From WWII Switzerland to HP Santa Rosa, An Engineer's Life

Hugo Vifian

Foreword

The Life and Times of a Creative Engineer --- Hugo Vifian

Stick with me on this road map through Hugo's life accomplishments. Engineers build things. And love their life and what they do. This is no more evident than on the popular TV show, *The Big Bang Theory*. While PhDs Sheldon and Leonard work with conceptual equations on their white boards, MIT Engineer Howard Wolowitz is designing and building a space toilet and a telescope-aiming system that got him a rocket ride to the Space Station.

Mechanical Engineers build cars and computers and appliances--and space toilets. Civil Engineers build dams and bridges and roads. Chemical Engineers build refineries and pharmaceutical process plants and now work on exploring parts of the human genome. And Electrical Engineers, by and large, spend their years exploiting the electro-magnetic (E/M) frequency spectrum. The radio frequency and microwave spectrum are mostly devoted to transmitters and receivers, used to move information from here to there, in vast quantities. When their kids ask, "What do you do at work Daddy or Mommy?" engineers can honestly say that they are building a better future for everyone.

Hugo's HPMemory starts on the eve of WWII, as he is born in Switzerland. Every side of that tiny country was bordered by a war combatant; Austria, Germany, France, Italy, and yet the country was spared by Hitler who needs their exceptional global banking system to launder his pillage. The country's social culture is highly structured and even paternalistic. He describes his path through the Swiss educational system, the industrial apprentice system and their nation's military operations. His early love of the technical side of hobbies and interest is aided by his father's work in the country's power systems. His story is interesting because of his generous recognition of numerous mentors and advisors and persons helpful to his scholarships and career. Not the least of whom is Cornelia, his future wife, whose accounting background becomes crucially important in creating his written applications and helping sort out his career decision-making.

All this results in Cornelia and Hugo moving to Canada for further PhD-level schooling. But after a not-so-useful year in Canada, they chose to use up their remaining visa time as an industrial intern--interviewing both HP and Tektronix. HP won, because of the cold and damp Beaverton, to HP's future technical advantage. Their early days in Palo Alto were rewarded by the birth of twin boys but complicated by a serious life-threatening medical episode for Cornelia. It took the unusual generosity of HP management in providing a no-interest loan to cover those huge medical expenses.

As Hugo began his HP EE career, he describes the unique working of the HP lab culture. He mentions great managers, timely mentoring, and to his mind, offers of promotions well before he thought he was ready. He then begins a long list of instruments and projects that stretch out in front of him as Hewlett-Packard RF and Microwave products hit some of their most inventive and technologically superior years. In 1970, when the decision is made to establish a new division in Santa Rosa, the product lines of Spectrum Analysis and Vector Network Analysis and Synthesized Sources are slated to be moved, so Hugo of course moves with them.

He spends some content on tutorial of the Santa Rosa EE's use of the frequency spectrum which requires information transmission. That comes in many forms, obviously communications, but also in distance information for radars and position information for navigation. Or jamming information to defeat a surface-to-air missile aimed at your fighter. And now, by the 21st century, the digital technology has captured almost all the data-carrying modulation. Assisted by HP products which characterize fiber optic transmission lines, massive amounts of data now travels underground and under ocean in another format of the E/M domain, lightwaves in fiberoptic glass filaments the thickness of your hair.

It wasn't long for Hugo's first encounter with Vector Network Analyzers, which happened in 1973 when he was engaged in the powerful 8505 project. The 8505 turned out to be the first replacement for the 8407/8410 (Stamp Out Slotted Lines!). By the time the 8505 rolled out, the technology of microprocessors and automated internal circuitry was available. This 8505 not only had remarkable functional performance but it also had data corrected routines which made it among the most powerful and most accurate and convenient VNAs available. It covered the frequency range from 500 kHz to 1300 MHz, which represents some of the most highly useful portions of the frequency spectrum containing much of today's mobile communications business sector.

Hugo would later be in charge of projects for other powerful instruments which ran with even higher functional performance and well up into the microwave spectrum and the application of HP's powerful microwave microcircuits-on-Sapphire.

He also becomes a go to guy for a variety of multi-division projects such as the Redwood Program, which was the design strategy for a microwave multipurpose plug-in concept. Prior to this time the industry had settled on a low-frequency plug-in slot instrument concept, called VXI. It used a common power supply and had backplane connections to move signals among functional plug-ins. But it used wiring and shielding only capable of proper performance at frequencies below 100 MHz. The Redwood modules would be wired for interconnections which could handle microwave signals in the gigahertz range and which were properly shielded to avoid RF interference problems.

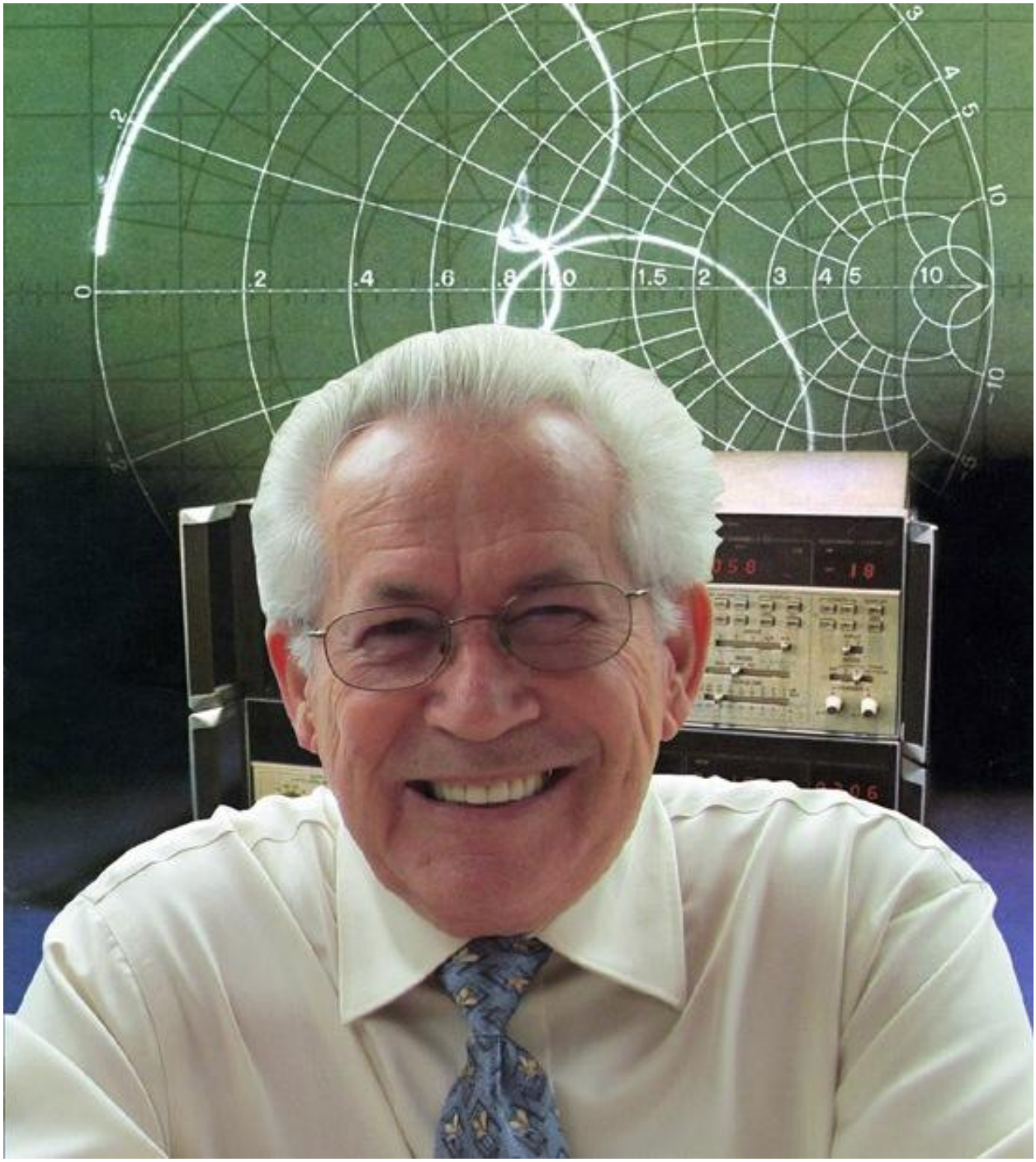
Always the plan-ahead type of personality, Hugo and Cornelia carefully evaluated the ending of his career at HP, looking for the ideal retirement venue, and ending in Florida. This even worked out in significant amounts of consulting work in fiber optics and other instrumentation, for some years thereafter. His description of his second hobby (the first one being soaring) the construction of Tesla coils and their subsequent failures just injected some deep diagnostics and investigations of the theory and practice of such high tension generators.

In an unusually comprehensive Acknowledgements chapter, Hugo defies senior citizen brain fade to name dozens of engineers who were involved for decades on the various instrument projects he managed. It is fun to just look through these memorable associates to recall each of them and their unique personalities.

It appears that Hugo and Cornelia have found the happy retirement formula. Read on.

---John Minck

Table of Contents



This image of the Smith Chart symbolizes my life and times in Radio Frequencies and Microwave.

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It's Nice to be Important, but More Important to be Nice

Hugo Vifian

Growing up in Switzerland (1938-1954)

No Baby Pictures

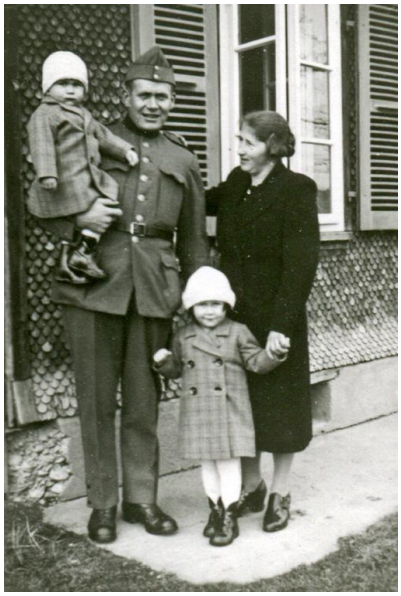
My life began on March 23,rd 1938 in the small town of Schwarzenburg, in the northern foothills of the Swiss Alps. Since I was not the first baby for my parents, I had an older sister, they promptly forgot to take pictures of me stark naked in the crib, as parents usually do. But I forgave them because they were saving me from the embarrassment that always seem to be associated with these early pictures, even before the cell phones flooded the internet with them.

It was a hectic time for my parents because one month before I was born, Hitler had invaded Austria and everybody thought Switzerland would be next in line, since it borders on Austria. The Swiss Army had just been mobilized, to protect the borders against the Nazis. So I suspect that my dad had to hurry back to the military very quickly and there was no time to take silly pictures of me.

At that time very few people knew that Hitler would not attack Switzerland, because he needed the Swiss Banking system intact to save-keep all the money he was stealing from the Jews. To gain access to the Swiss Trans-Alpine railroad and mountain passes was only secondary, and a gamble at best, because the Swiss had always promised to blow up all the strategic bridges and tunnels if the Nazis crossed the border.

My Parents

My parents lived in a small town of about 3000 people, at about 2500 feet above sea level. It was basically a farming community with a few businesses, such as a couple lumber mills and a sizable milk processing plant-producing milk powder for the Chocolate industry.



The earliest available picture of me with Mom and Dad

Several professional people commuted daily by train to Bern, the Swiss Capitol, situated approximately 20 miles to the North, at about 1500 feet. Schwarzenburg became well known by the Allied pilots because they used the very powerful intercontinental short-wave radio transmitter as a beacon on their bombing runs to Italy later in the war.

My Dad was an electrician who worked for a big Utility Company (BKW) that covered the generation and the distribution of electricity throughout our entire Canton of Bern, maybe the size of Sonoma or Santa Clara County. The Utilities Company also implemented all the new installations (homes and businesses) and maintained the existing ones. Including the generating plants and high voltage transmission lines, the sub stations and everything else that had to do with electrical power.

As a little boy, my dad took me every so often along on a remote service call. This was fascinating for me, not just because I was allowed to sit on my dad's lap on the motorcycle, but also because I was able to "help" him with simple trouble shooting tasks. Such as reporting if a light was on or off when my dad checked the fuses.

By the way, Motorcycles became a fascination for me and I had my very own when I turned 18, which was the legal limit to drive anything in Switzerland at that time. But I think there was no minimum age for drinking alcohol, because our parents always served us sugar water with a splash of red wine, at our formal dinners, such as Christmas, Easter and all the other occasions when the adults drank wine. The wine added a beautiful color to the drink but did not alter the taste much, it was still sugar water.

My Mom was a stay-at-home-mom, as it was customary at that time. I am sure she welcomed it when I was kept busy by my dad, since there were no kindergarten or preschool activities for me in our town, and I could hardly wait to go to school.

My older sister Erica was very protective of me. She made sure that I was totally self-sufficient in all the household chores, just in case I would marry a girl who did not know how to cook or keep a place clean. Of course for my sister this was a very real concern, because women at that time were starting to rebel against having children and doing housework. They wanted careers and partners as husbands, not masters. This was all way over my head but I trusted her.

In 1939 as an early motorcycle fan. I got my love of motorcycles from my Dad.

Later on I realized that she was right because many of our friends pursued dual careers and had no children, including my brothers. At that time it was a perfectly acceptable lifestyle among people our age. By the way, I never quite figured out if Erika's primary motivation for training me was to have me do her chores, or if she was genuinely concerned about my future well being? It did not matter much anyway, because by then I knew enough about women power, that I realized that there was no way I could change my situation. Having learned to accept women unconditionally and to be obedient has greatly helped me to become an almost perfect husband for Cornelia.

Unfortunately my sister Erika passed away in 2011, but she did remind me at times that she deserved a lot of credit for our successful marriage, and I think she does….

