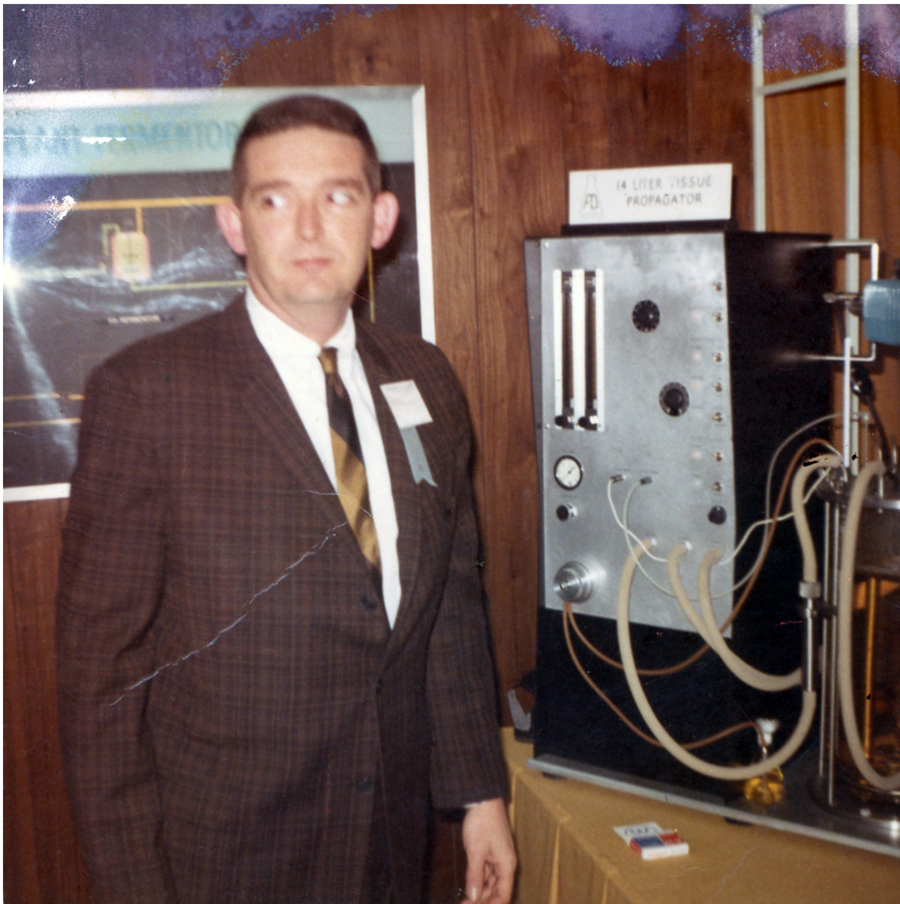

■ *In the 1960s, Jack transferred his sales savvy with cars to the new technologies of scientific fermentation and isocyanate production. Jack, 1967, next to an early fermenter created by Fermentation Design, labeled as "Propagator."*

Chapter Seven

LEAVE A PIECE OF BONE

The thrust of Jack's genius as a salesman is summed up in another of his original axioms: "Leave a piece of bone sticking out of the ground." In other words, give the customer every reason to want what you're selling, every reason to believe they need what you're selling, but don't think that sales is primarily delivering information in the right way. A great sales person understands that every card can't be laid out on the table; there has to be a little magic in the process. "The idea," Jack says, is to allow the customer to discover the principle of interest instead of presenting it all to him."

In other words, build the case, create the environment that lends itself to tantalization, but allow the customer the delight of figuring out yet another way the product can serve them better than what they now are using. Or, as venture capitalist Guy Kawasaki said, "Enchantment is the purest form of sales."

Jack's natural penchant for sales combined with his engineering capabilities to create a powerful new future for him in a budding industry with reliable profit margins: biotechnology.

He came easily into chemical engineering, although not many with a background in mechanical engineering could bridge that gap. It is mechanical engineering that runs in the family. Jack's father was recognized for his contributions while working at Corning Glass Works, and most notably drafted the blueprints for one of the world's largest telescopes. The original telescope, with its 200-inch reflector, stands atop Mount Palomar in California and is owned by California Institute of Technology. Of course, Corning made the glass reflector, which came to be known as "the giant eye." The replica 20-inch telescope in Corning was created from plans that bear Paul Wilson's signature.

