

A MIND, A MAN, A MYSTERY:
The Complex Life of David Shelton Cochran

A Thesis

Presented in Partial Fulfillment of the Requirements for the

Degree of Master of Culture, Society and Justice

with a

Major in Anthropology

In the

College of Graduate Studies

University of Idaho

by

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December 2022

Abstract

This is a life-story of David Shelton Cochran, who is also my father. This ethnography is an attempt to use my father's own voice gathered over the course of his 90 years of life in a way that shares his perspective through his more personal memories and information gathered from various other sources. He began an ambitious biographical writing project about a decade ago, when he was still a youthful octogenarian, but has long since set it aside, incomplete, and unfinished. He is now hoping that this work here will create the fuller and richer life history of both his personal and professional life beyond those documented by mostly technology writers and electrical engineering enthusiasts. I have built a bridge between ethnographic narrative and history by conducting interviews of my father while researching the well documented historical context of his career achievements. Using my father's personal documents as a take-off point, I focus my interview questions on those areas that he had at one time begun to recollect and write down but needed to be expanded and more fully developed. I spent many hours both in person and virtually to assist him with his autobiographical work, helping him to accomplish his dream of leaving a legacy for his family beyond just his professional achievements. What we accomplished together here is to illuminate his unique string of pearls of a life actively, voraciously, and fully lived. In the process of interviewing my father, it transformed us both in a way that was enriching as it was delightful. This work is a gift to both my father as my subject and myself as the interviewer; for what is a life that bears rich fruits if not one of compassionate and generous reciprocity.

Acknowledgments

First and foremost, I would like to thank the members of my graduate committee. This was an endeavor of patience by all parties. I also wish to acknowledge the many professors over the years that were dedicated to training future anthropologists and always insisted on hard work and excellence.

Next, I could not have had access to more than fifty years of archival information without the assistance of many Hewlett-Packard (HP) staff and alumni who worked with the hpmemoryproject.org and The Computer Museum. Also essential was other contributing technical writers, radio and internet show hosts who allowed me to use my father's words directly from their interviews.

I wish to especially acknowledge the participation of my subject, David Shelton Cochran (now deceased). He answered my endless questions during our many interviews. Just as importantly, I could not have accomplished this work without the steadfast help and dedication of my father's life partner, Reina Lopez, who fielded phone calls, relayed messages, questions, set up zoom sessions, and made sure I had much of the reference material and many of the images used within the retelling of my father's life story.

My thanks to The University of Idaho Writing Center, COGS, friends, and family for assisting me in editing my work. I could not have gotten the writing laid out without them.

Dedication

I would like to thank my parents and dedicate this thesis to them; my father for giving me access to his personal writings and to Reina Lopez for handing his memory works, images, and publications over to me.

I wish to thank my incredible daughter, Madysen, for always believing in me, and also for saying more than once that I was just like my father. This project has made me realize that she was right.

Finally, a special thanks to my dearest Bruce, who made sure I was fed throughout the entire writing process of this work.

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CHAPTER 1

Introduction

This is a life story of David Shelton Cochran who passed away October 7, 2022, during the editing portion of this work. I was fortunate to find out more of who my father was and interview him before his health declined to the point that he had difficulty communicating. This work is based on my father's written memories, which illustrate his own perspectives and narrated in his own voice. His first personal family story was written in 2010. He was upset that he could no longer remember the sound of his mother's voice so many years after her passing. He suddenly realized that he wanted to write about all the things he could remember about his life. Over the next six years he wrote a small collection of "vignettes" (D. S. Cochran 2010-2016), which varied in length from a few paragraphs to a few pages long. I was aware that he had written some things about his parents but had no idea he had added more meaningful memories. When I visited him in December of 2021, I was given his journal to take back to Idaho to my printshop and bind them together. On the flight home, I read one event and realized that the little stories probably covered so many parts of his life with which I knew nothing. I called him immediately and asked if I could use them for my graduate thesis project. I realized time was short and began to create an ethnography based on his life.

After he signed the consent form, I interviewed him both in person and virtually, based on his autobiography. I also investigated his published work from his twenty-five-year history with the Hewlett-Packard (HP) Company. His career was the center of his adult life. I knew only a little about his direct involvement in the creation of the world's first desktop and pocket calculators, first as a team member and then as a project manager. Many years after

the calculator's huge success, he gave presentations to groups who wanted to hear about the marvels of those two innovations directly from one who lived it. His best-known presentation was called, "HP Calculations: From Desktop to Pocket," written by him as talking points in April of 2009. He would give his presentations to community members, college students, engineer laymen or experts, for almost a decade across the US and all around the world. He knew it could help people understand what it was like to live and work in the midst of the Silicon Valley technology revolution. His last talk was in 2018, at the age of 86, at the Hewlett-Packard Hand-held Users Community (HHC) in Palo Alto, where he received a standing ovation and an award for best speaker in the group's forty-year history. His other well-known presentation work is entitled, "HP-35 Design: A Case Study in Innovation," drafted in November of 2010 and revised in May 2011 by editor Dag Spicer, expressly as an addition to the Hewlett-Packard Memory Project (hpmemoryproject.org).

Another source for understanding my father's perspective were several interviews as a guest on radio shows. He was the first guest in a new series for innovation guru Phil McKinney called *Killer Innovations* (McKinney 2009), but more famously seen and heard on a YouTube interview by Steve Leibson, an engineer and technology writer/editor for Electronic Design News (D. S. Cochran, YouTube 2013).

What follows is an explanation of what an ethnography is, its long history in cultural studies, and how the sub-genre of life stories involves many considerations and criticisms.

Ethnography as a Tool to Study People

Cultural studies explore a shared group's norms, values, beliefs, knowledge, customs,

and organizational systems that are non-material as well as physical manifestations that are produced such as shelter, clothing, tools, and art. Both ideations as well as tangible artifacts like musical instruments, storage containers and meeting halls can all be studied to find out how a people live and what is important to them. For cultures long gone from extinction or migration, it is still possible to know how they lived through the things they left in their wake. Social relationships weave in and out of all aspects of culture since humans are inherently social beings. Studying relationships through kinship, language, economics, rituals, organizations, values, beliefs, and a myriad of other situations where individuals or groups interact with one another explains an essential aspect of how and why a society functions.

