

Who Is Thomas D. Callinan, and Why Is His Name Associated with Dielectrics?

by Dennis W. Hess

Nearly everyone involved in The Electrochemical Society, and particularly with the Dielectric Science and Technology (DS&T) and Electronics Divisions, is aware of the Thomas D. Callinan Award. This award was established in 1967 to encourage excellence in dielectric investigations and to recognize outstanding contributions to the field of dielectric science and technology. I reluctantly admit that I knew little about Thomas Callinan until Rick Ulrich and I began the planning of a retrospective symposium for DS&T that was held during our Centennial Celebration. To my surprise, neither our Society headquarters nor the Chemical Heritage Foundation had uncovered significant information about Callinan, even as a result of extensive investigation of historical documents amassed by the Society. This lack of information resulted in a treasure hunt into the background and accomplishments of an extraordinary individual.

Thomas D. Callinan was born in 1919 and graduated with a BS in chemistry from St. Peter's College in Jersey City in 1938. In 1939, he began his professional career with Carleton Ellis, in Montclair, New Jersey, where he synthesized specialty chemicals for a variety of applications, including plasticizers and detergents. He described his experiences there most favorably, indicating that it was his interaction with Ellis that taught him to think and think fast. A notable example of this was described by Callinan, when he was interviewed for an article in *Insulation* (August 1957, p. 46). Ellis, who was interested in patents, handed a patent specification to Callinan and asked him what he thought of it. As Callinan glanced at it, he said, "Oh, isn't that good news; any alkali will work." Ellis asked Callinan to inform Callinan's research collaborator about this. When Callinan gave the document to his cohort, the collaborator looked confused, and said, "#!&*, I can't read French." Callinan laughed and said, "Neither can I!" Over the years, Callinan obviously applied his ability to think and think fast rather successfully, as he made insightful discoveries for several different employers on numerous widely divergent projects including liquid dielectrics, solid insulation, inorganic fibers, paper technology, and radiation chemistry.

Callinan developed novel gaseous, liquid, and solid insulators for high voltage transformers and capacitors at General Electric between 1941 and 1944. During that time, he was also involved in the development of asbestos paper. Subsequently, he was employed by Industrial Condenser Corporation, where he studied oil-filled capacitors. He then worked for Western Electric Company, where he investigated capacitors for radar

applications and the electrical properties of laminates. Callinan was employed by Johns-Manville from 1945 to 1947, where he developed inorganic papers and resins. From 1947 to 1956 he was with the Naval Research Laboratory (NRL), where he developed the first successful glass fiber paper for gas mask filters. This development resulted from the formulation and investigation of dozens of fiber papers made from different materials. Callinan and his collaborators became so proficient at such formulations that they believed that they could make paper out of any material; rumor had it that they had even made an apple fiber paper. In addition to the fiber paper projects at NRL, Callinan investigated the effects of gamma radiation on polymer synthesis and on dielectric materials, and studied the structures of partially fluorinated polyesters used as high temperature lubricants. In 1956, he moved to IBM where, until his untimely death in 1963, he investigated the dielectric properties of various materials including natural waxes. As is clear from his diverse background, experience, and interests, Callinan was a scientist and engineer who viewed dielectrics and their process technology as encompassing almost every conceivable material. Indeed, he stated his breadth of interest most concisely, "There is no state of matter, gas, liquid, elastomer, plastic, glass, gel, or classical solid that is not of interest to one in dielectrics." (*Insulation*, August 1957, p. 45)



Callinan had a most outgoing and likeable personality. Although he generally showed considerable passion regarding his work, he was not always receptive to those who did not share his technical view of a subject. A recent conversation with Jimmy Romans, a collaborator of Callinan's at NRL, established that Callinan was very patient in explaining technical concepts and details to anyone who sought information. However, Callinan did not appreciate being challenged during these conversations. According to Romans, when someone wished to tell Callinan that he was wrong, they could not do so explicitly or they would be "thrown out of his office." Instead, one would ask for an explanation of the questionable conclusion or principle. In the middle of expounding on the concept, Callinan would recognize his mistake and explain the concept correctly.

Callinan was instrumental in the development of the Society's Electric Insulation (now Dielectric Science and Technology) Division, serving twice as Division chair: 1951-1954 and 1961-1963. In the July 1952 issue of the *Journal of The Electrochemical Society*, Callinan stated that the Division was formed to "promote the attainment and dissemination of

knowledge pertaining to dielectrics... a division of science dealing with the electrical, mechanical, and chemical properties of nonconductors of electricity." He also noted that the electrical or power industry "has stimulated developments in the field of materials..." and that the interest in this field was "shifting from power transmission to intelligence transmission"—wherein he implied that the recent discovery of the transistor would have a major impact on the field of dielectrics. These prophetic comments in 1952 have proven to be cornerstones of the Division's development.

Since 1967, the Thomas D. Callinan Award has honored the extraordinary accomplishments of its namesake whose breadth of interests, activities, and stellar accomplishments represent a

goal to which all scientists and engineers in the field of dielectrics should aspire. Clearly, the name Thomas D. Callinan will forever be synonymous with dielectric materials. ■

(Auth. Note: I am most grateful to David van Keuren and Jimmy Romans for supplying information about and insight into an extraordinary individual: Thomas D. Callinan. Dr. van Keuren is the Naval Research Laboratory Historian.)

Dennis Hess is the William W. LaRoche, Jr., Professor of Chemical Engineering at Georgia Institute of Technology. He may be reached at dennis.hess@che.gatech.edu.