

THE BECKMAN CENTER FOR THE HISTORY OF CHEMISTRY

ROY J. PLUNKETT

Transcripts of Interviews  
Conducted by

James J. Bohning

in

New York City and Philadelphia

on

14 April and 27 May 1986

(With Subsequent Changes and Additions)

## THE BECKMAN CENTER FOR THE HISTORY OF CHEMISTRY

## Oral History Program

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(Date)

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ROY J. PLUNKETT

1910 Born in New Carlisle, Ohio on 26 June

Education

1932 A.B., chemistry, Manchester College  
1933 M.Sc., chemistry, Ohio State University  
1936 Ph.D., organic chemistry, Ohio State University

Profession Experience

E. I. du Pont de Nemours & Company, Inc.  
1936-1939 Research chemist, Jackson Laboratories  
1939-1945 Chief chemist, tetraethyl lead plant, Chambers Works  
1945-1949 Superintendent, tetraethyl lead plant, Chambers Works  
1949-1950 Superintendent, Ponsol colors, Chambers Works  
1950-1951 Assistant manager, Chambers Works  
1952-1953 Manager, chemical development, Organic Chemicals  
1953-1960 Manager, plants technology, Organic Chemicals  
1960-1970 Director of research, Freon products, Jackson Laboratories  
1970-1975 Director of operations, Freon Products Division, Organic Chemicals

Honors

1951 John Scott Award, Franklin Institute, Philadelphia  
1952 D.Sc., Manchester College  
1968 D.Sc., Washington College  
1969 Chemical Pioneer Award, American Institute of Chemists  
1973 Plastics Hall of Fame  
1977 D.Sc., Ohio State University  
1985 National Inventor's Hall of Fame, U.S. Department of Commerce  
1986 Moissan Award, France  
1988 John W. Hyatt Award, Society of Plastics Engineers

## ABSTRACT

Roy Plunkett starts this conversation with James Bohning by describing his family background. As the family were members of the Church of the Brethren it was natural for Plunkett to attend Manchester College, where Paul Flory was a close friend and near contemporary. Despite the rigors of the Depression, Roy Plunkett was able to complete his chemistry studies at Manchester College and to go to Ohio State University for graduate work in carbohydrate chemistry. An offer from Du Pont sent Plunkett to the Jackson laboratories and the refrigerants group where an early assignment was the synthesis of tetrafluoroethylene. Plunkett tells the story of the plugged gas cylinder and his recognition of the unusual properties of the polymer. However, soon after this, Plunkett was moved to tetraethyl lead manufacture; he details his work there and his later career in the Organic Chemicals Department. The interview ends with the recognition of his pioneer work with Teflon and the honors it has brought him. In a brief second interview, Roy Plunkett tells of his common religious background with Paul Flory, their student days at Manchester College and Ohio State University, and their contacts over the years. The conversation ends with further recollections of the circumstances of the initial discovery of tetrafluoroethylene polymerization.

## INTERVIEWER

James J. Bohning holds the B.S., M.S., and Ph.D. degrees in chemistry, and has been a member of the chemistry faculty at Wilkes College since 1959. He was chair of the Chemistry Department for sixteen years, and was appointed chair of the Department of Earth and Environmental Sciences in 1988. He has been associated with the development and management of the oral history program at the Beckman Center since 1985, and was elected Chair of the Division of the History of Chemistry of the American Chemical Society for 1987.

