CHEMICAL HERITAGE FOUNDATION

A. DONALD GREEN and WILLARD C. ASBURY

Transcript of an Interview
Conducted by

Peter J. T. Morris

at

Westfield, New Jersey

on

9 December 1985

(With Subsequent Additions and Corrections)

Chemical Heritage Foundation
Oral History Program
315 Chestnut Street
Philadelphia, Pennsylvania 19106

A. DONALD GREEN

1905	Born in Boston, Massachusetts on 24 October
1988	Died in Mountainside, New Jersey on 26 April

Education

1926	S.B., chemical engineering, Massachusetts Institute of Technology
1927	S.M., chemical engineering, Massachusetts Institute of Technology

Professional Experience

1927-1929	Chemical Engineer, Atmospheric Nitrogen Company
1929-1930	Chemical Engineer, Solvay Process Company
1930-1935	Chemical Engineer, Standard Oil Company
1936-1954	Director, Development Division, Esso Research and Engineering Company
1955-1958	Deputy Coordinator, Chemical Research, Esso Standard Oil Company
1958-1966	Vice President, Enjay Chemical Company

WILLARD C. ASBURY

1900 Born in Portland, Maine on 16 December
1986 Died in Westfield, New Jersey on 27 April

Education

1925 S.B., chemical engineering, Massachusetts Institute of Technology

Professional Experience

1925-1927 Research Assistant, Laboratory of Applied Chemistry, Massachusetts Institute of Technology
1927-1929 Chemical Engineer, Standard Oil Company of Louisiana
1929-1930 Chemical Engineer, Standard Oil Development Company
1930-1933 Chemical Engineer, Hydrogenation Engineering and Chemical Company
1933-1935 Chemical Engineer, Standard Oil Development Company
1935-1936 Chemical Engineer, Standard Oil International Company
1936-1940 Executive, Standard Oil Company, International Associates Ltd.
1940-1941 Assistant to Vice President, Standard Oil Development Company
1941-1947 Manager, Research and Development, Standard Oil Development Company
1947-1964 Vice President and Director, Esso Research and Engineering Company
1964-1965 Executive Vice President, Esso Research and Engineering Company

ABSTRACT

Peter Morris starts this interview by asking Donald Green and Willard Asbury about the early years at Standard Oil Development Company and the influence of Frank Howard and Eger Murphree. The arc process is discussed as well as the level of assistance obtained from IG Farben; Green and Asbury recall the IG research organization. The wartime pressures during the development of GR-S, and the problems at the Baton Rouge plant are discussed by Green, while Asbury tells of his visit to Germany with the U.S. Strategic Bombing Survey. The political recriminations of the prewar cooperation between Standard Oil and IG Farben are recollected as are visits to Germany in the 1930s and 1950s. The interview ends with a survey of the postwar move into chemicals, the Ziegler process and the future of the oil and petrochemical industries.

[NOTE: Both Donald Green and Willard Asbury died before this interview was edited and annotated.]

INTERVIEWER

Peter J. T. Morris is currently a Senior Curator at the Science Museum, London, where he looks after the experimental chemistry collection. He was the Royal Society-British Academy Research Fellow at the Open University, Milton Keynes, between 1987 and 1991, and Edelstein International Fellow in 1991-92. Morris was educated at Oxford University [B.A., chemistry (1978); D.Phil., modern history (1983)], and was a Research Fellow at the Open University from 1982 to 1984. During the period 1985-1987, Peter Morris was Assistant Director for Special Projects at the Beckman Center. He is author of Polymer Pioneers (1986), and The American Synthetic Rubber Research Program (1989) and co-author (with C. A. Russell) of Archives of the British Chemical Industry, 1800-1914 (1988). Morris also co-edited Milestones in 150 Years of the Chemical Indusrty (1991) and The Development of Plastics (1994).

TABLE OF CONTENTS

NOTES

1. A. Donald Green, An Engineer Putting Chemistry to Work, typescript, 1977. See BCHOC oral history file #0065.

2. The acetylene is converted to butadiene through the aldol or four-step process. This process was used in Germany before and during World War II. Acetylene is hydrated in the presence of a mercury catalyst to acetaldehyde. The aldehyde is treated with dilute potassium hydroxide to convert it into acetaldol. The latter is hydrogenated to 1,3-butylene glycol and the glycol dehydrated to butadiene.

3. F. A. Howard, Buna Rubber: The Birth of an Industry (New York: Van Nostrand, 1947).

4. Whenever acetylene is heated (as it obviously is in the arc process), it polymerizes to a great variety of products, including benzene, and a complex mixture of hydrocarbons which Berthelot (1862) called cuprene. "A yellow-brown, solid polymerisation product made by heating acetylene in presence of copper," Hackh's Chemical Dictionary, 3rd edition, completely revised and edited by Julius Grant (Philadelphia: The Blakiston Company, 1944).

5. The main by-products of the arc process are ethylene and hydrogen. All of the other by-products are insignificant in quantity. On the Hüls arc process, see Ullmann's Encyclopedia of Industrial Chemistry, Fifth, Completely Revised Edition (Weinheim, Germany: VCH Verlagsgesellschaft, 1985), volume A-1, pp. 116-120.

6. I. G. Farbenindustrie, "Polymerizing Isoölefins," British Patent 401,297, issued 3 November 1933; I. G. Farbenindustrie, "Polymerizing Isobutylene," British Patent 421,118, issued 10 December 1934; I. G. Farbenindustrie, "Polymerization of Isobutylene," British Patent 432,196, issued 15 July 1935.

7. The process that uses liquid ethane, ethylene or any other gas that will vaporize is known as autorefrigeration. This concept is widely practiced.

8. The plant at Sarnia came on stream in 1944.

9. Rubber From Oil [A motion picture on the discovery and development of Butyl Rubber made by Esso publicity department, 1958.]

10. See Joseph Borkin, The Crime and Punishment of I.G. Farben (New York: Free Press, 1978).

11. Attilio Bisio and Robert L. Kabel, Scaleup of Chemical Processes: Conversion from Laboratory Scale Tests to Successful Commercial Size Design (New York: Wiley, 1985).

12. Attilio Bisio and Vernon Herbert, Synthetic Rubber: A Project That Had to Succeed (Westport, Connecticut: Greenwood Press, 1985).

13. P. J. T. Morris, Polymer Pioneers (Philadelphia: Center for the History of Chemistry, 1986).

INDEX