Burroughs Corporation: 1958-1960

I started my job at the Burroughs Research Center in Paoli, Pennsylvania in January 1958 as an Assistant Development Engineer in the Business Machines Development Department. This was the fulfillment of my dream; I was now an engineer, and not only that, but a development engineer, the most advanced kind that invents new things using complicated mathematics and formulas. My salary was $5700 per year which worked out to more than three times the hourly rate I was making at UPS and seemed quite munificent to start with; however, after some time I noticed that it did not allow for a lot of discretionary spending. The price for a basic American car was around $2000 and a sports car like the ones I was hankering for were closer to $3000, Porsches were closer to $4000. Rent for a small apartment would be around $800 per year, a modest dinner out was maybe $5.00. Houses in Levittown, which I visited together with Bjarne and Joyce, started at $13,000.

Paoli was then a small quiet town on the Main Line about 30 miles west of Philadelphia. Highway 30 ran through it in the East-West direction and Highway 202 crossed it in the NE-SW direction, more or less. I use past tense because the geography in and around Paoli has changed dramatically since 1958.

Bjarne who had started at Burroughs about three months earlier was already established there and had rented a brand new house in Malvern, the next town along the Main Line, in a development known as the General Warren Village. It was located near an historic inn called the General Warren Inn; in fact Bjarne's house was just a block and a half from the inn. Bjarne and his wife Joyce kindly let me room with them for the first few months after I came to Burroughs which was of tremendous help to me, since it would have been extremely challenging for me to hit town and come up with a place to live on my own in short order. Among other things, Bjarne had a car and I did not, so solving the transportation problem alone was a huge help.

In March or April of 1958 a severe snowstorm hit the Philadelphia area which left many areas without power and all roads except for the main thoroughfares impassable for several days. This was true also of the streets in General Warren Village. Bjarne and I put on our best cold-weather gear and hiked down to US highway 30 which had been plowed. There we went to the first guy we saw that was stuck in the ditch and helped push him out. In appreciation he gave us a lift to Burroughs and in this manner we were able to be among the very few dedicated people who showed up for work on those snowy days.

After a few months of rooming with Bjarne I had gotten myself together enough that I could set out on my own. I had bought a car so I could get back and forth to work, and had enough money that I could put down the deposit on an apartment.

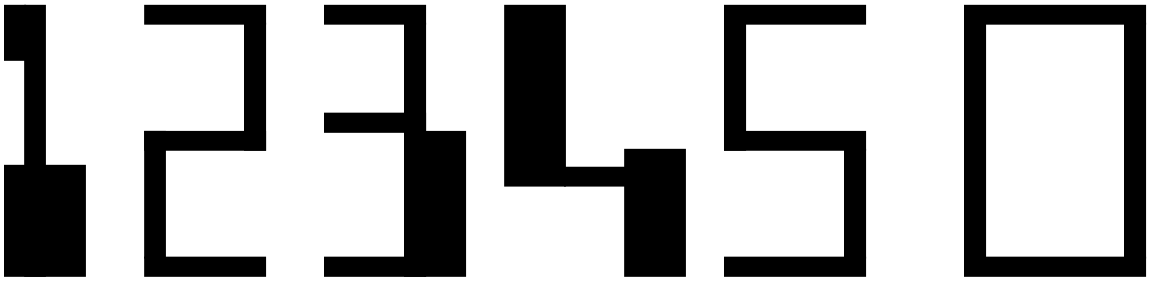
I rented a two-room apartment on the third floor of the Plymouth Hall building at 1 State Street in Media.

The office environment at the BRC was a long narrow hallway with four-man offices on one side and labs and machine shops on the other side. The engineers occupied the offices and the technicians and machinists had desks in the labs and the machine shops. There was one department manager and one secretary for about 40 engineers. I moved into an office with three other guys, Dick Fussell, Harvey Rosenberg, and Ralph Parris. Ralph was the only nonsmoker in the office, and he never uttered a word of complaint. O tempora, o mores! Dick was given the task of helping and mentoring the new guy so I got to work on his project tasks. The leader for our group, as well as a couple of others, was Eric Seif. Since Dick was my mentor, I spent a good deal of time with him and we became good friends. We both took evening courses at University of Pennsylvania and we often drove there together. I visited his home a few times; he lived with his artist-mother in a picturesque converted stable between Paoli and Newtown Square. He was, still is, a refined and reserved individual who was into theater and people like Alfred Lunt and Lynn Fontaine, and told anecdotes about Cyrano de Bergerac. He showed me many kindnesses and served as a great influence on my career. For my part I believe I influenced him to trade in his conservative black Plymouth for a brand new silver-colored Austin Healy 3000.