My younger brothers. I also have two younger brothers: Hansruedi and Arthur. Hansruedi, who is three years (almost 4) younger than I. This age difference was significant when we went to school because we were in different school buildings and understandably had no common playmates or friends. We always got along well but he left home at 16 years of age to join the Swiss Merchant Marine Training Center in Basel. Despite the fact that Switzerland does not have any direct access to the worlds oceans, they do have a sizable Merchant fleet sailing the oceans around the globe. Hansruedi went on long trips and very rarely came home after that, until he retired.

Arthur is 11 years younger. This was a big age difference and I felt he belonged into a different generation. He was still this little thing when I was a teenager and barely reached table heights when Cornelia and I got married. But later on we became very close and we consider him and his wife some of the best friends we have. Both my brothers live in Switzerland and neither of them have any children.

Earliest Memories

I only have some vague memories of my early childhood. For example when my younger brother was born in winter of 1941 and when my dad came home (permanently) from the war in 1944.

Despite the fact that I was still a very young child when the 2nd World War was raging around Europe and Switzerland, I do have some distinct memories related to it.

Soldiers and horses

For example one of my still vivid memories is that we had several Polish officers with their beautiful shiny horses living in our attached barn. The men were lost in a snowstorm high up in the Eastern Alps and mistakenly crossed the Swiss border. They were picked up by the Swiss guards, disarmed and sent as prisoners of war to people who could board their horses. I was impressed how proper and educated they were. They always looked nice and clean and were very grateful that they could live with us.

They were totally self sufficient and helped my mom, my aunt and my grandparents whenever they could. It was in winter and it was very cold and every day they shoveled snow to keep our road clean and chopped wood for our stoves. They also walked or rode their horses and sometimes when it was warm and sunny they took my sister and I along for a ride. I remember that the back of the horse was so wide that I could not put my legs

around it and I sat on it like on a chair. I was very sad when they were moved to a Red Cross camp later on. Since my dad was away, they were the only men around that would play with me.

Jewish Refugees

After that my mom took care of several elderly Jewish couples who were living with us. They had escaped from Germany and were waiting to go to a refugee camp. But all the camps were overcrowded and the Swiss Government was looking for volunteers to give them a temporary home. They too were very nice but they did not stay for long. They were later sent to their relatives in the USA.

I admired my mom for doing all this extra work. She was always helping them and cooking for them. Even though our food was rationed at that time and we barely had enough for our family, my mom could do it. Interestingly, we never heard from any of our guests after the war.

Big Planes

Probably the strongest impression I have of the war is that when the Allies bombed Milan and other industrial centers in northern Italy night after night. Before the waves of big bombers arrived, the local security sounded an alarm to alert the people to move into the shelters. But I knew that there was no danger of them dropping the bombs on us. So I always snuck out of the shelter and watched the big airplanes roaring very low over our house. They came from the north-west and then they made a slight right turn to the South over the powerful Short Wave Transmitter station close to us, which they used as a beacon. And then they kept on climbing to cross the Alps with their heavy loads.

Some of the planes flew so low that I could actually see the pilots in them. Maybe my vivid imagination made this up, but I still do remember to have seen their faces. Watching these planes might not have been as safe as I thought because one night one crashed not too far from us in the forest. It created a huge fireball but no explosions followed. This surprised me because I thought the bombs would explode if a plane crashed.

The next morning my dad, who just happened to be at home on leave from the military, took me on his motorcycle to the crash site. The big plane had been clipping some tree tops and it was torn up. The wings and the tail were scattered away from the badly burned fuselage, which had skidded between the tree trunks on the forest floor. But the rescue teams had removed the bodies, the remaining fuel in the torn up wing tanks and of course the bombs during the night.

The Swiss Education System

The Swiss Education System makes it mandatory for all the children who live in Switzerland to attend public school from the age of 7 to 16. When the children reach the age of 12, then the parents have a choice to send them to one of three different levels of schooling for the next 4 years.

The first level is the Primary School, which is free of charge for the parents. But it somewhat limits the professional job opportunities later on. For example, most technical, health care and business apprenticeships require at least a secondary level of education.

The second level is the Secondary School. This school costs some money, but it is affordable for most single income parents.

To enter a Secondary School, the applicants have to pass an acceptance exam at the age of 12. This is quite a competitive event, because the number of students admitted is less than 40%.

This secondary level of education provides the broad basis for most professions. For example teaching, nursing, banking, clerical etc. By the way, all these skills are not taught at the Universities but rather at tightly controlled trade schools and community colleges (and so called seminaries). The Secondary School education in Switzerland is roughly equivalent to the High School Diploma in the United States.

The third level is the Gymnasium.
There were no Gymnasium Schools in small towns such as ours. They are located in the Capitol cities of the Cantons (states). These schools are more costly and the additional expense to commute to or to reside in a major city pushes these schools out of reach for most middle class families living in smaller towns.

The gymnasium education is mandatory for attending any University and the applicants have to pass an exam that eliminates the ones who do not qualify for a demanding university education. Less than 10% of the young adults go to a University in Switzerland, since most of the specialized education such as teaching, nursing, banking, hospitality etc. is administered by Trade Schools or Seminaries.

The Gymnasium education is roughly equivalent to a two year Community College degree (Associate degree).

Attending Public School (1945 to 1954)

I could hardly wait to be allowed to attend school. My sister taught me what she had learned in school since she went to the first grade. And even though she was two years ahead of me, I tried to keep up with her as much as I could. Sometimes I missed a few lessons because she or I followed other interests, but overall I had a pretty good idea what to expect when I started the first grade.

Of course, I got bored pretty quickly, when I realized that the other students did not have older sisters teaching them, and they had to learn everything from scratch at a very slow pace. Later on my sister had to work harder on her schoolwork and she could not spend as much time teaching me anymore. Eventually the other kids caught up with me and we all learned at the same pace.

Soon we had to prepare for the exam to attend Secondary school and I passed without any problems. Even though I was a relatively smart kid, it did never occur to my parents (or me!) to send me away at 12 years of age to attend a Gymnasium in the city.

At that time I did not even like cities. But I surely liked to go stream fishing in the relatively wide Sense river canyon, near Schwarzenburg. It was quite challenge to get to the water because of the steep canyon walls there were only a few roads and trails that provided access. I went mostly all by myself and walked along the river for miles and enjoying the untouched nature of the surroundings and daydream about all kinds of topics. I did not catch that many fish but once in a while I got a nice trout and I liked to bring it home and eat it.

I happily attended the Secondary School and over the next 4 years, we got several new young teachers replacing the older ones, who taught my parents 30 years earlier and were ready to retire. One of these teachers encouraged me to find out as quickly as possible what field I wanted to work in when I grew up. He arranged for me to meet with a counselor he knew who taught at another school. It was exciting to hear about all the opportunities I had, and the counselor offered to arrange for me to meet with people who were in the respective fields. Subsequently I met with some science and math teachers. But I was not eager to become a teacher, because I liked to build things with my hands.

Up until then, I thought I would follow in my dad’s footsteps and work for a big Utilities company and find out what I would like to do there.

Choosing a Profession

During the last two years of Secondary School I also had a chance to meet with several of my dad’s colleagues to find out what kind of work they were doing.

Of course, after we visited one of the hydroelectric power plants high up in the Alps, I was fascinated and I thought I would like to work there.

But after we visited the powerful intercontinental short-wave transmitter station near Schwarzenburg, I was convinced that I would like to be part of that group, rather than the power plant team.

I was particularly intrigued by the fact that the transmitter crew could talk to their counter parts in Australia and Greenland and Japan and India and so on, several times a day, over the test channels of the transmitter. They would exchange all kinds of information about the weather and the solar spots and the different layers of the atmosphere.

The transmitter itself was a maze of powerful vacuum tubes in Faraday cages. You could see the anodes glowing from dark red to a bright orange. Some tubes were forced air-cooled and others were encapsulated in steel containers and water-cooled. The antennas were huge rhombus arrays, pointed in the direction of the continents they were radiating towards.

The transmitter people were great mentors and showed me how to build a crystal detector radio and they taught me how the vacuum tube radios worked. Of course they were on stand-by and had lots of idle time on their hands to teach an eager kid of one of their friends.

I spent many afternoons after school with the transmitter staff and they helped me build my own little Tesla transmitter for Morse code. They also taught me how to fix radios and I managed to earn some extra money doing that. I used the money to buy books about electronics and electronic parts, such as vacuum tubes, resistors, capacitors and coils etc. When I was 15 years old (1953), I built myself a fancy short-wave radio with the help of this team.

Towards the end of my Secondary School, I was convinced, that I wanted to become an electronics professional and eventually become a member of the transmitter team that was mentoring me so well.

In order to be able to do that, I first had to join a good company for a four year apprenticeship, just as my dad did. After that I would have to spend three more years at a Technikum, which is a kind of a technical community college, to become a Techniker. Which is approximately equivalent to a BS in engineering in the US.

Apprenticeship Years (1954-1958)

Thanks to my relatively good grades in the Secondary School, I got accepted by a well-known telecommunications company (Hasler AG) in the Capitol City of Bern. They had an outstanding but strict apprentice program, and many boys (or their parents) applied for it.

In 1954, I started my 4-year apprenticeship. The training was very rigorous with 2 days a week of school and 3 ½ days of practical work (on Saturdays we worked a half-day).

Skills and Life Lessons Learned

During my time as an apprentice I was eager to learn all I could in order to become a worthy candidate for an assignment on the short-wave transmitter staff in my hometown.

The first year was mainly devoted to learning how to safely operate machinery and to do metal work. We learned how to do drilling, turning, milling, cutting, bending, welding and forging. For example I vividly remember having forged an entire set of screwdrivers for my dad, from tiny to super big. I bought the steel for the blade (Chrome –Vanadium) and the grips from a local supply store. After hammering the red hot tips into shape, I hardened them by heating them in the fire pit to a certain temperature (identified by the glow color) and then shocking them in cold oil.

We also learned how to solder wires to relays and be careful that we did not over heat the copper or the tin. The solder joint had to look shiny when it was cold; otherwise the connection was not reliable.

During the three remaining years of my apprenticeship I was rotated through several divisions of the company and I got exposed to many aspects of electronics. I learned many skills that I used throughout my career, such as:

- Building and testing relay driven telephony equipment for exchange offices.
- Winding and assembling transformers for Telecom equipment.
- Testing under-sea coax cables with built in vacuum tube amplifiers.
- Helping to construct and test the first commercial (color) TV transmitter in Switzerland.
- Assembling Avionics equipment, such as artificial horizons for airliners.
- And many more.

I also found mentors who taught me many important life lessons that stayed with me until today. Some that come to mind are:

- Always be grateful and generous, and count your blessings.
- Always be polite and friendly with everybody regardless of their social standing and regardless how they treat you (me).
- Be modest and smile and do not to take yourself (and anybody else) too seriously.
- Find the positive in everything, even when being criticized for doing something wrong. Say thank you all the time, because criticism makes you better.
- Help other people and do not hurt anybody (intentionally), even when you are angry at them.

- Attenuate the negative and try to de-escalate and neutralize any confrontation.
- Praise people for what they do right and do not scold them for what they do wrong.
- Do not pass on rumors or negative comments to others.
- And many more.

Every year all the apprentices had to pass a practical and theoretical exam to continue on the track, and I usually did quite well. At the end of the 4th year we had a final exam and got a certificate for the training we had received.

Soaring

Even though my apprenticeship was quite demanding, I found time to develop some other aspects of my life. A fellow apprentice, a few years older than I, was a devoted soaring pilot and flight instructor. He talked me into taking a glider ride with him, which I did on April 8th, 1956.

This was the first flight in my life and I very much enjoyed the simplicity of flying in a sailplane. My instructor friend promised to teach me for free if I was interested in learning how to fly, and all I had to pay for was the use of the glider, the tows and winch launches. This was not cheap but I had a chance to get an after hours office cleaning job at my company, which would pay for that extra expense.

I made good progress and by June 3rd I soloed in a Grunau Baby glider. Almost a year later, in May of 1957, I received my glider pilot's license. In August of 1957 I started taking power plane lessons because the gliding group was short of tow pilots. I soloed after 8 flights in a Piper Cub and got the license in June of 1958. It was a wonderful hobby for me to have, and I enjoyed flying either in gliders or small power planes and spent all my spare time doing it and earning the money to pay for it. Of course I also had to maintain good grades as an apprentice.

Planning the Next Step in my Education

At this point the logical progression for me, in order to join the short-wave transmitter staff, would have been to attend a form of community college called Technikum, for another 3 years, to become a "Techniker", which is equivalent to a BS degree in engineering. However, one of my mentors, who was in charge of all the apprentices at the Hasler AG Telecom Company, suggested that I should not go that route, but instead try to get access to the top Technical University in Switzerland, the ETH.

This path sounded very costly and risky to me. I would have to attend a special school to pass the Federal Matura Exam and I might never get there, and then what? But my mentor promised to help me if I agreed to take a test he suggested (some sort of an IQ test). This test was an all day event and a medical doctor and his staff of psychiatrists administered it. I thought I had flunked it, because I got really tired towards the end.

Several weeks later, I had already forgotten about the test, I was called into the mentor's office. This was usually not a good thing; it was similar to being sent to the principal's office for some disciplinary action in High School. And I was afraid that my supervisor had complained to him about me wanting to take some days off to go soaring, in the midst of a tight delivery schedule. If so, I was ready to back down and not go soaring, since my mentor was such a nice man.

When I entered his office, he was in the company of an elderly gentleman who introduced himself as the manager of the company's Philanthropy Foundation. (At that time I had no idea what the word philanthropy meant). They were looking at some paperwork, basically my test results, but they did not let me see them. They both congratulated me and told me how pleased they were that "their candidate" (I) had achieved such good results. I honestly did not know what they were talking about, but I was relieved that there were no soaring complaints. The two gentlemen promised to invite me back as soon as I was done with my military duty and we would work out a plan for my future education.

