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ELVIN CHARLES STAKMAN

1885—1979

A Biographical Memoir by

C. M. CHRISTENSEN

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May 17, 1885–January 22, 1979

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ELVIN CHARLES STAKMAN was born May 17, 1885, on a farm near Ahnapee, Wisconsin, a small town on the west shore of Lake Michigan, the eastern terminus of the twenty-three-mile-long Green Bay and Ahnapee Railroad. Later the name of the town was changed to Algoma, which is listed officially as his birthplace. His parents were Frederick and Emelie Eberhardt Stakman, and he was the youngest of four children: Arthur, born in 1878, Lawrence, born in 1880, and Edna, born in 1883. While he was still a babe in arms the family moved to Brownton, Minnesota, a town of some 350 inhabitants about seventy-five miles west of Minneapolis, just where the Big Woods abruptly gave way to the prairie. All his life he remembered Brownton and the surrounding countryside, and the people there, with affection, and late in life wrote a letter to the editor of the Brownton paper telling of his love for the town.

His schooling through the tenth grade was in Brownton, but some courses necessary for entrance to the university were not available there, and his last two years of high school were in St. Paul, and in Glencoe, not far from Brownton. He was a natural-born scholar; learning came easy to him. Even as a youth he had wide-ranging interests, and his memory, all his life, was phenomenal. For two summers in

Brownton as a youth he studied German in a church school, and later continued the study of it on his own, so that by the time he matriculated at the university he already was fairly competent in spoken and written German. He began the study of Latin in the tenth grade, in Brownton, continued it during the last two years of high school in St. Paul and Glencoe, and during all his four years at the university. He also continued his study of German at the university, and by the time he graduated, German was a usable second language to him. German literature had a strong appeal to him, and he could and sometimes did quote long passages from Goethe's "Faust"—not to show off, especially, but because he loved the sonorous, rolling phrases, and the expansive thoughts they expressed.

He graduated from high school in the spring of 1902 and matriculated at the University of Minnesota in the fall. After he had paid his tuition of fifteen dollars for the semester and bought his books, he had sixty-five cents left. He worked at various odd jobs to help pay his way, and worked summers in Brownton and, in the harvest season, on threshing crews on nearby farms to help earn college money; he also received some needed financial help from his sister, who at age seventeen had begun teaching school. He must have lived frugally in college, as many other students of limited means have done before and since, and probably had few funds for extracurricular entertainments and amusements.

There were no formal "majors" then, but rather "group subjects," and Stakman chose botany, German, and political science as his special fields in which to concentrate. He graduated with a B.A. degree in 1906, and was elected to Phi Beta Kappa, although he seldom wore the key in later life—or any other tokens of membership in special or select groups or organizations or societies. Upon gradua-

tion he was offered an assistantship in botany, and also one in German, the assistantship in German being unusual in that it permitted him to continue graduate work in any field he chose. He also was encouraged to continue graduate work in political science. Obviously, his professors recognized his abilities. However, he needed to recoup his finances, and evidently felt an obligation to repay his sister for the help she had given him, and so he chose to accept a teaching position in a high school at Red Wing, Minnesota, an attractive town on the Mississippi River below St. Paul. After a year at Red Wing, he taught another year at the high school in Mankato, in south central Minnesota. At both schools, there had been problems with discipline among some of the boys, and Stakman evidently took care of those very effectively, in part by organizing athletic teams, which he also coached. In 1908 he was chosen, at age twenty-three, to serve as superintendent of the high school at Argyle, Minnesota, in the far northwestern corner of the state, in the Red River Valley. There, in addition to his administrative duties, he taught several courses, and again organized and coached athletic teams that, according to his account, excelled in competition with the other county schools.

In 1909 he accepted an assistantship in the newly (1908) organized Department of Vegetable Pathology, on the St. Paul campus of the University of Minnesota (the name of the department was soon changed to Plant Pathology and Agricultural Botany, and later to Plant Pathology). This was the beginning of a long and fruitful association that continued for almost seventy years; he continued to occupy his office and take part in seminars and discussions until shortly before his final illness in 1977.

Stakman received the M.A. degree in 1910; the head of the Graduate School gave him the choice of receiving ei-

ther an M.S. or an M.A. degree, and Stakman chose the M.A. According to Stakman's account, the head of the graduate school asked him, "Did you study particularly for technological purposes, or for the purpose of an education?" and Stakman answered, "Well, since I'm not completely sure that I can be a professional, I guess you'd have to say I studied particularly for educational purposes." He then was told he could have an M.A. degree if he wanted it, and replied, "Give me a M.A. degree. Okay, I'll take that degree." Graduate education was considerably simpler then.

