
 PETER BOYSEN JENSEN
 1883-1959

Peter Boysen Jensen was born January 18, 1883, in South Jutland. Growing up on a farm, he early found himself enjoying the close contact with living nature which he loved and admired throughout his life. After one year of premedical studies, including botany, he made the decision, inspired by the ecologist Eugen Warming, to devote himself to plant physiology. Boysen Jensen's teachers and advisors in plant physiology were Rasmus Pedersen (1840-1905) and Wilhelm Johannsen (1857-1927). Neither of these was actively engaged in experimental plant physiology while Boysen Jensen was a student in Copenhagen. Johannsen was already pursuing his studies of the variation in populations and pure lines. Boysen Jensen received the degree of magister scientiarum in 1908. During the following year, he spent 3 months in the laboratory of Wilhelm Pfeffer in Leipzig and 4 months with the biochemist, E. Schulze in Zürich. Boysen Jensen's doctoral thesis (Copenhagen 1910) dealt with the breakdown of sugar during respiration in higher plants. Already in 1907 Boysen Jensen had been appointed scientific assistant in plant physiology at the University of Copenhagen. He gradually took over all teaching of plant physiology in the department and was recognized as lecturer in 1922. He succeeded Wilhelm Johannsen as professor in 1927.

Before Boysen Jensen there was no strong tradition for research in plant physiology in Denmark—although the foundation had been laid by Rasmus Pedersen and Johannsen. Boysen Jensen, on the other hand, succeeded in establishing plant physiology as a recognized and worthwhile experimental science in his country. This development, however, came slowly and as a result of many years of patient effort, for which Danish plant physiologists owe him an immeasurable debt.

Internationally, Boysen Jensen is known for his studies on the production of matter in photosynthesis and his work on plant growth substances. He realized that in order to analyze the process of production of matter, it was necessary to measure the rate of photosynthesis under conditions as close to natural as possible, primarily at normal CO_2 -tension. He succeeded in constructing the necessary equipment, which became subsequently developed to a high degree of precision. His ideas and results are contained in "Die Stoffproduktion der Pflanzen" (Jena 1932) and in later publications by Boysen Jensen and others.

In 1910, Boysen Jensen published his first paper on the transmission of the phototropic stimulus in the oat coleoptile. He demonstrated beyond doubt that the transmission could take place through non-living material, namely a thin layer of gelatin separating the unilaterally illuminated tip from the shaded stump. He was further able to show that the trans-

mission took place in the part of the coleoptile, which was below the non-illuminated half of the tip, i.e., that longitudinal section which exhibits the greater rate of elongation during the phototropic curvature. These experiments were extended and published in greater detail in 1911 and 1913. In 1911, Boysen Jensen concluded from his experimental results that the transmission of the phototropic stimulus consisted in the transport "of a substance or of ions". These results were fundamental for the auxin theory of tropisms and thereby for the development of the auxin concept in general.

Boysen Jensen, however, did not immediately pursue a further study of the carrier of phototropic stimulus. He was actively engaged in investigations of the carbon cycle in the sea, and he also continued his studies of sugar metabolism in plants. Not until the 1920's were problems of tropisms and growth again made the object of investigation in his laboratory, first by students of Boysen Jensen, but later also by Boysen Jensen himself. Publications on growth substances alternated with publications on photosynthesis and production of matter. His book, "Die Wuchsstofftheorie und ihre Bedeutung für die Analyse des Wachstums und der Wachstumsbewegungen der Pflanze," came in 1935 and was later translated to English and Russian.

Among Boysen Jensen's other major literary achievements may be mentioned a textbook of plant physiology (two Danish and one German edition) and a broad treatise on biology, "Det levende" I-IV (1951-1953), in which, on the basis of a general survey of biology, he undertakes a discussion of the significance of biological concepts for sociology, ethics, theology, and other fields concerned with the life, behavior, beliefs, and ideals of man.

After his retirement at the age of 65 in 1948 Boysen Jensen continued his experimental work in his home and, in addition to "Det levende", published a dozen research papers, mostly on cellular determination and differentiation. His daughter, Margrethe was his devoted assistant in this work, which occupied Boysen Jensen until the day before his death on November 21, 1959.

Boysen Jensen was awarded honorary degrees from the Universities of Oslo, Norway, and Aarhus, Denmark. He was a member of the Royal Danish Academy, the American Academy of Arts and Sciences, and a number of academies in other countries. He was elected Corresponding Member of the American Society of Plant Physiologists in 1941 and of the Botanical Society of America in 1950. He became Honorary Member of the Danish Botanical Society in 1948.

His friends, colleagues, fellow plant physiologists, and students, of which a number came from the United States, will deplore the loss of this great thinker, gifted experimenter, and inspiring teacher.
—POUL LARSEN

WALTER THOMAS
1880-1960

Dr. Walter Thomas, Professor Emeritus of Plant Nutrition at Pennsylvania State University, died at the age of 79 of a heart attack on February 1, 1960, in Miami, Florida. Through his long and distinguished career he was responsible more than any other man in this country, for the fundamental research work on the present widely accepted use of plant analysis in studying nutritional status and determining fertilizer requirements.

Walter Thomas was a native of Swansea, Wales, and graduated from the University of Wales in 1905. After spending a short time in Canada, he went to Pennsylvania State University in 1910 and remained there until his retirement in 1950 except for a two-year period during World War I when he was an officer in the Chemical Warfare Service of the British Army.