Meeting Cornelia (1957)

Our First Meeting

In late 1957, I met Cornelia for the first time. The occasion was somewhat strange. Cornelia was the designated chaperon of her friend Heidi, a girl of the same age but as assessed by her mother, less mature and kind of on the wild side. Heidi was only allowed to go to the movies with her boyfriend Werner, if Cornelia was there to make sure that the two of them were under constant observation. Heidi's mom trusted Cornelia unconditionally. Werner was my best friend at that time and he chartered me to distract Cornelia and then he and Heidi would leave the cinema and spend some "quality" time together.

A young Cornelia. How many beautiful women fall in love with an engineer?

It all worked perfectly, but Cornelia felt very badly that she did not perform her duty as the chaperon as she was supposed to. I was kind of sorry too, but I could not tell her what my assignment had been and that I got paid for doing my dirty work. All I could do was try to convince her that it was not her fault that the others disappeared and that Heidi's mom would never find out anyway. I suggested that we should finish the movie and then go for some coffee and pastry at a nice "Tearoom" afterwards, which we did. I finally managed to put her at ease and when I accompanied her to the bus station, she seemed to have forgiven herself for the incident and we laughed about it.

When the bus left to bring Cornelia to her godmother's house, where she lived while she was going to business school, we waved goodbye and we both thought that we would probably never see each other again.

Our Second Meeting

Several months later, Werner invited me to a party at his girlfriend's (Heidi's) parent's home, but I told him that my friend girl was not available then and unless he could provide a substitute, I would not attend.

Werner was delighted to arrange for Cornelia to be my date. She was already at the house and was talking and laughing with Heidi's mom when I arrived. The two seemed to be good friends and I felt kind of awkward to introduce myself. When they spotted me, they both came and welcomed me. They told me that they knew all about my "sin" and that they both had forgiven me for it. It turned out that Heidi had told her mom the whole story. I was certainly relieved about that outcome.

But I was also startled about Cornelia's appearance. She looked smashing, she was elegantly dressed and wore her long hair down, not in a bun as she did when I sat next to her in the Movie Theater. She looked very secure and ladylike and tall in her high heels, totally different from the girls we called our girlfriends at that time. I suspected that she had an older boyfriend and that she just passed the time with me until she went on her real date.

Military Training (1958-1960)

The Swiss Military

It is mandatory in Switzerland for all the "able bodied" young men of the age of 20 to attend basic military training. After that, until the age of 50, every soldier has to attend a yearly refresher course of at least two weeks. Every year there is also a mandatory competency test with the issued weapons, which each soldier has at home. Mostly a semi automatic rifle, which replaced the carbine rifle issued prior to the 1950 ties.

This marksman ship test is usually performed over the weekend at a local 300-yard target range. Every small town has at least one to accommodate all the men who have to practice. For the casual visitors it looks strange to see so many civilians carrying guns on weekends, in particular on Sunday mornings. The way it works is that everyone brings the issued rifle and ammunition to the target range and shoots about 50 rounds, hopefully meeting the minimum required score. Otherwise more ammunition will be issued or another practice day will be scheduled.

As most armed services around the world, the Swiss Military is organized in mayor branches, such as Army (Infantry, Transport, Medical, and Communications etc.), Air Force (Planes, Radar, etc.) and Navy. However, there is no Swiss Navy, since the country has no direct access to any of the Oceans. But it is a common joke to tell foreigners when they ask which branch of service a person belongs to, to say the Swiss Navy. Most people figure it out pretty fast.

The length of the training varies depending on how special the assignment is. The basic training lasts for approximately one year. My Radar specialist training took an additional year. The part time solders perform not all the military related support functions. In particular the maintenance of the high technology equipment such as airplanes, tanks etc., communications systems and early warning Radar stations are backed up by full time professionals from outside the military.

Training as Radar Specialist

After boot camp, I did not qualify as a pilot candidate, because of my eyesight. This was not a big surprise for me because my civil aviation physician had already forewarned me that since I needed glasses to see well enough to fly, I would probably not get selected. At that time people with glasses did not qualify for military pilot training.

My military radar experience helped convince me that I wanted to work on electronics.

Instead of going to pilot school, I was trained as a Radar specialist. This training took place in several Early Warning Radar Stations, in underground installations in some of the highest peaks of the Swiss Alps. The training was performed by a team of very high caliber engineers and scientists as instructors. They too advised me to try very hard to study electrical engineering, if I ever had a chance to do so.

First Exposure to HP Test Equipment

Probably the most consequential experience during my Radar specialist training was the exposure to HP test equipment, which was abundant within the Radar stations. Every technical maintenance task included some kind of adjustment or tuning that required measurement equipment. We mainly used HP Microwave Generators, HP Sampling Scopes or other fancy HP bench instruments.

I was impressed by how well the products were documented, in particular by the “Theory of Operation” in the manuals. I spent lots of time with the dictionary to help me understand the various paragraphs. Not only were the manuals a tremendous technical resource, but they also inspired me to learn enough technical English, such that I could follow and understand the schematics. By the way, Tektronix, the other brand of test equipment that was abundant in our radar stations, did an excellent job documenting their products too. It was easy to daydream about maybe some day visiting the HP and Tektronix plant in the USA. But I never thought that it could really happen.

Back to Civilian Life (1960)

When I had finished my second tour of military duty in 1960, I went back to work for my telecom company. True to his promise, my mentor had arranged for a scholarship application that would allow me to pursue the necessary schooling to get the Matura Diploma, and subsequently I would get admitted to the Swiss Federal Institute of Technology (ETH) in Zurich. Cornelia helped me with submitting all the administrative details required, such as the various budgets for the scholarship application. I realized very quickly that Cornelia was a truly talented financial advisor and that her banking background helped her explain to me why all this information was necessary.

I was really worried that I would not receive the scholarship, but Cornelia put me at ease by offering that she would help me, even if I did not get the scholarship. She showed me that we could make ends meet with her (impressive) salary and my modest part time income as a student. When I received the scholarship I was surprised how generous it was. It covered the tuition for a private school to get the Matura, as well as the

engineering education at the ETH. Furthermore, the scholarship was not a loan, it was a gift with no strings attached other than that I had to meet the minimum GPA that was required to become an engineer.

I immediately began studying for the Matura and working part time on the side. Cornelia and I typically met on weekends for a few hours, because this was all the time I could spare.

We Decide to Marry

In the meantime Cornelia had finished her business education and she had gotten an excellent job as a junior accountant. In contrast, my economic situation was hopeless. Even though I had a generous scholarship, I was still years away from being able to support a family and I felt I was holding Cornelia back and she should go on with her life without me. When I expressed my concerns to her, she was very disappointed and thought I was trying to dump her. She was sad because she liked me too and she did not want to end our relationship and neither did I. But I just could not see a solution for us.

Then one weekend, Cornelia had just returned from her brother's wedding, she said in her typical "cut-through-the-smoke-way": "Why don't we get married, I make enough money to support us, and together with your fellowship you can go to school full time and then we can spend more time together." It only took me a millisecond to swallow my pride to be her "kept" man. She did not even ask me to give up flying*. What a fantastic arrangement. This was too good to be true for me.

Our First Apartment

After our engagement in June of 1961, we signed up for an apartment, knowing that it would take at least 6 month and possibly up to a year to get one. This was a normal waiting period at that time in Switzerland. However, miraculously we got an offer after only three months. It was for an affordable apartment in a brand new high-rise building within an easy streetcar commute for both of us.

The only slight problem was that we were not married yet. We had planned to get married in summer of 1962, but the apartment was available in October of 1961. There was no doubt that we liked the place and we did not want to take a chance to pass it up. So we moved in together.

Consequences

However, the neighbors in the high-rise called Cornelia Mrs. Vifian because they thought we were married and Cornelia felt she was betraying them by not telling them the truth. So she called me during my 3 week military refresher course, and told me that we either had to get married right away or hat she would move back with her godmother until I was ready.

Of course I was ready by then. I might not have been ready earlier when I still suffered from not having accomplished anything to be worthy of Cornelia's generosity. But by now I wanted to be married too, except that the middle of winter was not exactly a romantic time for a wedding. But I told Cornelia to arrange everything and that I would be there for the wedding.

By the way, this has become a standard operating procedure for us: Cornelia makes all the arrangements, and I will be there for the event.

I also sometimes jokingly use the fact that Cornelia said let's get married, as evidence that she actually proposed marriage to me, and not the other way around. Or even more out of context, that she gave me an ultimatum to either get married or she would move out.

Either way, I am so glad she did whatever she did, and we got married on January 20th, 1962 and we can truly say that we lived happily ever after.

A no-frills wedding started us off on a life of adventure

Our Modest Wedding

And so it came about that we got married on January 20th 1962 in a nice little church on the Lake of Thun. It was bitter cold and Cornelia did not wear a white wedding dress, which we thought was very appropriate. Besides, we had no money and nobody paid for our wedding. Moreover we most certainly did not want to go into debt and start our new lives as a couple with a financial burden. It took us 20 some years to actually go on our honeymoon on Hawaii we had fantasized about but we did nor really believe it could ever happen.

It was a very low key wedding of a party of four because we had only invited one each of our best friends as witnesses. Since Cornelia's mom was ill and she and her dad could not attend the ceremony, we did not invite my parents either. Everybody understood the situation and there were no hard feelings on either side.

Married Life

I used to tell everybody that we never had an argument during our marriage (which is true but nobody believes it!). By the way, the rumor that the reason we do not have any arguments is because I always give in right away….. is false!

I attribute our no-argument-marriage to our prenuptial contract that stated that Cornelia would make all the little decisions and I would make the big ones. Needless to say, that I never had to make any decisions, because for Cornelia all our decisions were minor ones.

By the way, we did not have such a contract, but we have some conflict resolution guidelines. One was to always have our disagreements resolved before going to bed at night. Another rule was that it was perfectly acceptable for us to disagree on certain issues. For example, Cornelia has always been against nuclear power plants, and I was for them. Partly because my dad worked in one and I understood how they operate and how save they can be. But we never forced our opinions on each other.

Moving from Bern to Zürich (1963-1968)

In spring of 1963 I received my Matura diploma and in fall I started my engineering studies at the Swiss Federal Institute of Technology, the ETH. We moved from Bern to Zurich where we spent the next 5 years of our lives. While I was studying, Cornelia was working for a well known Swiss bank.

Becoming an Engineer

The ETH is the only government funded University in Switzerland, and the administration had no tolerance for slackers. During the time I was there, only half of the students that enrolled actually graduated. Cornelia took a real gamble with me. Scientifically speaking, 50% is a very low probability of success.

I did my best to get good grades, not only to show Cornelia how grateful I was for her support, but also to appreciate the generous donation of the scholarship foundation from my previous employer. What made it even easier for me to study hard was that I truly enjoyed learning about science and technologies. This was a very exciting time to learn about engineering because the solid state transistors just became commercially available and started to replace the vacuum tubes in most electronic equipment such as radios and TVs.

Besides working and studying, Cornelia and I also did take time to relax and enjoy ourselves during my vacation. And whenever either one of us passed a major hurdle, we rewarded ourselves with a special gift. For example in summer of 1965 we celebrated that I had passed my last elimination exam before my graduation (in 1967). This meant that the probability for me becoming an engineer jumped to 85%. Cornelia took me on a wonderful vacation to the Isle of Majorca. It was also our first real honeymoon, and we had a great time there.

We also did have some time to enjoy sailing on the Lake of Zürich. Cornelia knew how to sail and I just got our little boat ready for her. We had a lot of fun cruising and swimming all over the lake. There were no sharks or alligators. But I did stop flying (for the next 40 years), because I felt it was unfair to waste Cornelia's (hard) earned money on my selfish hobby and I could not afford the time for it either. .

Graduation, Instructor, PhD Candidate

In fall of 1967 I graduated with a "Diplom Ingenieur" degree, as it is called in Europe (~MSEE). Even though I was in the top 10% of my class, I was very lucky and honored to be selected to become an instructor. My title was "Assistant to the Professor" (~teaching assistant). Being an assistant also was a prerequisite for becoming

a doctoral candidate, which I did. All I had to do was coaching some students in the labs and correct their homework assignments. Later we had to propose and grade their term papers. I got a monthly salary and a nice office for being an assistant. And even though Cornelia out-earned me by far at her bank, I enjoyed getting paid for studying, and we could certainly use the extra money.

Gaining Experience Abroad (1968-1994)

In the late sixties it had become fashionable for young electrical engineers in Europe to spend a couple of years at a US university or with a reputable company in Silicon Valley. Having such a credential on ones' resume had become a considerable career advantage in the Swiss industry. It just so happened that my advisor at the ETH suggested that I take a leave of absence from my doctoral program, because he could get me a two year fellowship to attend a University in the USA (or Canada).

Because of the demonstrations that supposedly were going on at several US campuses at that time, he did not want us to get us exposed to any danger, and he recommended that we should attend the University of British Columbia in Vancouver (UBC) in Canada. He also told us that the fellowship would allow us to move from Vancouver to a California campus (which was our original choice), at any time once the unrests had settled down.

Leaving for America

In July of 1968 we arrived in Vancouver, Canada, and immediately found out from the numerous draft-dodgers at the UBC, that we had made a costly mistake. They told us, that we should have gone to a US campus instead because there were no unrests at any of the engineering schools. They claimed that only the hippies and the social-study-students were willing to waste their time and energy to demonstrate.

We immediately tried to correct the situation, but it took us almost a year (11 months) to get a visa to enter the US from Canada. (Much longer than it took from Switzerland, but we had no choice). Since we had already spent a year of our leave in Canada, we decided not to apply to a university in the US, but rather spend the remaining year of our leave of absence at a reputable technical company. My preference was to join Hewlett Packard or Tektronix, the two companies whose products I had previously admired during my military service. And afterwards we would return to our jobs in Switzerland.