His research for the M.A. degree dealt with germination patterns of spores of cereal smuts, among which he found numerous deviations from the standard textbook versions that had been taught for some decades.

For his Ph.D. work he undertook a study of "bridging hosts" in the black stem rust fungus, *Puccinia graminis.* The idea of "bridging hosts" stemmed from work in England in the late 1800s, and by the time that Stakman began his work on it, the "bridging host" concept was practically a tenet of faith among plant pathologists in general and of students and researchers of the stem rust fungus in particular. According to this concept, varieties of the stem rust fungus that could attack rye, say, but not wheat could, after growing for a time on barley (which they could infect to some extent as well as rye), become adapted to wheat and could then readily attack wheat. Barley thus served as a "bridging host" for the fungus to enable it to change its parasitic capabilities. If this were true, then any attempt to breed varieties of wheat resistant to the rust were hopeless, because the fungus could readily, by means of various bridging hosts, become adapted to attack wheat.

Stakman and his coworkers attacked this problem, begun for his Ph.D. thesis work but continued afterwards. By means of well-planned, meticulously carried out, and very

extensive work, they (mainly Stakman) within a few years killed this widely accepted but, as it turned out, fallacious bridging host theory—killed it, pounded nails in its coffin, and buried it forever. This was the start of his approximately forty years of work with black stem rust of wheat—work which eventually reduced this disease from a major plague of wheat throughout the world to a relatively minor problem that can be and is being coped with effectively. Black stem rust still is with us, and probably always will be, but it no longer is the fearsome and widespread destroyer it once was. And the principles and practices developed during this work by Stakman and his many students turned out to be applicable to many other plant diseases, and, indeed, to just about all diseases of living things, both plants and animals, including humans, everywhere. Stakman had the vision essential to developing wide-ranging principles, coupled with the practicality and persistence to accumulate the necessary evidence to establish them as valid. His pioneer work on parasitic races of the stem rust fungus was enlarged to become a generally applicable principle that made reasonable and understandable order where before confusion had reigned.

When Stakman received his M.A. degree in June 1910, he already was or then was made assistant in plant pathology, with responsibility for undergraduate and graduate teaching, research, and extension in plant pathology. At times he taught other courses also, as diverse as one in wood structure to the undergraduates in the College of Forestry, and in household bacteriology to the women in home economics. On July 1, 1913, shortly after receiving his Ph.D. degree, he was made head of the Section of Plant Pathology, in the Department of Plant Pathology and Agricultural Botany. Just six weeks past his twenty-eighth birthday, he was well established in a position of leadership in

what was to be his lifetime profession, in the department where he was to spend most of the rest of his professional career.

He was head of the Department of Plant Pathology from 1940 until his retirement in 1953.

As section head, Stakman in the 1920s and 1930s attracted outstanding graduate students from all over the world, who came to Minnesota for their advanced degrees in plant pathology, and who carried his teachings and some of his inspiration with them when they returned to their own countries. He was an unusually gifted and stimulating teacher, and the department under his leadership was pervaded by an atmosphere of excitement, accomplishment, and intellectual adventure. Stakman had a way of making his staff and students feel that they were on the cutting edge of scientific progress, that their work was important, that their contributions were significant, and that they were on an outstanding team. At any one time the department might have graduate students from many states in the United States and from Canada, England, Germany, Hungary, Australia, New Zealand, China, and India; it was a cosmopolitan department, and the students felt that they were contributing to the development of a new field, one with important basic principles and a multitude of practical applications in world agriculture. Thanks in good part to Stakman, they were caught up in an exciting adventure, converts to a newly revealed gospel expounded by its major prophet; of course it was exciting.

Stakman had an important part in getting a postgraduate curriculum established at the Agricultural College in Chapingo, Mexico, to which, from the early 1970s on, graduate students from Mexico and other Latin American countries could obtain M.S. and Ph.D. degrees in plant pathology and related fields. He taught one semester at the Univer-

sity of Halle (1930–31), where he lectured in German. He also lectured occasionally at several colleges in Mexico, and there he spoke in Spanish.

