Bruce Wallace

May 18, 1920 – January 12, 2015

Bruce Wallace was born in McKean, Pennsylvania on May 18, 1920 and died on January 12, 2015 in Blacksburg, VA at the age of 94. He was predeceased by his wife, Miriam, and is survived by his children, David B. Wallace, of Blacksburg, VA, and Roberta Wallace, of Wauwatosa, WI. He graduated from McKean High School then attended Columbia University where he received his Bachelor's degree in Zoology in 1941. His Ph.D. study under the eminent population geneticist Theodosius Dobzhansky at Columbia University was interrupted by World War II, during which he served in the army as Statistical Control Officer under Robert McNamara. After four years in the army, he returned to Columbia and received his Ph.D. in 1949. He took a position at, and later was Assistant Director of, the prestigious Long IslandBiological Laboratory (LIBL) at Cold Spring Harbor, NY. In 1958, he joined Cornell University, where he was a professor of genetics until retiring in 1981 to take a position at theBiology Department at Virginia Polytechnic Institute and State University. There, he became a University Distinguished Professor of Biology (1983) and was active until he retired again in 1994. He authored over 150 research articles, mostly in the field of population genetics using *Drosophila* as a genetic model. During his years at Cornell, he published no fewer than 70 research papers or book chapters. He also wrote more than 15 books, many translated into other languages. Most of his books were written while he was at Cornell. Four books in particular, *Radiation Genes and Man* (1959, with Th. Dobzhansky), *Adaptation* (1961, with Adrian Srb), *Topics in Population Genetics* (1968, W.W. Norton & Co.) and *Genetic Load: Its Biological and Conceptual Aspects* (1970, Prentice-Hall) were well received by the evolutionary geneticists of the time. In 1981, his textbook, *Basic Population Genetics* (Columbia Univ. Press) was published. This book was one of a very few written at the time and was very popular because it was not full of mathematical equations.

Bruce Wallace was recruited from the LIBL by R. P. Murphy in 1958 to replace H.H. Smith in the Department of Plant Breeding at Cornell. Murphy’s justification for hiring a geneticist who

did not work on plants argued for the best scientist to fill the position and Wallace fit the job. He was

a member of the American Academy of Arts and Sciences (1971), and served as President of the Genetics Society of America (1974), the American Society of Naturalists (1970), the Society for the Study of Evolution (1974), and the American Genetics Association (1990), as well as an editor of *Evolutionary Biology*. In 1970, he was elected to the National Academy of Sciences. However, during the Vietnam War, his social conscience prompted him (and several others) to resign from the Academy when it was discovered that the Academy, through its operating arm, the National Research Council, had committees doing secret war research, funded by the Defense Department. If not unprecedented, resignation from the Academy was certainly a profound action and one which necessitated great strength of conviction. Happily, Professor Wallace was reinstated in the Academy after the war was over.

Professor Wallace was a truly original thinker. He had a sometimes eclectic, but always insightful view of population genetics and biology. As Theodosius Dobzhansky's graduate student, Bruce Wallace viewed natural populations as genetically diverse (now well documented at the molecular level) with polymorphisms maintained by heterozygote superiority or overdominance. His research initially centered on irradiated populations of *Drosophila melanogaster* and the fitnesses of the flies in those populations. Professor Wallace maintained that the additional heterozygosity generated by the irradiation was beneficial to the genetic health of the populations. This viewpoint was not immediately accepted by the population geneticists of the time, but Wallace persisted by obtaining extensive data that supported his view of population diversity.

Professor Wallace's imagination never stopped generating new ideas and innovative ways of testing popular theories. For example, in order to test certain assumptions regarding island biogeography, he devised an "island machine," a large plexiglas population cage where founding populations could be controlled in number and density and immigration could be controlled by the length of time vials remained attached to the machine. Island size or the number of ecological niches available could be controlled by exchange rates between vials representing an island, and extinction rates could be measured. In so doing, Professor Wallace devised the best way to estimate the equilibrium number of species and what was the major determinant of extinction (Wallace, B. 1975. The biogeography of laboratory islands, *Evolution* 29:622-635).

Another novel experiment was prompted by Hampton Carson's descriptions of several species of *Drosophila* whose larvae live amongst the bristles underneath the excretory pore of certain tropical land crabs. Wallace devised an "artificial crab" consisting of a rectangle of indoor-outdoor carpeting inside a population cage. Dilute urine was slowly dripped onto the carpeting via an I.V. tube. The population was initially started with eight different *Drosophila* species, but *D. virilis* quickly became the only species that survived. This population maintained itself for more than a year, when they essentially ran out of pupation sites. When the remaining adults were removed and put on standard *Drosophila* medium, they failed to survive. Thus, Professor Wallace demonstrated that a small population had adapted to this unusual niche so that, within one year, they became virtually unable to survive on the standard Drosophila medium. (Wallace, B. 1978. The adaptation of *Drosophila virilis* to life on an artificial crab. *Amer. Nat*. 112:971-

973). Bruce also correctly anticipated the structure and roles of enhancers in gene regulation, well before they were discovered by molecular biologists (Wallace, B and T.L. Kass. 1974. On the structure of gene control regions. *Genetics*. 77: 541-558).

Bruce loved to travel and did so extensively as a visiting scientist and scholar, teaching and working at various universities and academic institutions worldwide. Devoted to his family, he frequently travelled with his wife and two children. Lee Kass remembers Professor Wallace at Cornell as a brilliant educator, making difficult or abstract concepts clear to both the scientist and the public. He graciously offered his time and assistance to professional societies, yet he was always available for guidance to family, friends and students, often with his wife, Miriam. Following the example they learned from Dobzhansky, Bruce and Miriam freely hosted visiting faculty at their home, inviting graduate students and colleagues for dinners, good Scotch and lively conversation, lasting long hours into the evening.

Bruce Wallace and his close colleague Adrian Srb hosted and arranged for future Nobel Laureate Barbara McClintock to return to Cornell as one of the first A.D. White Visiting Professors (1965- 1974). Previously members of Cornell's Department of Plant Breeding, they had moved to the Section of Genetics, Development and Physiology (GDP) in 1965, as members of the newly established Division of Biological Sciences. As a graduate student in GDP, Kass, other graduate students, and faculty colleagues were encouraged by Wallace to engage with and learn from McClintock and other visiting faculty.

Cornell celebrated Bruce Wallace's second retirement (1994) by a symposium in his honor. Colleagues and former students lauded his contributions and legacy on October 27, 1995; many published subsequently in *Evolutionary Biology* Volume 30.

After retirement, he turned his attention from genetics to complex environmental, and associated societal issues. He became concerned about environmental degradation and wrote extensively on the subject.

Bruce Wallace gave us the opportunity to learn from him, and, in essence, started us off on our careers in science. We, and his many students and colleagues both at Cornell and Virginia Tech, will never forget nor cease to appreciate this remarkable man.

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