Without delay, I sent out resumes to several high tech US companies and quickly received two job offers. One from Tektronix in Portland, Oregon and one from Hewlett Packard in Palo Alto, California. The decision was easy, because on the day of my interview with Tektronix, it rained and was cold in Beaverton. And on the way back to the airport, my recruiter's car broke down. This was before car or cell phones and the only option we had was to signal to the other drivers that we needed help by opening the hood and trunk lid. A nice person stopped and drove me to the airport, explaining that this kind of weather was typical for the area.

A couple weeks later, on November 2nd of 1968, I had an interview with HP. In contrast to Beaverton, it was warm and sunny in Palo Alto. All the people were very friendly there, and they had assigned an engineer from Germany to welcome me, guide me to the various interview stations and to be my interpreter, if I needed help. He also convinced me that there was no better place to work than for HP.

Thus it was that in June of 1969 we drove from Vancouver to Palo Alto and I started to work at HP, while Cornelia got ready for the little baby girl we were expecting in about a month.

Change of Plans

However, instead of one little girl in about a month, we got two little boys within days after our arrival. Unfortunately Cornelia had very serious complications, and she had to stay at the Stanford Hospital for an extended period of time. She had suffered an internal injury giving birth, which had caused undetected internal bleeding and a subsequent infection, which shut her kidneys down. After an extensive emergency surgery, which was so critical that the doctors summoned me to the hospital, she miraculously recovered. Soon afterwards she came home with the boys, weak but lucky for all of us be alive.

When we received the hospital bill we realized that our Canadian Insurance would only pay for what the same treatment would have cost in Canada. Which was only ~10% of what the Stanford hospital charged us? And the HP insurance was not covering us for the first 30 days after our arrival. At that point we were desperately trying to get a loan from a local bank, but they all refused us, even though I had a good job with a very reputable company, but we had no established credit. Eventually HP gave us a loan with good terms, but there was no

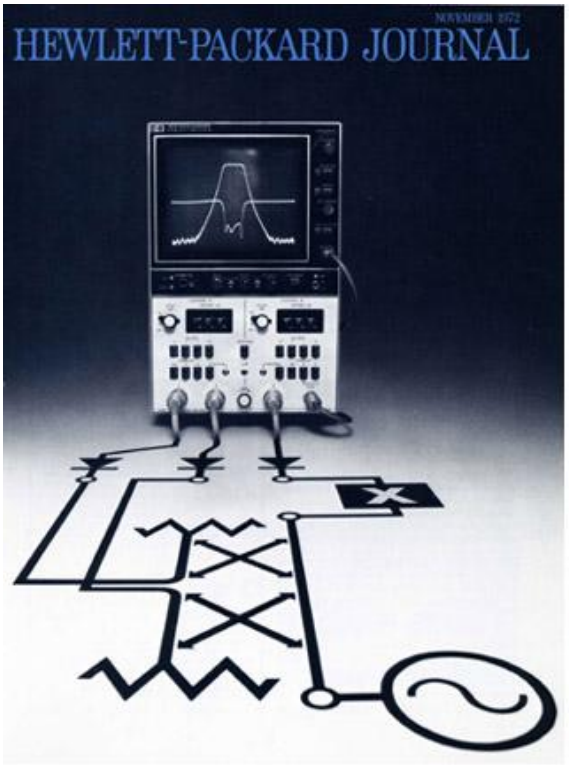
way we could pay it back before we had planned to return to Switzerland. We estimated that it would take us about 5 years to do so.

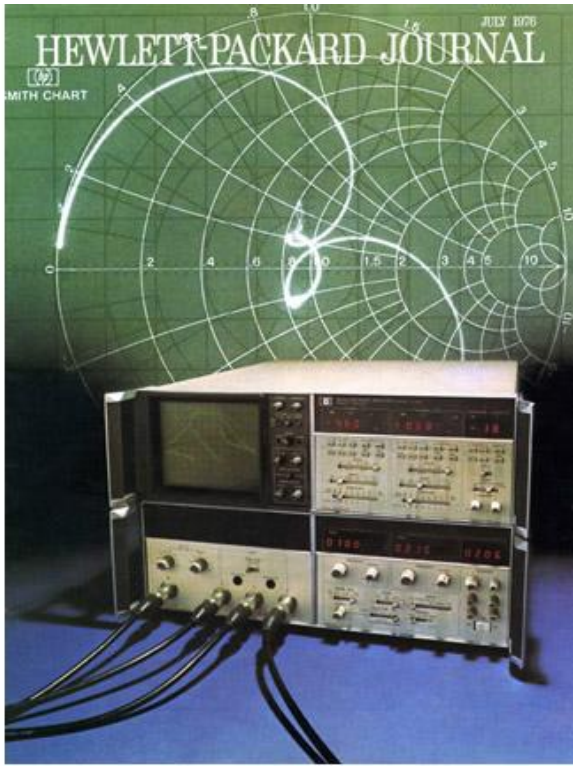
Obviously this new financial setback completely changed our plan. Instead of going back to Switzerland within a year, we had to stay in the US for the next 5 years. Of course we told our previous employers that we felt obligated to stay in the US until we had paid off our hospital bills.

Using our hardship case as an example, HP was able to change their insurance policy, such that all future employees would be covered from the first day when they arrived, and without any exceptions for pregnancy or pre-existing (undiagnosed) illnesses. After a couple of years, HP even got the insurance company to retroactively pay for part of our medical bills. Miraculously the burden of our huge loan started to lift itself off us. And about two years later (in 1971) we received a notice from HP that our loan was paid back in full.

In a way it was good for us to be forced to settle down, because we were always living in the future. We were constrained by the fact that our stay was very time limited. For example, we did not want to acquire anything beyond the essentials because we had to get rid of it eventually. And we would not even consider buying a house. But I enjoyed my work at HP and was in no hurry to go back to my assistant job at the ETH. Cornelia also liked the warm climate very much. And she praised the easy going atmosphere, as well as the children friendly lifestyle in the Bay Area. Basically we enjoyed our lives there very much. As time went on, we bought our first house in 1972 (for less that our current cars are worth), and Cornelia transformed it into a cozy home. The kids went to pre-school and loved it.

But none of us were talking about moving back to Switzerland anymore.



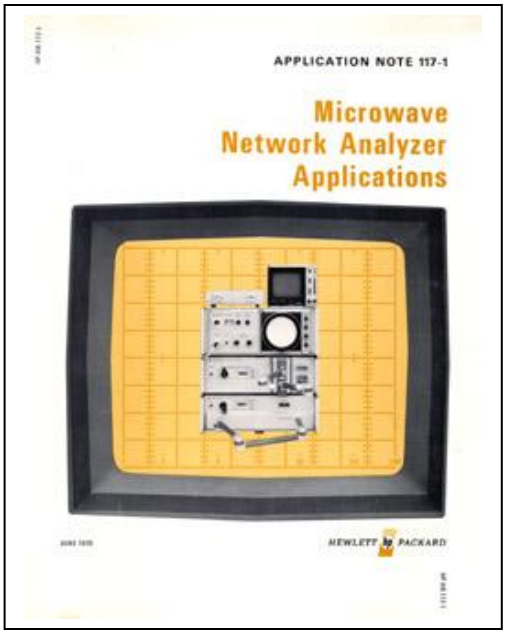


Hugo's first two projects were published in the Hewlett Packard Journal
HP 8755A in November 1972 - AND - HP 8505A in July 1976

My

First Project at HP

During my interview at HP, one of the interviewers was working on a tutorial application note (which later became AN 117) that fascinated me. It contained all the S-Parameter test configurations and also the block diagrams of the 8410 and 8407. The engineer gave me an early draft copy to take home and study, which I did. When I arrived as a new engineer in 1969, I received an updated copy, as all the other new engineers did. Since I was pretty familiar with HP's VNA products by then, I got an assignment to propose a block diagram for an "amplitude only" version of the 8410. This was the beginning of what later became the 8755.



From the introduction of the 8410 in 1968, HP exploited the Scattering Parameter measurements technology, with equipment and comprehensive applications tutorials. The classic document was AN 117-1, which is reproduced by clicking HERE.

Editor's Note: On the website HPMemory.org; Vifian memoir, you can access a copy of AN 117-1

In 1972 I finished my first project, the 8755 for HP. It became a reasonably successful product and I got promoted to become a project leader on the 8505, even though I felt I was not ready for it.

But my supervisors/mentors felt otherwise and they promised to help me anytime I needed assistance, which they did. By the way, this pattern repeated itself several times during my career. Whenever I felt comfortable in a job, I was presented with a new assignment that was more risky and more difficult for me. My bosses called this on-the-job-training.

In 1971 we got the news from my professor that he was about to retire and he wanted to know if I was still coming back to finish my doctoral thesis work. He also realized that we might be beyond the point of no-return, since one of his sons, who also lived in Silicon Valley with his family, had decided to stay in the US permanently. As an alternative for going back to the ETH in Zurich, my professor suggested that I meet with one of his colleagues, Dr. John Linvill, at Stanford University and explain my situation to him.

As I met with Dr. Linvill he told me that my professor was a good friend of his and that he had spent several of his sabbatical leaves in Zurich at the ETH. He seemed to be delighted to be able to help his Swiss friend and he generously offered to personally coach me through the thesis research as my advisor, representing my professor at the ETH, which he did.

“We” finished my thesis project in 1973 and I received my “Doctor Ingenieur” degree from the ETH the same year. By the way my HP boss and mentor at that time suggested that we should try finding a thesis topic that was of interest to HP and would also qualify as my research project. And then maybe he could arrange for me to get paid while I was doing the research. Miraculously his approach worked and I am eternally grateful to him too. While I was doing my thesis research, with the title: (Group Delay, Delay Distortion and its Measurement), I was still working on other HP projects as well, because I did not want to abuse HP’s generosity.

When I returned from Zurich, where I had to “defend” my thesis work, my colleagues and bosses at HP were teasing me with a new name tag and a little box they put on my desk, indicating whether the “Doctor” was “In” or “Out” of his office. This was very funny because we did not have offices at HP, we had cubicles. They even made a sign-up sheet, asking my colleagues to make an appointment before they could see me.

After my PhD was granted, I got teased with a sign indicating if I was "in" the office or "out" and a new name tag.

Of course, I was embarrassed for getting all this attention. But at that time engineers with a PhD degree were relatively rare at HP. I was only the second engineer with a doctorate in our microwave lab at that time (out of about 100 engineers). But HP had always been a company where everybody had a chance to prove themselves, and advance, regardless of their formal education or cultural background. I am certainly a good example for that. Even though my English language skills were very limited and I still have a heavy Swiss accent, I never felt there was any discrimination against me.

Going through the Ranks at HP

When I joined the Microwave lab team in June of 1969, we were located in building #5 at the Page Mill Road facility in Palo Alto. At that time there were two major product development labs. The one I joined, the Network Analyzer lab was located on the upper floor of building 5 (5U) and the Spectrum Analyzer lab was downstairs in 5L. Our lab was focused on measuring Scattering-Parameters (S-Parameters) with the 8410 Vector Network Analyzer (VNA) as accurately as humanly possible. Several teams devised sophisticated calibration procedures and error correcting algorithms to achieve superb accuracy. Calibration methods and error correction routines coupled with the newly emerging computing power became a challenging new discipline in itself and many talented engineers made their careers in this field.

The Spectrum Analyzers lab developed the world's best Spectrum Analyzers, which provided equal challenges in a somewhat different dimension, the Frequency Domain. Put in a simplistic way, the network analyzer teams focused on characterizing linear networks, whereas the spectrum analyzer teams provided tools to characterize non-linear networks.

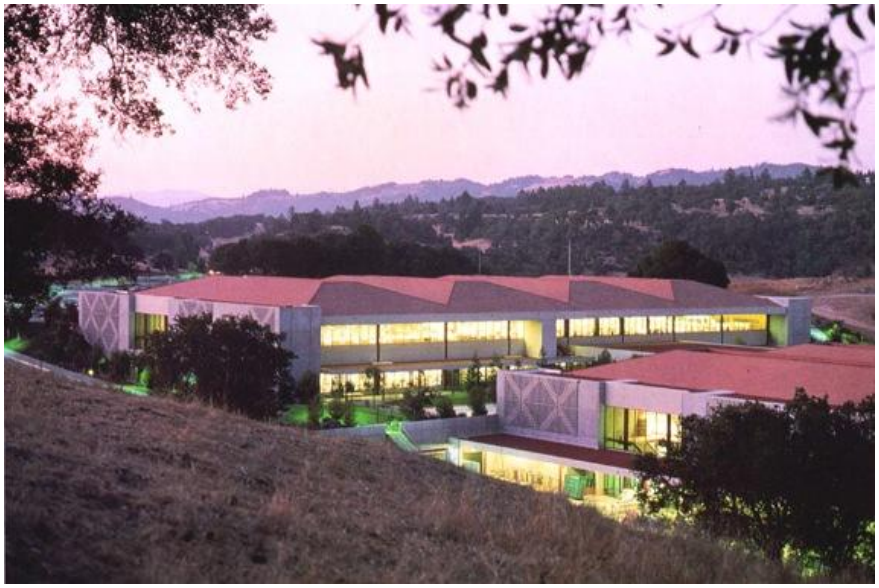
Because of my early exposure to communications, in particular during my apprenticeship, where we built and tested entire systems, I was aware that there were many measurement tasks our HP products did not address as well as we did the VNA S-Parameter measurements. For example signal distortion was often the limiting factor for these systems but it was a challenge to identify where it was generated and how to improve it. And having built modulators and demodulators for my ham radio friends, I realized that it was quite difficult to assure their linearity over the various frequency bands and the dynamic range of the input signal. And at that time there was no HP modulator-linearity-analyzer available to do it with. Furthermore, the cause of Amplitude Modulation to Phase Modulation (AM to PM) conversion in radar system, which distorted the superimposed frequency modulation (chirp) on radar pulses, was not easy to measure either. Even the fact that linear networks such as RLC-filters could create harmonic distortion in frequency modulated signals just by having an unfavorable phase characteristic was not well understood.

