

Branda

DAYTON

engineer

BIRTHPLACE OF AVIATION

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ENGINEERS CLUB HONORS TROLANDER

The highlight of the 1992 Founder's Night was the induction of Hardy W. Trolander as Fellow of the Engineers Club of Dayton. In bestowing its highest honor, the Engineers Club recognized the outstanding contributions Hardy has made as an inventor, engineer, innovator, entrepreneur, manufacturer, business executive and community leader.

Hardy is a co-founder of Yellow Springs Instrument Company, better known as YSI Incorporated. Hardy and his partners actually started YSI in the basement of the Physics Lab at Antioch College in 1948. He was Chairman of YSI from its founding until 1990 when he was named Vice Chairman. He served as President and CEO from 1948 to 1986. During his tenure as CEO, YSI grew by its own resources from an initial investment of \$300 dollars to a firm employing 400 people with sales of twenty million dollars a year. Most of YSI's growth has come from its in-house development of biosensors and associated instrumentation.

Hardy's inventions alone justify his induction as a Fellow of the Club. However, his approach to life and to improving the quality of life for others has been and is holistic. His inventive genius has always been driven by a real application or need. He considered his inventions incomplete until they were brought through the development process, manufactured and made available as useful, high quality and affordable products.

Hardy's creativity has generated numerous inventions and many patents. Hardy along with Dr. Leland Clark invented the first practical medical electronic thermometer in 1952.

In 1958, Hardy invented the precision interchangeable thermistor which he considers the most important of his inventions. The U.S. Patent # 2,970,411 granted in 1958 was titled "Thermistor Standardizing" and described as a means and method for producing close tolerance uniform thermistors for the measurement of medical and biological temperatures. The precision interchangeable thermistor solved the variation problem previously inherent in thermistors making the electronic thermometer practical for commercial applications. It was the breakthrough needed to make thermistor technology important in medicine, medical and biological research, and a wide



variety of scientific and business applications. The continued production of the precision interchangeable thermistor attests to the impact of this invention.

In 1966, Hardy invented the multiple thermistor active element linearizing network. He received U.S. Patent # 3,316,765 in 1967 for this remarkable invention. It was titled "Extended Range Thermistor Temperature Sensing" and described as an 'n' term electrical network employing multiple thermistors to linearize output over a wide temperature range. Thermilinear components developed and manufactured under this patent may be operated

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as either a device for linear voltage versus temperature or linear resistance versus temperature. Sensitivity is 400 times greater than a thermocouple with outputs as high as 30 mV/C. Output voltage applied to a recorder or digital voltmeter will produce a precise, sensitive, direct reading thermometer. These components remain in active production today. The assignment of a Russian patent for this invention illustrates the international recognition Hardy's work has received.

Hardy invented high stability, high precision thermistors in 1981 which established a new level of the state-of-the-art that has not yet been equaled by other producers of thermistors anywhere in the world.

Hardy has authored a number of important technical papers. The following landmark publications significantly influenced his field:

"Thermometer for Measuring Body Temperatures in Hypothermia," *Journal of the American Medical Association*, Vol. 155, p. 251, 1954.

"A Wide Range, Linear Output Thermistor Sensor for Biological Temperatures," *6th International Conference on Medical Electronics and Biological Engineering*, Tokyo, 1965.

"Reproducibility, Stability and Linearization of Thermistor Resistance Thermometers," *5th International Symposium on Temperature*, 1972.

"Enhanced Stability in Precision Interchangeable Thermistors" *6th International Symposium on Temperature*, 1983.

Hardy shares that he is not an eureka type inventor and has benefited from others. He attributes success in creative endeavor to the "serendipity of circumstances." He identifies Fred Hooven, a noted Dayton inventor and protege of Charles F. Kettering, as a mentor who contributed greatly to his

understanding of the inventive process. Hardy fondly remembers Hooven's incisive quote that "Many inventions are rubber gloves for a leaky pen."

Hardy was inspired by Charles Kettering's interest in his work. He benefited from needs and suggestions that flowed from a close association with Dr. Leland Clark, the Father of the Biosensor.

He identifies others such as Russel Varian, inventor of the Klystron, and David Newman, a fellow inventor at YSI, who enriched his career.