An Ethnography is a qualitative, systematic investigation of an individual or group in terms of social relationships. Social Anthropologists have always tried to find the best way to study how others think, feel, behave, and create as members of families, groups, societies, and systems that are passed on. It has aspects of the universal human condition that can be viewed on a large or macroscopic stage as well as pulling in particular elements found in individuals or groups. Ethnographies are undertaken to answer all sorts of questions, such as *who are these people and how did they get that way?* The results can help describe a given population, make policy decisions, determine special funding projects, illustrate grievances, understand behavior, alter medical, financial, educational practices, or just tell an individual story or a group history. Each ethnographic study involves detailed investigation and research. The most thorough research has been completed out in the field, embedded amongst a community, using scientific methodologies to collect, analyze and interpret shared characteristics in order to have a better understanding of them. It may involve interviews,

surveys, observations, participation in rituals or social activities alongside members or more commonly a mixture of those research tools. The research may involve different elements of compensation for participants. Direct payments in money, vouchers or provisions are offered and incentives for subjects, though people may readily volunteer to benefit indirectly by the increase of prestige or just a good feeling to be seen as an important voice on behalf of others. A study can involve just one or a few key informants all the way to larger groups considered to be representative of an entire community. With an individual participant, the purpose can be to illuminate a particular point of view through their own remembered stories or experiences. Putting together a compilation of several life stories can help explain something of interest within the larger community or culture.

Ethnographies have a long history of use to study culture. During the late nineteenth and early part of the twentieth century, the study of culture had grown to begin to move away from universal generalizations used to compare “them from us.” The earlier traditions of culture study emphasized the differences between various peoples, especially from the Western point-of-view. It was a comparative rather than inclusive methodology, done from an “outside-looking-in” approach. Fortunately, other anthropologists began to practice a multidisciplinary methodology to gather information by looking at cultures more broadly or holistically. This is particularly important by considering the other underlying elements of human life such as the inner mental landscape which some believe is the real generator of all culture. The participant-observer researchers felt more was to be gained by embedding themselves into the culture they were studying to gather their data in a more intimate way. Social anthropology began to be less sterile and more collaborative; sometimes yielding extraordinary perspective in the data. Many ethnographers began to draw in closer by

emphasizing the particular individual's experiences and using their life story to be a voice that reflects the times and histories of the group from which they come. I remember that my ninth-grade class read the biography of Ishi, the Yana Indigenous person found and then studied (Kroeber 1964), and how deeply it affected me. My thesis is also a combination of memoirs, biographies, and research; though I do not use my thesis to explain the sub-culture of Palo Alto, Silicon Valley residents or the engineering world per se, hopefully it is implied by the background information I supply.

Considerations and Critiques of Life Stories

As always, there are considerations and criticisms of ethnographic study, but they are magnified in the sub-genre known as life histories or life stories. For example, Vincent Crapanzano's review essay for the *American Anthropologist* (Crapanzano 1984) shines a critical light on the oral history approaches of five distinctive authors, all publishing in the early 1980s. He summarized their work as somewhat of a mixed blessing. Overall, Crapanzano is a skeptic of life stories, with his biggest argument based on common methodological pitfalls. Is it ever possible to get in-depth enough to the real story, no matter how the information and data is collected, recorded, analyzed, and then re-told? He argues that despite some limited popularity, the life history as an academic exercise pales in comparison next to other forms of cultural anthropology. In part, this is because he suggests it is a genre that is a poorly regulated "peripheral" activity that presents more shadows than illumination. He claims this is because the very nature of compiling information contains the two biggest enemies to scientific research: that of ambiguity and sentimentality. Because of this, a life story can be both more "literary than scientific, yet more scientific than literary" (pg.954). He posits that this genre is sometimes viewed as an embarrassment to the more

purist academic portions of the anthropological discipline, many of whom fought long and hard to be considered seriously by colleagues and members of other sciences. The fact that anthropology has merged with archaeology, biology and linguistics was a bold move in that direction. Combining geology, climatology, and other disciplines to solve real world problems through applied anthropology brings a more comprehensive, holistic approach, than ever before. There are still debates, especially in the post-modern world, about what is “really” real and is it even possible to know the difference between fact and fiction given our own egos, our own experiences, our own values, and expectations dominate how we see the world and others. Cultural anthropologists have often been accused of creating conjecture from “soft” data and making generalities or even inadvertent misrepresentations that can result in unintended consequences. Postmodern criticism’s biggest objection is that the creation of life stories is often more like creative acts than of truths. There are always tensions to mitigate involving trust, status, motive, perspective, and relationship between those being studied and those who are researching them. This is especially true between those who live vastly different lives with alternative customs, values, attitudes, norms, and views. Other criticisms of life stories ask how is it possible to tell if something is true without witnessing it yourself? How do you know that subjects are being truthful? How does one know if the power differential or incentives are not skewing the data? The biggest quagmire in ethnography specifically is in the collection, analysis, and interpretation which Crapanzano believes inevitably reflects more about the researcher than the researched. He concludes that the position of the “omniscient narrator” telling the life story is itself a “literary construct” (pg. 959) but concedes that by recognizing our own shortfalls and limitations, it is still worth trying to get a reasonable taste of the essence of the work.

David Zeitlyn's article, "Life-History Writing and the Anthropological Silhouette" (Zeitlyn 2008) emphasizes that writing the life-history of another must be done with the understanding that we are at best able to create something less than complete or full but "demonstrably based on an individual, and honest about its limitations and incompleteness. . . yet striving for faithfulness" whenever possible (pg. 159). In essence, an anthropologist doing a life-history does not give up because the partiality of the story is inherent, but as ethnographers, we do our best for as much impartial accuracy our discipline demands. When he asks questions, takes notes, records conversation and finally compiles in final form, Zeitlyn says, "Therefore I must translate; as an academic I must transcribe; and as an anthropologist I must interpret. As anthropologists we think our way through people's lives, our own first among them" (pg. 160). Therefore, a reflexive statement is such an important part of the telling of any personal story of another. My own reflexivity and motivation statement is explained in the next section.

Charlotte Linde posits in her book, *Life Stories: The Creation of Coherence* (Linde 1993), that while a life-story may be steeped in unusual or unfamiliar behavior and belief systems, contradictions, or inconsistencies, it is essential that it be retold with a cohesiveness of narrative and in chronological order. Her example would be in the life story of someone with mental illness or drug addiction. To disobey these rules in the telling of life stories is a kind of chaos which is not only uncomfortable but difficult to consider within a larger narrative of the family, the group, the community, and society. Linde is a linguist who analyzes oral and written histories down to small, distinguishable parts. Her studies have shown her that certain elements are necessary to make for the successful retelling of a life history that is rich, vibrant, comprehensive, cohesive, and clear. A chronological timeline is

essential to go from where a subject has been, where they are now, and an expectation of how their future will be. Life stories can sometimes seem to evolve as they may undergo revision as facts change or situations alter. Individuals have their memories and subjective experiences that are colored by attitudes, beliefs, and values; they can also be influenced by strong emotion and are often selective. People can always give controversial views of the facts due to perspective and changes in context, though it can be compensated for by collecting further information from family members, friends, or coworkers. For people with lives dominated by their careers (as my father's was), certainly the non-work relationships can flesh out a more complete or coherent life story for that individual.