Therefore I was delighted to be given the opportunity to investigate some of these measurement challenges, rather than improving S-parameter measurement accuracy, before and during the development of the 8505 VNA. In addition to my thesis on Group Delay Distortion, I wrote several tutorial papers addressing non-traditional measurements for our customer seminars. Some were published in the Microwave Journal, the IEEE-Transactions and elsewhere. I am sure that these insights helped to address customer needs beyond the traditional VNA S-Parameter measurement applications and therefore created additional revenue for our products

HP Santa Rosa

In 1973 a new division was formed in Santa Rosa and I had the privilege to be among the 100-some employees that were transferred from Palo Alto. This was a great experience for me because we were essentially starting a new business (a start-up) in a new location about50 miles north of San Francisco, in temporary facilities, but with the comfort of having a working infrastructure and methodology already in place.

Over the next few years I went through the ranks from a new



From a 1979 Hewlett Packard Calendar,
Courtesy of the Hewlett Packard Company

engineer to becoming an R&D Lab manager. I was very lucky to have excellent bosses, mentors and great team members, and we developed many successful instruments for the communications industry.

As part of my job as an R&D Lab manager, I was also encouraged to cooperate/partner with other laboratory and university teams, domestically and internationally. At that time, HP was a model company (just like Google is today) and we were able to help out less privileged organizations with guidance, equipment loans and donations.

THE Microwave Electronics NEWSLETTER

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$1 Million Hewlett-Packard Gift Boosts Microwave Education

Hewlett-Packard Corporation has made a million-dollar grant of equipment for teaching and research to the Department of Electrical and Computer Engineering. The grant, which is being matched by a $200,000 contribution from the University, was announced during a press conference last February 24 at Chancellor Joseph Duffey's residence. About $300,000 of this gift will go toward equipment for a microwave metrology laboratory course, and the remainder will benefit research and teaching efforts in microwave electronics, solid-state electronics, and communications.

Prof. Keith R. Carver, Head of the Department, called the Hewlett-Packard award a "match of their corporate philanthropy and our educational goals." The grant is the latest in a series which has included computers and an HP-8510B microwave network analyzer. The special relationship between Hewlett-Packard of Palo Alto, Cal. and the ECE Department goes back to the summer of 1985 when a delegation of microwave faculty visited Hewlett-Packard's Network Analysis Division in Santa Rosa, Cal., and presented an overview of the growing microwave program at the University.

Several faculty, including Profs. Robert Jackson, Robert McIntosh, David Pozar, Daniel Schaubert, and Karl Stephan, have contributed to the microwave instructional curriculum and its accompanying one-semester laboratory, and expansion of the laboratory phase to two semesters has been contemplated for some time. The Hewlett-Packard gift was an ideal opportunity to propose the establishment of a new Microwave Metrology Laboratory which will include in-depth experiments that the time limitation of a one-semester laboratory course does not permit. Bob McIntosh and Karl Stephan collaborated on the proposal for this new laboratory, and currently Prof. Stephan is preparing for the first session to be held in the Spring of 1989.

Experiments planned for the new laboratory include precision FET S-parameter measurements, oscillator phase noise measurements, and nonlinear mixer experiments. The Hewlett-Packard gift includes two Microwave Design System workstations which will allow students to model their experiments with interactive schematic-capture software. The great expense and rapid depreciation of microwave equipment makes it difficult to establish and maintain up-to-date laboratory courses in a university environment, and the Microwave Electronics Group is very grateful to Hewlett-Packard for this gift.

Chancellor Joseph Duffey, Electrical and Computer Engineering Department Head Keith Carver, and Hewlett-Packard Corp. staff members Tony Napolitan and Hugo Vifian (left to right) listen as Prof. Bob McIntosh expresses thanks for the $1 million gift during a news conference in the Chancellor's residence.

Since we were often approached by colleges for equipment donations, I learned very quickly how to help the applicants to write successful proposals. This was relatively easy for me because I knew a member on the HP philanthropy board who was my former boss, and he explained to me what board was looking for, to approve the donations. This way I could advise the applicants on how to pre-empt the board member's concerns or questions and tailor the proposal to make it more likely to pass. A good example was a big donation I coached for the University of Massachusetts, at Amherst, where I was the campus recruiting manager for HP. After the donation was approved in 1992, I received Christmas cards and invitations to visit the campus from the faculty, for many years to come.

Honestly, I got even more satisfaction from working with other customer teams in leading technical companies or Universities, than handing out donations. I also learned that it was very easy to give away someone else's money, and I was no longer impressed by all the philanthropy gurus.

Our division in Santa Rosa sponsored several R&D teams outside the US and I had the privilege to help some of them to define and manage their projects. Our lab team also had a great working relationship with the local Technology Division and with HP's Central Research Laboratory in Palo Alto. There is no doubt that helping a person or teams succeed, gave me the most satisfaction.

During many of our vacations, Cornelia and I drove up to the Trinity Alps in our travel trailer, hiking along the beautiful rivers while fishing and enjoying nature with our twin sons. Sometimes friends from work joined us there and we went exploring the area together. Later (~1980) we built a summer home in the Sierra Foothills, which was also in the mountains but much closer to Santa Rosa than the Trinity Alps, and we enjoyed the outdoors from there. We also spent time camping in our RV at the Bodega Bay where some fellow engineers taught me how to fish for salmon and other sea creatures from a boat. Even though stream fishing was not as productive as fishing from a boat, I preferred the beautiful mountain scenery over the endless water of the Pacific Ocean.

Touched by the Ever Evolving Technology

Being part of a Technology-Leader company also demanded a lot of learning as new technologies became available. For example, my engineering career in the 1950s, began shortly after the "human" telephone operators were replaced by mechanical relays in the early automated switching networks. After the relays, I worked with vacuum tubes, which were broadly applied in radios and TVs.

In the military I learned about Radar systems and the key components that made them work were also vacuum tubes. Only the very powerful transmitter stages were applying special tubes such as klystrons and magnetrons. The magnetrons later also found their way into most kitchens as the key component in Microwave ovens.

After the vacuum tubes the solid state technology was developed and diodes and transistors emerged. The solid state devices had many advantages over the vacuum tubes. First they were much smaller and had an unlimited lifespan. They also did not need extra power to heat the cathode filaments and were much less expensive to produce.

Transistors and diodes could also be deposited and interconnected by the thousands, and packaged as integrated circuits. Several ICs could then be configured to become a radio, or a TVs or a computer. With so many advantages, it is no surprise that the solid state technology was rendering most of the vacuum tubes obsolete in the late sixties. Even the longest surviving vacuum tubes, the CRTs, used as TV picture tubes and as computer monitors, which lasted into the 1990-ties, were eventually replaced by solid state displays. And today even the light bulbs are being phased out by solid state Light Emitting Diodes. (LED).

A special group of integrated circuits called microprocessors (Intel) were instrumental in making computers smaller, faster, more capable, and much less expensive. In addition, the software technology, which used to be called programming, replaced a big part of the computer hardware. Software became the key technology driver of the 1970 ties and 80 ties (IBM, Microsoft, HP, and Oracle, etc.).

As computers and computer chips became readily available and affordable, they started to enter all aspects of our lives. From washing machines to cars to airline ticket reservation, everything is now controlled by some sort of a computer. The most recent wave of smart phones is basically just a further integration of displays, microprocessors, camera technology and GPS satellite navigation, and lots and lots of software.

Evolution of Communication

In addition to witnessing the advances in the component or device technology, we also became part of the incredibly fast evolving Communications Industry, which we served with our test and measurement equipment. The associated evolution of propagation media technology created an additional learning challenge.

Over the past many years HP was involved in creating instrumentation for characterizing telephone wires, coaxial cables, fiber optic cables and the newly expanded free space media and its associated antenna technology.

The old telephone wires transmitted signals or information by moving electrons in a certain rhythm along a conductor, such as a copper wire. The rhythm or rate at which the electrons are moved can be Morse code or the sound of our voice.

Today the voice signals are digitized and look just like any other digital pulse stream. Similar to Morse code, the signal is “on” and “off” at certain points in time. Information theory opened up the opportunities to do efficient pulse coding. The mathematical transforms, for example between time and frequency domain, allowed for many sophisticated signal processing applications.

The signal propagation in a coaxial cable is also based on moving electrons (and electromagnetic fields), but coax cables allow the transmission of much higher pulse or bit rates than the telephone wires. Therefore much more information can be transmitted over a single coax cable. For example, Comcast transmits hundreds of TV channels and phone lines all together over one single (inexpensive) coax cable coming to our homes. It would take a million telephone wires to transmit the same information.

Of course, the most revolutionary new propagation media is the optical fiber. The conductor is a very thin glass fiber; the signals are transmitted by photons, not electrons. The information transfer capacity of an optical fiber is enormous. It is measured in Terra Hertz. One Terra Hertz is 1000 Giga Hertz. In other words, one thousand times the entire TV and phone transmissions Comcast provides via coaxial cables will fit on one single fiber! It would take a billion telephone wires to do the same.

Fiber optics is a technology that has been expanding into many new fields. In long range communication, it is used to connect major cities together. Furthermore, fiber optic submarine cables carry most of the secure data and voice traffic across the world’s oceans. These long range fiber connections do not suffer from the propagation delay to and from satellites and are highly immune to electromagnetic interference. In the computer industry, fiber is used for internal as well as external connections. And fiber is also replacing signal wires in airplanes and cars.

The oldest and the most widely used propagation media is still the free space. It allows wireless transmission wherever a cable connection is no feasible or not desirable. The signal propagation takes place by moving electromagnetic fields through space. No electrons or photons as information carriers are required. The Indians used a form of free space communication to transmit smoke signals.

Free space transmission makes wireless cross country communications with microwave links possible. (Identifiable by Microwave dish antennas on high towers). Free space transmission it is also used for connecting cell phones to antenna towers. In addition, it is used for satellite transmission of TV and data signals as well as GPS information. All deep space communication and radio astronomy telescope applications are based on that same principle of transmitting electromagnetic fields through the immense free space surrounding us.

Many of the electronic gadgets, such as (smart) phones, tablets and personal computers are eventually connected to a vast switching network. This switching network is called the internet. It is nothing more than a telephone exchange network, which allows a very large number of users to be connected to each other, as well as to servers (storage media) that host enormous amounts of stored data. All is managed by enterprise software centers operated by big software companies, such as Google, America-online, Yahoo, Oracle and many more.

New Product Developments I was Involved With

I was very fortunate to be able to participate in the development of many new instruments that helped test these new technologies.

8755 (1969-72)

As a new design engineer, the first product I contributed to was the HP 8755 Scalar (Network) Analyzer. It was basically a very sensitive microwave receiver, based on a diode detector down conversion. Together with a swept microwave signal source the three channel receiver could simultaneously display two ratio measurements. Such as the frequency response (magnitude) of the transmission and the return-loss (quality) of microwave filters and other components.

The 8755A

My contribution to this product, other than the 3 channel system architecture, was a wide dynamic range (>100dB) logarithmic AC-amplifier with a built in shaping characteristic. This hybrid integrated circuit, which I designed with lots of help from my colleagues in HP's Loveland Division, was subsequently used in several follow on products of the 8755. Because of the very low processing frequency of ~28 KHz I (very likely) used the first active filters applied in an HP instrument. *The 8755 was featured on the cover of the November 1972 edition of the HP-Journal.

Shortly after this product was introduced to the customers I became an R&D Project manager for the 8505.

The HP 8755A Design Team, L to R: Wayne L. Frederick, Frank K. David, Hugo Vifian
From the November 1972 issue of the Hewlett Packard Journal
Courtesy of the Hewlett Packard Company

8505, 8507 (1973-76)

The next product I worked on was the HP 8505 RF Vector Network Analyzer (VNA), which was the first fully integrated swept frequency response (transfer function) measuring system available. It included a built-in signal source and measured the Amplitude and Phase (signal vector), as well as the Group Delay of components from below one MHz up to 1.3 GHz. It was also a full dynamic range (100dB) three channel instrument. My contribution was the group delay and deviation from linear phase measuring capability, for which I could use some of my work in my doctoral thesis. And I also introduced the concept of having remote control capability of all the functions via the HP-Interface Bus (HP-IB computer interface), which was a first for HP's Network Analyzers.

The 8505A

Many outstanding engineers contributed to this product, which probably still holds the performance record in its class of analog signal processing Network Analyzers. Several of us were awarded patents for our contributions. This design also set the standard and the direction for many new HP (and its competitor's) products that followed. The 8505 was a "BIG" project even by HP standards at that time, and I ended up becoming the R&D Program manager for it. But I had lots of help

from my bosses and fellow engineers, within and outside of our R&D lab to make it successful. **The 8505 was featured on the cover of the July 1976 edition of HP-Journal.

From the introduction of the 8410 in 1968, HP exploited the Scattering Parameter measurements technology, with equipment and comprehensive applications tutorials. The classic document was AN 117-1, which is available for download at the website HPMemory.org Vifian.

Redwood Project

In early 1977, after the 8505 instrument family was completed, I was assigned to a multi divisional project that was hosted by the Santa Rosa division and called the “Redwood Project”. The project team consisted of several divisional representatives that were tasked with a one year investigation. The goal for the team was to propose a next generation high frequency instrument concept that would utilize generic building blocks/modules and main frames developed by the participating divisions.

The Modular Measurement System, code name "Redwood Project"
HP Memory Collection

Many instrument families had already some modular products that used a main frame and plug-ins to added versatility to the product. For example the Spectrum Analyzers were configured within an oscilloscope main frame, hosting the display and power supply, and several IF and RF-front end plug-ins or modules. This allowed the designers and the customers to add incremental capability or frequency range when the technology became available. A similar system was used by the sweeper family to provide additional frequency ranges or bands. By building the necessary microwave components into a compatible plug-in, the mainframe did not have to be redesigned for each added new capability. The microwave counters had similar requirements and a similar modular system. The oscilloscopes also had different plug-ins for the different bandwidths and sensitivity requirements. And there were other modular approaches. However, with the exception of the 140 Oscilloscopes and the 855X Spectrum Analyzers and the 180 Scopes and the 8755 Scalar Analyzer, nobody else took advantage of the existing mainframes and built their functionality into them as plug-ins.

