

## Obituary



**DR. SOLON ALBERT GORDON  
1916-1973**

THOREAU said in his journals: "I suspect that the child plucks his first flower with an insight into its beauty and significance which the subsequent botanist never retains". Thus sighed a colleague (C. F. Ehret): "Too bad, Thoreau didn't know Solon Gordon as well as Solon knew Thoreau".

SOLON ALBERT GORDON was a man enthralled in nature's splendor. This love for wild things had led him to his early college career in forestry at Pennsylvania State College. His delight in outdoors took him and his roommate (Walter C. Morrison) to grade and scale logs, on skis, in winter months. During Gordon's first expedition to Mt. Katahdin, Maine, he and his companion were forced to camp in a cirque by the edge of the timberline. A storm was brewing. The evening wind came upon them as if straight from Thor's bellows. Gordon spent that night on an exposed rock alone, just to feel the free force of the wind; it blew like a hurricane.

In pursuit of harmony, he had a love for the arts and music, and a keen sense and delight for motions in rhythm. He painted and sculptured to relieve the cares of a busy day. (A piece of his metal sculpture stands unfinished in the shop where he worked a few months before his death.) In summer, during college days, he practiced the recorder by a waterfall. The call of the wilderness, the spring blooms, and the autumn hues inspired young Gordon into words of prose and poetry:

"Ecstatic ending  
Of a song unheard,  
Melodic notes  
Of a deep-wood bird.  
Is music unlist?  
A lyric unbeing?  
Does existence depend  
On senses perceiving?  
Liquid tumbling  
Over a wind-swept wall,  
Rushing crescendo  
Of a spray-wet fall.  
Quick flow merging  
To lethargy of spent  
Slow waters traversing  
The stream-bed's bent.  
A flashing of wing  
A twig's trembling, left  
Musings of meaning  
I sought bereft.  
When silvery lilt  
Is brain enmeshed  
And sibilant prodding  
In body found rest."

(1934)

A turning point which had a great impact on his later career came when he took a plant physiology class taught by Henry W. Popp.\* Under Dr. Popp's tutelage, an inquisitiveness developed for the mechanisms of plant growth, development, and forms. He spoke of Dr. Popp with fondness and respect, and regarded him as a teacher of great dedication. After receiving his BS in Forestry from Penn State in 1938, he studied under the prominent plant physiologist, F. G. Gustafson, at the University of Michigan. Under a Newcomb Research Fellowship, he began research by collaborating with Sam G. Wildman on the release of plant hormone auxin from leaf proteins (*Proc. Nat. Acad. Sci.* **28**: 217, 1942). In the midst of graduate school, he went to South Carolina on a special assignment for the USDA Natural Rubber Program, to study latex production in Russian dandelions and milkweeds for war needs. The University of Michigan awarded him the degrees of Master of Science in 1941, and Doctor of Philosophy in 1944, both in Plant Physiology.

After graduation, Dr. Gordon was hired by the eminent Johannes van Overbeek as Head Chemist for the Institute of Tropical Agriculture in Mayaguez, Puerto Rico. The warm breeze, sultry sea, and Latin rhythms suited Gordon. He spent four years there, the last year as Professor of the University of Puerto Rico, collaborating with numerous individuals on auxin biosynthesis in the pineapple (*Arch. Biochem.* **20**: 356(I) and 367(II), 1949, with F. Sanchez-Nieva). A synthesis of this research appeared subsequently in "The Biosynthesis of Natural Auxins" (In: *Chemistry and Mode of Action in Plant Growth Substances*, Wye College, England, 1956), and "The Biogenesis of Auxin" (In: *Handbuch Pflanzenphysiol.* **XIV**: 620, 1961). He returned to Puerto Rico in summer 1961 as an Office of Naval Research Fellow at the Institute of Marine Biology and Puerto Rico Nuclear Center.

Solon Gordon's career took on an added dimension as he assumed the post left vacant in 1948 by the well-known biophysicist and

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\*Co-authored with Overholts and Hill, the textbook, *Botany*. McGraw-Hill Publications in the Agricultural and Botanical Sciences.

plant physiologist, Robert B. Withrow, at Argonne National Laboratory. To Gordon's interest in plant hormones was now added radiation. He noted that a drop in auxin after ionizing radiation was due not to a destruction of the hormone *per se*, but to a rapid inhibition of the enzyme which converts indoleacetaldehyde to indoleacetic acid. A critical assessment of the occurrence, formation, and inactivation of auxin can be found in his scholarly review for the *Annual Review of Plant Physiology* 5: 341 (1954). An earlier research with van Overbeek on the function of the leaf in root formation (*Am. J. Bot.* 33: 100 (1946), also with L. Gregory) resulted in a series of later work on the correlative inhibition of root emergence in the gamma-irradiated *Coleus* leaf (*Rad. res. Bot.* 11: 453 (1971), with B. Gaur and L. Woodstock; 12: 361 (1972), with E. Buess). A third paper on the same topic was one of his last submissions before his death.