Linde also emphasizes the importance of a linear approach of a retelling of a life story through *facts, reasons, and accounts*. It is the ethnographer's skill that takes a collection of bits and pieces taken from an individual or group and molding it into a cohesive life being retold. While supporting the speaker's own words is critical, strong interviewing techniques help smooth out some of the challenges of incomplete stories and may bring more clarity and narrative flow that feels more authentic to both the speaker and the audience. Developing a sense of trust between the subject and the ethnographer is an essential element of this process.

In his book, *The Power of the Between* (Stoller 2009), Paul Stoller emphasizes the intense need for stories in our lives. He scoffs at the argument between science on the one hand and stories on the other and puts a high value of the importance of anthropologists in our world. He says, "In ethnographies, memoirs, novels, and films, anthropologists tell other people's stories. In doing so, we tell our own stories as well" (pg. 171). Being human is to deal with a messiness of social interactions that stories can reveal, explain, educate, or just

plain entertain. We are always trying to bridge the chasm between oneself and “the other” to lessen the anxiety of living in a world of shared space and multiple levels of interpretation of reality that comes with it. He says that stories act “as defenses we build against the unsystematic and unstructured nature of our experiences within that reality” (pg. 33). Our observations, experiences and the subsequent stories we tell ourselves about those events structure how we navigate through them. We share stories with our children to give them a sense of these alternate realities. We describe the world and their place in it. Stories are how we learn best to be not just a human being, but to be a part of something bigger and older than ourselves. The shadowy nuances of uncertainty of the human condition are resolved, I believe, by seeking out people quite different from the familiar and asking them about themselves. My belief is that we are all closer than we think, interconnected in so many ways but that we just do not know the stories of connection yet. Every experience we have, every person we meet and stories we share with one another brings us closer together.

Gathering The Data

My job has been to research my father’s life as thoroughly as possible so that I can collect, review, analyze and present his life story. To accomplish this, I have used a number of sources, starting with his autobiographical memories, personal notes for presentations, interviewing and outside research. I went through more than 1200 images from inside the family and off the internet to add intimacy and impact to his stories and my work. His “vignettes” were like snapshots of moments in time. They ranged from a few paragraphs long to several pages. From those, I asked him a series of fifty-five questions related directly to his personal memories as well as from my research concerning his career (see Appendix 1 for a complete set of the questions and answers). We began conducting in-person interviews

between March 14-17, 2022. These interviews were recorded, transcribed, then edited. As a point of discussion during the last two days of my visit, I used the Psychologist Edwin G. Boring's work, "Great Men and Scientific Progress" (Boring 1950). It was our most in-depth and lengthy discussion of all, and it seemed to have transformed our conversations as we moved from a discussion of his life events into philosophic considerations. Though I was learning a lot about him through the ethnographic process, he was learning about *me* as his eldest daughter who left home early and stayed away too long. This shifted our relationship a great deal, (something that Linde noted is constantly evolving during that the collaborative process between subject and listener). One of the most frequently made comments from my father during the Boring article discussion was, "That's an interesting question!" We came a long way in sixty-six years, and by far the biggest leap we have experienced in mutual understanding resulted from this discussion. I felt we had come to meet in the middle of a bridge which has always been distinct by differing perspectives that intersect elements of phenomenology, experience, knowledge and understanding.

For the next fifteen Sundays after returning from our visit, I held virtual interviews with him, usually sending questions a few days in advance so that he could consider them. I averaged only three to five questions per week, depending on his health. Throughout both in person and virtual interviews, I used a qualitative and responsive approach to ask questions. A good, responsive interviewing technique tries to take the result of many interviews done over a period of time to tease out a more complete version of the topic. The process is much more than a conversation in that it involves intense listening, mutual trust, and respect of personal privacy. It also allowed me to discover who he was as an individual and take a peek into that hidden inner life "in which we create our private universe of meanings." (Linde, pg.

12) This period of time formulated much of the emic perspective of learning about another's life.

Remembering the Past

Remembering the past is harder than we think. Memory can be with an individual, a group or even national. Individuals have their subjective experience and memories that are colored by attitudes, beliefs, and values; they can especially be influenced by strong emotion and may often be selective. Groups have narratives that often explain historical events and how it affected them. Social memory refers to the relationship between identity and historical memory, often referred to as collective memory. Even with my father's photographic memory he has regrets that he cannot remember more about the people he loved early in his life. He only came to realize that he did not know much about them at all. Therefore, life stories are an essential gift to the living as well as honoring the dead. My father wrote:

I really miss my folks; they have been gone for almost 50 years. Sure, there are a lot of things I want to know, but it would have been nice just to spend more time with them. Why didn't I call my dad every-so-often just to say hello? I had seen my father several times holding court in a bar telling stories about the old times. I wish I had transcribed his tales because I scarcely remember any now. Even after left home when I joined the Navy in 1950, I had a chance to spend time with them. After nine weeks of Navy boot-camp, where it seemed that was all we did was a lot of running around the base, I was sent to Electronics School on Treasure Island in San Francisco Bay for an entire 36 weeks. It was my old stomping ground, and I was happy to be back in the area as I had been a little homesick. I came down to see my parents occasionally but most often just to borrow the car. I don't remember eating dinner with them. I met my dad a few times in San Francisco; he would take me into a bar called Breene's Long-bar in the financial district where he would brag on me a little. Occasionally I would bring a girl home but that was about it.

I'd give anything to talk to my mother again. I would ask her so many questions: 'tell me about your childhood, you told me so little. Tell me about your father, what do you remember about him? How did he meet Grandma? He was from Germany, and she came from Missouri; how did that happen?'

- Excerpt from the first written vignette of David S. Cochran

After the passing of a loved one, the giving or receiving of a eulogy, the finding of old diaries or journals or cleaning out their home, we sometimes discover that we did not really know as much as we thought about the departed; perhaps if we had only asked more questions when they were alive, we could have understood them better. Then the question becomes did we ever really “know” them at all? Like the fable of the six blind men and the elephant, our perspective may be inevitably tainted by our own illusions or mindset. It also could be the fact that humans can be inconsistent in their behavior. Inarguably, we are one thing to the market clerk, another in the classroom, another to our siblings and yet another to our friends. Even then, our moods and behavior are so easily altered by something as complicated as a traumatic event or as simple as taking a medication. How, then, is it possible to paint any kind of picture that even approximates the essence of ourselves or especially others? Plato used his fifth century BC analogy in Book VII of *The Republic*'s cave as a thought experiment to illustrate his belief in phenomenology (Plato 1982). In his story, he wants readers to imagine people restrained in a cave experiencing only puppetry illuminations to illustrate the possibility that what we think of as our world may well rest on a shadowland of projections. Like the group describing their tiny piece of the elephant or the mirage of a lake in the distance or mistaking a rope for a snake, we have a reflective view that sometimes says more about ourselves than the world and people beyond.

