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FRANKLIN FOSTER HINES

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The Quiet, Self-Effacing Genius Behind the Bonded Resistance Strain Gage

by Peter K. Stein, President

Frank died at his home in Hudson, New Hampshire on the evening of Friday, April 6 from the prostate cancer for which he had been treated since May 1991 and which suddenly spread throughout his body after years of successful containment. With him was his wife of one day, Velda née Vacca whom he had known for over 51 years and courted for the last 10, some time after the death of his wife, Norma.

I last chatted with him on his 87th birthday in December and he was making plans to attend the February 2001 Western Regional Strain Gage Committee meeting in Phoenix. He had been its Executive Secretary from 1957 through 1961 and an honored guest at many other meetings, the last of which was the 40th Anniversary of WRSGC in 1996 at which he was a featured speaker.

The most humble and self-effacing man I knew, he was the genius behind the development and success of the bonded resistance strain gage, as will be related below.

As a boy, growing up in Blacksville, West Virginia, Frank Hines knew he wanted to experience life beyond his rural community. As a youth he expressed it as a desire to find "a way out". Developing an aptitude for building an inventing he recalled one of his ventures, a hand glider, which he tried unsuccessfully to launch. He later referred to it was his "lucky failure" because his lack of success with the glider caused him to shift his interest to a contest he had seen publicized in a magazine ad. This competition, sponsored by the Fisher Body Division of General Motors, presented a new challenge, to build an exact small scale replica of the coach once used at the wedding of Napoleon to Marie Louise of Austria in the late 1700s. There were many prizes to be won including the first: a \$5,000 college scholarship.

Having only a detailed design provided by Fisher Body and a copy of Henley's 20th Century Formulas, Processes and Trade Secrets, he recalled: "I cancelled my life and worked for a year. He knew the standards for the competition would be high because the original model was built by a German Craftsman who was employed at Fisher Body. The judging was to be based on workmanship, accuracy and resourcefulness. The latter of these categories was perhaps the toughest for Frank since his resources were so limited. Could he really build a model to specifications which entailed so many different

materials and over 2,000 hand crafted parts? Persevering, a young Frank Hines took on the challenge.

His first job was to create the major parts of the coach. These he carved out of the wood he took from an apple tree growing in his back yard. The original carvings were then used to make the molds which were ultimately cast, creating the main frame, body supports, spokes of the wheels and decorative trim for the carriage. "I didn't buy the available castings," said Frank, they were too crude!" To make his own castings he used his father's blacksmith forge and melted down the aluminum pots and auto parts he had scavenged from the local junk yard. He also used old metal type which he acquired from his contacts at the local newspaper where he was employed as the small town's only paper boy. The required chemicals needed for the formulas to make the brass plating and other solutions, had to be obtained from a drug store located miles away at the County Seat. The silk and velvet fabrics required for the interior upholstery were also a rare commodity in Blacksville, and had to be "imported" from Pittsburgh. The coach was detailed with hand-knotted tassles and displayed hand-carved eagles on its four corners (accomplished by casting one eagle mold four times, then detaching two of the heads and rotating them to create the Austrian Double-Headed Eagle). Carefully following the design of the original model, he used leather and gold buckles to hold the leaf springs in place, and the carriage doors were finished using small spring latches.

Upon completion of the model in 1931 he entered and won the state contest which included \$100 and a trip to Detroit with other members of the Fisher Body Craftsmen's Guild. During the year that followed, he developed new techniques and made improvements on the coach. His efforts were again rewarded when he entered the national competition and won. The grand prize was \$5,000 in scholarship money to be used at a college of his choice. He selected Massachusetts Institute of Technology and after 1-1/2 years at West Virginia University he arrived at M.I.T. as a transfer student in 1936 with all the attendant problems which transfer students have: that courses in the junior and senior years might not be offered when needed. Indeed, Frank had to take one semester off from his studies and worked at the M. I. T. Hobby Shop as "gofer", as he put it, but I'm sure that his love for model making and crafts was involved too.