A. Baird Hastings (1895–1987) was born in Dayton, Kentucky but lived in Indianapolis until he went to college (1).1 A high school teacher, Ella Marthens, was strongly influential and encouraged his interests in biology and in going to college. He chose the University of Michigan and decided to major in chemical engineering primarily because after graduation he would be able to get a job quickly and help support his family. After a time at Michigan, Hastings gravitated toward physical chemistry and was asked by Professor Floyd Bartell to serve as his course assistant. As graduation approached, Hastings was prepared to get a job but was encouraged by Bartell to consider graduate school. He entered the University of Michigan graduate school in 1916, but with the beginning of World War I his graduate training was interrupted and his advisor, Bartell, joined the Chemical Warfare Service. Hastings’ persistent efforts to enlist in the military were rejected primarily because he was underweight. He took a job as a “sanitary chemist” with the Public Health Service to study fatigue, convinced that it would be a contribution to the war effort. It was a notable opportunity because it introduced Hastings to the study of physiology, which eventually became his life’s work.

The Public Health Service officials had decided that fatigue in munitions factory workers was due to acidosis. Hastings’ assignment was to measure the pH of the urine of workers at the Ford Motor Company in the morning as they arrived for work and again in the evening after they had completed their day’s work. Hastings perceived immediately that this was an exceedingly complex problem and told the project leader, Frederic S. Lee, Head of the Department of Physiology at Columbia, that the project was hopeless and a waste of government money. Lee ordered him to come to Columbia to continue his studies on fatigue in the controlled experimental way that Hastings had argued was necessary. After the war, Hastings decided to complete his graduate education in physiology at Columbia studying acid-base balance as affected by exercise. For use in some of his studies, he adapted a hydrogen electrode for titrations and devised a procedure to measure the alkali reserve in blood. In his efforts to publish this work, it was submitted to Donald D. Van Slyke at the Rockefeller Institute, then Editor of the Journal of Biological Chemistry (JBC). His paper entitled “A Hydrogen Electrode Vessel Adapted for Titrations” was published in the JBC in 1921 (2). Even more important; Van Slyke invited Hastings to join his group at the Rockefeller Institute once he received his Ph.D. degree. (Van Slyke is the author of a previous JBC Classic (3).)

Hastings spent five years with Van Slyke during which time the group was describing electrolyte balance in blood (3). In 1926, Hastings accepted a professorship at the University of Chicago while continuing his studies on electrolyte balance and initiating experiments on bone deposition. In 1935, when Otto Folin, the author of a previous JBC Classic (4), died,

1 All biographical information about A. Baird Hastings for this introduction to the JBC Classics is from Ref. 1.
Harvard President James B. Conant asked Hastings to replace Folin as Head of the Department of Biological Chemistry at the Harvard Medical School. He accepted the position and remained for 25 years building a notably strong department. To return personally to laboratory research, he left Harvard for the Scripps Clinic and Research Foundation in 1959 where he remained active in research for another 20 years.

The papers selected as JBC Classics are noteworthy for several reasons, among them Hastings’ distinguished co-authors. James B. Conant was President of Harvard, and Birgit Vennesland, then a postdoctoral fellow, had a distinguished career as a biochemist and is the author of an upcoming JBC Classic. John Buchanan likewise had a distinguished career in biochemistry and is also the author of an upcoming JBC Classic.

The work reported in these JBC Classics is noteworthy as an example of one of the early uses of radioactive carbon, $^{11}\text{C}$, for metabolic studies. (The use of isotopes for metabolic studies was pioneered by Rudolf Schoenheimer (5) who employed the heavy isotopes, deuterium and $^{15}\text{N}$.) $^{11}\text{C}$ was prepared in the Harvard cyclotron. Because it has a half-life of 20.6 min, these metabolic studies required rapid procedures for chemical synthesis of precursor molecules, administration to animals, and analysis of metabolic products. The experiments reported in these two JBC Classics were completed in about 6 h after removal of isotope from the cyclotron. Radioactive lactate with $^{11}\text{C}$ in the carboxyl group was prepared and administered to rats, which were sacrificed 2.5 h later, and the radioactivity was quantified in expired $\text{CO}_2$ and in purified liver glycogen. In an interesting note, the authors commented that the integrated dose of radioactivity was 65 microcurie hours, and no deleterious effects of this level of radiation on the health of the rats were noted. The metabolic information provided by the experiments described in the first paper is rather meager. About 20% of the administered $^{11}\text{C}$ was expired as $\text{CO}_2$, and only about 1.6% found its way into glycogen. The authors concluded that lactate was not the principle source of carbon for liver glycogen synthesized during the experiment. They also pointed out the many caveats that apply to the interpretation of the experiment, for example the unknown extent of isotope dilution-like dilution of isotope in pools of glycogen precursors.

The second paper is scientifically more interesting and showed that $^{14}\text{C}$bicarbonate was incorporated into glycogen. It follows up the classical work of Wood and Werkman who demonstrated the incorporation of $\text{CO}_2$ into organic matter by microorganisms (6). This is the subject of another upcoming JBC Classic. In addition, Evans and Slotin had reported in a JBC Letter to the Editor, $\text{CO}_2$ incorporation into $\alpha$-ketoglutaric acid by pigeon liver (7). Thus the work of Hastings and his colleagues contributed to the growing recognition that $\text{CO}_2$ is metabolically active in many organisms as well as in plants. Moreover, the use of radioactive
isotopes of carbon, later $^{14}$C, had clearly transformed the conduct of metabolic and biochemical studies.

Hastings served on countless national and international advisory panels, commissions, and committees and received many honors for his research accomplishments during a distinguished career. As a member of the very influential Committee for Medical Research during World War II, he received the National Medal of Merit from President Harry S. Truman. He was elected to the National Academy of Sciences in 1937. He was especially devoted to students and colleagues and was very involved with as well as effective in finding them excellent positions.

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REFERENCES

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