In 1917 Stakman married E. Louise Jensen, who since 1913 had been a mycologist in the Section of Plant Pathology that he headed. She had assisted him in teaching several courses, and she was a joint author with him of a research paper on timothy rust; she evidently was a productive member of the staff. They were a congenial couple, and she accompanied him on a number of his trips to foreign countries. They had an attractive home within easy walking distance of the plant pathology building on the campus where Stakman commonly put in twelve- to sixteen-hour working days. Louise died suddenly, without any advance warning, one evening in 1962, and Stakman deeply missed her companionship. They had no children.

In 1918 Stakman was primarily responsible for organizing, and for a time was leader of, a campaign to gain financial and legal support from the federal and state governments to eradicate barberries, the alternate host of the black stem rust fungus, from the major spring wheat growing areas of the United States from Michigan and Ohio on the east to the Dakotas, Montana, Wyoming, and Colorado in the west—an area amounting to about one-third of the United States. Barberry eradication had long been accepted in Europe as a necessary ingredient in the program of control of black stem rust, but nothing of the magnitude that Stakman planned had even been tried before, and no one knew whether it could be done, or whether, if it was done, it would contribute significantly to control of the rust. Stakman enlisted the solid support of men in the U.S. Department of Agriculture, of those in state governments, and of business tycoons in the railroad, milling, and farm equipment industries and in banking—no small accomplishment for a

thirty-three-year-old professor in a new and small department in a midwestern university. Stakman not only got the program under way, he headed it for its first year. It was successful in every sense of the word—by 1954, more than 450 million barberry bushes had been eliminated in eighteen states, and long before that the often regular and destructive local epidemics of black stem rust were a thing of the past. Many men were involved in this program over the years, but its inception and its successful establishment were due primarily to Stakman; when he strongly believed that a given course of action was necessary to achieve a desired and beneficial goal, he could be an untiring and extremely persuasive promoter of it.

In 1941 Stakman, along with Dr. Paul Mangelsdorf of Harvard University and Dr. Richard Bradfield, head of Agronomy and Soils of Cornell University, was asked by the Rockefeller Foundation to make a survey of farms and farming, of agricultural research and teaching, and of agricultural extension and administration, in Mexico, to provide the foundation with the basis of information on which to judge whether it would be desirable to establish a joint project of agricultural research with the Mexican Department of Agriculture. Their report was uniformly favorable to the undertaking of such a program, and in 1943 the joint Mexican Department of Agriculture–Rockefeller Foundation program officially got under way. It turned out to be phenomenally successful, other countries became interested, and similar programs were initiated in Colombia and Chile in South America, in the Philippines (in collaboration with the Ford Foundation), and in India. Subsequently, these efforts led to the establishment of a worldwide network of research centers in developing countries around the world, all of them devoted to agricultural development and economic improvement of the countries they serve,

and to the training of competent research and administrative staffs capable of pursuing the research necessary for agricultural and economic improvement. As of 1981, thirteen such international centers of research were in operation, under the general aegis of the Consultative Group on International Agricultural Research (CGIAR), with support from many different governments, agricultural agencies, and foundations. In most of these Stakman had little or no part, but all of them were an outgrowth of the Mexican Government–Rockefeller Foundation cooperative program in agricultural research that he helped get under way in the early 1940s, and for which he served as a consultant for many years after his retirement from the University of Minnesota in 1953.

As Stakman matured, he became more and more convinced that science as exemplified by agricultural research in its best manifestations could be a powerful force for the improvement of the lot of mankind. Through research came control of diseases and improved agricultural practices, with an increased abundance of food and fiber to furnish the necessities of life, to provide health and physical and mental well being for the peoples of the ever more crowded earth, and to provide education—if the peoples of the earth had the knowledge and the wisdom to take advantage of it. Coupled with this ability to produce the materials and goods necessary for a better life for humankind was the necessity to restrict the population to numbers that the various countries themselves could support. Stakman expounded this doctrine of improvement of production by means of research, and of the need for population control, from the mid-1950s on. The Cosmos Club, in its award to him in 1964, called him a "statesman of science," a happy and accurate designation. He spoke of these topics often with conviction and with evangelistic fervor.

Some of these talks were published, and were classics. Brief excerpts from two of them will serve to illustrate his themes.

