recognition that nitrogen metabolism was a characteristic feature of algal metabolism. Although carbohydrate is the primary product of photosynthesis in higher plants, the green alga, *Chlorella*, is primarily a protein synthesizer with up to 10% of its mass as protein. Jack reported on the new data on nitrate reduction at a photosynthesis symposium in 1949. This symposium marked the end of what Jack called the "green-box era—we were beginning to peek inside."

In the years that followed, Jack, his graduate students, and post-doctorals really opened the "box" and made many seminal observations about the mechanism of photosynthesis. Although he considered himself an "algal physiologist," the scientific papers illustrate an enormous breadth of interest with contributions to photosynthesis in physiological ecology, biochemistry, and biophysics. His meticulous time-resolved measurements of oxygen evolution and fluorescence emission provided some of the earliest convincing evidence of two sequential light reactions in photosynthesis.

Jack considered all teaching very important whether of graduate students or children. This is reflected in his dedication as science editor of a magazine popular across the country, "*Highlights for Children,*" which was founded by Jack's parents. In this capacity, he answered hundreds of questions from children every year. He later recalled that writing for children was "a challenge I hadn't counted on, but my Pop was of a mind that, 'You can do this. You're a scientist'." He always took the questions seriously and was particularly interested when the child had really thought about the question.

Not long after he arrived in Texas, he collaborated with physicist Frederick A. Matsen and chemist Norman Hackerman at the University to produce an excellent text on physical chemistry for pre-medical students. The text reflected his hands-on approach to science. For example, the gas laws were illustrated in terms of respiratory gas exchange measured with Warburg's manometric apparatus.

In a similar vein, he taught a course in cell physiology that became famous as Myers' "Mystery Hour." He made the students think. Thus, if a student failed to follow and understand a complex series of processes of electron transfer in photosynthesis and asked a question, Jack would guide the student so that the student would answer the question himself. Thus, from "mystery" to enlightenment was routine exercise each time the class met.

Graduate students were free to visit Jack's lab and office any time. As one student remembers, "never was a harsh word spoken, and he had that 'spark' in his eyes as he spoke to you, closing his eyes and pausing for a very long moment before he answered. He wanted the student to think along with him." He wanted to have students to figure out problems by themselves while always being available.

There was always a lunchtime gathering that was part of the daily routine. Jack was usually present. The meetings were a joy, and no one could forget Jack's booming laugh especially when the joke was on him. The questions children asked in *Highlights for Children* often came up. One of these questions was discussed for several days. A 7-8 year old had seen the demonstration of a celery stalk placed in a solution of red dye and had

seen the red dye move up into the stalk. So this young scientist concluded the green color of grass must have a similar origin. So he went into his backyard to dig and find the green fluid. He found none and asked *Highlights* for advice. Was he digging deep enough or in the right place? For Jack, this was no joke and deserved as careful a response as he would have in a scientific paper.

Almost every evening Jack would come back to the lab from about 7-10 PM to catch up on paper work or writing. This afforded a further opportunity for students to discuss their science with Jack. One student recalls, "Occasionally those discussions would last several hours. So much of our creativity and learning came from those sessions. Nothing that he came to do was ever more important than we were, and that left us with very special feelings for him." He never stopped asking questions. Late in his life Jack commented on his good fortune, "You know, I've been a lucky guy. I always had questions to answer. I never ran out of questions to work on."

Jack was honored for his many contributions to photosynthesis by his election, in 1975, to the National Academy of Sciences which stated that his "insights were fundamental to much of photosynthetic research over the past thirty years."

Jack was preceded in death by his wife, Evelyn, and survived by his four daughters and their husbands: Shirley and Fred Wendlandt, Jacquelyn and Jim Leonard, Linda and Allan Anderson, and Kathleen and Steve Holland. Jack's family had been expanded to include five additional children when his younger brother and his wife died tragically in a plane crash. He is survived by four of his brother's five children and their spouses: Tom Myers, Fred and Jennifer Myers, Patricia and John Mikelson, and Marie Jolene Rich.

The memorial Resolution was prepared by a special committee consisting of Professors Austen F. Riggs (Chair), Hugh S. Forrest, and R. Malcolm Brown, Jr.

Distributed to the dean of the College of Natural Sciences, the executive vice president and provost, and the president on September 26, 2007. Copies are available on request from the Office of the General Faculty, WMB 2.102, F9500. This resolution is posted under "Memorials" at: http://www.utexas.edu/faculty/council/.