The work at Burroughs fulfilled my dreams about working as an engineer. The big project at the Burroughs Research Center in Paoli was to develop a check sorter based on the brand new technology called Magnetic Inc Character Recognition, or MICR for short. Not only was MICR bleeding edge technology with the accompanying circuit design challenges, the mechanical package itself was an impressive kitchen-counter-size collection of motors, levers, motion detectors, huge permanent magnets, (the joke was that it would stop any watches within 10 feet), voice-coil operated selector blades, springs, latches, and whatnot. And, it made a lovely noise when it ran, something along the lines of a threshing machine. Also, the MICR project involved the forerunner of industry standards groups such as the CCITT and EIA in the informal cooperation among Burroughs, IBM, Honeywell, and General Electric under the auspices of ABA (American Bankers Association) to work out a special type face that would facilitate interoperability among checks and machines. Because of differing recognition algorithms, the different machines were sensitive to different characteristics of the type face and these differences had to be accommodated, which led to protracted negotiations about the exact shape and line widths of each numeral and symbol. After each meeting of the “font group”, Eric Seif would come back with a new proposal in the form of 50X drawings of each character. These were then used to make transparencies for evaluation on our flying spot scanner which we had in the lab. This instrument consisted of a lens rotating around a photo-multiplier tube with a narrow slit in front of it, housed in a wooden box about five feet long and about 1ft by 1 ft in cross section. At one end was a diffuse light source in front of which we placed the transparency and at the other

end was the rotating lens. The transparencies were made up of 81/2 by 11 card stock with the character cut out and covered with translucent tissue paper. They were made in three versions for each character, nominal line width, 10% narrow and 10% wide line widths. Other printing faults were also simulated in the scanner, such as smudges, voids, ragged edges and skew. The evaluations consisted in scanning all the characters in all the anomalous conditions, recording all the waveforms by reading them off a storage scope and then calculating the correlation of each character against itself and against all the other characters. (This process was greatly facilitated by the sum-of-products feature on the Friden calculator. Sum-of-products is one of the most beloved operations in all of engineering mathematics, and like any beloved child it has many names. It is a convolution, a cross correlation, an auto correlation, a dot product, a vector inner product, an FIR filter, a transversal filter or a weighted average, to name just the ones that come to mind.) A passing result for a proposed font was when the auto-correlation for every character was at least 11% greater than its cross correlation against every other character for all the conditions of print anomalies.

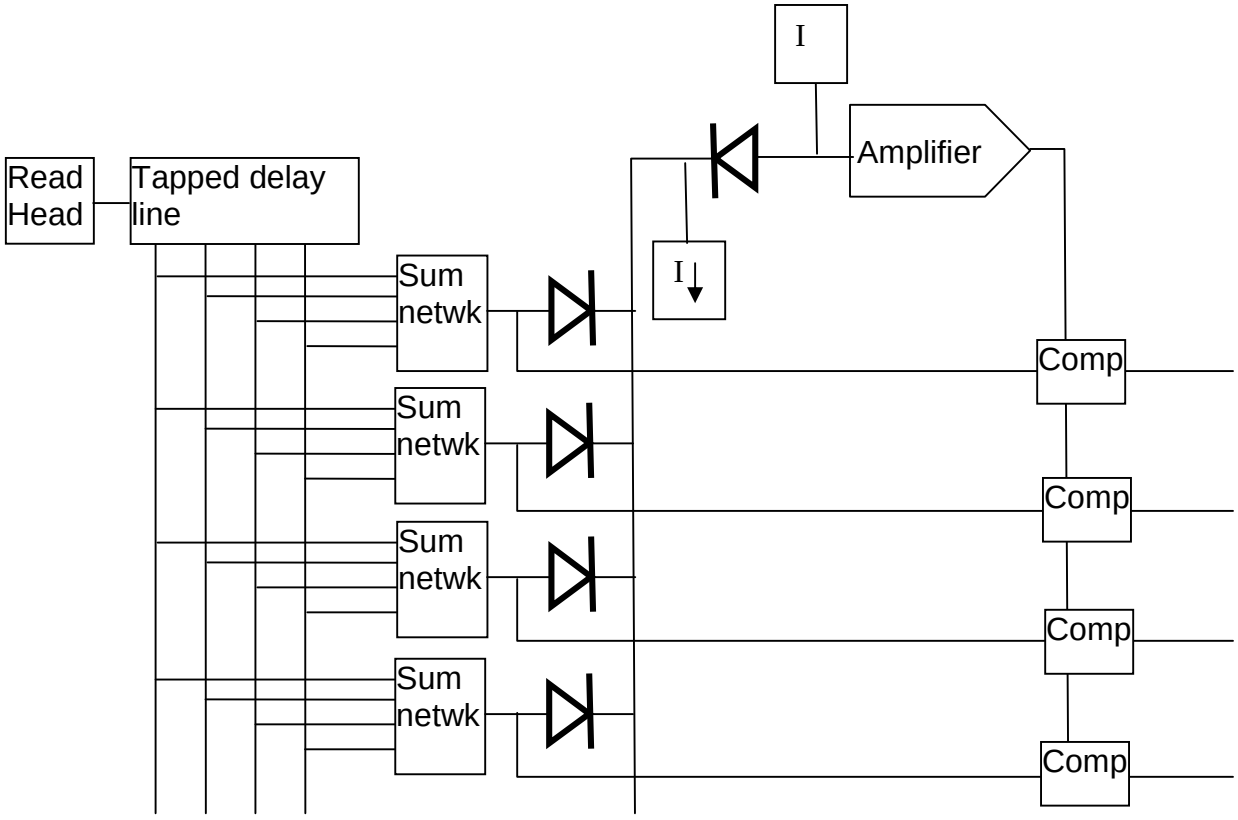
The strange appearance of the MICR font, or E13B as it is officially known, is due to the crude 1950's technology that it was designed to accommodate. The character recognition technique of the day relied on single-gap magnetic read heads with mostly analog circuitry for making the detection decisions. Consequently it was only able to measure the horizontal distribution of ink and make its decision based on that. (It is like a bar code with the additional constraint that the bars have to resemble normal human readable characters.)