From his acceptance speech on receiving the citation from the Cosmos Club, as "Statesman of Science," in 1964:

Science has contributed much to the material welfare and to the intellectual enlightenment of society. Can it also contribute to spiritual refinement and the improvement of human relations? Can it help promote the general use of the scientific code of scrupulous intellectual integrity within each society and between all of them? Can it help to eradicate intolerance and bigotry from societies of the world as it has helped eradicate malaria, cholera, and yellow fever from many areas of the world? It can do its part, but its part is only part of what is needed. Society and all its civilizing agencies must do their part also, and may good sense, and even better sense, prevail in all their efforts!

From, "Education: Needs and Virtues; Crimes and Misdemeanors" in *New Concepts in Agricultural Education in India,* 1969:

Eventually every country must adjust its population to its means of subsistence, it must produce enough food for its people or develop the purchasing power to buy it—provided enough food is available for purchase. But will enough always be available? Some thoughtful people say that it will not, unless the rate of population increase can be reduced rapidly and dramatically or food production can be increased quickly and substantially. If present food-population trends continue, the world food situation will be critical and may be catastrophic within two decades (he was very close to the mark, here), according to many competent students of the problem. Among neo-Malthusians there appears to be a growing conviction that Malthus probably was more right than wrong.

Man has become the potential master of his own fate in his struggle for subsistence. Thanks to science and technology, he has the means to restrict his numbers simply and humanely and to increase his food supplies quickly and substantially. But to become the actual master of his fate, he must have the will and the wisdom to utilize fully his present means and the wit to devise better ones for the future.

That his message has not been heeded by some of the Third World countries who most needed to hear and to heed it does not detract from the soundness of his vision and of his prophecies.

One of his last public appearances was on January 30, 1973, when he was feted by the Plant Pathology Department of the Colegio de Postgraduados at Chapingo, Mexico, which he had long labored to help get established and which now dedicated to him a special reading room, named in his honor.

On July 19, 1977, at his home in St. Paul, he suffered a paralytic stroke and congestive cardiac arrest. Although a pacemaker was installed and helped him resume some activities, his power of speech was never recovered, and he gradually declined. He was well enough, on his ninety-third birthday, to attend in a wheelchair a dinner given in his honor by the graduate students of the Plant Pathology Department of the University of Minnesota, and which he seemed to thoroughly enjoy. He died January 22, 1979, about four months short of his ninety-fourth birthday. As specified in his will, his remains were cremated and the ashes interred at a nearby cemetery, near the graves of his mother and of Mrs. Stakman. The bulk of his estate, amounting to approximately $500,000, was left to the Department of Plant Pathology of the University of Minnesota, the income to be used to further various worthy causes for which public funds are not available. Even in death, Stakman contributed to the advancement of the profession, the department, and the university that he had served so long and so well.

PUBLICATIONS

Stakman published more than 300 papers, as well as several books. Several of his papers, dealing with science and society and with education, are classics.

MEMBERSHIP IN SCIENTIFIC AND LEARNED SOCIETIES, AND HONORS AND AWARDS

Dr. Stakman held regular or honorary memberships in thirteen scientific and learned societies in the United States and in Canada, Great Britain, Germany, India, and Japan. He was president of the American Phytopathological Society in 1922 and of the American Association for the Advancement of Science in 1949. In 1948, he was a member of the Scientific Mission to Japan under the auspices of the Supreme Command for Allied Powers. He was a member of the National Commission of UNESCO, 1950–56; the Executive Committee, National Science Board, 1951–54; and the Advisory Committee on Biology and Medicine, United States Atomic Energy Commission, 1948–54 (chairman, 1953–54, and consultant, 1954–59). He held various offices in the National Research Council in 1931–34, 1937–38, 1947–48, and 1950–58.

He received honorary degrees from the University of Halle-Wittenberg, Halle-an-der-Saale, Germany, 1938; Yale University, 1950; the University of Rhode Island, 1953; the University of Minnesota, 1954; the University of Wisconsin, 1954; and Cambridge University, England, 1964.

Among the special honors given him were the Emil Christian Hansen Gold Medal and Prize, 1928 (for his contributions to the knowledge of physiologic specialization in fungi); the Medalla de Merite Agronómico, Colombia, South America, 1955; the Centennial Award, Michigan State College, 1955; the Certificate of Merit, Botanical Society of America, 1956; the Otto Appel Medal, 1957; the first Cosmos Club Award, 1964; and La Cruz de Boyaca, Colombia, South America, 1966.

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