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I am a "closet" Process Engineer. During my senior year in high school, I looked over the types of chemical engineers such as project engineers, research engineers and process engineers. I wanted to make things for others, so I wanted to be a process engineer. My father was somewhat an upper management process/project engineer in a major oil company. But, my education ruined my dream when I earned my Ph.D. from the University of Wisconsin-Madison which was ranked #1. My twin brother also obtained his Master's degree from the University of Michigan prior to being drafted. I was exempt due to a medical condition cause by falling off a swing set when I was 11 years old.

When I went to work, it was in the research field of enhanced oil recovery. That is abbreviated as EOR which I think really stands for "expensive oil recovery." After the oil bust of 1986, I started up a small chemical company in Wisconsin named Furniture Restoration Products, Ltd. Our best product seller was a methylene chloride based furniture stripper to which was added a blend I developed of a potassium oleate surfactant, ethyl alcohol and methyl ethyl ketone along with paraffinic wax to control evaporation the stripping process. It was sold it by the 55 gallon drum. At last I was living my dream.

But, as things would have it, I got sidetracked by developing an Electronic Data Interchange (EDI) software package for my wife's consulting company. That package was called BridgeWorks EDI for ACCPAC Plus by Computer Associates. That accounting system was the world's largest selling accounting system with over 80% of the Canadian market. And, in the early 1990s, EDI became a required system to do business with the big box retailers in Canada and almost a required system in the U.S. Before the advent of Windows based accounting systems after approximately the year 2000, we had over 200 users including several Fortune 500 companies. The market for ACCPAC Plus, which was a DOS based accounting system, started to dry up and we decided to not support the Computer Associates' Windows based platform. So, we sold out!

One thing that I realized when looking back at the software development is that my mindset was almost identical to that when I ran my small chemical company. The EDI process inputted raw text data, namely the ANSI X-12 Transaction Set Document 850 Purchase Order, instead of reactants and then converted it to a user's internal item numbers, adjusted quantities based upon the units of measure of the buyer versus the supplier, and then posted that data in a hexa-decimal format into the user's Order Entry module of the Computer Associates' ACCPAC Plus. Raw data went in and converted data came out that the user then posted. But in both cases, as a process engineer must monitor their process and correct for deviations, the computer software program must detect errors and provide a method so that a user can understand and then correct the problem so that the data can be reprocessed. In addition to inputting the 850 purchase order, different modules for our software prepared outgoing

documents including the 810 Invoice, the 852 Product Activity Data, the 855 Purchase Order Acknowledgement, the 856 Advanced Ship Notice, the 870 Order Status Report, and the 997 Functional Acknowledgement. With the accounting system's Purchase Order module, a user could generate their own outgoing document 850 Purchase Order to send to their vendors.

Just as we must convert different units of measure such as kilograms to pounds, the EDI program also had to convert different units of measure. And, that accounting system was multicurrency which complicated things even more. We even had one case where an "EA" for each as ordered by a customer was different than the "EA" for the user's item. One company was order a display case which had 30 items for sale. But, they ordered "30 EA" instead of just "1 EA" for the entire display case. The good news is that the software was written so that trading partner's units of measure were user defined. A conversion factor of 1 divided by 30 permitted the correction to be made. Note again that thinking ahead in planning the cross reference tables for the conversion process so that both a numerator and a denominator instead of using a decimal fraction permitted an exact calculation of the number of EA "eaches." This is (computer) process engineering!

The software development part of my life is not the only time I feel that my process engineering perspective has made an impact. I am an instrument rated private pilot though I sold my plane and quit piloting when we started our software company. Just as we monitor process operations, I monitored my aviation instruments particularly when using the autopilot. The important thing was to cross check the various flight indicators much in the same way that we should cross check our process instrumentation indicators. When flying in the clouds, one does not a visual reference. In both cases, if an instrument fails we must determine what is right and what is wrong without "seeing" our process!

