



## **Andre T. Jagendorf**

October 21, 1926 – March 13, 2017

André Tridon Jagendorf, Liberty Hyde Bailey Professor Emeritus in the Plant Biology Section of the School of Integrative Plant Science died on March 13, 2017. André Jagendorf was born on October 21, 1926 in New York City to Moritz Adolph Jagendorf and Sophie Sheba (Sokolsky) Jagendorf. André married Jean Elizabeth Whitenack on June 12, 1952. Together they had three children, 8 grandchildren, and 9 great grandchildren. He was an accomplished musician as well as a world renowned scientist. Indeed, opera or symphonic renderings of the classic repertoire could often be heard as one passed his office door.

André was an undergraduate in the Botany Department at Cornell University from 1943 to 1948 where he was strongly influenced by Loren Petry who taught General Botany. André was further inspired by Otis Curtis and Dan Clark, from whom he took Plant Physiology, when during afterhours they discussed the nature of science and promoted mechanistic over teleological explanations for the actions of plants.

André earned his Ph.D. in 1951 at Yale University under David Bonner, working on the effect of the herbicide 2, 4-D on cabbage seedlings. Then André went to UCLA, where he was awarded a Merck Postdoctoral Fellowship and spent what he called “*the happiest years of my life*” working with Sam Wildman on establishing a method to purify chloroplasts. After receiving a phone call from Bill McElroy to join the McCollum-Pratt Institute and the Biology Department at the Johns Hopkins University, André joined the Johns Hopkins University as “*the token botanist*” and became an Assistant Professor in 1953, an Associate Professor in 1958, and Professor in 1966. André then returned to Cornell University as Professor of Plant Physiology in the Section of Botany, Genetics, and Development in the Division of Biological Sciences, and in 1981 became the Liberty Hyde Baily Professor. In 1997, André retired and became the Liberty Hyde Bailey

Professor Emeritus in the Department of Plant Biology. A symposium and banquet was held in his honor on April 19<sup>th</sup>. Tom Owens chaired the symposium where Richard McCarty, Dave Krogman, Pal Mailiga, Don Ort, and Harry Roy shared their reminiscences.

André was the Chairman of the Section of Plant Biology from 1985-1986 and 1987-1992. André was humble and unpretentious—insisting that the office staff call him by his first name. He would not answer to Dr. Jagendorf. André was always happy to help students, faculty, and staff, and his lab was always open to everyone who needed to borrow chemicals or equipment. André taught Plant Physiology lectures and labs as well as Plant Biochemistry, where he would draw, from memory, the structures on the board of any chemical he mentioned.

At a pivotal moment in his career, André heard Peter Mitchell give a talk about chemiosmosis at a bioenergetics meeting in Sweden. According to André, *“His words went into one of my ears and out the other, leaving me feeling annoyed they had allowed such a ridiculous and incomprehensible speaker in. But – Geoffrey [Hind] read Nature. Geoffrey was from England, both better trained and more intelligent than I was. He read Peter Mitchell’s paper, came to me, and said ‘André, could this possibly explain XE [something that preceded ATP formation]?’”* As a result of this conversation, André began to communicate with Peter Mitchell who invited him to visit his lab so that he could learn about the chemiosmotic hypothesis. Later that summer André did the *experimentum crucis* that showed that the synthesis of adenosine triphosphate by chloroplasts depended on the magnitude of a pH difference. The experiment consisted of creating a pH gradient across the thylakoid membrane of chloroplasts in the dark. André created the transient pH gradient by incubating chloroplasts in a pH 4 buffer for 15 seconds. They then placed the chloroplasts in a pH 8 buffer that contained ADP and Pi. Under these conditions, the pH of the stroma increased to 8, whereas the pH of the thylakoid lumen remained at 4. An immediate increase in ATP synthesis accompanied the neutralization of the pH gradient across the thylakoid membrane. This provided the experimental evidence to support Peter Mitchell’s theory that ATP synthesis is driven by proton-motive force.” Following André’s results, Mitchell wrote a letter to Edward C. Slater on November 2, 1965, stating: *“experiments have been steadily pushing me towards accepting the chemiosmotic hypothesis and I think I shall feel inclined presently to regard it as a theory.”*

André was also a pioneer in many aspects of chloroplast molecular biology, including protein synthesis and protein degradation, chloroplast DNA repair mechanisms, and the movement of DNA across the chloroplast envelope.

André became the President of the American Society of Plant Physiologists in 1967; received the Charles F. Kettering Award of the American Society of Plant Physiologists in 1978; was elected to the National Academy of Sciences in 1980; received the Charles Reid Barnes Life Membership Award of the American Society of Plant Physiologists in 1989; and received the 2012 Rebeiz Foundation for Basic Research Life Time Achievement Award for his contributions to the understanding of ATP Biosynthesis.

At the Rebeiz Foundation Award ceremony, Tom Sharkey said, *“André Jagendorf, a brilliant and an original scientist has made seminal contributions to the development of photophosphorylation and the elucidation of its mode of action. His numerous breakthrough*

*findings established him as a world leader in this field of science. He was a major force among the pioneers that established the presence of photophosphorylation in defiance of the common knowledge prevailing at that time that photosynthesis produces oxygen and reduces CO<sub>2</sub> while plant mitochondria produced ATP... Those breakthrough findings paved the way for a new field in science that led to confirmation of the chemiosmotic theory. During his scientific career André Jagendorf proved himself as a nonconformist who broke new grounds in science using a rare combination of imagination, meticulous scrutiny of experimental results and the ability to devise ingenious experiments that gave answers to major unsolved mechanisms in science.”*

As noted, André officially retired in 1997, giving up a corner lab on the second floor of the Plant Science Building, overlooking the Quad. Robert Turgeon moved into that space and, knowing that André wanted to keep working, he asked if he would be an honorary lab member. André readily accepted and began what was to become a long and productive time at the bench. At first, André devoted himself primarily to helping undergraduate and graduate students and post docs. He was a true inspiration to them. He continued in this fashion for many years, helping with experiments and general lab activities while refusing authorships so that he would not compromise students' academic advancement. A few years ago, André began a new study analyzing the biological activity of compounds transported in the xylem. The work he began continues.

André was very well known, indeed internationally, for telling jokes. All of them were funny, and it was clear to one and all that he enjoyed making people laugh.

*Written by Randy Wayne (Chair), Robert Turgeon and Karl Niklas*