As far as the recognition circuitry was concerned the characters shown above looked more like this:

As this illustration makes apparent, the distinctiveness of the characters in this form is considerably poorer than that of their visual shapes. As coding theoreticians would say, their mutual Euclidian distances are considerably smaller. Information theoreticians would point out that this is to be expected since we throw away all information about the vertical features of the characters and keep only the horizontal

The circuitry for recognizing these shapes consisted of a read head, an amplifier, a tapped delay line one character-duration long, a set of summing resistors, a diode mixer with a constant current source giving it the characteristic that its output was equal to its greatest input, a chopper stabilized amplifier with a gain of .9, and a set of comparators. The summing resistors were connected to the successive taps and sized such that the conductance of each was proportional to the nominal signal of its character at its tap, thus the output of each network was proportional to correlation between the character in the delay line and the tap-weights of the network. Schematically it looked like this



Analyzing this circuit now I see that the reverse biased diode being fully conducting causes the input to the amplifier to exactly equal the greatest output of the summing networks, since it will be coming through an also fully conducting diode in the opposite direction. This signal is then multiplied by .9 and compared

to all the summing network outputs to find the greatest one, which represents the character decided on. In light of current methods this scheme seems quite inelegant and inefficient.

The first circuit design problem I got to work on was to do a stability analysis of the power supply regulators. These were linear regulators, obviously since switching regulators hadn't been invented yet, and featured four cascaded emitter followers with the final stage being made up of four emitter followers in parallel with each transistor mounted in its own 8" by 8" by ¼" aluminum heat sink. The problem with this circuit design was that it tended to oscillate, and it became my task to figure out how to stop the oscillation. As encouragement I was often told that one of the professors at University of Pennsylvania, which many of the Burroughs engineers had attended, had a saying that "no electrical engineer can be considered experienced until has designed an amplifiers and had it oscillate." To which I would respond that the words "and made it stop" should be added to the saying. Anyway, by experimenting and testing, and reading about the characteristics of emitter followers I concluded that the problem was that the input capacitance to the emitter follower causes its output impedance to look inductive at certain frequencies, which connected to the input capacitance of the following stage creates a resonant circuit at those frequencies. This effect is multiplied for each successive stage until the tendency to instability graduates to outright oscillation. To characterize this I ran a series of experiments with different size inductors and capacitors in the circuit to determine under what conditions it would oscillate. I plotted the data from these experiments in a form I called the locus of instability. To analyze the results and prove that my theory correctly described what was happening I wrote up various equations, learning about, and how to use, the Routh-Hurwitz criterion to derive an expression for the locus of instability. I also derived a solution for the system with feedback capacitors across one or more of the transistors designed to modify their phase characteristics such that the output impedance would no longer be inductive, thereby eliminating the oscillation. This scheme was tested and worst-cased and proved to be acceptable as a solution and was adopted.