Though I wrote all of the EDI code in a proprietary version of the C language, my wife is the real computer programmer. She uses COBOL. And, her specialty was the credit card system of which she had been one of the original developers for the banking software company whose system is used by the banks "too big to fail." There are only about 20 of them in the world and they are scattered all about. In 1997, she had a contract in South Africa to work on the installation of that credit card system. Typically, installation takes from 1 to 2 years. Our wildlife photography bug was awoken when I made trips down to Johannesburg. After she returned to the states, we started looking for property which had wild life along the Gulf Coast of Texas. Except in private reserves, Texas does not have the African Big Five which includes elephant, lion, rhinoceros, Cape buffalo and the elusive leopard. But, Texas offers some of the best birding in the country with the Clive Runnel's Mad Island Marsh Preserve in Matagorda County ranking No. 1 in the continental U.S. for total number of species in the 2018 annual Audubon Christmas Bird Count. That was the 12th year in a row and the 26th time overall. Only in 1993, the first year that Mad Island participated in the CBC, were there fewer than 200 species reported. And for that year, it was 199 species. Unfortunately, "engineering accuracy" is not acceptable for the Christmas Bird Count.

As I wrote earlier, my father was a chemical engineer who had a Masters Degree from the University of Michigan. He was the Assistant Manager of the Gas Utilization Department of his employer. I had my first venture into a chemistry lab was watching titrations at the New Hope Gas Plant near Mt. Pleasant, Texas. When teaching a course of Industrial Processes to process technology students at a local community college, I found a newspaper article from 1961 stating the New Hope Gas Plant was the first implementation of the Clause Process for sulfur recovery in Texas. At the time, my father said it was the purest produced sulfur in the world. That was one of his projects. For some odd reason, Canada was in the Southern Division of that oil company and is where he leaned to curl.

As I just mentioned, in my semi-retirement I have teaching process technology at a local community college. I discovered that the Texas Workforce Commission had proposed a "physics" course in their Workforce Education Course Manual (WECM) designated CTEC1401 and named "Applied Petrochemical Technology" which would qualify as one of the two required science courses. The course description is:

> "Instruction in the basic principles of physics and their application to process facilities. Topics include units of measurement; gas laws; thermodynamics; temperature; pressure; and the properties of solids, liquids, and gases and how these properties relate to the operation of process equipment."

Most of the attempts to implement that course concentrated on the "basics physics" instead of a rephrased and more meaningful description using the same words stating "the application of basic principles of physics to process facilities." Those other courses instead concentrate on Newton's Laws of Motion, rotational motion, the atomic nature of matter, electrostatics, electric current and magnetism. Those subjects are fine for a general physics course for most students. But, they are not an "application of basic principles of physics to process facilities." So, I developed such a "process physics" course and authored the book *Basic Principles and Calculations in Process Technology*, ISBN 9780133388336 published by Prentice Hall. Now, before everybody gets upset that I plagiarized the name of Professor David Himmelblau's book *Basic Principles and Calculations in Chemical Engineering* which is now co-authored by James Riggs, Prentice Hall publishes both textbooks and suggested the name after all of the reviewers of the book proposal hated the name "Applied Petrochemical Technology" which is the name of the course.

In addition to the above book and course, in 2014 I also developed the eLearning course ELA128 Statistical Quality Control Charts for the AIChE. In graduate school and until his death in 1986, William G. (Bill) Hunter was my statistical mentor. He had B.S. from Princeton in Chemical Engineering and an M.S. in the same from the University of Illinois. I have also kept close ties with Chemical Engineering faculty members from both The University of Texas at Austin and the University of Wisconsin-Madison. This last January, "Johnnie" McKetta passed away. When I started my college education, my father told me that he had gone to school with McKetta at Michigan. I learned later that there were quite a few other chemical engineers that my father either had gone to school with or had known during his career. Of those I have

known, only R. Byron (Bob) Bird is still living. But, he is still active and keeps sending me interesting papers that he has co-authored. When he sent me the latest one last January, Transport phenomena and thermodynamics: Multicomponent mixtures, it had not yet appeared in print. Prior to that, when Bob reviewed chapter 12 of my book he had Dan Klingenberg send me a copy of their paper "Multicomponent diffusion—A brief review" which is an extension of Einstein Diffusion from a binary system. He stated that equation 2.1 in the paper starts the development with an entropy balance. In Chapter 12, Transport Phenomena: Mass Transfer, I had written that the diffusion was caused by entropy.

Let's face it, as Process Engineers we do not turn the handles on valves unless you are running your own chemical company like I was in Wisconsin. However, I also had to sweep and mop the floor around some of our equipment. But, we must communicate! And, communication is a two way street. Our process technologists must understand what we are saying. And, it helps if they can describe things by speaking "geek" to us.

The good news is that I now live in an area with abundant wildlife that is the center of the world's petrochemical industries. Now granted, some of that wildlife like feral hogs can get out of hand. But, last night when I stepped out of our RV on our 12.289 acres, there were 3 deer coming up from a feeder just north of our pond.