Gordon's interest in radiation extended to the visible spectrum. Through his introduction of Charles F. Ehret to George S. Monk, the Argonne Biological Spectrograph was conceived and constructed (*Rad. Res.* 5: 188, 1956). This powerful grating design expands the spectrum between 200 and 800 nm on a 20-ft focal curve to yield a linear dispersion of about 1 Å per mm. With the aid of this machine, Gordon was the first to demonstrate the association of phytochrome with a membranous organelle thirteen years ago (*Rad. Res.* 12: 325 (1960), with K. Surrey). (Evidence is now emerging on the binding of this chromoprotein to membranes.) Combined ionizing and visible irradiation studies led Gordon to postulate the potentiation of X-ray induced chromosomal aberration by visible light in pig kidney cells (*Rad. Res.* 45: 274 (1971), with A. N. Stroud and C. H. Chen). His research now encompassed the use of mammals, on the spectral sensitivities for the phasing of circadian temperature rhythms in the pocket mouse (In: *Biochronometry*, NAS, Wash. D.C. (1971), with G. A. Brown), and on the origin of urinary auxin in the germfree and conventional mouse (*Am. J. Physiol.* 222: 399 (1972), with R. J. M. Fry and S. Barr). Gordon's work on radiation attracted collaboration from a myriad of distinguished

men and their students in biology (i.e. M. Gibbs of Cornell, K. V. Thimann of Harvard, R. Burchard of University of Minnesota, J. Perkins of Harvard, etc.) to Argonne.

Dr. Gordon's interest in hormones and light led naturally to the study of phototropism. From his laboratory emerged the thesis that unilateral irradiation of a shoot gives rise to a differential inhibition of the basipetal transport of the plant hormone (*Plant Physiol.* 41: 59 (1966); 44: 491 (1969), with J. Shen-Miller). This phenomenon was extended also to geotropism (*Plant Physiol.* 41: 1113 (1966), with S. Naqvi).

The active exploration of Solon Gordon brought him to a long association with the National Aeronautics and Space Administration. He was supported in part by NASA for the last ten years of his research. His thesis was that "organism structure and gradient across that structure are a consequence of polar differences induced sequentially at cell, tissue, and organ levels. There is evidence that such polarities can be modified in plants by reorientation in gravitational, radiation, electrical and less certainly, magnetic fields. Development in an abnormal or subthreshold field would result in plants altered at biochemical, physiological, and morphological levels of organization". For this mission, sophisticated clinostats,  $1\pi$ ,  $2\pi$ , and  $4\pi$ , were designed and constructed at Argonne. These designs became a resource for those who used clinostats as research tools across the United States. The  $2\pi$  and  $4\pi$  design and construction involved knowledge in electronics, elegant mathematics, computer programs, and a high caliber of machine fabrication. Gordon's recognition of mathematical application, interest in electronics and shop machinery, focused diverse talents from Argonne's various Divisions to implement successfully the production of these unusual equipment. An introduction to this work on gravity and plant development appeared in *Proceedings of Biology Colloquium* (1963), Oregon State University Press. He was the convener of the International Conference on *Gravity and the Organism* in 1967. The proceedings of this conference become a valuable reference volume for both animal and plant research (University of Chicago Press (1971), co-edited with M. J. Cohen).

Dr. Gordon left an enviable record characterized by scholarship and lucidity. Over the years he collaborated with 106 men and women in various disciplines of science. He authored or co-authored 77 scientific papers in books and journals, 44 abstracts, and 112 reports in the Argonne National Laboratory periodicals. He was invited to and participated in 221 symposium presentations, seminars, and talks. In addition to this vigorous, productive scientific record, Solon Gordon participated enthusiastically in the committee activities of the numerous national and international scientific societies. He was the Secretary-General to the Vth International Congress on Photobiology. This important conference in 1965 precipitated the formation of the American Society for Photobiology in 1972. He was a consultant to the NAS-Space Biology Study Group, and, on four occasions, he served as a U.S. Delegate to the International Conferences on Space Research. He was on the editorial boards of three journals, *Plant Physiology*, *Space Life Sciences*, and *Radiation Botany*.

Dr. Gordon's association with *Radiation Botany* was a long one. He served from the beginning on its Editorial Board. According to the Editor-in-Chief, Dr. Arnold H. Sparrow, Gordon also had the onerous task of Book Review Editor from May 1965 through December 1969. This is a thankless job, but one that he filled with enthusiasm and dedication. On many occasions he made helpful suggestions concerning editorial policy. Dr. Sparrow added: "Dr. Gordon's contribution to the journal was very great, and because of his highly specialized interest and high competence, it will be almost impossible to find a suitable replacement. He will be sorely missed both by the management of the journal, and his colleagues in radiation botany".

Solon Gordon is remembered best by his colleagues as a happy man full of youth and vitality, a man of deep consideration for his

fellow men, a man full of empathy and understanding, a man who found joy in trading a quick succession of impromptu double and triple puns, a man who loved books and films, particularly those by Bergman, a gentleman blessed with impeccable standards, a man of highly civilized courage and action, dictated only by controlled wisdom, and a love for beauty, truth, and gentle goodness. The English writer, Malcolm Muggeridge, once said: "To those who love life, death is an outrage". The tragedy of Solon Gordon's passing is the irrevocable cessation of the fine and beautiful associations he had with others. In eulogy, his colleague, Charles Ehret, said: "An earlier Solon, sage of Athens who lived 2500 years ago, brought laws, compassion, and harmony to the Athenian people. He also lived to enjoy the fruits of his endeavors until the age of 82. Our Solon did not live so long, but also has left us with a rich harvest, the gifts of his life's work—not the least of which have been a rare sense of beauty, and an appreciation for civilized harmony in our community. As we remember him, these gifts too will endure, and he will remain with us a presence more than a remembrance".

Solon Gordon was struck down by a brain tumor in the thalamus in June 1972. After a full series of radiation therapy, he returned to work in October, and on the first day of his return, he delivered the opening address to the brilliant Biology Symposium on Photobiology he organized at Argonne. He resumed his normal activity, and delivered a paper at the annual meetings of the American Society of Plant Physiologists in Calgary, Canada, June 1973. The recurrence of the growth came suddenly after his return from the conference. He died at home on 5 October, 1973, at the age of 57, leaving behind his wife, Maxine, and son, Scott.

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