AIChE 100th Anniversary

My attorneys have advised me to make the following disclaimer, which was sworn in front of a Notary Public, before I begin my remarks. I grew up on the South side of Chicago and the Southern suburb of Chicago Heights. If you haven't heard of it, it's a little South of Dolton. I was a White Sox fan as a kid. And my name really is Robert Francis. But I am required to disclose that I am not the pope. Although I received a dozen congratulatory emails from friends who did not wait for the last name to be revealed.

Good evening and welcome to all of you. I want to share a lot of lessons I have learned during my career. This assignment got me thinking about interactions between education, working, professional society activities, the environment and other social issues, meeting interesting people from around the globe, world travel, teaching, coaching, entrepreneurship, and career progression. I want to show how the AIChE was interwoven with a great career at UOP – Illinois Tech student chapter AIChE, Chicago Section, Fuels and Petrochemicals Division, National Program Committee, and the Institute Council itself.

The Centennial committee spent a lot of time looking for someone to greet you who was here at the founding of the Chicago Section. That didn't go well, so they decided they would try to find some old guy who was here for the 50th anniversary, still living in the Chicago area, holding a driver's license, who could still put a few rational thoughts together, and find his way to Oak Park. They said 4 out of 5 was OK, so here I am. I'm proud that I did not get lost on the way here this evening. Not like the guy in the hot air balloon who had run out of fuel. He called out to a man on the ground "Where am I?" He responded ,"You're in the gondola of a hot air balloon, 30 feet above a corn field, out of fuel, and going nowhere." "You must be a chemical engineer" he returned. "How did you know?" "Precise information, but absolutely useless". "And you

must be in management." Response. "How did you know?" "You don't know where you are or where you are going, you ran out of gas, you are in the same position as before we met two minutes ago, only now it's my fault."

I became a chemical engineer by accident. I had enrolled at Illinois Tech in electrical engineering. A strange choice as I couldn't even figure out how to replace a blown fuse. Anyway, as I approached 33rd and State, looking for the EE building, Siegel Hall, I turned right instead of left and wound up in Perlstein Hall, in a chemical engineering welcome ceremony hosted by Professor Ralph Peck. Chemical Engineering sounded interesting. The room held about 120 students, standing room only. Dr. Peck suggested we introduce ourselves to the person on our right and left and say goodbye. In his opinion, only about 26 of us would receive BSChE degrees. He was close – actually 25.

I want to share with you how AIChE has had several important impacts on my professional life. At Illinois Tech, when I was a sophomore, the Juniors and Seniors were not interested in keeping the Student Chapter alive. I left the room for a bathroom break during which the nominating committee picked me to run unopposed for President. First lesson learned, go to the bathroom before any nominating committee meeting. But that gave me my first taste of managing a group, running meetings, and greeting distinguished visitors.

And the opportunity to build a special relationship with the faculty. A great one it was. Octave Levenspiel taught reaction engineering from the galley proof of his book, Bob Kintner, bubbles and drops expert with whom Bob Zabransky and I worked under his PhD student Bob Wellek, who went on to a distinguished career at DOE and NSF. My wife can still recite the title of our senior thesis – Determination of Droplet Eccentricity in Liquid-Liquid Systems Using Photographic Techniques.

Jim Stice brought real-world experience to the classes in energy and material balances. And taught a problem-solving strategy that sticks with me today. Don't start flinging numbers around, first draw a diagram, then generate a strategy, then find the data you need, then solve it. Jim went to the University of Texas at Austin where he moved from chemical engineering to "how to teach engineering", via a Bureau of Engineering Teaching, and later founded a Center for Teaching Effectiveness that expanded coast to coast. Thermodynamicist Dick from IGT (63 years later I still remember one of his final exam questions – If you drop a bowling ball from the 19th floor of the IIT tower, what is its temperature after it hits the ground). Another lesson learned. "Who gives a rat's ass" is not an acceptable answer to a final exam question. Bernie Swanson, was an early process control guru, and the lab mechanic, Ralph Fortino, who taught me how to work with the orneriest people on earth. He insisted that schedule 80 and schedule 40 pipe had the same outside diameter and inside diameter, only difference is the wall thickness. Woe to the neophyte who attempted to teach him that OD – 2 times wall thickness gives you the ID. Since the two different schedules had two different wall thicknesses, they had two different IDs. If you tried that he wouldn't give you any tools to do your unit ops experiments. And Ralph Peck became famous for his ten minute quizzes. Nobody ever got close to solving it in 10 minutes. So, he told us to take it home. Still no deal. So, take the rest of the semester. At that point we asked him for the solution and his response was "I have no idea."

When my about-to-be wife Lynne told her mom she was going to marry a chemical engineer, Grandma said she had never heard of it. In her kindest grandmother/mother-in-law voice she scoffed "What the hell is that?" Lynne explained it was someone who is good at math but doesn't have the personality to be an actuary. Now, she also could have said that ChE's make the best husbands (and that is documented, at least I think I saw it somewhere). Anyway, next month we celebrate our 63rd anniversary. She was going to attend this meeting with me, but

somebody leaked to her that I would be giving a speech. She remembered that Saturday was the night she shampoos her hair. She sends her regards.

