13. S. R. Ames, *J. Biol. Chem.* **169**, 503 (1947).
14. W. M. Govier and N. S. Jetter, *Science* 107, 146 (1948).
15. K. L. Zierler, D. Grob, J. L. Lilienthal, Jr., *Am. J. Physiol.* 153, 127 (1948).
16. H. P. Jacobi, J. W. Chappell, S. Morgulis, *Federation Proc.* 6, 136 (1947).
17. W. H. Miller and A. M. Dessert, *Ann. N.Y. Acad. Sci.* 52, 167 (1949).
18. T. R. Holman, *Arch. Biochem.* 15, 403 (1947); H. O. Kunkel, *ibid.* 30, 306 (1951).
19. M. Rabinovitz and P. D. Boyer, *J. Biol. Chem.* 183, 111 (1950).
20. L. Michaelis and S. H. Wollman, *Biochim. et Biophys. Acta* 4, 156 (1950).
21. P. D. Boyer, *J. Am. Chem. Soc.* 73, 733 (1951).
22. Contribution No. 115 of the McCollum-Pratt Institute. A report of this work, as presented here, was given at the Federation meetings in April 1955 [A. Nason and I. R. Lehman, *Federation Proc.* 14, 259 (1955)]. We are indebted to Bella C. Averbach for her invaluable technical assistance.
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24. L. Smith, *Methods in Enzymology*, S. P. Colowick and N. O. Kaplan, Eds. (Academic Press, New York, in press).
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26. Described in a personal communication from Klaus Schwartz.
27. F. Brown, *Biochem. J.* (*London*) 51, 237 (1952).
28. H. Lineweaver and D. Burk, *J. Am. Chem. Soc.* 56, 658 (1934).
29. H. R. Mahler *et al.*, *J. Biol. Chem.* 199, 585 (1952).
30. B. L. Horecker, *ibid.* 183, 593 (1950).

A. P. Colburn, Humanitarian and Chemical Engineer

In the death of Allan Philip Colburn on 6 February 1955, chemical engineering lost one of its most distinguished men and science, a great humanitarian. In an age of narrow specialization, Colburn stood out for his breadth and depth of interests and for a remarkable combination of the best of science and culture. He was conversant with literature, philosophy, and economics, and he devoted some of his little leisure to painting. He found time for an active part in the Delaware chapter of the American Red Cross, the Delaware branch of the American Cancer Society, his church, and other community activities. When I saw him shortly before his death, he was discussing plans for assisting in a program to improve the quality of teaching in the Delaware schools. Seldom has one man encompassed so much so well.

Allan P. Colburn was born in Madison, Wisconsin, on 8 June 1904, the son of Willis Paul Colburn, high-school principal, and Jane Grimm Colburn. After 2 years at Marquette University, he transferred to the University of Wisconsin where he was awarded a B.S. degree in 1926, an M.S. degree in 1927, and a Ph.D. degree in chemical engineering in 1929. His thesis, "Studies in heat transmission," was published by the Wisconsin Engineering Experiment Station in 1930 and stands as a classic in this field and a major stimulus to the work in heat transmission and mass transfer that has followed. The achievement was the more remarkable because he had only foreign literature to guide him and had to construct most of his own equipment. From this auspicious beginning, he went on to make significant contributions and published a long list of technical papers on heat transfer, fluid flow, distillation, absorption and extracting, and other subjects.

During the years 1929–38 at the experimental station of the E. I. duPont de Nemours and Company in Wilmington, Colburn not only matured in his science but also fought a long battle with tuberculosis, which left him with only one functioning lung and a deepened sense of social responsibility and personal idealism. While he was at Saranac Lake he won the first Walker award for outstanding publications in chemical engineering and in 1948 was the first recipient of the Professional Progress award of the American Institute of Chemical Engineers. In 1951 he was selected to deliver the principal address in London, England, at a symposium on heat transmission held jointly by American and European engineering societies. He was honored with a Civilian Service award in 1954 and posthumously with a certificate of achievement for his services as chairman of the U.S. Army Chemical Corps Advisory Council.

His public service during World War II was substantial and, typically, went far beyond a wise use of his limited physical resources. Important war research was carried on by the department of chemical engineering at the University of Delaware, a department that he organized and headed. He served on the National Defense Research Committee, on the National Advisory Committee for Aeronautics, at the Office of Rubber Reserve, and as a consultant to strategic war industries. With B. F. Dodge of Yale University, he prepared the curriculum on chemical engineering for the AST program that was taught throughout the war.

His keen sense of responsibility to his profession and to science as a whole was reflected in his positions in a wide range of professional societies. His honorary societies included Phi Kappa Phi, Phi Lambda Upsilon, Tau Beta Pi, and Sigma Xi.

In his capacities as assistant to the president, acting president, and provost of the University of Delaware, Colburn demonstrated his appreciation of the importance of developing research in the social sciences and of the broadening influences of educational programs for students which fostered the understanding of human relations and international problems.

President John A. Perkins of the University of Delaware has expressed well what all of Allan Colburn's friends and associates would want to say of him: "The most wonderful quality about him was his ability to inspire others with his own infectious enthusiasm. The breadth of his interest grew not only out of his active intellect but also out of his deep human sympathy. When he heard of other people's problems and concerns, they immediately became his own, and his active mind was driven to learn more about them. This quality made him a great teacher as well as an outstanding scientist. His creative talents, balanced by his vast store of scientific information, enabled him to make significant contributions to engineering education and higher education generally."

JOHN A. BEHNKE

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