Now the descriptor used in Jack's high school annual about his athletic prowess—invincible—applied to his salesmanship. He had an appetite for presenting the saleable points of a product and helping folks understand why it was worth buying. He had no trouble parlaying those talents into a field that virtually no one had heard of: sprayable foam plastics.

He found work with a childhood friend who would soon be known as a pioneer in isocyanate engineering, Kenneth P. Satterly. Isocyanates, simply explained, are a family of highly reactive, low molecular weight chemicals. Microcellular plastics was a new, exciting field in the 1960s and was based on the reaction of isocyanates with compounds that contain active hydrogen groups. (Think: sprayed foam insulation.) A simple explanation of how microcellular foam is created is that gas is dissolved under high pressure into polymers, which creates a uniform arrangement of bubbles in a plastic foam, which is used in insulation and many other commercial and scientific uses. The size of the cells is near the wavelength of light.

In the 1950s and 1960s, Satterly's company, Isocyanate Products, Inc., was based in Wilmington, Delaware, and made a name for itself filing patents for cellular plastics, including sprayable foams. Satterly wound up defending an early patent in a 1966 suit, General Tire Rubber Co. v. Isocyanate Products, Inc., whereupon he filed a countersuit, and was in court defending his patents through the 1980s.

Witnessing the time and money and trouble involved in protecting patents, Jack concluded that it wasn't a worthy endeavor....He didn't bother with trying to trademark his ideas. He gave them away.

Witnessing the time and money and trouble involved in protecting patents, Jack concluded that it wasn't a worthy endeavor. When he began to invent mechanical modifications and envision new, chemically engineered processes, he didn't bother with trying to trademark his ideas. He gave them away.

After a brief stint at Isocyanate Products, Jack spent the next fourteen years in leadership positions with another icon in thermodynamics, Charlie Snelling. Cryogenics, the scientific study of using low temperatures to change or preserve life forms, was about to be snapped up by forward-thinking commercial businesses, including two of Snelling's groundbreaking companies: Cryotherm and Fermentation Design, Inc.

A headline and photo in The Morning Call newspaper, October 29, 1972, documented Jack's trip to Moscow, Russia, during which he secured a $500,000 contract for Fermentation Design. Jack is described in the front-page article as "an energetic executive whose six-year-old firm has grown from nine employees to the present 45." He told the newspaper that the system he sold to the Russians was a biological interactive control system, unlike any other in the world. The revolutionary system, he pointed out, "couples the computer to a biological process for the purposes of control."

In an autobiographical essay sent to the New York Times in 2011, Charlie Snelling gave a synopsis of those businesses: " I sold my company (Frozen Semen Products Co.) to Union Carbide Corporation. Cryo-Therm, Inc. (in the applied thermodynamics business) was my next company. Innovations followed. Patented products developed at Cryo-Therm were sold to 3M (energy storage electric heat baseboard); to Armstrong Cork Co. (continuously molded urethane pipe insulation); to the Melpar Division of Westinghouse Airbrake (our military division, and several patents); and to New Brunswick Scientific (our Fermentation Design Corp.)."

Jack saw a better way to approach the design of certain instruments, and felt strongly about his ideas. Company leaders didn't want to hear it—a common conflict between the engineering department and the executive suite—and he left the company to start his own. ■

PIONEERS IN A NEW INDUSTRY

In 1955 or so, I left Corning to take a sales job with a startup company. It was a DuPont licensee started by a neighbor kid in Corning, Ken Satterly, who called me up and asked me if I would be interested in a job. He was one of the principals of the company, Isocyanate Products. I took it, and we moved to New Castle, Delaware, just south of Wilmington.

Isocyanates were a new product at the time, and no one had really seen anything like it. The foam mixes up and it's pourable. It expands, so it's used for insulation and a whole lot of other things. One of the reasons the material was exceptional is the foam itself was chemically active. In other words, when it touches any carbon source, for instance, wood, it makes a chemical bond with the wood. The foam is glued right in place without any special effort, and that has a lot of advantages. You can make laminated panels that are very strong because they're bonded on all surfaces. But it also means that if it gets on something…well, I've ruined several suits and clothing.