Furthermore, looking at the block diagrams of the various instruments it was obvious that there were more engineering developments that could be shared. For example the Synthesizers used high performance local oscillators in their design and so did the Spectrum Analyzers and it was tempting to assume that one design could probably do both jobs. However, the designers were not so sure it would work and felt more comfortable to design their own. There was also the Not Invented Here (NIH) syndrome that had to be dealt with. There was quite a bit of competition among the divisions developing similar products. For example Synthesized Signal Generators were mainly used as stand alone sources and had modulation capability. Whereas the Swept Synthesizers were mainly used with Network Analyzers and did not need modulation. Of course, the Spectrum Analyzers also used Tracking Generators of similar quality but it was not obvious how they could use the same building blocks as the other sources. Also in that competitive environment, using somebody else’s design was considered stealing ideas and was frowned upon. It is interesting to observe that the Japanese engineering culture is different in that respect and copying somebody else’s design is encouraged.

Obviously the lack of this engineering leverage did not go unnoticed by the overseeing higher level engineering managers and they discussed the potential opportunities with the interested division managers who then agreed to delegate some of their engineers to the project, guided by a group engineering manager (Al Bagley).

The team identified several generic building blocks such as power supply modules, display modules, controller modules and a set of mainframes that could accept one or two rows of modules. The instrument modules could be developed in different widths, depending on their complexity. The main frames that would provide the structural integrity and the power distribution as well as the interface bus for the communication among the modules ant to the outside. The mainframes and generic modules would be developed by the participating divisions and then shared at a reasonable transfer cost. The divisions would add the instrument functions in modular for such that others could use them as well. Some of the generic measurement modules were also

identified. For example local oscillator modules for all the Signal Sources and Spectrum Analyzers, The division teams were encouraged to work together on them such that they could use them in their modular instruments. There was also hope that common receiver modules could be developed for spectrum analyzers, network analyzers, bit-error-rate receivers, oscilloscopes etc. All these modules could then be configured and integrated as instruments or test systems (similar to the low frequency VXI module family). This approach had the potential to improve our engineering effectiveness by reusing these modules, rather than having to re-invent and re-develop similar functions in each division independently.

We identified some pilot projects but as we worked out the details it turned out that externally modular solutions such as the MMS became more costly for the customers than the traditional integrated instruments with the same capabilities. But there was a performance level where modularity made sense and several products were successfully introduced over the years.

Unfortunately the extra cost made the MMS architecture less attractive for the 8700 family but more importantly it took much longer than expected to get the common parts developed by the participating divisions and so we forged ahead and built the 8753 in a standard package. However, some of the basic Redwood concepts could still be applied for instruments with very similar architectures such as the 8700 family, which had a very modular internal architecture.

A lot of good work was done and the final outcome was the creation of the 70'000 series Modular Measurement System (MMS) and several divisions used the concept for some of their product families. A very positive side effect of the Redwood project was that the team members were very compatible and after we went back to our divisions we kept in touch and whenever we needed some help from a Redwood partner division we could count on their support.

ENA Section

As our division and the R&D organization grew, a new lab section was added around 1978 and I was selected to become the new Section manager. The goal for our team was to develop a significantly lower cost instrument family than the existing flagship 8505 and 8510 VNA systems. The new Economy Network Analyzer family was targeted for manufacturing applications. And we became the ENA section in contrast to the High Performance Systems section. Our group consisted mainly of an expanded version of my old 8505 team.

Before I am going to describe the ENA products, I want to insert a memorable event that happened during a Santa Rosa Division Review.

First Handshake with Bill Hewlett.

Every year our spiritual leaders from the galactic headquarters in Palo Alto came to visit for a couple of days to review our progress as a division and to check on our lab projects. We usually put on quite a show and tried to impress Bill Hewlett, Dave Packard, Barney Oliver and several of the VPs who came more or less along as flower girls. I do not want to report on the review itself but what happened to me that morning

I usually came to work quite early (~7:00) and had a light breakfast in our cafeteria with some of my other early bird colleagues. That morning I was paged by the receptionist as I was on my way to the cafeteria. She frantically ordered me to come to the lobby immediately, because Bill Hewlett was there and he wanted somebody to show him the progress we had made on the new Fountain Grove building #4.The receptionist told me that she could not get a hold of the division manager or any other higher level manager. And since I was the only person she knew that was there early in the morning and was wearing a tie, I just had to do it. I was scared because I had no idea what progress we had made on building #3.

But when I arrived in the lobby, Bill smiled and greeted me as if we were old friends. Maybe he remembered me from previous division review presentations but I never had shaken hands with him until then. He told me that he liked to come to work early in the morning too because he could get a lot done before he got interrupted all the time when everybody else showed up. Since the receptionist told him that I was originally from Switzerland he told me that he very much enjoyed skiing in the Swiss Alps. As we walked towards the construction site of building #3, he explained to me that the crane with the long outriggers was pounding steel rods into the ground all the way down to the bedrock and then they would drill holes an fill them with concrete and tie the floor of the building to the columns. He also made me aware of several other construction issues he said we had to deal with because the Fountain Grove campus was being built on a hill and close to an earthquake fault. He actually gave me the tour and not the other way around, including a tutorial on how to build HP plants. But he seemed to enjoy it and after almost an hour we headed back to the lobby. When we arrived there Bill thanked me warmly for giving him the tour, in front of the high level managers who were waiting for him. I am sure they were a little

envious and were probably wondering how the heck I got to give Bill Hewlett a tour. Later that day our division manager thanked me personally for being there early and for not embarrassing him. He also mentioned that Bill had enjoyed my company and that he was supposed to give me his regards. Here is what I have learned from this event: Go to work (breakfast) early and wear a tie, because you never know who wants a tour of the building…

RF Products: 8753, 8752 (1980, ongoing with other models)

We started with the development of a fully integrated lower cost version of the 8505 RF Analyzer, which was named the 8753. It came with different frequency ranges (8752) and with different test sets. It was only half the size of its predecessor and could be built at significantly lower cost.

The 8753

Microwave Products: 8720, 8719, 8722 (1988, ongoing)

Then we added a microwave model, the 8720 (20 GHz) which used the same packaging, display and digital signal processing block as its lower frequency sibling, the 8753. This gave us a lot of engineering leverage because we could re-use instead of re-develop many of the same building blocks. Later on we added the 8722 (40 GHz) model to the family.

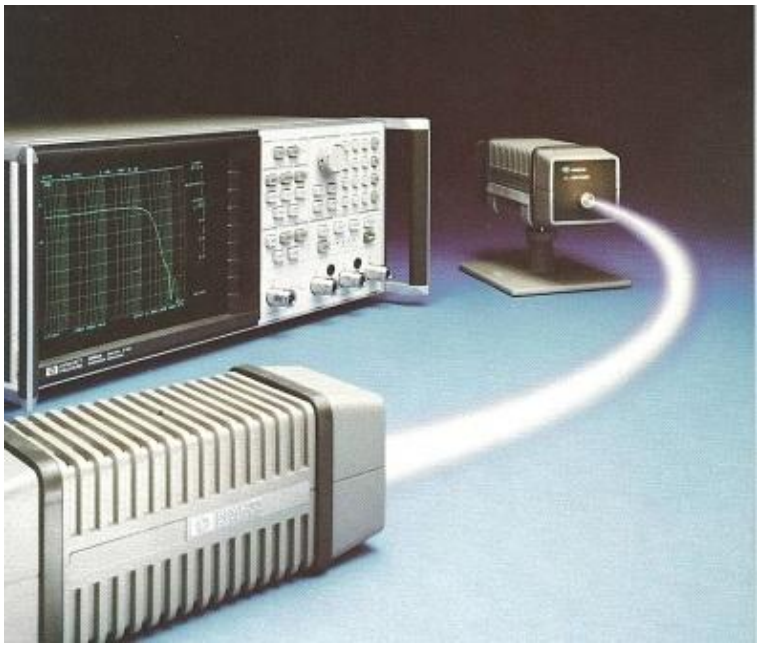
The 8720 VNA

Lightwave Products: 8702, 8703 and 83400 Converters (1988, ongoing)

Around 1980, we also started to dabble in Fiber-Optics measurements. We learned from 8753 customers about Fiber-Optics applications where they used the 8753 RF Network Analyzers to characterize high speed (at that time!) optical modulators, optical receivers and other components of fiber optics transmission systems. And we realized that we could help them by providing a more integrated solution.

Instead of modulating the optical carrier with a digital bit stream, we applied the analog RF signal of the Network Analyzer's (built-in) source to an optical modulator, which we called an Electrical to Optical converter. (E/O-converter). And then we demodulated the light wave signal with an optical receiver (O/E converter) back to RF. By changing (sweeping) the modulation frequency we could display the bandwidth of the components on the Network Analyzer. Therefore, by building calibrated precision optical modulators and demodulators for our Network Analyzers we could help the customers characterize their optical systems, including the fiber itself. Optical fibers, in particular single mode fibers have an enormously wide (transmission) bandwidth (in the Terra-Hz range) and very little loss. But what limits their transmission capability is the dispersion. How can we

measure fiber dispersion? With my Group Delay background it became obvious that the phase characteristic of the modulated signal could be interpreted as the Group Delay characteristic of the fiber. And as long as the group delay characteristic was constant versus modulation frequency, there could be no dispersion.



The HP 8702A Lightwave Component Analyzer

However, if the group delay changes versus the modulation frequency, then this is an indication that the light signal experiences different propagation delays through the fiber and the signal gets spread out in time which means it suffers dispersion. This can happen when a part of the light beam finds a different propagation mode which follows a different path length. (Similar to microwaves in wave guides). For example a rotating beam in the fiber (tube) travels a longer distance than a direct one and the two will interfere with each other. Furthermore, the slightest kink in the fiber or reflections from fiber splices will create additional dispersion. By applying a Frequency Domain to Time Domain transform on the group delay information, it was possible for us to show our customers at what point(s) along the fiber the dispersion occurred.

Being able to measure signal dispersion is very important for fiber manufacturers (Corning, Alcatel etc.) and we were able to do this very well by using the group delay technique. Companies that were laying (very long) submarine cables actually used our equipment on their ships during the deployment of the cable.

With the handsome 8700 family platform we had the flexibility to add calibrated optical converters, the 83400 family* of laser sources and photo detectors for the various high speed applications. We basically used the 8753 to modulate the light signals up to 3 GHz, and later the 8720 and the 8722 up to 40 GHz. We also added the necessary calibration software for the precision convertors and additional software to make our instruments friendlier for the non-Network-Analyzer-speaking users in this new field, who were mostly physicists. Polarization dispersion in optical fibers also became a measurement issue and we addressed it as well. *Our key Lightwave products were featured in the HP-Journal from June of 1989.

8700 Family (1986 to now)

Our 8700 product family was essentially a practical implementation of the Redwood concept. By re-using the same building blocks (or modules) in many different instruments, we gained a significant advantage in engineering effectiveness. But unlike the original Redwood model, which used external plug-in modules, the 8700 family's modularity was internal only.

As our 8700 Instrument family was growing, our ENA section was expanding and in early 1990 the original R&D lab was divided into a Systems lab and a (bench) Instrument lab and I became the new Instrument Lab R&D manager. Our lab had four lab sections:

1. Sweepers
2. Synthesizers
3. Economy Network Analyzers and
4. Photonics.

My boss later convinced me (told me!) to combine the Sweepers and Synthesizers into a Signal Sources section. We continued to develop new products in all areas. We also enjoyed a close cooperation with our fellow researchers in the Technology divisions and in HP's Central Lab in Palo Alto, in particular the photonics teams.

Lightwave Operation

In 1992 a big reorganization took place and a new Lightwave Operation was created and I became its R&D manager. This was a case where I would have preferred to stay on as the Instrument lab R&D manager, but I was told that I was more valuable in the new Lightwave Operation. I obviously could not refuse that new assignment. In particular because I was also put in charge of the Strategic Lightwave Council, which was setting the direction corporate-wide for all of HP's Lightwave instrumentation efforts.

Life After HP (1994-Now)

My Retirement from HP

In 1994 I retired from HP, probably slightly past the peak of my career. Over my 25 years at HP, I had many opportunities to work for other HP organizations or to leave HP and work for other companies or start-ups. But I just was not interested and I never talked to the headhunters that were after me.

But in summer of 1994, on one of my frequent commutes to HP labs in Palo Alto, a headhunter called me on my car phone and told me that he knew that I was on my way to the Palo Alto labs, and he was acting on behalf of one of my colleagues there, and he wanted to meet me for dinner. Since I had nothing else to do that evening I accepted the invitation. But I was also curious whom the headhunter represented in HP's Central lab.

During dinner, the headhunter explained to me that a former colleague of mine had started a new Fiber Optics Technology Company in Silicon Valley, supplying the CATV industry with Lightwave components. The founder was looking for an R&D manager (who could spell Photonics) and could set up a professional R&D organization for him.

I was not really interested in making a career change. But I was thinking once in a while of maybe joining one of the HP-Labs teams I was working with, because I liked Palo Alto and the Bay Area better than Santa Rosa. I also had inquiries from other division managers who needed an experienced R&D manager. And since our sons had left home several years before, there was really nothing holding us back in Santa Rosa other than my job as R&D manager for the Lightwave Operation and my loyalty to my engineering team. But the fact that I was pressured (by my boss) to demote one of my key contributors, who essentially had started our Lightwave program, and that did not sit well with me, and it might have made me more susceptible to considering a change. But only within HP.

The headhunter also explained that there was no risk for me to consider a change like this. And that he could easily get me a better job in the Bay Area if it did not work out, because I was more valuable outside of HP than inside. After dinner I agreed to meet with the CEO of the new start-up. The job sounded exciting and challenging. But I was afraid to quit HP. Nobody in my position had done such a thing before, at least not to my knowledge. It felt like treason.