Reflexivity and Motivation

Reflexivity is at the heart of ethnography. It is a main component because of the way it colors the way data is collected, analyzed, interpreted, and presented. My biggest

motivation is that the subject is my own father. He has a story he wishes to tell, and he wants me to tell it. Others certainly have been enthusiastic about things he did in his life, and they describe him as unique and fascinating. I also admit that I know little of my father, so that is part of my reflexive equation that is immensely important.

On the positive side, I am fortunate that I grew up in the same town as my father; I went to many of the same schools, went to the same stores and movie theaters, and was exposed to many different influences, so I do not have to jump across geographic or ethnic barriers to understand his perspective. However, his experiences during the Great Depression, World War II, The Korean Conflict, and early years of Vietnam made for a lot of friction between us. I grew up during times of social unrest, activism, terrorism, and distrust of my government, so we did not share the same world view at all. Over six decades later, in the re-telling of his story, choosing what to write about, accentuate or put in a certain order is merely a reflection of my own beliefs though my father's own words are the foundation of his personal stories. Luckily, my father and I have found to have much in common and our positions have softened with time and experience, finding more middle ground. The number one research skill needed to undertake any ethnographic study is to be authentic in who I am and viewed as earnest and trustworthy. I must be able to honestly see myself and the preconceptions that I have about both the topic and the subject. Also, I know my father as a man of integrity. Many of the things he has written about or told others can easily be verified.

Presenting the Data and Telling the Story

One needs to decide, like good journalists, what, when how and who they seek out to ask the questions, get the answers and then work out how to put everything together to make

a coherent, cohesive, and authentic story. But as criticisms of life stories come to agree, an approximation of the accuracy of retelling another's story is possible though there should be no question that although ethnographers try their best to collect accurate data, then reflect it back in a flowing narrative that describes the subject of the project. We are bound to do our best, take accurate notes, ask questions that will bring out the most complete recollections and telling of the tale, transcribe carefully, look for patterns, analyze the information and then reconstruct everything into something that is more scientifically oriented, yet flows as a literary work. In the spirit of good anthropological research, ethnographies require that the investigator always does their best to represent the person in a way that is considered authentic to them and others in their sphere of relationships. If we use the person's own voice, listen carefully, employ techniques of responsive interviewing, but draw them out to facts, reasons, and accounts, include context, set them into a chronological order that makes for a life story that is a cohesive, rich, vibrant, and compelling of a life that bring Zeitlyn's silhouettes into sharper view. As Stoller would say, stories link our past, present, and future, "etching our traces in the world. Stories are for eternity, when memory is erased, when there is nothing to remember except the story" (pg. 173).

Telling the story for me really began with finding out more about the families my father was born into. I felt it essential to begin by setting the stage, with a combination of his research and mine. I believe it establishes the Rosenau and Cochran families as a solid foundation for my father's life. These courageous pioneers and visionaries, with a keen sense of adventure on both sides, became the basis for the kind of life for my father then would have. It was filled with free-spirited imagination combined with expectations of hard work and dogged persistence. My father's family also exposed him to an amazing array of

opportunity. Being born during the New Deal era created prime conditions for new ideas and productivity. My father was especially influenced by WWII, the Korean War, and the Cold War. He was living in a great period for science and research which were vast fertile grounds for his innate desire to learn and grow. Obviously, being born male and white, and into privilege, helped immensely during those years of incubation.

Outside research pulled in contributions from other sources such as journals, articles, book excerpts, websites, images, radio, and video. I sifted through the large volumes of information about my father from many different angles, including the voices of others to help me get an outside perspective about him. I feel that this helped me balance and solidify what he remembered about particular events as well as how others may have remembered about the same incident. I used online interviews with key participants as well as other technology researchers writing about the same events to support and round out the picture of my father.

After setting the stage, I follow with chapters of his early years of childhood and youth, then teen years and young adulthood. His adult life is covered in chapters beginning with the Korean conflict, then into his post-war years, family, education, and career. His career years take up several chapters since they encompass the bulk of his life and involved quite a lot of his time and attention to his love of “figuring things out.” His career, his volunteer work with an accreditation company, his consulting jobs, giving presentations and visiting with friends and family also allowed him to travel extensively. He found people from other places and cultures to be endlessly interesting and over time this activity altered his perspective of himself and his relationship to others.

Ultimately, my father, David S. Cochran, was a man perpetually in motion. He was in

many places at many times, and he was very fortunate to have led such a life of intense interaction that allowed him to frequently be in the right place, at the right time, with the right people. He was the right individual too; his characteristics guaranteed success for him in his chosen field. He had a great mind that saw the world in terms of how things could be deconstructed, analyzed, and reconstructed. He had a photographic memory and an intensity of curiosity, drive, focus, tenacity, and self-confidence. He had incredible vision while also understanding that any success is the natural result of building upon multiple failures. I cover this in the last chapter in the conclusion portion of this work through the lens of historical contingency. Historical Contingency is a theory that says that all history, whether describing an individual, group or society, is based on causality. Historicists Thomas Andrews and Flannery Burke say, “To argue that history is contingent is to claim that every historical outcome depends upon a number of prior conditions; that each of these prior conditions depends, in turn, upon still other conditions; and so on” (Andrews 2007). An understanding of historical contingency is to also acknowledge that every life path has a dynamic unfolding that bonds us to events and each other, like a giant web of connections.

CHAPTER 2

Setting the Stage

Why A Maternal Grandfather Came to America

(Taken from Dave Cochran's biographical materials, which are single-spaced, with additions of research portions by Lisa Cochran presented as double-spaced.)

The importance of Frank Leopold Rosenau's travel to America cannot be understated. First, it brought an ambitious, imaginative, and courageous man from a rural farming life to a foreign country. Like many immigrants, he was in search of more opportunity and the possibility of a better life. Second, it allowed him to find and marry the woman who would become a mother of the new generation of German Americans. As the father of two daughters and a son, he brought a perspective based on a traditional German upbringing of hard work, responsibility and family that was the foundation of the children's lives. Third, his drive and creativity took his humble beginnings from working at a small laundry business in the San Francisco area and growing it into a formidable establishment that employed as many as five hundred people and catered to the best-known establishments in the city. He became a well-known community member, an industry leader, President of the Laundry Owners National Association whose name often appeared in the *San Francisco Examiner* newspaper. He also made sure his daughters were college educated, a rare thing in the 1920s. Finally, he was born on my birthday, which brought an understanding and closeness to him which I was able to share with dad. Here is my father's story about this remarkable man.

My grandfather on my mother's side, Frank Leopold Rosenau, died about a month before I was born. I knew he was from Germany and had married a woman from Missouri; I saw a few pictures of him always in a suit (figure 2.1). He had started the New Method Laundry in San Francisco and Belmont Land Development Company comprised of sixty acres in the Belmont Hills. My mother had told me that he had served in the Kaiser's army and didn't like it much. She also told me that he never spoke German as my grandmother didn't know the language. She was born in Hannibal but had gone to Joplin, Missouri at some point. Joplin was known to have a large enclave of immigrant, especially German and Italian and perhaps

the chance to find a hardworking wife. However, I wished I had asked my mother so many questions that I have had about him and my grandmother these many years after my mother died.