The expression for the locus of instability was too unwieldy for hand calculation, so to verify that the expression matched the actual circuit behavior I had to resort to computer solution. The Burroughs Research Center at that time had two Electrodata 101 computers and a couple of programmers. (The Electrodata 101 was a relay computer that operated at something like 1000 steps per second, and made a nice clicking noise as it ran. The rhythm of the noise depended on the kind of loops it was executing, the programmers claimed that the pattern produced by various algorithms became so familiar to them that they could tell what part of the program was running, and even if it was running correctly. The square root routine was said to have an especially pleasing melody to it.)

One of the programmers was a guy named Joel Pitcairn, whose claims to distinction among the rest of us engineers included the fact that he was a scion of the Pitcairn Aviation family, that he drove a Porsche Speedster, and that he knew how to program a computer. (I was totally envious on all accounts,)

Engineers who had computing work to do got to submit their request to these programmers, including complete mathematical description of the calculations needed to be done. Joel got my programming task and within a couple of days produced the results in the form of tables which I quickly plotted to see if they matched my measured locus of instability, and by golly they did. I wrote up a report on my work and one of the Burroughs PR guys suggested I turn it into a technical paper and try to get it published. He put me in contact with the magazine Electronic Design, which accepted the report and published it under the title “Low-frequency Instability in Cascaded Emitter Followers”.

My other project at Burroughs was to design a power control system that would insure the proper shutdown of the different power supplies in case any of them failed. The issue was that there were several different supplies powering motors and other electro-mechanical components and if one of them failed during sorter operation it could cause significant damage to mechanical parts unless the other supplies were also shut down as quickly as possible and in the proper sequence. This was a quite interesting task, requiring the design of detection logic and shutdown sequencer all implemented with relay logic. I did the best I could at analyzing and worst-casing my design but nobody checked it very thoroughly so I was always a little nervous about it going into production. Was it solid enough?

My first car

I found an ad for a used Austin Atlantic (which I was familiar with from drooling over while I was still at home). I told the dealer I wanted to buy it and put down a $60 deposit to hold it for me until I could arrange the financing with the credit union at work. When I went back to complete the transaction, I was told the car had been sold. Obviously, I was very disappointed. To add insult to injury, the dealer gave me a hard time getting my deposit back, I finally had to threaten him with the police. Next outing was on a Friday evening and I happened to stop by a used car lot where I saw a Hudson Commodore. Since Nelson had owned a Hudson and said many good things about it I was kind of interested in it and looked it over in some detail. The salesman put the pitch on me, but I said I wasn’t sure, I’d have to think about it. He closed the deal by telling me that the car might not be there tomorrow. So there it is. I bought the first car that I looked at, a big, old ugly 4-door sedan, painted pink (although it looked purple under the neon lights), when I really wanted something sporty, all because the salesman said it might be gone tomorrow. When my boss saw it he suggested I park it as far away in the company parking lot as possible so it would look like it wasn’t one of the employee cars. After doing this transaction I celebrated by having dinner at

a nice restaurant and then saw Viktor Borge, who was appearing at a local theater.

The Hudson was not a long lasting infatuation. No matter how much I valued the straight eight engine, which probably no other car in the parking lot could claim, the plain fact was that it was a barge on wheels, and the color was, frankly, embarrassing. The final straw came one rainy evening when I was on a date, driving to some event and the windshield wiper broke. In the pouring rain I had to drive with the window open so I could look out and see where I was going. The lady was not amused.

As soon as I had saved up enough for a down payment I bought a used Triumph TR-3 for about $1700. The dealer gave me a $50 trade-in allowance for the Hudson, but his comment was “Frankly your car isn’t worth anything.” The place where I bought it was the Saab dealer in Downingtown, the salesman’s wife Marge worked at Burroughs, and the former owner, Burch Smith was an engineer working at Burroughs. So it was all within a fairly close-knit group. I became good friends with Burch, rode in his beautiful Alfa Romeo to auto-crosses and ghymkanas, and was invited to his parties; he lived in an elegant little apartment on top of a garage or barn on a farm between Malvern and Exton. I was very impressed with his life style: this was how a young engineer really should live.

The Triumph was a big thing for me; it wasn’t new and it wasn’t the best handling or the most powerful, and it didn’t have the most caché, but it was an honest to goodness sports car and I was very proud to drive it. No more slinking into the back of the parking lot because I was ashamed of my car. Eric Seif, who had a little bit of a mean streak, had, of course, a comment on this car also. As I was getting into it on one of the first days I had it, he was walking by to his car and said something like “I wish I had personality like that.” I was too intimidated by Eric to feel insulted, let alone to respond.

