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A Biographical Memoir by
ROBERT HOGG, CHARLES G. MILLER, AND
C. WILLARD SHUSTER

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LESTER ORVILLE KRAMPITZ was born in the family home at Maple Lake, Minnesota, on July 9, 1909. His father, Henry Richard Krampitz, was the son of German immigrants who had settled and farmed in the Albion region of Minnesota. His mother, Selma Wolff Krampitz, also came from a farming family of the same region. Had economic conditions been better, they too would have raised their family on a farm in what would now be considered a rural northwest Minneapolis suburb. Henry chose to seek his fortune in town, however, and was employed for many years in the grocery business in Buffalo, Minnesota.

Les benefited from Minnesota's high-quality public school system. In 1915 he entered grammar school in the South Haven system and in 1919 transferred to the Buffalo system. In 1926 he played guard on the Buffalo High School basketball team that won the state championship. This was in the days when a short, wiry guard could still make a varsity team. Les's younger sister Ione was born in 1917 while he was in grammar school; a second sister, Kathryn, was born in 1923 while he was occupied with high school and basketball. Although he lived his entire youth on the shores of Buffalo Lake, Les never learned to swim, a situa-

tion that nearly proved disastrous when one winter evening he and some friends opted to drive his old car across the ice on the lake. The car did not make it; the occupants did.

Les matriculated high school in 1927 and managed to scrape together enough money to enroll at Macalester College in St. Paul, Minnesota. He had to work his way through college because there was no help coming from home and no athletic scholarships, even for a former state champion basketball player. The tuition was \$87.50 a semester and anyone with the money was accepted. Finding the money to continue in school was not easy as the country entered the depression years. Summer employment in a Detroit automotive plant provided funds for one year.

At Macalester Les met two of the most important people in his life. One was Norma Peterson, who became his wife in 1931. The Peterson family traditionally sent their children to Macalester. The other was Harland Goff Wood, who became his colleague and lifelong friend. Les and Harland both went out for football, with Les playing guard and Harland a running back. Together they probably weighed less than a present-day freshman lineman. They were both employed in the college kitchen, and Les often said he lettered in football and potato peeling. During college Les began to hunt deer with the Wood boys of Mankato, an annual event that continued into the 1980s. Harland's brother, Earl, later met and married Norma's sister, Ada Peterson.

Les graduated from Macalester in the spring of 1931 with a Bachelor of Arts degree, having majored in biology and chemistry and minored in German. He accepted a position as a science teacher in the Taunton, Minnesota, school system. However, this proved to be a short-lived career because the citizens of the area voted to bus the students to the next town to save money and Les ended up unemployed. Having just married Norma, he needed gainful employment,

and so took a position managing a "Quick Lunch" in Buffalo. This lasted only a few months until he located a position in the school system of Sacred Heart, Minnesota. In 1932 his only daughter, Joyce, was born. The following year he left Sacred Heart for a higher-paying position in Crystal Lake, near Mankato, where he coached basketball and spent six years teaching in the high school. One summer he set a door-to-door sales record for World Book encyclopedias. During this time he renewed his friendship with the Wood boys. In 1938 he resigned his position as teacher and principal to join Harland Wood at Iowa State University in Ames.

Harland's graduate advisor, C. H. Werkman, was initially reluctant to gamble on a student who had been out of the academic environment for eight years. So Les enrolled in summer school at Iowa State and did so well by dint of hard labor that Werkman provided him an assistantship at the end of the summer. Thus began the relationship of Les Krampitz, Harland Wood, and Merton Utter in the cornfields of Iowa and eventually in the medical school at Western Reserve University in Cleveland, Ohio.

