PAUL E. QUENEAU
1911–2012

Elected in 1981

“For innovative leadership in the invention and commercial development of efficient technology for extraction of nickel, copper, and cobalt.”

BY ELSA GARMIRE

PAUL ETIENNE QUENEAU, a pioneer in pyrometallurgy (smelting with oxygen to reduce environmental pollution) and coinventor of the Queneau-Schuhmann-Lurgi (QSL) process for efficiently extracting lead, died on March 31, 2012, at the age of 101.

Paul was born in Philadelphia, on March 20, 1911, to Augustin Leon Jean and Abbie Jean (Blaisdell) Queneau. His mother was a descendant of Ralfe Bleasdale, who landed at Pemaquid Point in Maine in 1635. As a young man, Paul and his family followed his father’s engineering career across the globe. He said it was challenging adapting to new schools in new countries every few years.

After gaining admission to Columbia University at age 16, he persevered in his schooling through the Great Depression, working as a waiter to make ends meet. He earned his BA (1931), BSc (1932), and Engineer of Mines (1933), and in 1965 received Columbia’s engineering alumnus Egleston Medal, “For fundamental discoveries in the field of process metallurgy.”

After Columbia he began employment with International Nickel (INCO), where he worked for 35 years. He began as a “hot metal man,” working more or less as a laborer in a nickel
ally plant—as he said, “smelling my sweat on a variety of furnaces.” In 1937 he was transferred to the Copper Cliff research laboratory to work on improving efficiency, where he was inspired to pursue oxygen-based pyrometallurgy. In 1941 he was promoted to superintendent of research.

Queneau volunteered for service in the US Army immediately after Pearl Harbor and was sent to the Army Engineer School. He was deployed to Europe as part of the Corps of Engineers, and spent the next several years battling from the Normandy beachhead to the Rhine River. He was awarded the Bronze Star, the Army Commendation Medal, and the European Theatre of Operation Ribbon with five battle stars.

In 1945 he returned to the Army Reserve as a lieutenant colonel and to INCO, newly dedicated to environmental conservation. His experience in the Army exposed him to the mass destruction of war and he came back determined to improve the environmental record of smelters with oxygen.

In 1952 INCO’s pioneering commercial oxygen reactor flashed into life. Paul and his team’s research and development led to oxygen flash-smelting of copper concentrates, fluid bed roasting, copper-nickel in matte separation, and iron ore from pyrrhotite. These activities are documented in his 1967 book *The Winning of Nickel* (coauthored with Joseph R. Boldt), which is still considered one of the bibles on nickel recovery and processing. He retired in 1969 as INCO’s vice president, chief technical officer, and assistant to the chairman.

After retiring, Queneau earned his doctorate at age 60 from the Delft University of Technology in the Netherlands. He then joined the faculty of Thayer School of Engineering at Dartmouth in 1971, where he taught for the next quarter century and continued R&D on environmentally sound smelting. In 1974 he and Reinhardt Schuhmann Jr. proposed the Q-S oxygen process, which carried out smelting in a single process within a continuous oxygen converter. They believed it would “prove to be a contribution to maximum economic utilization of the nation’s mineral heritage, with due regard to conservation of natural resources—including the environment.”
Working with the German company Lurgi, they demonstrated the feasibility of what came to be known as the QSL process on an industrial scale. Berzelius Metall ordered its primary smelter in Stolberg, Germany, converted to the QSL process; the plant was commissioned in 1990 and is still operating. The company’s website attests that this plant, “one of the largest and most modern lead smelters in the world, complies with the demands of modern, energy-saving, ecologically compatible lead production technology upholding stringent environmental standards on a continuing basis.” The QSL process is also employed in two lead smelters in Korea. Queneau’s dream of commercial QSL oxygen converters that continuously produce metal directly from mineral feed with minimal environmental consequences has become a reality.

A symposium honoring Queneau was held on the occasion of his 80th birthday, sponsored by the Extraction and Processing Division of TMS (the Minerals, Metals & Materials Society), and the proceedings were published in two volumes, entitled Extractive Metallurgy of Copper, Nickel, and Cobalt (1993).

Paul was awarded 36 US patents for continuous converters and processes that use oxygen technology to extract nickel, copper, cobalt, and lead from their ores and concentrates, thereby achieving environmentally clean, energy- and cost-saving metal production. He was a fellow (1967) and past president (1969) of TMS, and past chairman of the Engineering Foundation. He received AIME’s James Douglas Gold Medal, the Gold Medal of the British Institution of Mining and Metallurgy, the Robert Fletcher Award from Dartmouth’s Thayer School of Engineering, and Chemical Engineering’s Kirkpatrick Award.

In 1949 he explored, mapped, and photographed, for the US government, the Perry River region of the Arctic by 13-foot canoe with artist and ornithologist Peter Scott and zoologist Harold Hanson. Among other tasks, they studied the nesting grounds of the Ross’s goose, threatened with extinction. Scott wrote about the adventure in his book *Wild Geese and Eskimos: A Journal of the Perry River Expedition of 1949*, which included Paul’s photographs.

Paul said that, although his military service was one of his
life’s proudest moments, he returned from the war a broken semblance of a man. It was only by the limitless devotion, love, and patience of his wife Joan that he was able to recover from the trauma of all that he’d seen. Years later as he was being honored by Chemical Engineering for his distinguished career, he threatened to turn down the Kirkpatrick Award unless editors agreed to publish a photo of both him and Joan, saying he owed his life to her and they could “find someone else” if they didn’t want her in the cover portrait. In addition, with help from his former employer, INCO, he endowed Thayer School with the Paul E. and Joan H. Queneau Distinguished Professorship in Environmental Engineering Design.

Both avid lovers of nature, he and Joan bought a farm near Cornish, New Hampshire, where they spent their free time building ponds, making maple syrup, raising cattle, and living out Paul’s boyhood dream of being a farmer.