As an actual sports car owner I started to get involved in sports car activities, joined the Eastern Pennsylvania Sports Car Society (EPSCS), and went to sports car races. The nearest was Vineland in New Jersey which was less than two hours drive and Marlboro in Maryland which was slightly farther. But distance was not an issue; I went to Watkins Glen in New York two or three times, to East Hampton on the farthest tip of long Island, to Lime Rock and Thompson in Connecticut, and to Hagerstown in Maryland. In addition to watching people race sports car I got involved personally by competing in Rallies. I went on Rallies with Dick Fussell and a mechanical engineer at Burroughs named Don Kirkpatrick, but most of my rally activity was as driver for Frank Hannon. Most of the time we used his 3.4 liter Jaguar, but at least once we drove in my Triumph. Frank was a big manager at Univac (he had been the project manager for the development of the Univac 3, the second commercial computer in the world) and lived in a mansion in King of Prussia, where I was a frequent guest and enjoyed the

hospitality of Frank and his wife Pat. We had some successes as a team and won or medaled in our class in local and regional rallies and even medaled in a national rally and made the sports pages of the New York Times. Frank was a totally generous guy who took care of all the expenses and arrangements and I just went along for the drive. The reason we did well was mostly due to Franks' navigation equipment and his skill in using it. The rallies were run over some of the most picturesque country side in Eastern and Central Pennsylvania and the views have remained vivid for me ever since, and made Pennsylvania an ideal of bucolic beauty for me.

My final task at Burroughs was to work on an optical character recognition project. I never got beyond the point of learning some basic optics, such as the difference between illumination and brightness, the definition of lumens and candle-power, and the basic ray tracing techniques. During this time my supervisor was Bill Allen, a really friendly guy who was a former Triumph TR-3 owner, but now a happily married man with two kids driving a Chevy station wagon. We spent too much time talking about sports cars but we still got the job done. One of his counsels to me, which I should have taken to heart far more seriously, was that I should spend more time researching the literature to find out what had been done so far on solving some particular problem instead of just trying to figure it out from scratch myself. In other words, he thought I had a tendency to reinvent the wheel.

Two of the more memorable characters in our department were Juan Gottshalk and Weld Carter. Both suffered from a severe case of logorrhea, continually bending the ear on trivial and irrelevant topics of whatever unfortunate person that had occasion to visit their office for some reason. Besides their talking habit they shared the distinction of having the most overflowing and messy desks in the whole department, if not the whole building. It was a scandalous failure on the part of the department managers that they allowed this kind of waste of time and Burroughs' resources to go on for years. Gottshalk was a serious amateur investor who belonged to an investor club. He started every day by reading the Wall Street Journal and then talking about items that had interested him with whomever would listen. Once a week, or whatever, the topic would be the discussions in that weeks investment club meeting. Carter on the other hand was more of a general purpose bull-shitter, who was ready to pontificate on just about anything. I remember his theory that the influence of aristocracy is the reason European languages have formal and informal versions of the second person singular pronoun (ni and du in Swedish) whereas Americans use the word "you" for everyone. I was not quick enough to ask how he explained the case of England, and too uninformed at that time to question why English speakers are so formal (aristocracy influenced?) that they don't use the informal version (thou) at all but address everyone with the formal "you". Both Weld and Juan were given projects that apparently where hard to measure progress on which may have made them feel safe in so completely ignoring the need for even the

appearance productive work. Weld's project was to research the literature on optical character recognition, which gave him the excuse for having his desk covered with stacks and stacks of documents. Juan's project was to investigate the possibility of building a discrete element simulator to study the behavior of a multi-gap read head using resistors. Exactly how resistors could be used to simulate the magnetic-inductive properties of a read-head was a mystery to me at that time, but as I gained experience I realized how the trick was done.

After living in my apartment in Media for a year I decided to move in with three other guys in a house they rented in Broomall. They were looking for a fourth partner to fill up the fourth bedroom and help share the expense, which was also my objective. John Steckert, George Nile, and Willard Hatcher had rented the house some time earlier so I moved into an existing group, but was welcomed and integrated into the group immediately. John was also an engineer at Burroughs, and was the guy who got me involved in the deal. George and Hatch worked for American Viscose, George as a chemical engineer and Hatch as production technician. Both George and Hatch were fanatical golfers who played most weekends, rain or shine, summer or winter. I was the only sports car nut and John did not have any consuming hobbies. However, before too long, John had bought an Austin Healy 3000 and George had an Alfa Romeo Giulietta, and they became my companions in driving to Vineland or Watkins Glen for the races.