Werkman's research laboratories were spread between the Industrial Science Research Institute and the Agricultural Experimental Farm. Les became affiliated with the Bacteriology Section of the institute. Werkman's research interests centered on microbial metabolism. The organisms of choice were *Micrococcus lysodeikticus* or *propionibacterium*. Harland Wood, now an assistant professor in the Department of Bacteriology, had shown earlier the fixation of CO₂ by the heterotrophic bacteria. He proposed that pyruvate plus CO₂ yielded oxaloacetate. Les's research demonstrated a magnesium-dependent enzymatic activity capable of decarboxylating oxaloacetic acid. With advice from A. O. Nier (a physicist at the University of Minnesota) Krampitz and Wood built a 60-foot thermal diffusion column to enrich (¹³C)

methane, which they converted to $^{13}\text{CO}_2$. Using a mass spectrometer of their own construction to measure the isotope, they demonstrated the exchange of $^{13}\text{CO}_2$ into the carboxyl group of oxaloacetate. One story claims that Mert Utter inadvertently used the elevator whose shaft housed the diffusion column and set progress back at least a week for reconstruction. Les received his Ph.D in Bacteriology with a minor in Biochemistry from Iowa State in 1942.

His interest in microbial metabolism had kept Les abreast of the work of D. W. Woolley at the Rockefeller Institute in New York and he was able to obtain a research assistant's position in Woolley's laboratory for what we would now refer to as postdoctoral studies. Research centered on naturally occurring vitamin antagonists. Les worked on the artificial generation of scurvy in rats by feeding glucoascorbic acid, which appeared to irreversibly inactivate ascorbic-acid utilizing enzymes, possibly the mixed-function oxygenases involved in the conversion of proline to hydroxyproline in collagen. He also studied an enzyme in fish tissue that hydrolyzed thiamine between the pyrimidine and thiazole rings. This was not microbial biochemistry, but there was one project that involved the study of the inhibition of growth of *Lactobacillus casei* by a crystalline protein isolated from wheat. Les showed that the inhibition could be reversed by the addition of lecithin and other phosphatides to the media. At the end of the year Les loaded his family into the 1932 Chevrolet that had brought them to New York (and was parked for a year behind the Rockefeller building) and returned to Iowa to accept an assistant professorship offered by his mentor C. H. Werkman in the Department of Bacteriology at Iowa State.

Les stayed at Iowa State for three years and focused his research once again on *Micrococcus lysodeikticus* and its respiratory enzymes. He renewed his collaboration with Werkman

and together they studied acetyl phosphate as a reactive compound, developing assays for diacetyl, and demonstrating the reversibility of the “phosphoroclastic” reaction in which pyruvate is converted to acetate and formate with acetyl phosphate as an intermediate.

In 1946 Les received a call from Harland Wood, then Chair of the newly formed Biochemistry Department in the Medical School at Western Reserve University, offering him an associate professorship. Within the year Les and his wife and daughter loaded the 1932 Chevrolet once again and moved to Cleveland. As a member of the biochemistry department in the medical school Les continued to pursue his research interests in microbial systems. Within two years he was asked by the Dean of the Medical School, Dr. Joseph Wearn, to move downstairs to the second floor to establish and become Director and Professor of the new Department of Microbiology.

It was as department chairman and through the people he brought together and the environment he established that Les had his greatest influence on the field of microbiology. The research support facilities of the department were the envy of many and included centralized media preparation and dish washing, a stockroom, and photography and electron microscope capabilities. He insisted on a policy of shared equipment and space, not only for efficiency and economy, but also to foster an interactive departmental spirit and to counteract the tendency for insularity among faculty and students. Thursday morning faculty meetings were followed by a brown-bag departmental lunch where students and faculty informally talked about their research problems to garner departmental input, and if no one rose voluntarily, Les did not hesitate to point a finger. Everyone soon learned it was better to come prepared and leap forward than to hang back. The annual Christmas party was notori-

ous: the anonymous poems and gifts given out for all to enjoy—Les kept his faculty and students interacting.

Over the years Les was able to attract an outstanding faculty. Some of the people he gathered to the department included Leon Cambell, Irving Crawford, Michael Fanger, Howard Gest, Joseph Lampen, Charles Miller, G. David Novelli, John Spizizen, Abram Stavitsky, Morris Tager, and Charles Yanofsky. Individuals who trained in this environment included Tom Brock, a young postdoctoral fellow, John DeMoss, Elliot Juni, Eugene Nester, Howard Peck, Peter Plagemann, Earl Swim, T. P. Wang, Neil Welker, and Frank Young.

