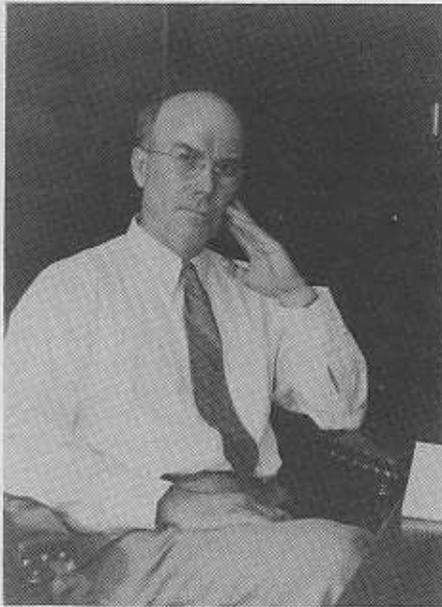


# "AND IT'S THE THEN SOME THAT COUNTS"



GEORGE H. LELAND

ing machine capable of mass production of coils for Boss Kettering's new aircraft generator.

Leland was well prepared for such an assignment. Born in 1887 and raised on a farm in north central Indiana, he was a curious little boy, possessing an insatiable appetite to tinker with anything mechanical. He attended public school, graduating with the highest marks recorded there. He was so advanced he passed the state teachers' exam and was teaching in high school the very next year after graduation. After a couple of years of this and marriage to a local girl, Hazel Miner, Leland decided that a career in education was not for him. He was hired by General Electric Company in nearby Fort Wayne and quickly progressed from lab technician to machine designer in manufacturing engineering. He was the bright star in complex winding machine design and his reputation spread to GE's Dayton competitor, Delco Products Division, desperately in need of special production equipment to help meet wartime schedules.

Young Leland was self-taught in advanced mathematics and possessed a thorough understanding of the laws of physics, electrical and mechanical engineering. His winding machines were finished on schedule and new generators, built from production tools, were first started up on November 11, 1918, Armistice Day.

Delco's pay envelopes, each week, carried a different message or old saying passed down over the years. This idea probably originated with Boss Kettering who, himself, was a bountiful source of pithy statements of wisdom. Many of those valuable quotations etched their way permanently into Leland's memory. One of these, author unknown, guided his every endeavor: "Success is the result of hard work and then some . . . and it's the *then some* that counts." This statement drove Leland to start two very successful manufacturing companies and become a highly respected community leader with deep civic pride. During his career he filed, as inventor, over 150 applications that resulted in U.S. and foreign patents.

But Delco was too big for him. He was soon raising capital from friends and relatives for a new venture, The Leland Electric Company, soon to be a manufacturer of fractional horsepower electric motors. Leland had converted an industry-wide technical problem into an oppor-

tunity. The force of electromagnetic repulsion was very powerful but pitifully inefficient while the induction type electric motor ran efficiently but was too weak in starting torque. Leland combined the best of both with a centrifugally actuated switch integrally packaged inside the end frame of his new motor. Its job: after the motor starts and gets up to running speed in the *repulsion* mode, switch the circuit over to run in the *induction* mode . . . an inexpensive but efficient and effective motor for all kinds of household appliances and industrial equipment. The repulsion-induction motor became the core product around which the new company began its early successes. The little company grew rapidly, returning generous rewards for the original investors.

During this period the young self-taught engineer, prodded by the ". . . *then some* . . ." developed the first electric motor approved by the Underwriters' Laboratories as explosion-proof and safe for driving a gasoline pump in a filling station. With America now on wheels it seemed archaic that gasoline had to be manually pumped from the underground tank to an overhead bowl and then drained by gravity into the auto's tank. The slightest spark from an electric motor or switch might set off an explosion that could rock a city block. Now the company had an exclusive marketing position with Leland explosion-proof motors in demand worldwide. A good thing because right around the corner was the Great Depression. By 1931, "The Leland," as the company was known in the local community, was down to two days' work per week and could have gone under except for the popularity of the explosion-proof motor. The "01' Man" (age 44) was working without salary as hard as ever to save his company and several hundred jobs.

Recovery was slow but steady and by the mid-30's, "The Leland" was back on its feet. The depression had left its scars, however, and nagging financial problems continued to divert management's attention from the important task of new product development. Too, this was no longer a company owned solely by Leland and a few friends and relatives. Considerable shares had been sold during the heady successes of the '20's in order to finance the new building at the corner of Leo and Webster. The depression was over and investors and bankers were impatient for a resumption of the earlier

This is a draft for the Engineers Club bulletin, The Dayton Engineer. It is written for a Dayton, Ohio audience familiar with such names as Boss Kettering and Delco.

George H. Leland, 1887-1969, arrived in the Valley of the Giants in early 1918 driving a car full of three little daughters, a pregnant wife, and a few household goods. In his words, ". . . none of it was paid for; not even the car."