During his early years in Pennsylvania, he worked with various phases of soil analysis but concluded that these were not giving him the results he sought. He was encouraged by Dr. William Frear, Professor of Agricultural Chemistry, to study plant analysis to determine if chemical composition could be used as an index of plant yields. His earliest work clearly established that the composition of the leaf reflected added fertilizer treatments when yield responses were obtained. This was carried out with dwarfed apple trees grown in metal rims under different fertilizer treatments. A sidelight from this experiment was the discovery that all nitrate nitrogen was reduced in the fine roots of apple trees and thus no nitrates are present in apple leaves, a fact later confirmed by several workers.

In continuing work aimed at establishing the principles of plant analysis, Thomas became very interested in work being done in France by H. Lagatu and L. Maume on "Diagnostic Foliaire". He visited these workers in 1928 when in Europe receiving the degree of Doctor of Science from the University of Wales, and in succeeding years cooperated with them to establish more uniform procedures and means of expression. Some of the key features of present-day plant analytical procedures, including the selection of samples from morphologically homologous leaves and the importance of seasonal changes in nutrient-element composition were established during this period.

In 1937, upon transferring to the Department of Horticulture, his fine and fruitful association with the late Dr. Warren B. Mack commenced. Their work on foliar diagnosis dealt with the nutritional requirements of many crops and the relationship between nutrition and other factors, especially disease and environmental conditions. Their research primarily in-

involved a study of fundamental relationships among nitrogen, phosphorus, and potassium and among the three bases, potassium, calcium, and magnesium. Through their concept that both intensity and balance had to be optimum for best nutrition, they established a very important principle which was first illustrated with corn in the historic Jordan fertility plots. Thomas and Mack were the first workers in the United States to emphasize the importance of balance between various nutrient-elements in interpreting the results of fertilizer experiments.

The work of Walter Thomas and his associates has proved to be very stimulating to many other plant physiologists and agricultural chemists and, while the exact procedures with which they worked are not widely used today, the validity and importance of most fundamentals they emphasized are receiving ever-increasing recognition. During most of Thomas' active years plant analysis was a very controversial subject. He showed courage in defending the principles he believed to be true.

Through his 78 publications Walter Thomas gained an international reputation resulting in a sizeable list of honors. Among these he was elected to the Court of Governors of the University of Wales in 1928 and was presented with the Charles Reid Barnes Honorary Life Membership award by the American Society of Plant Physiologists in 1943. In 1947 he was invited to read a paper on foliar diagnosis before the Twelfth International Congress of Pure and Applied Chemistry in London.

He gave his active support to forming the American Society of Plant Physiologists and served for many years on the finance committee where his extensive knowledge of the security markets proved most valuable especially during the depression years.

Walter Thomas was a true scholar. In his specialty, he had a very thorough knowledge of the whole field of plant analysis and could discuss in considerable detail the work being done by various investigators in all parts of the world, with many of whom he corresponded. After he retired at 70 his remarkably active and inquisitive mind continued to delve into many subjects. He could quote passages from Shakespeare, describe the composition of the latest missile fuel or discuss current stock market trends with equal authority and lively interest. He also kept up with his life-long hobbies of swimming and hiking, swimming at Miami Beach in the winter months and taking long hikes through the picturesque areas surrounding State College in the summer months.

Walter Thomas never married and was the last surviving member of his immediate family. His friends and those who are continuing and will continue the work he started will long remember the dedication and unselfishness that his life and work exemplified.—CYRIL B. SMITH.

NEWS AND NOTES

JAPANESE SOCIETY OF PLANT PHYSIOLOGISTS. The Japanese Society of Plant Physiologists (JSP) was founded in April 1959. One of its chief activities will be to maintain a professional journal, *Plant and Cell Physiology*. The appearance of this new journal, which is issued quarterly, marks the fulfillment of a desire long cherished by plant physiologists in Japan. The primary aim of *Plant and Cell Physiology* is to acquaint the scientific public throughout the world primarily with work of Japanese scientists. However, foreign colleagues will be welcome as members of the JSP and as contributors to the new journal. Membership and subscription fee is \$5.00 per year. Correspondence concerning the society and the journal may be directed to the Editorial Offices of *Plant and Cell Physiology*, c/o Institute of Applied Microbiology, University of Tokyo, Bunkyo-ku, Tokyo, Japan.

CANADIAN SOCIETY OF PLANT PHYSIOLOGISTS. The Canadian Society of Plant Physiologists now has a category of corresponding membership available at a nominal fee to plant physiologists who live outside Canada. Inquiries should be directed to Secretary-Treasurer, Dr. D. F. Forward, Department of Botany, University of Toronto, Toronto 5, Canada.

AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS. *Midwest Section:* The sixth annual meeting of the Midwest Section was held at Michigan State University on June 20 and 21, 1960. Approximately 75 members were in attendance and several visitors were present. The program on Monday morning consisted of two concurrent sessions in which a total of 22 papers was presented. On the afternoon of the same day a "New Frontiers" symposium featured talks by Dr. B. Vennesland on "Photosynthetic Phosphorylation", Dr. Warren Butler on "Phytochrome, the Red-far-red Photochromic Pigment", and Dr. N. E. Tolbert on "A New Group of Plant Growth Substances".

Dr. R. H. Burris, section chairman, was master of ceremonies at the annual banquet in the evening. After the dinner, Dr. Georg A. Borgstrom presented a dynamic discussion of "World Food Problems".

On Tuesday morning, seven additional short papers were given in two concurrent sessions and this ended the meeting.

Officers elected for 1960 were: Dr. Alfred Sussman, chairman; Dr. J. B. Hanson, vice-chairman; and Dr. Sam Aronoff, representative to the American Society of Plant Physiologists (to complete the term of Dr. Harry Beevers who resigned to accept another office).—CARLOS MILLER, *Secretary-Treasurer, Midwest Section*.