## TABLE OF CONTENTS

- 1 Childhood and Early Education  
Parents and siblings, influence of Church of the Brethren. High school.
- 3 Undergraduate Education  
Manchester College, chemistry faculty. Flory as fellow student. The Depression and financial support.
- 4 Graduate Education  
Ohio State University. Chemistry faculty and colleagues.
- 7 Du Pont and Fluorocarbons  
Jackson laboratories, refrigerants research and fluorocarbons. Tetrafluoroethylene, spontaneous polymerization in gas cylinder. Properties of product, early applications.
- 16 Du Pont and Tetraethyl Lead  
Transfer to TEL manufacture. Wartime demand. Recognition for Teflon achievement, later applications.
- 24 Later career with Du Pont  
Chambers Works. Organic Chemical and Freons. Family, interests in antiques. Honors.
- 28 Second Interview  
Church of the Brethren. Flory and family. Manchester College and contact with Flory; his early research. Further recollections of TFE polymerization.
- 40 Notes
- 41 Index

## NOTES

1. John Gorrie, "An Appliance for the Artificial Production of Ice in Tropical Climates," U.S. Patent 1851
2. F. Swarts, Bulletin de l'Académie Royale de Belgique, 24 (1892): 474-. idem., ibid., 29 (1895) 874-.
3. O. Ruff and O. Bretschneider, "Preparation of Hexafluoroethane and Tetrafluoroethylene from Carbon Tetrafluoride," Zeitschrift für Anorganische und Allgemeine Chemie, 210 (1933): 173-183.
4. E. G. Locke, W. R. Brode and A. L. Henne, "Fluorochloroethanes and Fluorochloroethylenes," Journal of the American Chemical Society, 56 (1934): 1726-1728.
5. Roy J. Plunkett, "Tetrafluoroethylene Polymers," U.S. Patent 2,230,654, issued 4 February 1941 (application filed 1 July 1939).
6. Anthony F. Benning, Frederick B. Downing and Roy J. Plunkett, "Preparation of Tetrafluoroethylene," U. S. Patent 2,401, 897, issued 11 June 1946 (application filed 4 April 1940).
7. Framed and autographed reproduction of Plunkett's research notebook for April 6 and April 8, 1938 is in the Beckman Center Collection. [Courtesy of E. I. du Pont de Nemours & Company, Inc.]
8. Willis J. Clem and Roy J. Plunkett, "Manufacturing Tetraethyl Lead," U.S. Patent 2,464,398, issued 15 March 1949 (application filed 12 March 1946). Plunkett, "Manufacturing Tetraethyl Lead," U.S. Patent 2,477,465 issued 26 July 1949 (application filed 21 March 1946). Clem and Plunkett, "Manufacturing Tetraethyl Lead," U.S. Patent 2,515,821, issued 18 July 1950 (application dated 30 November 1946).
9. W. E. Hanford and R. M. Joyce, "Polytetrafluoroethylene," Journal of the American Chemical Society, 68 (1946): 2082-2085.
10. M. M. Renfrew and E. E. Lewis, "Polytetrafluoroethylene. A New Heat-Resistant, Chemically-Inert Plastic," Industrial and Engineering Chemistry, 38 (1946): 870-877.
11. J. D. Park, A. F. Benning, F. B. Downing, J. F. Laucius and R. C. McHarness, "Synthesis of Tetrafluoroethylene. Pyrolysis of Monochlorodifluoromethane," Industrial and Engineering Chemistry, 39 (1947): 354-358.



## INDEX

### A

Alyea, Hubert N., 18  
Antiknock compounds, 16  
Arlington laboratories [Du Pont], 22, 38

### B

Benning, Anthony F., 10, 22, 38, 40

### C

Calcott, William S., 7  
Carbohydrate chemistry, 5  
Carothers, Wallace H., 8, 31  
Chambers Works [Du Pont], 15, 18, 23, 24  
Church of the Brethren [the Dunkards], 2, 28  
Corpus Christi, Texas, 19, 24  
Cylinders, gas, 11-13, 34, 35

### D

the Depression, 4, 7  
Dichlorotetrafluoroethane, 10, 11, 34  
Downing, Frederick B., 10, 40  
du Pont de Nemours & Company, E. I., Inc., 7, 8, 10, 13, 15, 18-22, 31-33, 36-38  
Du Pont fellowship, 31  
Dunkards, see Church of the Brethren