I looked up my grandfather's naturalization application at the National Archives registry in San Bruno and found that he had left Bremerhaven in 1890 and age twenty-two for America. I couldn't find a landing record; there was a fire in the archives that had destroyed the records from 1890 to 1892. I had also read that many emigrants from the Saxony area of Germany (along the Elbe River) had travelled to Missouri as the U.S. Government was giving out free land if you would agree to plant crops.

From the Mormon website I learned my grandfather was born September 12, 1868, and had gotten married in Los Angeles; I ordered a copy of his marriage license from the county recorder in Los Angeles and sure enough my grandfather married in 1892 to Laura Senor Delano, born August 21, 1871, in Hannibal, Missouri. The first lived in Santa Ana, where their first daughter was born August 10, 1897. The 1900 U.S. Census showed he was manager of a laundry in Berkeley with one child, my aunt Royal M. Rosenau. The 1910 census stated my grandfather the owner of a laundry in San Francisco with two daughters; my mother coming July 24, 1904. A boy, Raymond Earl was also born during that decade but died at age four, though I don't know what from.

By 1920 my grandfather had another boy, Frank Junior. By then he was well established living in a big house at 17 Buena Vista Terrace. By then he had risen the ranks from working at a laundry business to eventually owning the business. The laundry serviced most of the major hotels such as The Mark Hopkins and the St. Francis Hotels. as well as pick-up and delivery to individual homes. He grew the business by having good customer service but also by developing cost and labor cutting equipment while being able to massively increase volume. He applied his innovations and owned several patents that steam-driven systems to the washers, mangles, tumblers, and ironers, all run by overhead jackshafts with belts down to each machine. He called his business the New Method Laundry, located at 407 Sanchez Street and was about a whole block in size. He had established several large wells to process the massive amounts of water and in fact used a new method water processing system that helped him increase laundry output while keeping costs lower. During the great San Francisco earthquake, great fires resulted from broken gas lines. Those water wells for the New Method Laundry located on Delores Avenue were tapped by the SFFD to fill their pump trucks.

Frank Leopold came to this country with nothing but really made something of his opportunities. He rose to the top by working hard, having a lot of business savvy and eventually became one of the wealthiest men in the Bay Area. My mother showed me a Kodak home movie that my grandfather made in 1927. I believe he took my mother to Europe to get her away from seeing my father, but he also wanted to show off that he had made it big in America (the irony is that he would only live about two more years after returning from that trip). I think it was an early Eastman Kodak camera that had come out in 1923 and was 16mm. Probably the chauffeur did a lot of the filming, though he is shown in the still below (figure 2.1). The film, later converted to VHS, then a CD, shows my grandfather and my mother traveling to Europe; loading his car on a boat in San Francisco, going through the Panama Canal, stopping in Havana and finally Naples. The car was chauffeured, and the movie looks like the chauffeur handled the filming as some is not in very sharp focus, but it is still quite a movie. It shows them travelling up through Italy, France, and into Germany, stopping at many of the places my grandfather had visited as a youngster. Each stop shows them posing in front of a statue, building or road sign and the movie was subtitled, often providing a roadmap of their



Figure 2.1 Frank Leopold Rosenau (FLR), seen in 1927 with his Packard and his chauffeur visiting his brothers and their families near Dresden.

travels. I would later use these to zero in on where my grandfather was raised. The movie showed my grandfather stopping at a small town called Polenz, reuniting with brother Olaf and members of his family.

Then there was Gustav and Frederick and all their families. There were tons of cousins for my mother to meet. After all, my grandfather had not been there since leaving home. This was the first time he had been back to Germany in 37 years. The movie continued to a farm and showed my grandfather cutting some hay; subtitled *Back at the old homestead*; he even took his jacket off and put his cigar out for that. The next scene was at another village, Loetzen with other relatives. This led me to believe that he was raised on a farm situated between the two villages and was the youngest of four boys.

I went to Google to find where those towns were. My Grandfather's naturalization application had stated his place of birth was Neidershern, but I could never find it; perhaps two world wars had destroyed it or maybe it was just the name of the farm? But I did find Polenz and Loetzen a few miles apart near the very large city of Dresden on the Elbe River in East Germany. I decided to try to find these places so I could walk in the footsteps of my grandfather, so off my wife and I flew to try to find family. We stayed in Dresden and took day trips out in a car with GPS, which can you believe found these little hamlets, not more than a dozen homes?

There was nothing but large fields in between so I'm sure any small farm had been gobbled up by agribusiness. We also went to the closest city with records to see if anyone with the name of Rosenau lived in the area and found no one with that name. We also went to a couple of churches in larger neighboring cities to see if there were any birth records but as Rosenau could possibly be Jewish, we were told it was doubtful. There were a few Rosenaus listed in the Dresden Directory but by now I wasn't interested in pursuing long-lost relatives. I had walked in the footsteps of my grandfather and was satisfied why he had come to America. He was not the oldest so he wouldn't inherit any property, I learned from my reading that only the oldest would inherit anything. He didn't learn a trade from his father and hadn't liked the Kaiser's army. America was the land of opportunity; he took advantage of it and did very well.

He died at the top-of-his-game when he was sixty-two from congestive heart failure. He knew he was sick because he kept telling my mother that she needed to hurry up and have that baby if he was going to be able to meet his first grandchild. I wish I had met him!

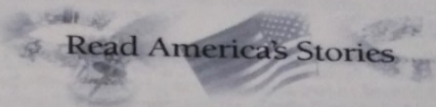
Cochran Descendancy

My family genealogy on my father's side shows incredible fortitude and a true pioneer spirit. Research going back to the 1700s was undertaken by David P. Hurley as a tribute to his wife, Celeste Cochran Hurley who herself was born in Perry County Mississippi in 1924. Hurley poured through records, letters, census listings, military databases, parish lists, family bibles, diaries, journals, photos, and such to get as accurate as possible a listing of 200 years' worth of genealogical information of the Cochrans of Mississippi. He self-published his findings in August 1991. All genealogy information used in this portion of the thesis is taken from D. Hurley's book, pages 100-127 (Hurley 1991).

As outlined in Hurley's book, our common ancestor was William Cochran. He most likely came to the United States from either Scotland (as a Cockerham) or most likely Ireland (as a Cockrom or Cockram) in the late 1700s. Phonetic spelling that altered and changed names or spelling was common in those days. Birthplaces outside the US often were passed on through oral stories, and no knowledge is known as to where he entered the country. The first US Census taken in 1790 lists him as William Cochran, Sr. of South Carolina, aged between twenty-six and forty-five years. He would have been born somewhere between 1755-1774. But given that his wife Margaret was listed in an 1850 census as having been born in Mississippi around 1760, it can be concluded that William was born around that time as well. There is evidence that he fought in the Revolutionary War. In 1808, William Cochran Sr. was then shown to have been given a special passport to travel west that attested to his good character and reputation and sent to the Governor of Georgia for issuance (sometimes known as the Georgia Passport). He and his family came to the area known as

Spanish West Florida which later became known as the Mississippi Territory in 1810. The Mississippi Territory became the State of Mississippi in 1817. There is a handwritten list of people who came to settle in the new territory listed in the Mississippi Land Office in Jackson. William Sr. came to own 620 acres in what later was called Greene County. Our family is listed as First Families of Mississippi (Figure 2.2). My father, David Shelton Cochran is the great-great-great grandson of William Cochran Sr.