Being student chapter chair got me in the habit of attending Chicago Section meetings; and later, in 1975 as you might remember, I served as chair of this Section. At one of those meetings I attended as a student, I sat at a table with a group of UOP employees who were having great fun tossing insults back and forth. Something clicked, and I focused my job search on UOP. For 37 years, I had a great ride that included making hydrogen from methane in an 1800° F fluidized bed reactor and making the first catalyst for automobile catalytic converters (and giving thieves something to steal these days). To test the catalytic converter, we installed in on a 1948 Chevy truck owned by our chief welder. Worked great for one round trip from McCook, IL to Riverside, IL, then it died. We took it apart and analyzed the catalyst which we discovered had been poisoned by the lead from the gasoline. We quickly began working on the technology for producing leadfree gasoline to protect the catalyst and eliminate the impact of the lead on public health, especially among kids playing in high traffic areas.

Based in my expertise with catalytic converters and my experience with startup companies, I am planning to startup a company. If you have a few dollars to invest, please see me at the end of the meeting. This is a business with no competition, I'm planning to call it Catalytic Converters for Teslas.

The USPTO issued 28 patents in my name for these and other activities and about 45 years later I was inducted as a Fellow of The National Academy of Inventors, alongside my friend and Chicago Section member Bipin Vora, who is a much smarter chemical engineer than I am and has 3 times as many patents.

I managed three R&D departments (Process Design Development, Experimental Development, and Process Development), visited 40 countries as director of business development for petrochemicals and as producer of global technology conferences for our customers, ran a small manufacturing subsidiary, managed the former Union Carbide office in Antwerp, Belgium that came into the UOP family as part of a larger merger where an Italian engineer, Roberto Antonelli, was an active AIChE member, then served as managing director of their FCC catalyst manufacturing business in the Netherlands, Savannah, Georgia, and Baltimore. I finally returned to the headquarters as vice president of quality and productivity and later my last job – vp of marketing.

Back to the AIChE – national program committee. I served as program chair of the Refining & Petrochemicals Division meeting in Houston in the mid 70's. 1,000 miles from Chicago, dealing with a bunch of Texans, and trying to honor the demands of the ethylene industry group that considered AIChE a wholly owned subsidiary of their organization. Lesson learned there. Don't do that again.

Another lesson learned – did you known there are only two kinds of people in the world – chemical engineers and people who wish they were chemical engineers. Am I right?

In 1982, while attending Northwestern's Executive MBA program, I also started a three-year term as a director of the National AIChE. Working alongside the outstanding Institute leaders, professors, department chairs, and members of senior management of key chemical engineering companies was like a lab course for the MBA. J. Charles Forman of Abbott Labs, a former Chicago Section member had gone to work for the national AIChE as Executive Secretary after Franklin J. van Antwerpen retired, directors John Sachs, president of Great Lakes Carbon, also from Chicago, John Sanders, vp of Eastman Chemical, a Tennessee native and another wise leader, and Henry Brown, the first African-American

director of the Institute who went on to establish DEI long before it was a word are just some of those cherished colleagues. At one national meeting I attended, I saw an elderly gentleman having breakfast alone and asked if I could join him. I introduced myself and he introduced himself as Ernest Thiele. At one point in our conversation, I acted on the opportunity to find out how he had coinvented the McCabe-Thiele diagram. His response, probably no surprise to you, was "It was obvious." So now you also know. At another meeting I met Professor Bob Bird (U of Wisconsin) of Bird, Stewart, and Lightfoot, authors of Transport Phenomena. I said thanks to them I have enjoyed a wonderful career at UOP. "So, the book helped you to develop some amazing skills?", he asked. "No, I said, I graduated the year before the book came out. If I had enrolled a year later I would probably have become a CTA bus driver."

After retiring from UOP in 1999 I took a job at Illinois Tech as Director of Intellectual Property and Technology Transfer. This led to helping several startup companies including All Cell that made lithium ion batteries safe from explosion and fire and Hybrid Electrical Vehicle Technology where we developed a high-efficiency electric motor that we demonstrated by converting a Ford F150 pickup truck into a hybrid. I also began teaching undergraduate and graduate classes which got me reattached to students and the Student Chapter. My E^3 class, energy, environment, and economics got me involved trying to change the world regarding climate change and intelligent energy policy. Haven't solved that one yet. I stress to the students that AIChE gives them an early opportunity to build a network, and to hone leadership, communications, and organizational skills useful in their entire careers.

I was recently asked which of my achievements I was most proud of. It was easy to answer, and I suspect I can find a couple of dozen examples in this audience. It is the young students who came into my classes and learned the meaning of my slogan "the beatings will continue until morale improves". I also shared a lot of stories classified as "Welcome to

the Real World", trying to prepare them for the tough environment they will face after the university. Each year a couple of them would send me a thank you note for the class but chiding me for painting such a scary future. Then, about five years later they would follow up by sharing their findings that I had sugar-coated it, the world was actually much tougher than I had said.

People development continued at UOP where I interacted with at least a thousand engineers including new hires (many of whom I had recruited from Rose Hulman, Michigan Tech, and Illinois Tech) and mid-career employees – coaching, mentoring, teaching, leading, and encouraging them to be the best they can be. Many went on to become senior technologists, managers, directors, vice presidents, and I suspect a president or two, although perhaps at other companies.

As I look back on a great life and a great family, I cannot imagine anything I would do differently.

I hope all of you enjoy this festive evening. Thank you for walking down memory lane with me.