### E

Emulsion polymerization, 22  
Ethyl Corporation, 18  
Evans, William L., 5  
Experimental Station [Du Pont], 8, 21, 31, 37

### F

Family,  
    brother, 1  
    father, 1  
    mother [Elizabeth M. Garst], 1, 3  
    wife [Lois], 19, 25, 33  
    sisters, 1  
    sons [Michael and Patrick], 25  
Flory, Emily, 31-33  
Flory, Paul J., 3, 4, 6-8, 26, 28, 29, 31-33  
Fluorocarbons, 8-12, 15, 36  
Freons, 10, 24, 34, 36, 38  
Frigidaire Corporation, 35

### G

Gamma Alpha fraternity, 31  
Garst, Elizabeth M. [mother], 1  
General Electric Company, 35  
General Motors Corporation, 9, 10  
Gorrie, John, 8, 40  
Groves, General Leslie, 15

Gubelmann, Ivan, 7

## H

Hanford, William E., 22, 38, 40  
Henne, Albert L., 9, 11, 34, 40  
Holl, Carl W., 3, 4, 32  
Honorary D.Sc., 26

## I

Inventors Hall of Fame, 19, 20, 26

## J

Jackson Laboratories [Du Pont], 7, 8, 16, 31, 32, 38  
Jefferson, Edward G., 19  
John Scott Medal, 18  
Johnston, Herrick L., 6  
Joyce, Robert M., 22, 38, 40

## K

Kettering, Charles F., 9  
Kinetic Chemicals Incorporated, 10  
Kirch, Helen R., 15, 27

## L

Laboratory assistant, college, 3-5  
Laboratory notebook, Du Pont, 15  
Lewis, Ernest E., 22, 40

## M

Mack, Edward, 6  
Manchester College, 3, 4, 26, 28-32  
Manhattan Project, 15, 21, 23, 37, 38  
Martin, Don, 3, 32  
McHarness, Robert C., 22, 38, 40  
McKusick, Blaine C., 37  
McNary, Robert R., 9  
Midgley, Thomas, 9

## N

New Carlisle, Ohio, 1  
Newton High School, 1, 2

## O

Ohio State University, 3, 4, 6, 7, 26, 30, 31  
Organic Chemicals Department [Du Pont], 7, 24

## P

Patents, 13, 14, 17, 20, 21, 37, 40  
Pauley, Jane, 20, 26  
Paulsboro, New Jersey, 13, 33  
Pleasant Hill, Ohio, 1, 2  
Polymerization, 12, 14, 35, 36, 38  
    emulsion, 22  
Polytetrafluoroethylene [PTFE], 8, 12-15, 18-23, 34, 36, 40  
Ponsol colors, 18

**R**

Rebok, Jack, 13, 33  
Refrigerants, 9-12, 35, 36  
Renfrew, Malcolm M., 22, 40  
Roanoke, Virginia, 1  
Rohm & Haas Company, 6  
Roy, Rustum, 37  
Ruff, Otto, 10, 40

**S**

Swarts, Frederick, 9, 40  
Synthetic rubber, 17

**T**

Teflon [PTFE resin], see polytetrafluoroethylene,  
aorta, 23  
applications, 18, 19, 21, 23  
molding, 14  
physical properties, 13, 14  
processing, 21  
pump packing, 15  
Tetraethyl lead [TEL], 16-18, 36, 38, 40  
Tetrafluorochloroethane, 11, 12  
Tetrafluoroethylene [TFE], 10-12, 14, 22, 34, 38, 40  
Thiokol rubbers, 17  
Thompson, Virden, 2

**U**

Urey, Harold C., 26  
U.S. Gasket Company, 19

**W**

Washington College, 26, 32, 33  
White, William J., 2  
Wilmington, Delaware, 7, 20, 24, 31  
Wilson, Homer, 6  
Wingate, Phillip J., 32  
Wolfrom, Melville L., 5  
World War II, 16