"I worked quite a lot on developing the spray equipment for it, because it's a two-liquid system. "

I worked quite a lot on developing the spray equipment for it, because it's a two-liquid system. There's an activator and a prepolymer; the spray gun has to do the mixing, because the two streams impinge and create the mixing. That was really fun, because we were demonstrating our spray machine for DuPont, in one of their buildings, and DuPont doesn't build trashy buildings. They put us in the basement of one of their office buildings, it's full of pipes and everything, and it's fall but they hadn't started the heating system yet, so it was cold in the basement. We start spraying to demonstrate this stuff, and it came out like molasses. It was dripping down onto the floor instead of spraying. It was a real mess.

Patents were being developed for materials that were capable of storing heat, materials that used the heat of fusion, and Ken invented a patent for what he was doing at Isocyanate Products. To give you an idea, when a solid changes into a liquid and when a liquid changes into a solid, it gives up heat. Water becomes ice, and ice melts to become water: that's fusion. It takes the removal of quite a lot of heat relative to the mass of the material to cause that change of state. We developed systems that utilize substances that need heats of fusion at different temperatures. We could stabilize at almost any temperature by utilizing certain materials as a heat sink, or a cold sink, if you will.

To tell you the truth, I contributed more to that company than I took away. Ken, this kid from Corning, was in charge of research, and they were focusing on foams. I was focusing on the application, and I suggested to him, why didn't they make a varnish, a foam that didn't foam? Because the stuff would make chemical bonds with anything that had hydroxyl units attached, like wood. So, he made up samples of what were the first isocyanate varnishes and finishes. Isocyanates bond to the wood. It makes a chemical bond, not like an adhesive. An adhesive just makes a mechanical bond: it fills the pores, hardens, and creates the grip. But to actually have a chemical bond is infinitely stronger, and that's why it makes such good finishes, because it has that feature.

"To tell you the truth, I contributed more to that company than I took away."

I was with Isocyanate for a few years, but we couldn't stand Delaware. God! What a place. I love to hunt and the DuPont family owns Delaware, practically the whole state. You can't walk in the woods they don't own, and it's all posted that you can't hunt. I thought my wife would leave me, because I was traveling and she had two kids in diapers, and one of them brand new, and she had no friends there. The climate is hard. The winters there are terrible, because it isn't cold enough to snow, you get very little snow, but you get this dreary rain. It's depressing. I understood all that, but there wasn't much I could do about it. We lived through it, but we weren't happy about it.

Around 1958, I took a job in Bethlehem, Pennsylvania, with Cryotherm, a company that was one of my customers at Isocyanate. We leased a farm in East Texas, Pennsylvania, and the whole family was much happier then.

I became sales manager at Cryotherm. The principle that I've tried to follow my whole life in selling is that you have to understand the market you're in and the people you're dealing with, and you've got to generate a plan that they believe is profitable for them. If you do that, you can be successful. If you don't do that, somebody else is going to take the business. I always work on trying to find the methodology that's likely to work.

The name Cryotherm was a contraction of cryogenics and thermodynamics, and we made shipping containers for temperature-sensitive equipment, including for the inertial guidance systems that were being developed during that period of time. Gyroscopes and accelerometers are used in inertial navigation systems, especially by the military, and they depend on heat sensitivity to work properly. Both of them provide a fixed point from which measurements can be made. This becomes, you might say, the heart of the navigation system, because it can sense any kind of change of positioning by the effect on the gyroscope. The accelerometers determine the rate: how fast it's going or how slow. I remember some of the gyros were the size of a small sausage, and they were worth $7,000 each. Quite valuable. If they got outside of their temperature range, the fluid that the gyroscope spun in tended to crystallize, and that would break the hair-like electrical wiring connections to it. An accelerometer that is not stabilized is ruined; it has no detectable input and therefore no measurement can be made from it.

As the equipment got bigger, we had to build storage containers that were quite large, because once the equipment gets bigger, you've got to distribute the ability to absorb and give up heat, right? ■