Work in Les's laboratory continued to focus on questions in microbial metabolism. Howard Saz, an early student, established the oxidation of acetate by *Micrococcus lysodeikticus* and critically evaluated the possibility that the tricarboxylic acid cycle existed in bacteria. Until this time it was generally held that bacteria used a dicarboxylic acid cycle. Using isotopic methods, Earl Swim and Les went on to clearly establish the tricarboxylic acid cycle as a functionally significant metabolic pathway in bacteria. Elliot Juni and Les established the role of acetolactate as an intermediate in the production of acetoin. During this time the entire department worked on problems of microbial metabolism and many interactions and collaborations existed within the faculty.

In 1950 his daughter Joyce followed in her father's footsteps and went to Iowa State, where she met and married John A. Hansen. They eventually settled in the Indianapolis area and raised Les's two grandchildren, Leslie and Scott. In his later years Les knew his great-grandchildren, Leslie's two daughters, Kisha and Shawna Burk.

In 1955 Les received a Fulbright Fellowship to go to Munich, where he worked in the laboratory of Feodor Lynen

on the utilization of tartrate. The highlight of his year there was his visit with Otto Warburg, perhaps one of the few times Les was at a loss for words. Lynen introduced Les to skiing, which he continued to enjoy on his return to the United States. Eventually he purchased a ski cabin in the Holiday Valley region of upstate New York which was also enjoyed by his friends Harland and Millie Wood, Warwick and Adi Sakami, and Fitz and Eva Lynen.

Les was an active participant in the reorganization of the medical school curriculum at Western Reserve to the organ-system based, integrated teaching method. It was the first time that the material presented to medical students was not presented by discipline. Clinical studies were introduced in the first year and many of the faculty attended each other's lectures to facilitate interaction and references to previously described systems and conditions. This new approach had a major influence on medical education in this country. Medical students were required to pursue research projects and submit a written thesis. Les and Harland were the active motivators of the clinical faculty to get this process off the ground. These revisions still stand today, although there is no longer a thesis requirement. In 1958 Les was awarded a honorary doctorate of science by his alma mater Macalester.

In the 1960s his research interests moved back to the subjects of his postdoctoral days in Woolley's laboratory, particularly the mechanism of thiamine in enzymatic reactions. He pursued the mechanism of hydroxyethyl thiamine diphosphate in reactions of alpha-keto acids and dihydroxyethyl thiamine diphosphate as a possible intermediate in the transketolase reaction. During the late 1970s Les's research interests took a major shift when he became interested in the generation of hydrogen by the biophotolysis of water as a potential renewable energy source. He pursued

this interest until his retirement. He stepped down as chair in 1978 and theoretically retired; however he maintained a laboratory on the floor and came in daily until illness forced him to stop in the early 1990s. It was not until the mid-1980s that he stopped hunting with the Wood boys of Mankato. Venison stew was often on the menu at Thursday lunch.

Throughout his career he pulled his weight in service, serving on the editorial boards of the *Journal of Bacteriology* and the *Proceedings of the Society for Experimental Biology and Medicine*. He sat on both the Biochemistry and Bacteriology Study Sections of the National Institutes of Health, as well as the Research Career Development Award Committee and the Microbiology Training Grant Committee. In 1963 he enlisted the entire department, including students, to host the sixty-third annual meeting of the American Society for Microbiology in Cleveland. He was elected to the National Academy of Sciences in May 1978.

Les had a lasting influence on the development of microbiology in this country through his scientific pursuits, the students he trained, and the young faculty whose careers he fostered. Many have gone on to chair departments (15 at last count). They took with them the philosophy and ideals of what a department should be like: interesting, exciting, and fun. Les lived for his department and his ideals continue to shape the careers of the scientists he trained and influenced.

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