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HUMANITIES

First Families of Mississippi: The Cochrans
By Senator William Thad Cochran

My ancestors, William and Margaret Cochran, came to the Mississippi Territory from Barnwell County, South Carolina. They traveled through the lands of the Creek Indian Nation with a passport that was signed by the Governor of Georgia on December 12, 1808.

They settled on land in Spanish West Florida that was annexed by the United States after some of the settlers declared themselves to be the Independent Nation of the Republic of West Florida. President James Madison claimed the land was included in the Louisiana Purchase and was therefore part of the Mississippi Territory.

When statehood was granted in 1817, the Cochran family became legal residents of Jackson County, Mississippi and one of the first families of Mississippi. There were 15 children born to William and Margaret Cochran.

When I was a young boy I remember watching the men in the family shearing sheep at my grandfather's barn near Richton. When my father was a young boy, the Cochran family's sheep had grazed on the open range in Greene and Perry Counties. There were Cochran cousins who lived throughout south Mississippi in Jackson, Harrison, George, Greene, Wayne, Perry, Jones and Forrest Counties. Most of them were farmers or involved in the timber business. Some were merchants. The most famous were Commodore Shelton Cochran and his youngest brother, Leroy Braxton Cochran.

In the 1924 Olympic games, which were made famous by the movie, "Chariots of Fire," Commodore (Racehorse) Cochran won a gold medal as a member of the 1600 meter relay team. Then, twenty-four years later, after missing a chance to compete in the Olympics because of World War II and service as an officer in the U.S. Navy, Leroy (Little Racehorse) Cochran won gold medals in the 1600 meter relays, and in the 400 meter high hurdles in an Olympic record time of 51.1 seconds, even though he was almost thirty years old.

<http://www.mvhistory.org/yourstories/cochran.html> 1/21/2002

Figure 2.2 Cousin Thad's contribution to the First Families of Mississippi Webpage



STARTING OUT: 1,000 ACRES & TEN CHILDREN

Leroy Rufus Cochran was born March 20, 1879, in Perry County, Mississippi, according to an entry in the family Bible of his parents. On January 23, 1901, he was married to Clarissa Arizona Byrd in Greene County, Mississippi. She was born August 7, 1882 or 1883, the daughter of Josiah Byrd and Clarissa Smith Byrd. Arizona Cochran, as she was usually called, was sometimes referred to as "Zonie." She died September 11, 1968, and was buried in the Sunset Cemetery in Richton, Mississippi. Leroy Rufus Cochran died September 10, 1971, in Perry County, and was also buried in the Sunset Cemetery. Their joint tombstone is inscribed "Leroy Rufus Cochran, 1879-1971," and "Arizona Cochran Byrd, 1882 - 1968." Ten children resulted from this union.

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Figure 2.3 Grandparents stowing hay with youngest son, Talmadge "Keith" The text is from David Hurley's compilation of genealogy. the William Cochran, Sr. 1790-1990 family (*Hurley, 1991*)

Why Paternal Grandparents Played Such an Important Role

My father, David Shelton Cochran, born in 1931, is the eldest son of Commodore Shelton Cochran (1902), who was the eldest son of Leroy Rufus (1879) and Clarissa Arizona Byrd Cochran (1881). The Byrd Sisters were said to have been distantly related to the colonial Virginia family, whose most notable descendent is the pilot and arctic explorer Richard E. Byrd.

My grandparent's home was on a farm just outside the small town of Richton, Mississippi. It was so small that the main street was about a block long. My grandparents, Clarissa Arizona and Leroy Rufus Cochran had developed the farm, about one-thousand acres, ever since getting married and coming from Virginia. In fact, my grandfather's brother Uncle Dowd was married to my grandmother's sister Aunt Vade (Nevada) and lived on the next farm just down the road. They had ten children. My father Commodore was the oldest, then Edna, Ford, William, Fain, Robert, Bertha (Arluin), Gertrude (Piny, short for 'peanut'), LeRoy (Roy) and Talmage (Keith). I first visited them after my father returned from the war when I was fifteen.

Commodore Cochran was the oldest of ten children raised on a large agricultural and livestock farm. All six boys and four girls were born in the early 1900's. According to

legislators who wrote an induction into the Mississippi Hall of Fame for son number five, LeRoy Braxton Cochran, was born into a big family where there was not much money, and not much to do outside of school, chores, swimming in the creek and hoping the big catfish they used to see when the creek was full did not swallow one of them. The whole family took up running and literally ran everywhere from school to the store to home for the sheer joy of running (Dickerson 1997). Their father used to sing old songs he learned as a young man, and he smoked a corn cob pipe. He, his wife, and their children worked incredibly hard, sometimes with the help of other family members from nearby farms. Every one of those children who wanted to go to college was able to go on academic or sports scholarships.

Why Genes May Count

The athletic gene was an obvious strong one in the Richton, Mississippi Cochran family. As a result of their physical prowess and intellectual capabilities, doors opened for this farming family. Almost all excelled in sporting events in high school where they were well-known, especially in basketball and track. There were scholarship offers and new opportunities. For two of the Cochran boys, it meant Olympic dreams and a life full of hard training and new experiences abroad. They would both end up living in California and one would even get his master's degree studying the hearts of athletes at UCLA. Both their lives were influenced by contact with the other.

My dad, Commodore Shelton Cochran, had several nicknames, including Racehorse and Speed, which he picked up during his running years. He met my mother when he had come out to the bay area to run in a track-meet as a preliminary to the Olympic Games in 1924. He was already the AAU champion in the 400-meter run and was favored to lead the Olympic team to Paris. There was a warm-up run at Cal where my mother was attending.

Interestingly, my father didn't qualify in the Olympic trials in Boston. He said he was stiff from being on a train for three days just prior to the meet. However, the coach took him over as an alternate and decided to run my father in the relay. What an honor for a young farm boy from Mississippi to be selected to be on the Olympic team! In the '24 Paris Olympics, my

father, Commodore Cochran ran the anchor lap of the 1600-meter relay which set a new world record of 3:16. I can only imagine the pride which my father must have felt ascending the platform and receiving the gold medal around his neck (figure 2.4). He never mentioned that moment though, and I wish I had asked about how it felt. I know that after the games, the prestigious Olympic Club of San Francisco, had promised that anyone from San Francisco who won a medal at the 1924 Olympics would get membership for life. He became one of their traveling exhibition athletes to inspire more people to join the club.