In August of 1958, in other words after only seven months of employment I felt flush enough to spend money on a complete indulgence, I started to take flying lessons. This happened at a small airfield in West Chester, an FBO airport with two grass runways, one of which featured a pronounced hill so that takeoffs were done going downhill. The plane I practiced in was a yellow Piper Cub, model J3, and the instructor was a crusty old guy with a wooden leg or other such handicap which caused a severe limp. His temper was not much better, he would give orders and instructions and threaten me with bodily harm when I failed to follow them correctly. "Keep those wings level, or I'll break this stick (meaning the joystick) over your head" was a typical admonition. I soloed after eight hours of dual training. I did some local practice flying around the West Chester airport for a few months until I joined a flying club at work. This club owned an Aeronca Chief, which was a plane that was maybe one notch above a J3 in performance but basically a puddle jumper which took off at about 50 mph and cruised at 90 mph or thereabouts. I did some local training as well as some cross country trips with an instructor plus a couple of solo cross country trips in this plane. Some of the places I visited were Vineland, NJ, Easton, MD, and New Holland PA. I did some instrument training in a link simulator operated by an interesting guy at Wings field. He was one of the aviation pioneers and claimed to have pilot's license number 35. He told tall stories about building his own double-decker airplane and having all kinds of risky fun with it, including duck hunting. They would string up nets between the wings and fly behind the ducks and scoop them

up in the nets. Sounded reasonable to me. He was also an inventor who had designed a type of runway light that he claimed was the standard on airports all over the country. Another of his invention was a scheme for focusing radiation onto a specific spot in cancer treatment. He was also working on golf ball that would improve your score, by putting a graphical pattern on the ball that help you focus your eyes on it the right way. I don't know how well it worked, but I have to admit the man's range was impressive.

In addition to my leisure activities I also took some evening courses at Penn. The first was Introduction to Digital Computers, where Professor McNaughton introduced the class to computers by presenting the Hypovac 3. This was a very basic architecture with something like 6 or 7 instructions and only one register (accumulator). It was however sufficient for me to have my "aha experience" and much of my added knowledge and understanding of computer architectures are based on the foundation of principle that the Hypovac provided.

Another course was "principles of logic" taught by Professor Prywes. The most memorable thing about this course was that I learned what a Turing Machine is and proved it by acing a home work assignment that required us to design a complete Turing Machine. Two other courses that I took, a graduate Physics course and Numerical Solutions of differential equations were not as successful. I made D in the former and a C in the latter. This was where some of the gaps in the abbreviated Heald's engineering curriculum made themselves apparent.

One day in 1959 or 1960 a Red Cross van with a portable X-Ray machine visited Burroughs and invited the employees to stop by and have a free chest X-ray. I did as I was asked and about a week later I received a note in the mail to contact Dr. so and so because the X-ray had indicated something suspicious. It turned out to be active pulmonary TB. The doctor that treated me was Robert Lambert who saw me in his home in Berwyn, where he had an office, complete with fluoroscope. He also had a nice black Jaguar XK120 roadster in his garage. With me having the Triumph we had something nicer to talk about than just consumption. He concluded that the diagnosis was indeed correct and prescribed Isoniacid to treat the TB. He also recommended that I quit the Lucky Strikes, which I was then smoking at the rate of about a pack a day.
After the examination we went out for a ride in the Jag and risked causing in a violent way the demise he was saving me from by his medical treatment.

The next day as I was enjoying a cigarette with my morning coffee in the cafeteria Eric Seif joined me at the table. "What did the doctor say" he asked. I told him about the drug he had prescribed and that he recommended I quit smoking. "Hah, you'll never be able to do that" was his encouraging prediction. I made a quiet promise to myself that I would not give Eric the satisfaction of seeing that prediction come true, so within a couple of days I decided to quit cold turkey. I invented a couple of tricks to help me pull it off. The first was that I carried an opened pack of cigarettes in my shirt pocket every day and matches in

my pants pocket. My theory was that this would leave 100% of my attention and will power available to fight the nicotine urge when it arose, whereas if I threw the cigarettes away, some part of my mind would be occupied with the problem of getting hold of a cigarette at those occasions and thus reduce my ability to fight it. The second trick was that I fought the urge by telling myself that I only had to refrain from smoking today. Tomorrow I might start again, so I only had to hold out today. The third trick was to tell myself that I was only going to quit temporarily, until the TB was gone. After that I could start again, so I was not looking at an entire lifetime without a smoke. I kept the open cigarette pack in my shirt pocket every day for two weeks before I had the nerve to leave it home. After that it sat on my dresser for another couple of weeks before I decided it was safe to throw it away. And Eric never saw me smoke another cigarette.

