



M F Gautreaux

Marcelian Francis Gautreaux, Jr.

1930-1994

Written by Edward McLaughlin

Submitted by the NAE Home Secretary

Marcelian Francis Gautreaux, Jr., affectionately known as Bim to everyone, died on February 13, 1994, at the age of sixty-four. He was an extraordinarily inventive chemical engineer, who has left his mark on the chemical industry by development of new technologies and by the diversity of specialty products developed under his leadership.

He was born in Nashville, Tennessee, on January 17, 1930, and attended Louisiana State University (LSU) for his chemical engineering training. He graduated magna cum laude in 1950 and completed his M.S. in 1951, after which he went to work for Ethyl Corporation as a process engineer. He stayed at Ethyl until 1955, when he returned to LSU to pursue his Ph.D., which he completed in 1958. During this time he served as an instructor and assistant professor teaching a wide range of courses in chemical process engineering. The distinctiveness that was always to characterize his work was shown at this stage by a seminal paper with Dr. Jesse Coates on activity coefficients at infinite dilution. His educational career at LSU was marked by many distinctions, and his leadership potential by his attainment of the rank of cadet major in ROTC as well as office holder in the various student societies.

On completion of his Ph.D., he returned to Ethyl Corporation as head of the engineering and mathematical sciences section, from which springboard he was to advance rapidly

through the managerial ranks of the corporation with which he was to spend his entire professional career.

Dr. Gautreaux was the key figure, frequently the leader, and always the mentor in the development and commercialization of more than twenty new processes and products on which he held eight patents. Of these, the first was the oxychlorination of ethylene to produce ethylene dichloride from air, hydrogen chloride, and ethylene. Ethyl was already producing vinyl chloride by pyrolysis of ethylene dichloride. The value of the oxychlorination process was to make use of hydrogen chloride by-product from the cracking operation to produce additional ethylene dichloride. This permitted a "balanced" vinyl chloride plant with no net hydrogen chloride production (with the rapid growth of vinyl chloride, hydrogen chloride production was outpacing demand and becoming a serious economic issue for vinyl chloride producers.) This process was licensed to Solvay and ICI for worldwide use.

A major step in the diversification of Ethyl Corporation's product lines occurred with the commercialization of primary alcohol production by means of aluminum alkyl chemistry. Dr. Gautreaux led the development of this challenging chemical process, including a unique step that permitted tailoring the product range much more closely to the demands of the marketplace than did the conventional ethylene chain growth process. The aluminum alkyl chain growth chemistry was later expanded to include the production of linear alpha olefins in addition to primary alcohols. Again, Ethyl's process was able to control the distribution of C_2 through C_{20} products to a much greater degree than competitors. The chain growth chemistry plants now produce more than one billion pounds per year of linear alpha olefins and primary alcohols.

During Dr. Gautreaux's tenure, Ethyl Corporation became a major supplier of specialty chemical products to the detergent, agricultural chemical, pharmaceutical, polymer, and related industries. Products developed and commercialized included alkyldimethylamines and sodium alumino silicates for the detergent industry; dialkylanilines and various organic phosphorus compounds for the agricultural chemical industry; ibuprofen and other intermediates for the pharmaceutical

industry; and orthoalkyld phenols, alkyldiamines, and organic bromides for the polymer industry. Proprietary Ethyl processes were discovered and developed for all these products. In a number of instances, Ethyl became the only supplier of the product worldwide.

In organometallic chemistry, he led the development of new antiknock compounds such as mixed lead alkyls (tetra ethyl methyl lead), a number of specialty aluminum alkyls, and production of polysilicon for the semiconductor industry. In this polysilicon area, again new technology was the major thrust as it had been for vinyl chloride and chain growth of alcohols and olefins. The process to produce ultrapure silicon involved purity enhancement by distillation of an organic derivative of silicon, followed by subsequent pyrolysis in a fluidized bed to produce a granular product, which opens the way for efficient, continuous "pulling" of single-crystal silicon used for semiconductors.

In all these areas of diversification of Ethyl from its reliance on tetraethyl lead, Dr. Gautreaux was the key figure. His winning personality and enthusiasm engendered the loyalty of his professional colleagues and instilled in all the will to succeed in technologically difficult chemistry and engineering. Not only was he fully involved in research, process development, and process design, but he was also active in the market research, market development, and contract negotiation phases for initial sale of most of these products on long-term contracts with user companies.

Throughout this period of a very productive career, he advanced rapidly from his initial appointment. In ten years he assumed the position of vice-president, research and development, in 1969 and then senior vice-president, research and development, in 1974. In 1972 he joined the board of directors and when ill health forced him to scale back his activities in 1981, he was made adviser to the executive committee of the board.

As was appropriate for such a distinguished record of achievement, Dr. Gautreaux was honored by many organizations. These include *Chemical Engineering* magazine with its PACE Award for personal achievement in chemical engineering

when that award was introduced in 1968. In 1976 he received the Charles E. Coates Memorial Award, which is given jointly by the Baton Rouge chapters of the American Institute of Chemical Engineering and the American Chemical Society. He was elected to the National Academy of Engineering in 1977 and chaired the Chemical/Petroleum Engineering Peer Committee. He received the Chemical Marketing Research Association Memorial Award in 1978 for outstanding contributions to chemical marketing research, and his alma mater added to his honors by inducting him in 1979 as a charter member of its Engineering Hall of Distinction and awarding him an honorary doctorate of science in 1991. In 1981 he was elected a fellow of the American Institute of Chemical Engineers. In 1987 Ethyl Corporation, marking its centennial year, honored Dr. Gautreaux by endowing the M. F. Gautreaux/ Ethyl Corporation Chair in Chemical Engineering at Louisiana State University.

Apart from his professional life, Bim Gautreaux found time to assist in many community activities, including the Louisiana Arts and Science Center, of which he was a trustee, the LSU Foundation, and the board of directors of the Community Concerts Association. An avid and significantly better than average golfer, he hated cold weather and always looked forward to the coming of spring.

To those who met him, Bim was a charming person who always greeted you with a large smile, a characteristic that endured even during his last days. He was a people person and deeply committed to the sanctity of life. In 1952 he married Mignon Alice Thomas. He was a devoted family man and father to four children, Marc, Kevin, Marian, and Andrée. His summary of his life is contained in words he wrote elsewhere: "Any successes I have had are no more or less than the composite result of a supportive and loving wife and children, professional associates who have never let me down, a corporation whose ethics are the highest, a religious heritage from my parents and early schooling, and some God-given talents for chemistry and engineering."

