

GO FOR IT

It's the Best Way to Learn

by Roy Curry

I began my education in a one-teacher country school. Home was a dairy farm 5 miles away. My mother was an experienced primary school teacher so, at home I received extra doses of reading, writing, and arithmetic that were designed to ensure that, after finishing at the local school, I would be ready to attend high school as a boarder at the Brisbane Grammar in Queensland, Australia. Those plans were to change drastically by the time I started my first year at Grammar. I arrived, not as a boarder, but as a scholarship-supported dayboy living with my mother and sister. My father's health had deteriorated and he had passed away eighteen months previously, forcing the sale of the farm and a move to Brisbane.

Much was new to me...not only was "Grammar" more than ten times larger than the country school, but so also were the different toys of the city boys. Model airplanes buzzed on the school sports field and in my imagination. When our form master suggested that a group of us develop a project for the school science competition, I naively drew on my first few weeks of high school chemistry to suggest we try to make a model airplane engine run on hydrogen. Any excuse to play with exploding oxygen-hydrogen mixtures. Mr. Ireland appeared to be youngest of our teachers (he drove a spiffy MG sports car.) A few weeks later, he handed me a copy of Popular Mechanics, which described a fuel



Roy Curry and his first fuel cell

cell, a device that combined hydrogen and oxygen, not as an explosive mixture, but to quietly create an electric current (a sort of battery run on hydrogen.) I remember this as one of those life-changing actions of an insightful mentor, but it is also possible that his motives were to avoid losing all or part of any student in his class. After reading the somewhat technical article on fuel cells, some of which I did not understand, my classmates' enthusiasm waned, but I was still hooked. When I told Mr. Ireland I was planning to try to build a fuel cell he said simply: "Go for it, it's the best way to learn."

By the time of the science competition I had two accomplishments. A working fuel cell, and an anxious mother and sister who knew I still could not resist using some of the hydrogen I generated to make a small explosion. My mother did supply the glass milk bottles, aluminum foil, and caustic soda used to generate the hydrogen. I was rocking the boat in our

small family unit, all still hurting from loss of father, husband, and the end of the farm, but she did not stand in my way.

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I also had help from a mentor from an unexpected source. Because my father had been a prisoner of war, our family had been assigned a so-called Legacy advisor, a veteran himself, a silver haired successful real estate businessman who called by periodically to offer help and advice. Through his network of business contacts, Mr. George helped me find a glass-blower who made the small chamber where hydrogen and air (for the oxygen) were brought into contact, and a chemical supplier who agreed to sell me the tiny amount of palladium chloride I needed to catalyze the non-explosive interaction of hydrogen and oxygen in the fuel cell. My plans to power a model airplane engine had fallen short, but the fuel cell battery did power a single transistor radio. The project was entered, and I won, the state junior science competition later that year.

Eight years later at a Legacy reception I was able to tell Mr. George and his fellow advisors how that fuel cell set me on a new journey, far from the farm. The project contributed to my decision to study chemical engineering at the University at Queensland. There, for a final year honors project, I investigated how gases are exchanged into flowing liquids. The fundamental principles of this

process are important in many industrial processes, including, by then, the use of fuel cells to provide power for the Apollo Moon mis-

sions, and in lightweight commercial vehicles. When I wrote up my project, I also learned that the same principles were being used to design human heart valves and to understand how oxygen was taken up by blood in the lungs and delivered to tissues. I discovered Biomedical Engineering and Physiology.

These physiology papers were like that Popular Mechanics article, but I did not have a Mr. Ireland or a Mr. George to help me leap over one glaring hole in my education and experience. Apart from a brief course in beer making in my junior year (generally treated as a relief from the rigors of an engineering curriculum), my formal education in biology and particularly human physiology was non-existent.

Sue played a key role in making that leap. We had met at a university conference two years previously, but attended universities 1000 mile apart, Sue at Monash University in Melbourne majoring in history and french. During a purely non-academic visit to Melbourne I learned that Monash Engineering was initiating biological oriented research into artificial organs, control of anesthetic machines, and the use of bacteria for food production and waste management. So I decided to accept a graduate fellowship in

chemical engineering and move so that Sue was only 3 miles away, not 1000. Then one of Sue's friends introduced me to a professor of physiology, who had a very clear response after hearing my background and interests. "Walk out of Engineering," he said, "and into the School of Medicine. Join the Physiology Department. Go for it.

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Professor Day was my new Mr. Ireland and Sue's network was my new Mr. George, actually much better

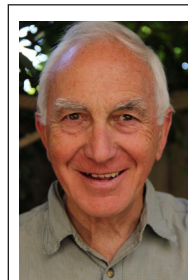


Toyota Mirai, one of the first fuel cell powered cars currently available in California.

than Mr. George's.

I will have lived with Sue and continued research at the interface between engineering and medicine for 50 years this summer.

I still hope that one day I might hear another "go for it" advisory as I try to decide if we should spend some of our children's inheritance to buy a Toyota Mirai, now available in California. ♦



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