Hardy observes that a small step is often what makes an important invention really work. His experience in buying a multimeter from a Bluffton, Ohio firm illustrates this point. He disassembled the multimeter and noticed that cheap resistors were filed away to make resistors with the proper resistance. This observation later became inspiration for his design of the precision interchangeable thermistor.

During his association with YSI, Hardy directed the development and production of many important and successful products. He guided the development of the first practical membrane-covered oxygen polarographic electrode which was invented by Dr. Leland Clark. The first model remains in production. He directed the production of the first blood-gas apparatus and of conductivity cells and instrumentation to measure blood-hematocrit. He led the development and production of the first practical membrane-bound enzyme activated polarographic electrodes for analyzing glucose, lactate, alcohol and other substances also invented by Dr. Clark. Hardy directed the production of the first thermistors ap-

proved by NASA for extended space travel.

Under Hardy's leadership, the human side of enterprise was given a high priority at YSI. YSI pioneered many of the progressive concepts such as aggressive employment of minorities, group and individual flextime and exclusion of time clocks for recording employee attendance. Hardy credits much of YSI's success in this area to the influence of Douglas McGregor, renowned behavioral scientist and management theorist, and to his colleagues at YSI.

Hardy is a Senior Member of the Institute of Electrical and Electronic Engineers (IEEE) and Founder and Member of the International Institute for Medical Electronics and Bioengineering. He was a Member of the Bioinstrumentation Advisory Council, A.I.B.S., from 1969 to 1975 and Technical Advisor and Chairman of the Reporting Secretariat 4/Pilot Secretariat 12, International Organization of Legal Metrology, from 1975 to 1982. He served as a Member of the Advisory Committee on International Programs, National Bureau of Standards from 1975 to 1985 and the Evaluation Panel for the Heat Division, Institute of Basic Standards, National Bureau of Standards from 1977 to 1979. Hardy has been a Trustee of the Engineering and Science Foundation since 1985 and was Chairman of the Foundation from 1987 to 1989.

After graduating from Antioch College in Engineering in 1947, Hardy taught Physics at Antioch until 1949. Hardy was a Founding Trustee of the Yellow Springs Community Foundation in 1974 and served as Trustee until 1985. The

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Yellow Springs Community Foundation has been very successful and is unique for a community of the size of Yellow Springs. He is Member of the Greene County (Xenia) Health Commission and a Trustee of the Health Care Account Project of Southern Ohio. He is Chairman of Miami Valley Regional Business Innovations, Inc. which provides advice and assistance to entrepreneurs starting new businesses.

Hardy has many interests. He is an electrified railroad enthusiast and notes that he has ridden the length of the Trans Siberian Railroad twice, once in each direction. He is a devotee and owner of Chrysler Airflows. He is a collector and restorer of antique radios.

Hardy and his wife, Imogene, have been married since 1946 and have two daughters, Megan and Patricia.

SECRETARIES' WEEK

April 20-24



This is a week set aside to honor the special people who are indispensable in your smooth running business. Show your appreciation to your secretaries or administrative assistants by bringing them to lunch at the Engineers Club during Secretaries' Week. We will be happy to order flowers, candy, balloons or make a special dessert for your hard-working dedicated employees. Call Brenda to make reservations early as this is a very popular week at the Club. Please allow a 24-hour notice when requiring flowers, candy, etc.

NEW MEMBER NETWORKING LUNCHEON

ALL CLUB MEMBERS ENCOURAGED TO ATTEND

THURSDAY, APRIL 2ND 11:30 to 1:00



We have planned an afternoon of networking so you can discover the available business opportunities and camaraderie that exist with your fellow Club members. You are welcome to bring a guest with you to enjoy lunch and the company. Introduce your friends and business associates to the benefits of membership. The cost is only \$5.00, and everyone is welcome.

MOTHER'S DAY

Sunday, May 10

11:30-2:30

You and your family will want to celebrate with that special lady in your life at the Club's special Mother's Day Brunch. Make plans for this day dedicated to all mothers.

SPECIAL OCCASIONS

The Engineers Club staff is well equipped to aid you with wedding showers or receptions, prom dinners and graduation parties. With facilities like the main dining room and the private elegance of the English or Wright rooms, the Club is well suited for large or intimate graduation parties and wedding showers.