I "secretly" discussed the matter with my HR manager. He told me that I was old enough (56) and had enough years as an HP employee (25) that I could instantly retire without any negative consequences, just as my former division manager boss did two years earlier. Then I could start a new career as a consultant or do whatever else I decided to do. This was good news because retiring from HP after 25 years of service sounded a lot better to me, than quitting HP.

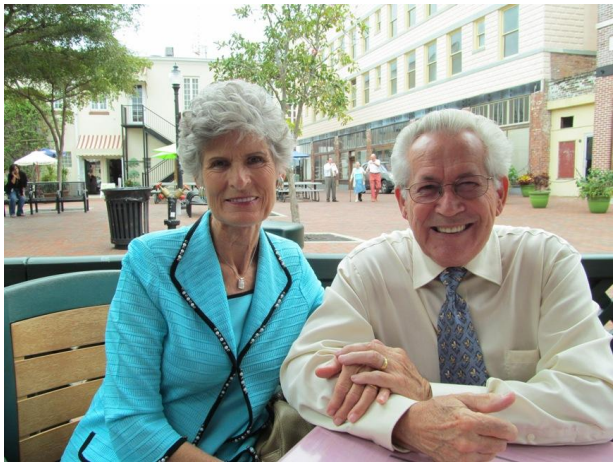
In fall of 1994, after an emotional retirement celebration, I joined the start-up of my friend, with the goal of becoming an independent consultant, once I had set up his R&D organization. And in spring of 1998, I established my own little consulting firm, Premiere Management Advisory. Before I had finished my advertising flier to find work, I was already booked out. Basically the first customer I met through a former HP employee, bought all the consulting time I had available.

This is when the good life really began: As a consultant for high tech firms, back in the heart of Silicon Valley. I only worked for people I liked and I only did the projects I enjoyed. It does not get any better than that. I mostly worked part time, helping my clients with their strategic planning or product development methodology. Occasionally I added a full time stint when the situation required it. In June of 2005, Cornelia told me that she had saved enough money and that I could join her now full time in Florida. Had Cornelia known about the upcoming stock market crash and the bursting of the real estate bubble, I would probably still be commuting forth and back to Silicon Valley.

Where Should We Retire?

Even before I became a consultant, my work involved extensive travel. And after the twins had left home, Cornelia often came along on my business trips, and while I was working with some customers or attending a convention, she explored the surrounding areas.

She also started to re-evaluate our retirement plans in California. We had lived in Santa Rosa for more than 20 years but we knew that it was too cold for us to retire there. For many years we enjoyed our summer/weekend home in the Sierra Foothills (near Grass Valley), where we could escape the Santa Rosa fog and the cold sea breeze, and we thought we would retire there. We were planning to build our dream home on a 7 acre parcel we had bought for that purpose, in a nicely wooded subdivision called Lake Wildwood Heights. It was close to the gated community where our summer home was located.



Our retired life has included a lot of rewarding times, here enjoying our local Ft. Myers downtown.

But after a while Cornelia felt that maintaining the 7 acres was too much work, and we wanted to live closer to a major city. This ruled out the Lake Wildwood area because Sacramento was the closest city and it was more than an hour's drive away. After we left Santa Rosa and returned to the Bay Area, we lived in a beautiful gated community (Silver Creek), in the hills on the east side of San Jose. But Cornelia also wanted to get away from the freeway maze of Silicon Valley.

With Cornelia's considerable effort investigating many potential retirement locations, including Southern California, Hawaii, Arizona, Texas, and many others, she fell in love with Bonita Springs in the South-West corner of Florida (between Ft. Myers and Naples).

In 1997 we decided to build our retirement home in the newly opened Sanctuary subdivision in Pelican Landing (Bonita Springs). In June of 1998 Cornelia and I moved to a rented home near by to supervise the construction. Our house was finished in late 1998. At that time I was still doing part-time consulting work in California and while Cornelia was decorating it, she also collected a nice set of new friends. Most of them were retirees from the Great Lakes area or from the upper East Coast who had moved to the Sanctuary as well. I spent two weeks in California working and then two weeks in Florida on vacation with Cornelia. Sometimes (only during the summer) Cornelia visited me in California for a while until she had to hurry back to take care of her garden and the house. It was a great life.

What Hobbies Should I Have?

Even though Cornelia did not anticipate the stock market crash, she did anticipate other important aspects of our future life as a retired couple. Several years in advance, she wanted to make sure that I had a challenging hobby and did not try to apply my managerial skills at home, after I stopped working.

Since I never got hooked on golfing, she thought I might still be interested in soaring. As I said earlier, I started my soaring hobby with 18 in 1956 but stopped flying in 1963, because I felt badly about spending Cornelia's hard earned money on my selfish hobby, and also because I was very busy with studying.

In June of 2000, Cornelia encouraged me to take a glider ride in Hollister CA, to find out if I still liked it. I found again that I liked it a lot and I re-learned to soar again from scratch. After I got my US pilot's license in early 2001, Cornelia as our CFO bought me the most beautiful self launching glider available. I could not have been happier.

My current soaring glider, German made, with a retractable powered prop for self takeoff.

Soon I realized that some of my earlier soaring experience came back and I became pretty good at collecting merit badges over the next few years. Unfortunately I missed the last badge I wanted to earn because my onboard battery was dying during the flight. And with that I lost the file of the critical altitude flight that was stored in the flight recorder. I should have repeated the flight while I still had a chance to do so in the High Sierras, and I could have been among the first 1000 pilots to accomplish this distinction in the US. Unfortunately there is no chance to achieve the required altitude in Florida, because we do not have mountain waves here.

Maybe I will be able to do it elsewhere and be in the next 1000? But it is OK even if I never achieved it because I do not fly competitively, just for fun. I also know that there are better pilots than I am who never bothered to collect merit badges.

For your amusement, I will attach for click reference a copy of one of my soaring mission reports.

Editor's Note: On the website HPMemory.org Vifian memoir, you can access a copy of one of Hugo's soaring mission reports, many pages long, with weather and route reviews.

Our Twin Sons

Our lives would not have been complete without our caring sons Marcel and Eric. Not just because they are so nice with us and call us very frequently just to say hi. But also because we are very fortunate to have them balancing our lives. Without them we would have never understood why the young mothers cannot keep their babies quiet in public places. We also needed to learn that children are independent creatures we try to coach, even as we have little or no control over them. They are different people, even as identical twins and they live their lives the way they see fit.

Since Eric and Marcel did very well in school, we let them choose what and where they wanted to study. All we were hoping is for them to pick careers that would make them happy. We also set a minimum GPA of 3.0, for us to pay for their education. Neither of the twins wanted to follow in dad’s or mom’s footsteps, because becoming an engineer or an accountant looked like too much work and not enough fun.

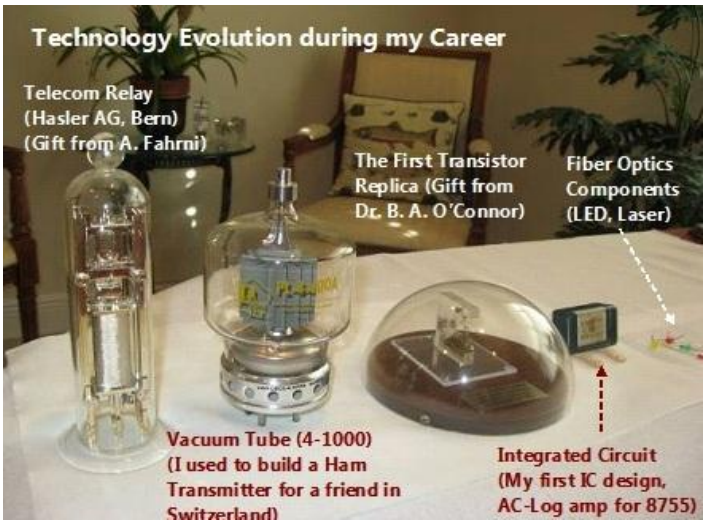
After graduating from college, Marcel decided to become a professional tri-athlete and he is a personal trainer now, living in Park City Utah. He is still single and we are not sure if that this will ever change.

Eric decided that hotel management was not as glamorous as he first thought, and after two years of training in a hotel school in Switzerland he came back to Sacramento where he changed direction and got a masters degree in communications. He is a property manager in Sacramento, and yes, he is still single too.

We appreciate our sons very much and enjoy them whenever we can, while they are still unattached. Who knows if they will get hitched some day?

Hugo's Other Hobbies

My number one hobby is obviously soaring. But I also have to admit that I am seemingly addicted to Tesla coils. They make big, noisy sparks, and here is the story of how I got involved with them.



Technology changes during my career are stunning.

After retiring, I thought of creating a small display for my office that would show all the technologies I was involved in during my career. I wanted to show a simple relay circuit, and then one for a vacuum tube and then a transistor / integrated circuit and finally a fiber optics example.

The relay circuit was easy. As a vacuum tube circuit example I wanted to build a little Tesla Coil. But even though I had copied a supposedly working schematic from the internet, when I built it, unfortunately it did not work. Of course this presented a real challenge for an engineer whose circuits have always worked in the past. And before long I got sucked into building many more coils, until I understood the problems to my satisfaction.

In 2008 one of my former HP colleagues encouraged my effort by sending me a nice HP-oscilloscope as a Christmas present. This gift got me started on building a mini lab in the garage. Then I bought more test equipment and more components on E-bay and it was a lot of fun building and evaluating all these Tesla coils. But by now they have taken up a lot of space and our garage looks more and more like a Frankenstein lab. I am currently in the process of making all the Tesla coils operational such that I can sell them on E-bay. Once they are gone, I can give Cornelia her gardening space back, which I deprived her of for all this time.

Why I got Fascinated by Tesla

Let me add a few words about Nicola Tesla and his accomplishments. When I previously mentioned the propagation of information over wires, I left out one important aspect. The first application for copper wires was of course not for telephone connections, but rather for transmitting electrical energy. Tesla invented our modern power grid and all its components such as alternating-current generators, transformers and AC- motors. He and Edison were mortal business enemies. Basically Tesla gave us the world's best electricity distribution system. It has lasted for over 100 years and it is far superior to the direct-current one Edison proposed. And to this day, it is still the most efficient method to distribute electricity known to mankind.


Just one of my experimental Tesla coils, this one successful.

However, in the late 1800 Nikola Tesla, who was born in Croatia (Serbia) in 1856, also experimented with wireless energy distribution. He demonstrated the concept of wireless power transmission by creating high frequency electromagnetic fields, with huge Tesla coils he built. But the results were not convincing and his effort was eventually abandoned due to lack of funding. Despite his many patents he had sold to the founder of the Westinghouse Company, George Westinghouse and others, Tesla died in 1943 as a poor man. He was not a good money manager, but he also got cheated out of his rewards by a lot of greedy partners, including Edison. His loss of trust in his partners also led him to withhold key information in his later patents, such that the patented concept cannot be applied without him filling in the missing information. Some of his inventions are dangerous if misused and many are still classified by the US Government.

Back to wireless power transmission. I think the huge sparks that his experiments generated, were actually distracting the observers from seeing and appreciating the fundamental wireless energy transmission capability of his Tesla transformers.


The 2006 Christmas Present from my dear friend Bob DeVries (HP 1722A) marked the beginning of my Tesla lab

Not that the concept had any real benefits at that time, because it was a lot less efficient than conducting electricity over wires. And today it would be impossible to even repeat some of his experiments, because the exposure of animals, never mind people, to this sort of very high strength electromagnetic fields which would be outlawed quickly with the help of some misguided animal protection group. Even though similar strength electro-magnetic fields are used in MRI machines. However, Tesla was a widely under-appreciated scientist and inventor of many other concepts. For example he demonstrated radio transmission long before Marconi did, and he built the first radio controlled model ship etc. just to name a few.

Tesla's name is honored as the unit, the Tesla, for measuring the strength of a magnetic field. Similar to the Italian scientist Volta, whose name was made immortal by having it used as the unit Volt, for indicating the strength of an electric field. By the way, there is no "Edison" unit, by comparison, and I think this is fair.

Our Other Hobbies

Yes, there is time for that too. Cornelia and I do quite a bit of bicycling on the beautiful nature trails in Florida, but also in our subdivision. And then there is kayaking on our rivers and trough the mangroves in the lagoons along the Golf of Mexico. We also go on birding and other ECO trips. Cornelia does a lot of gardening for herself and she helps others with their landscaping projects. On top of that she has been knitting many bears for the HIV infected children in Africa. She just shipped the one-hundreds bear.

As you all know, Cornelia and I were so fortunate to celebrate our 50th wedding anniversary in January of 2012, and we still have the best time of our lives.

The Bucket List

I have no "bucket list" because I was so lucky to do everything and more in my life, than I ever thought was possible for me. I am also thankful for having been credited by one of my coworkers for living my life according to the expression: It is nice to be important, but it is more important to be nice. I am not sure I actually created that phrase, but so what...it sounds good to me and I have really tried to live my life accordingly.

But most importantly, I am truly grateful for all the support and encouragement all of my mentors, friends, co-workers and bosses have given me over the many years. And I cannot thank you enough for having been such an important part of my happy life.

Acknowledgments

Throughout my life I was privileged to meet and work with numerous remarkable people who were my mentors, bosses, bosses squared and cubed, colleagues, students or just friends. I cannot attach all your names, because there are so many of you who touched my life and I am very grateful that you did. So please forgive me for any oversights, and just add yourself to this list.

With the risk of disappointing some of you, who did not make my list, I will only try to mention the people I still remember who were critically involved in my wellbeing or my career or positively influenced my life. Unfortunately I just cannot list the names of my counter parts in the other functions, such as Marketing, Sales, Manufacturing etc., even though many of you have been instrumental in mentoring me and supporting me throughout my career at HP. I'm still in touch with some of you, but most of you I met for one reason and maybe for a season and then you faded away, and unfortunately some forever.