America was at war and one of the new weapons was the airplane. Delco had a government contract to develop a light-weight generator for supplying electrical power so that military aircraft could be flown after dark. Leland had a new job at Delco and his first project: design a wind-

financial rewards. Mr. Leland gave up his post as president and chief executive and assumed the position of chairman of the board to be free to explore some new concepts, develop new products and concentrate on the company's future.

Meantime, Leland was having considerable difficulty with his eyesight and had received little satisfaction from the professionals he had visited. A few books from the Engineers Club library started him on a self-study path and within a few months he became an expert on the refraction of light and profession of optometry. His company model maker soon completed the hardware for a new system, designed by Leland, for testing eyes. The first patient, Leland himself, walked into a local optician's office and handed him a prescription for eye glasses. Over two-thousand people were satisfied with prescriptions by Leland before the local society of optometrists encouraged him to quit for lack of a proper license.

He believed in working hard but he also played. Playing for him, however, had to involve something technical. While working with his optometry venture he discovered a way to project three dimension, or stereo, color movies using polarized lens filters. While a quick patent search revealed that the technique had already been invented, he was intrigued by the idea and started producing stereo home movies in color with equipment he designed and had produced in the company model shop.

In 1939 international tensions erupted into war in Europe and the U.S. commenced preparing for hostilities. Dayton's Wright Field was the research, test and procurement headquarters for the Army Air Corps. In addition to complete aircraft, Wright was responsible for accessory equipment for aerial warfare such as instruments, armament and oxygen equipment. Officers in charge of the Armament Lab contacted George Leland to work on development. Within weeks he provided the Air Corps with the answer to a problem that had been unsolved since the first World War: how to drop small 20 lb. bombs from high speed aircraft without its wake turbulence disturbing the accuracy. This led to other development contracts the results of which were successfully incorporated into aircraft armament systems. The most significant was a device known as the A-4 bomb release. Tens of thousands of these were manufactured during the war and the basic design is still in use on Air Force B-52's.

The typical tripping device for a bomb release is an electrical solenoid, or electromagnet, employed to release the

energy stored up in a very powerful, cocked spring. Solenoids of the day were linear, straight pull or push, and very sensitive to acceleration forces of shock or vibration. A rotary device, however, would be shock-immune. Any good engineer would have reasoned this, but it took a mind like Leland's to accomplish it . . . a very clever and extremely powerful rotary solenoid. The novel solenoid promised a multitude of commercial and industrial applications, and Leland offered it to Leland Electric as a new product possibility for after the war but management had other problems and showed only lukewarm interest in the OI' Man's latest gadget.

After the end of World War II he resigned as chairman of Leland Electric, sold his Leland stock and concentrated full time on Leland Development and Engineering Company. That name later provided the acronym which identifies the present company, Ledex Inc. The firm was organized to develop a market for and to manufacture rotary solenoids. Once again, he started a company around a core product that would lead into many other market opportunities and product possibilities. Ledex Inc. is now a world leader in the design and manufacture of all types of precision, high speed, long life solenoids which perform a myriad of actuating jobs in high-tech office equipment, industrial automation systems, aerospace applications, and agricultural machinery.

As the new company grew, Leland found the time to get back to some technical playing. At 61, when most men are planning retirement, he was taking flying lessons, earning his private pilot's license in less than a year.

But his good health started to fade with the approach of Parkinson's tremor. In 1958, he underwent a then new surgical technique which did give him some relief but was less than a total cure. Failing health necessitated retirement from active executive duties and he took the position of consultant and advisor. Ledex continued to grow under family management and on the solid foundation which he had laid.

Now in 1986, Ledex' annual sales exceed \$25 million with over 400 employees and while it is owned by a British-based company, Lucas Industries, it is still managed by a member of the Leland family, a grandson of the founder. A neighbor on I-75 in Vandalia is Leland Electrosystems Inc. a direct descendent of the original Leland Electric Company.

Truly, George H. Leland, with the realization that it's the *then* some that counts, has left his mark on Dayton, the Valley of the Giants.



Internationally Famous  
World News Correspondent

**Dr. John Morley**

back from his 53rd world news trip  
will speak in the club auditorium  
on Wednesday evening of  
October 8th  
at 8:00 P.M.

following a social hour and dinner  
starting at 5:30 P.M.

Come early and meet the man who  
was aptly called by Lowell Thomas,

"Marco Polo Morley." He will be  
speaking to members of the  
Engineers Club of Dayton

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The Dayton Chapter of the  
World Future Society on the subject  
21st Century World Problems  
and Probable Solutions

Reservations must be received no  
later than October 6th.

Cost per person, including meat (or  
fish) dinner, coffee, dessert,

tax, gratuity, and

program — \$15.00. Cocktails C.O.D.  
Auditorium program only — \$5.00

Engineers Club members may  
phone 228-2148 for reservations.

All others should mail checks prior  
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