My first two vacations at Burroughs I went back to San Francisco and spent part of the time with Nelson Bohall. We drove to Yosemite on one of those occasions and had the benefit of Nelson's extensive knowledge of the park and its surroundings, gained through his work in setting up microwave systems for the park rangers. One of the places we visited was Tuolomne Meadows, which was then definitely off the beaten path.

In the summer of 1960, after I had received my citizenship and US passport I went back home for a visit. I traveled by Icelandic Airlines from New York to Amsterdam, with a stop in Reykjavik in a big old four-engine propeller airplane. After some touristing in Amsterdam I flew to Copenhagen in an SAS Caravelle. This was my first flight in a jet. After Copenhagen I took the train to Uddevalla to visit my brother Sven-Olof where I stayed for a couple of days with him and his wife Ulla. After that the next stop was Stockholm for some more sight seeing. The trip from Stockholm to Mariehamn was another first travel experience, a two-hour low-flight just above the water on the Hydroplane boat Sirena. At home I saw everyone except my ailing grandmother plus some of my cousins from Björkö. My grandmother had been bedridden for a number of months and was basically on her death bed. She wasn't completely clear in the head at that point and I guess I used that as my excuse for not going in to see her. The reason was that I was afraid that it would be too unpleasant for me to see an old decrepit dying person. It did not occur to me to think that it might be nice for her even in her reduced state to see her grandson from America. It's something I have been ashamed of ever since.

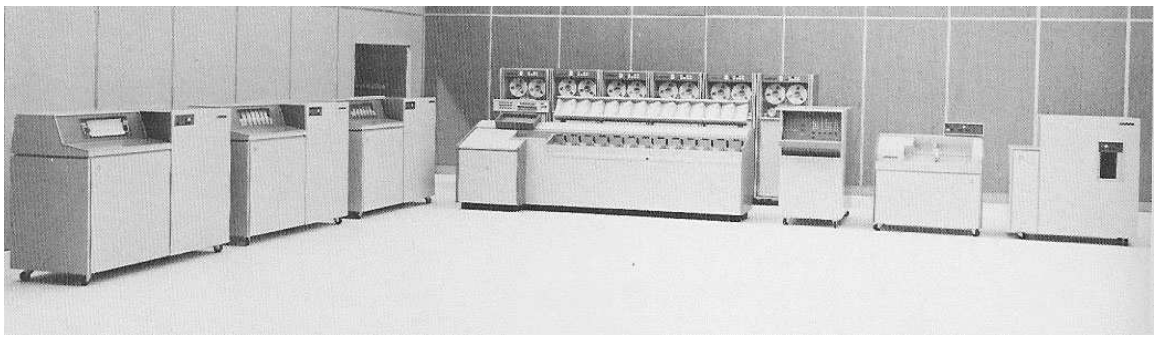
Things in Baggholma had changed quite dramatically during my six-year absence: they now had electric power and electric lights in all the rooms. A deep well had been drilled that provided running water to all the homes on Baggholma, although the flavor was a little off due to salt and mineral content so people did not like to drink it plain, but instead mixed it with some juice concentrate to make it go down easier. Transportation, which had always been virtually a life and death issue on the islands, had also undergone significant progress. Instead of getting a ride on a small motorboat to the nearest steam ship stop (Lappo) for an

eight to ten hour journey to Mariehamn, I could now ride with the "milk boat", a bigger faster motorboat that ferried the days milk production to the nearest bus stop, a trip which took less than five hours, Baggholma to Mariehamn. And plans were underway to build roads between the islands in Brando and ferry ports for year-round ferry traffic.

Before leaving I spent a lot of time thinking about what kind of gifts I could bring with me that would be uniquely American, something they couldn't get in Finland normally. Unfortunately my budget was quite limited, in spite of my reasonable salary I had a very hard time saving any money (I had to borrow from the credit union to pay for the trip) so I had some difficulty finding unique interesting useful things. The result was quite modest, the only things I remember is a carton of Marlboro cigarettes and a potato peeler. The cigarettes turned out to be a lot more trouble than they were worth due to customs difficulties, but I got them to the intended recipient eventually. In Mariehamn I was able to get together for a "klass träff" with my old buddies from Ålands Lyceum.