Since this summary focuses mainly on my life at HP, I will only mention the names and their involvement during my 25 years from 1969 to 1994 when I had been with HP.

HP Interview and Early Mentors

When I came to Palo Alto for my interview with HP in fall of 1968 from Vancouver, Canada, **Dieter Scherer**, who had joined HP earlier, had been assigned to be my guide and interpreter. He made me feel very welcome at HP. The interview ended with him telling me that HP was the best place to work and that I should accept their offer. The funny thing was that at that time I did not even know if HP would make me an offer. (I only had an offer from Tektronix). Dieter has been a wonderful friend ever since, and we worked together on numerous projects, even though he stayed in Palo Alto when our 8505 project moved to Santa Rosa. I want to thank him very much for all his contributions and his advice to join HP.

Shortly after the interview I received an official offer to join **Doug Gray's** Microwave Research and Development (R&D) lab. Doug called me every week (after I had accepted his job offer), while we were stranded in Vancouver, waiting for the US visa. It was like a ray of California sunshine came to us every time Doug called. He set an outstanding example of how the HP-way worked. And we stayed friends ever since. Thank you Doug

When I joined the Microwave lab I got to know many more people who helped me get started in this new culture. We had trainings classes for the newbie's, where I met other "go-to" people to show me the ropes.

Cyril Yansuni and his lovely wife Jeanne were very generously helping us when Cornelia had the twins, and through our early years in Palo Alto. When I first met Cyril in 1969, he was my boss' boss, and later my boss' boss' boss and so on….But he always took time to check how I was doing and encouraged me to stay with the program. I should have followed in his footsteps, but I could not keep up with him, because his career took off so fast.

Cyril and Jeanne later moved on to France to head up an HP division there. After Cyril left HP to start his own business (with Paul Ely), I kept inviting him as motivational speaker to instill some entrepreneurship into my team and he was a wonderful guest speaker and motivator. Cornelia and I want to thank you both for all the support you have given us and for all the times you have paid for our dinners. And finally, last June we were honored to have a chance to buy Cyril and Jeanne a cheap breakfast, during our anniversary celebrations. Thank you, thank you, and thank you.

During one of the New Engineer's Orientations I also met **John Minck**. He was accompanying John Young, who was the newly ordained Microwave Division Manager (I think?) and he gave us an overview over the business HP was in. As John Young was called out to take a phone call, John Minck seamlessly took over the orientation, introducing us to the secrets of successful sales and marketing. I was so impressed and subsequently I considered John the reigning guru in that field.

Lately John wanted me to do a write–up about my career at HP, which I foolishly promised to do, or at least I promised to provide him with an outline before the end of 2013. In return he offered to translate my Swiss English into proper English, and add it to the many other contributions people have made. Thank you John for all your wisdom and for your ongoing support.

First Product and Team

When I was working on my first design job, **Dick Hackborn** was our lab manager. (He later headed up the extremely successful HP printer development in Boise). **Phil Spohn** was the section manager (unfortunately I lost completely track of him). **Dave Gildea** was the project manager of my first project, the 8755 and we were a great team with **Wayne Fredrick, Frank David,** and **Bob Jacobsen,** our mechanical designer. The new product was featured on the HP-Journal front page of November 1972.

Group Delay Investigation and Supporters

In late 1971, my professor (Prof. Weber) at the ETH was planning to retire. And he turned me over to his friend and colleague **Dr. John Linvill**, at the Stanford University to be my doctoral thesis advisor for the ETH. Then **Stephen Adam** who was in charge of the Stanford Honors CO-OP program, (helping engineers to get advanced degrees at the Stanford University) learned about my situation. He helped me greatly to sort out my research project for my doctoral thesis and ultimately suggested to convert it into an HP sponsored investigation. I owe him a lot but unfortunately I am too late to extend my thanks again, since he passed away a few years ago. I still cherish his book Microwave Theory and Applications which was a must read for every new engineer in our lab.

Actually Stephen suggested for me to check with **Paul Ely** (who was the Microwave division manager at that time), if there was a chance for me do a research project on “Group Delay Measurements” for our instrumentation.

For me as a young engineer, Paul Ely was the closest to the Gods I could imagine, the Gods being Bill Hewlett and Dave Packard. I was scared to approach Paul and asked Stephen Adams how I would go about doing this. He told me to just walk into his office and check with his secretary if he was there. He also mentioned something about HP’s open door policy, which I did not fully understand at that time. For the next few days observed some of the people going in and coming out of Paul’s office and they were all smiling. I also checked the rumor about him yelling at people with some of the older engineers. But I was told that Paul naturally had a loud voice, but that he had never yelled at anybody they knew. After a few days I had rehearsed what I was going to say and had collected enough courage to give it a try.

Paul’s secretary, Geri, was very nice and she said he was on the phone but he would be right with me, because he did not make long phone calls. Seconds later Paul appeared, shook my hand and said congratulations, you are the engineer who designed the logarithmic amplifier for the 8755. I was blown away by his opening statement and immediately had to modify my speech that I had memorized over the past couple days. He made it so easy for me and encouraged me to start such an investigation and he would have my section manager open a special account for it. Within a few minutes the problem was solved.

In 1972, I met **Zvonko Fazarinc** for the first time. He worked in HP-Labs and he came over to the Microwave lab with **Barney Oliver** in tow or vice versa. They were often making the rounds and looking at our projects. I was so impressed with Zvonko’s intellect and his modesty, that I begged him to review my doctoral thesis. I was obviously very worried about his feedback, but to my surprise he said it was fine as it was, and I should submit it, which I did.

Later on I also invited Zvonko to give presentations to my teams about his work at the Labs. He was a great speaker and his insights and explanations were riveting and his enthusiasm rubbed off on all of us. We were impressed by his contributions, in particular by his simulator demos.

Thank you Zvonko for everything you taught us, and in particular the example you have set as a role model with your scientific accomplishments and your modesty. Thank you, thank you…Unfortunately I lost touch with Zvonko. Maybe he did not get my E-mail invitation for our little reunion last June?

I also got a lot of help throughout my career from Signal Analyzer people such as **John Page, Rod Carlson, Rit Keiter** and many others.

Second Product and Team

For my second project, the 8505, we had again a great team. Mostly young engineers who had joined HP at about at the same time as I did, such as **Dan Harkins, Rolf Dalichow, Bill Lawson, Dave Sharrit, John Barr, Jim Jones, Roger Oblad, Wayne Frederick, Fred Woodhull, Mark Roos , Phil Chen, Julius Botka, Bob DeVries, Dick Barg, Al Knack, Oleg Volhontseff, Dave Eng, Roy Church, Dennis Handlon, Ron Zimmerman** and others. The lab managers were **Cyril Yansuni** and later **Rit Keiter,** and **Doug Rytting** was our lab section manager. The product was featured on the cover of the HP-Journal of July 1976.

The product development actually started in Palo Alto and in 1973 it was transferred to Santa Rosa together with most of the project team. Except for **Bob DeVries,** who was the initial product designer. He was incredible, not only because of his expertise, but also because he was such a warm and gentle soul with whom everybody got along so well. We were all very sad when he decided to stay in Palo Alto. But Bob also helped me out tremendously along the way, even later on when I was consulting and needed some mechanical engineering expertise. Thank you all for the great experience and the support you have given me on this project.

Redwood Investigation and Team

In early 1977, after the 8505 instrument family was completed, I was assigned to a multi divisional project that was hosted by the Santa Rosa division and called the “Redwood Project”. The goal for the project team was to propose a product concept that would utilize generic modules and main frames as building blocks that could be configured as test instruments or test systems (similar to the low frequency VXI modules). This approach had the potential to improve our engineering effectiveness by leveraging and reusing these modules.

It was a great experience to be part of the Redwood team. Jim Thomason was the project leader and he reported to **Bill Terry** with **Al Bagley** as advisor. The other initial members of the project were **Dave Palermo,** Loveland, **Ken MacLoyd,** Santa Clara, **Bill Risley,** Colorado Springs**, Doug Garde,** New Jersey, **and Rich Hoogner,** from Corporate Design, Palo Alto. After six month or so, Jim added more people from various divisions for prototyping and additional support. And again I want to thank all of you for your contributions and the comradely throughout our shared effort.

After the Redwood project in 1978, I became the **Lab Section manager** for Economy Network Analyzers (ENA) in **Irv Hawley's** R&D lab.

ENA Section Products and Teams

One of our project teams with **Dave Sharrit** as project manager developed the 8753 RF Network Analyzer. Dave's team consisted of **Bill Pike, Paul Hernday, Wayne Frederick, Joel Dunsmore, Fred Woodhall, Ken Richter, Mike Hart, Bob Loder** and several other engineers who's names escape me at the moment, sorry about that. **Al Knack** and **Oleg Volhontseff** were the product designers and **Roy Church**, the artist, did the industrial design. This was the perfect team for the task. They laid the groundwork for the 8700 family that used the same hardware and software platform over and over. Essentially implementing the Redwood concept in a new product family, without the external modular structure and appearance. The 8753A was introduced in 1984. It was followed by other models extending the frequency range from 3 GHz to 6 GHz. And a 1.3 GHz model, the 8752, in 1989.

Another team with **Frank David** as project manager developed a Microwave version of the 8753 concept, the 8720. The additional key contributors on Frank's project were **Doug Bender, Stan Jaffe, and Dick Barg** (and again I probably missed some). Plus the 8753 team members that helped to leverage their initial designs. The 8720 20 GHz version came out in 1988. It was followed by a 40 GHz model, the 8722 in 1991.

We also added a Lightwave Component Analyzer the 8702 and 03 with the 83400 family of laser sources and receivers, that is featured in the HP-Journal from June of 1989. **Roger Wong** was the champion and project manager of this product with key team members **Paul Hernday, Michael Hart, Gery Conrad, Dale Albin, Kent Leyde. Fred Rawson, Ken Shaughnessey, Bob Bray, Susan Sloan, Patty Beck, Scott Elliott, Roger Jungerman, Steve Newton** and many other contributors from HP-Labs and other HP organizations.

I owe all these people a lot for making our products a great success and I want to thank them again for their support, loyalty and dedication.

Instrument Lab Products and Teams

In early 1990 I was promoted to the Instrument Lab R&D manager by my long time mentor and division manager **Bill Wurst**. Bill was a father figure for many of us and the most successful division manager I knew. He was extremely creative and supported all our new ventures such as the Economy Product family and the Lightwave instrumentation effort.

Our instrument lab had three lab sections:

1. Signal Sources (Sweepers and Synthesizers) with **Rolf Dalichow** as manager.
2. Economy Network Analyzers with **Dan Harkins** as manager.
3. Lightwave Products with **Roger Wong** as manager.

We continued to develop new products in all areas. And I want to thank our teams for their dedication and support for our cause.

Bill also encouraged me to work closely with other divisions, such as QueensFerry (QMD) in Scotland and the instrument operation in South Korea, and to look after the R&D product developments he had sponsored there. The QMD team developed a new RF-Vector Voltmeter, the 8508 for us. I very much enjoyed working closely with **Lawrence Lowe** and his engineers. The same is true for **Rick Belding** and his team in Korea (KIO), where we manufactured and further developed the power supplies for our 8700 ENA family.

Bill Wurst's retirement in 1992 triggered a major reorganization by **Dick Anderson** who was the overall Instrument Group manager. The products of the Santa Rosa and Rohnert Park divisions were re-aligned and a new Lightwave Operation was formed with **John Shanahan** as the operations manager and I became the R&D manager.

I want to thank **Roger Wong, Jack Dupre** and **Bob Bray**, who became my section managers, and their teams, for creating the many new and exciting products they developed, and for their help and support.

I am also very grateful for the contributions of HP- Lab's **Waguih Ishak** and **Bill Shreeve** (spelling?) and their teams. They were instrumental for the success of our lightwave products and deserve a lot of credit for our success. They also played a key role in the Strategic Lightwave Council and I want to thank them for their support there as well. My sincere thanks also go to **Werner Berkel** and his teams and his boss at that time, **Werner Huettenmann**, the division manager from Boeblingen, Germany. But most of all, I am indebted **to Bob Allan** and **John Page** for their leadership, their support and for their coaching me through that phase of my career.
In 1994 I retired from HP after 25 years of service. Looking back, it has been a great career for me and I appreciate all the help I have gotten from my mentors, bosses and my team members along the way. I sincerely want to thank all of you again for having been a big part of my life.

Hugo Vifian

Bonita Springs, FL
January, 2014

Editor's Note: On the website HPMemory.org Vifian memoir, you can access these reference scans of these technical documents listed.

Various Documents Linked from this Page for References:

- Hewlett Packard Journal, November 1972 - A "Voltmeter" for the Microwave Engineer
- Hewlett Packard Journal, July 1976 - A Direct-Reading Network Analyzer for the 500 kHz to 1.3 GHz Freq. Range
- Hewlett Packard Journal, July 1976 - Processing Wide-Range Network Analyzer Signals for Analog & Digital Display
- Hewlett Packard Journal, July 1976 - A Precision RF Source and Down-Converter for the 8505A Network Analyzer
- Hewlett Packard Journal, June 1989 - High-Speed Lightwave Component Analysis
- Hewlett Packard Journal, June 1989 - Design and Operation of High-Frequency Lightwave Sources and Receivers

HP Memories

This memory of Hugo Vifian's career at *hp* results from the work of the www.hpmemory.org website of Marc Mislanghe, who with John Minck (and Hugo) edited and published his Memoir.

One of the main objectives in starting this website five years ago was (and still is today) to get in touch with people who have worked at *hp* from the birth of the company up to today. We are interested in hearing your memories no matter what division or country you worked in, or whether you were in engineering, marketing, finance, administration, or worked in a factory. This is because all of you have contributed to the story of this unique and successful enterprise.

Your memories are treasure for this website. While product and technology are our main concern, other writings related to the company life are highly welcome, as far as they stay inside the *hp* Way guidelines. **Anybody Else?** Please get in touch using the Contact US form at "http://www.hpmemory.org."