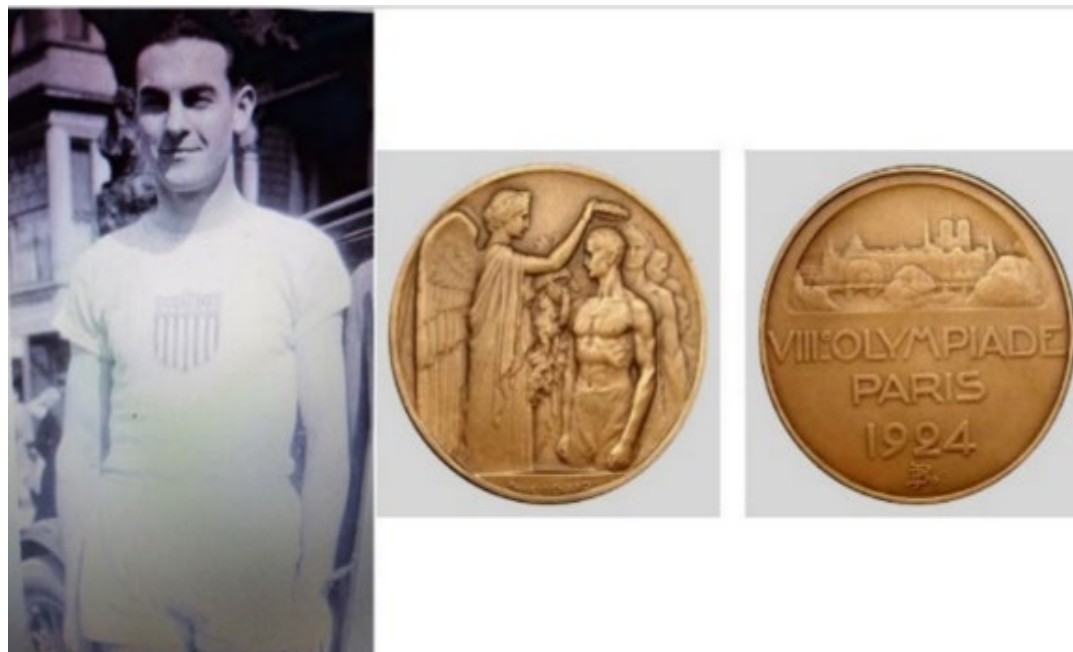


Figure 2.4 Commodore “Racehorse” Cochran after his return from the 1924 Olympics

My father never went back to the farm in Mississippi after having competed in the Olympics, where he got a taste of the big life, had traveled, met interesting people, and experienced a life he had never even imagined back on the farm. Even one of his sisters once told me it was a few weeks before they even heard that their big brother had won a medal and set a world record! At the Olympic Club, he could keep in shape and compete in West Coast races, hoping to qualify and go to the 1928 Summer Games in Amsterdam. Meanwhile, my mother had been attending University of California at Berkeley across the bay, and she often watched athletic events at Edwards Stadium, home of the UC Golden Bears. She happened to watch an AAU Olympic warm-up track-meet in 1926 and saw the quarter-mile champion; I’m not sure, but my dad probably won his race because he obviously won over my mother.

I called the Olympic Club Collections Manager, History and Archives Department, to speak with Jessica Smith and ask about my grandfather’s associations with the Olympic Club. She told me that athletic clubs back then were in the habit of having exhibition meets as a way to not just show off their members but also to attract new members. Someone else who attended an exhibition meet and saw Speed run was a young man named Dink

Templeton, who in 1922 at the young age of twenty -five was the head track coach at Stanford. She said that Dink was incredibly impressed with my grandfather, who ran the 400m that day faster than the 1920 Olympic Gold time logged, and suggested he think about getting onto the club's Olympic team roster. He spoke to the OC coach at the time, Charles F. Hunter, to put my grandfather on that elite team (figure 2.5).

Templeton was quite famous because of his own amazing performance in Antwerp,



Figure 2.5 The S.F. Olympic Club's 1924 Olympic Team. My grandfather is to the right of Head Coach, C.F. Hunter. See the club's Commodore Cochran Track and Field Bio in Appendix 2)

Belgium, when the American Olympic rugby team took gold. He was different from other coaches because he believed in intensive practice sessions every day, which got the most out of his own performance as well as getting his Stanford athletes reach their maximum potentials. Jessica said that Dink later coached for the Olympic Club after he had spent

seventeen years coaching at Stanford.

I did some research on Mr. Templeton, who changed my grandfather's life that day and thus changed the course of our family history. I found out that Robert Lyman "Dink" [you use given name and quotes around nickname here; should do this the first time you mention Dink] Templeton went to his high school and undergraduate education at Palo Alto Sr. High School and on to Stanford. He earned a law degree at Stanford, while also excelling in football, rugby, long jump, high jump, and pole vaulting. He qualified for the 1920 Olympic Games. High jump was his best sport though he was disqualified for it in Antwerp due to an unorthodox and therefore disqualifying jump style," but he did medal in the long jump. He went to the 1924 games in the long jump, where he again came in contact with my grandfather. Templeton later became a broadcaster and journalist, and he coached in one way or another until his death. Many of his methods are still in use today and the illegal twist he did in Antwerp later became common practice in the high jump. He was considered as possibly one of the best athletic coaches of all time. I believe his encounter with my grandfather was why the Olympic Club sponsored him to be part of their team.

Commodore had gotten a bachelor's degree in Physical Science from Mississippi State, which was known then as Mississippi A & M. He not only ran track but had joined the Army ROTC and upon graduation was commissioned as a 2nd Lieutenant in the Army Reserve. WWI had already ended, so he figured they did not need him anyway, so he resigned his commission and moved to San Francisco. He had a reputation for being good with numbers and was a great conversationalist, talking with his smooth southern accent. He was charming, even a bit flashy, enjoyed meeting people and socializing. He never met a stranger and could get along with just about anyone. He loved to tell stories and regaled in

his life in the limelight of his successes in track. You may remember the famous 1981 movie, *Chariots of Fire*. My grandfather met the focus of the film, Eric Lyndell, and spoke of him often over the years. In fact, he had also met and continued friendships with several Olympians from 1924, including the Duke of Waikiki swimmer Paoa Kahanamoku, who later became known as a gifted international surfer as well. Affectionately called the “Duke,” he was a true Hawaiian hero who left a lasting legacy in history and lore for the Hawa’iian people. My grandfather even told my father to look the Duke up if he was ever in Pearl Harbor, which he actually once did. He got a warm welcome from the gentleman and a wonderful story to tell!