Before my trip I had borrowed Nelson's Polaroid camera, partly to take pictures and partly to impress the locals with the latest American technology. I found it very useful in striking up a conversation with girls, I would just snap a picture of the some good looking chick and then ask her if she wanted a copy. It worked pretty good.

In the spring of 1961 I decided to learn digital and logic design since I thought that with integrated circuits coming to replace discrete components, physicists would be doing the circuit design and I was not well trained in physics. (This was of course a misapprehension on my part which I could easily have corrected by discussing it with some of the more senior guys at Burroughs, another example of my tendency to avoid asking questions or consulting existing materials, which Bill Allen had found to be my main weakness.). Be that as it may, there was also another element, I was hankering to get back to California, and now that I was a US citizen I could apply to defense related companies, which were still the main employers of electronics engineers in the Bay Area. A lot of the recruiting ads for those companies specified digital design and systems engineers. I responded to an ad from a group called Beckman Systems in Palo Alto. The location was ideal and I was somewhat familiar with the company (my aunt remembered that I had expressed the ambition to work for Beckman some day once when we had driven past their plant in Richmond on our way to see Uncle Axel in Paradise.) My application resulted in an invitation to interview with the manager of the systems group in Palo Alto, a man named Jim Tillotson. The interview took place in Philadelphia and seemed to go well. Tillotson was a personable and easy-going Oklahoman with a lot of enthusiasm about his operation and a free and open manner. Shortly after the interview I received an offer from Beckman which I immediately accepted and proceeded to make my plans for moving to California.



The Burroughs MICR check sorter.

Back

State street in Media, view from my apartment

Plymouth Hall with my Hudson parked in front.

Back

Austin Atlantic

Back

Hudson Commodore

Back

My Triumph TR3

Back

1963 Austin Healey 3000 Mk II

Back

Alfa Romeo Giulietta Spyder.

Back

The grid at Vineland

Back

Frank's Jaguar on a SCCA rally somewhere in Virginia

Back

With Frank Hannon and our Rallye trophies

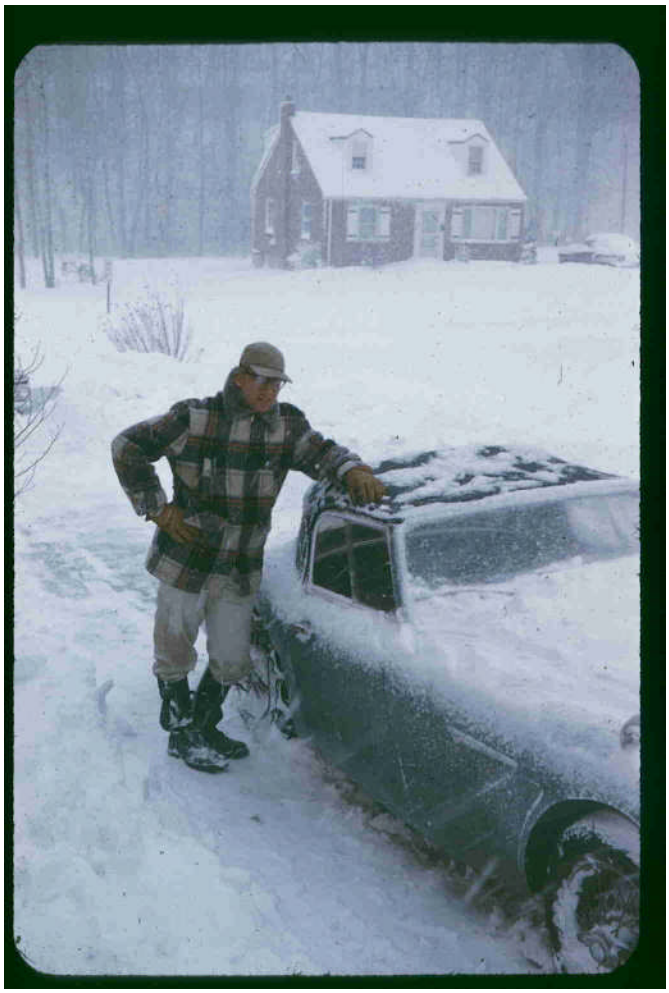
Back

2880 Lovell Ave, Broomall, Pa

Back

Willard Hatcher digging out his car

Back



John Steckert with his Austin Healy 3000

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Piper Cub

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My "Solo certificate"

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Aeronca Chief --practicing wheel landings

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Hydrofoil boat Sirena trafficking Mariehamn-Stockholm Back

On the milk boat

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Transfer from milk boat to bus at Långnäs

Class reunion in 1960

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Caravelle

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With Dick Fussell on his tractor around 1965

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