Parents

Whereas my father came from a very large family on a farm in Mississippi with kerosene lamps, no running water, and an outhouse (an indoor bathroom was finally built in 1966), my mother came from a small, urban, and aristocratic family. No two lives could have been more different. Growing up in San Francisco my mother had all the best schooling and opportunities. She was quite the athlete; in fact, as a teenager, she played tennis against and beat Helen Wills, who would later become a Wimbledon champion.

In college she learned to speak some Greek and was an excellent all-round student. She dated a pre-med student, which pleased her parents greatly. But everything changed quickly once my mother met my father. It seemed she liked fast boys over doctors. Her parents, especially her father whom she was a little afraid of, could not believe that she was fraternizing with someone obviously beneath her social class. Frank Leopold made it clear that the ‘practically barefoot boy from poor farm laborers would never be considered good enough in Frank Leopold’s eyes. He forbade her from seeing him, but then again, he also had forbidden her from playing cards (which she would do with the chauffeur, and she became quite good at it) and no drinking and definitely, no drinking and dancing. She became quite good at that, too.

Soon after that track event, my grandfather, Frank Leopold, apparently found out about the poor boy from Mississippi and took my mother off to Europe to keep an eye on her. That was in the spring of 1927, and it was only a temporary fix because she had no sooner gotten back when my they eloped to San Louis Obispo. It was a small community between Los Angeles and San Francisco, and they thought their marriage was less likely to be in any newspaper that her parents or their friends might read. The beautiful, smart, and talented society girl who was sometimes mentioned in the *Oakland Tribune* or the *San Francisco Chronicle* was now a wife (figure 2.6-2.7). As soon as her father Frank Leopold found out, he quickly disinherited her, and like all young couples just starting out, they had their struggles. It was particularly difficult on them after Black Friday in October of 1929, which led to a massive stock market



Figure 2.6 My Father



Figure 2.7 My Mother

sell-off, causing money to get scarce and a lot of people losing their jobs.

However, in the fall of 1930, when my grandfather found out my mother was pregnant, he immediately put her back in the will. He even bought my parents a 1929 Packard sedan with the back seat large enough for a basinet. My parents continued to live in Petaluma, with the closest hospital way over in Oakland; having a good car was essential for the long drive around the bay when I was born (figure 2.8)



Figure 2.8 1929 Packard Sedan

My grandfather kept telling my mother to “hurry up and have that baby so that I can meet my grandchild,” but he died just a little over a month before I was born. Strangely, he didn’t leave a will, though near the end, he knew he was not doing physically well from the high

stress of work, business, cigars, steak, and potatoes, and too much port wine and brandy. Upon his death, some of his money went to my grandmother. She also inherited the same accountants from the laundry business, and they put my grandmother on a strict allowance. A small amount also went to my mother, her older sister Royal and younger brother Frank Jr. and most of everything in trusts and property. By the time I was born, my parents were still living in Petaluma, a small city of chicken ranches well north of San Francisco and my father was working for Standard Oil, as a gas station attendant. My mom now had the job of caring for me, but also checking in frequently at the laundry, making sure everyone was doing their jobs and discussing financial matters with her father's business partners. My dad got a new job as a tracker and drove an old Model A painted with New Method Laundry on the doors. Life certainly changed quickly!

Over the years I have pieced together the unlikely marriage of my parents. I guess I only heard little snippets from my mother and none that I can recollect from my father. But my father was away for four years during the war and my mother was lonely and reminisced a bit. I do remember that she had saved some love letters from him before they were married; in fact, she let me have the 24-cent airmail stamps off of the envelopes. Like so many soldiers returning from the war, it had changed him. He drank so much more.

Many years later, my dad's little brother, my Uncle Leroy, whom everybody called Roy, began to excel in track and even at just five foot ten inches, became an amazing hurdler with an incredible stride. My dad talked him out of going to Tulane on a football scholarship in New Orleans and talked him into doing track said he should consider taking up track under the coaching of Billy Hayes at Indiana University. Earl C. Billy Hayes had trained my dad for a year and had earned fame by a career that included NCUU wins as well as sending seven individuals to the Olympics under his outstanding coaching. Called 'Little Racehorse Cochran' he could consistently plant exactly steps in-between and maintain the stride for the entire 400 meters, which made him quite remarkable. According to his daughter Janice Cochran-Pendleton and statistics of the time, he had won a world indoor record in the 1939 AAU 400m hurdles and was heavily favored to join the 1940 Olympic team (A Mississippi Olympic Story 2022). But the war overseas disrupted those games. Undaunted, he continued to train up until graduation and commission into the Navy, but not before winning the AAU indoor 600-yard event and setting both four hundred meter and 440-yard world records (figure 2.9).



Figure 2.9 Roy Cochran after setting the indoor record at the University of Indiana.

Uncle Roy went into battle as an Ensign on a Minesweeper in the Pacific Theater while my father had left months earlier as an MP in the high desert of the Japanese internment camp at Manzar, then later in Anchorage Alaska. After the war, my uncle and my father worked together for Uncle Roy to get back into shape for the next Olympic Games. Even as a twenty-nine-year-old man, married, a father of two children, Uncle Roy went to London to compete against other very notable athletes. There he set a world record and won two gold medals: one in the 400-meter hurdles and the 1600-meter relay. He broke a world record in the hurdles (Olympedia 2022). Whereas my father, Speed, had made the family exceedingly proud, the addition of Roy's medals to the family list of accolades made them stand out from the average farming family. The Mississippi Senate even made a proclamation to add my Uncle Roy to the Mississippi Hall of Fame (figure 2.10). It is said that the townspeople all could not believe how much talent came from my father's family, and they finally put up a big sign at the entrance to Richton to show it (figure 2.10).



Figure 2.10 Entry sign into Richton Mississippi

The sign seen above was installed not too long after the Mississippi Senate Resolution 581 was proclaimed in 1997 to instate Roy Cochran to the Mississippi Hall of Fame seen below (figure 2.11).

MISSISSIPPI LEGISLATURE

1997 Regular Session

To: Rules

By: Senator(s) Hall, Dickerson, Rayborn

Senate Concurrent Resolution 581

A CONCURRENT RESOLUTION COMMENDING LEROY BRAXTON "ROY" COCHRAN UPON HIS POSTHUMOUS INDUCTION INTO THE MISSISSIPPI SPORTS HALL OF FAME.

WHEREAS, LeRoy Braxton "Roy" Cochran was born on a farm in Richton, Mississippi, on January 26, 1919, as the ninth of ten children; and

WHEREAS, with ten kids in the family, not much money, and not much to do, the whole family took up running and literally ran everywhere from school to the store to home for the sheer joy of running; and

WHEREAS, Roy Cochran was a world champion and Olympic gold medalist track star who is a member of Mississippi's greatest Olympic family; and

WHEREAS, Roy was a star quarterback for Richton High School and was a highly recruited athlete out of high school; and

WHEREAS, Roy was a one-man track team at Richton from 1933 to 1937, and was recruited by Coach E.C. "Billy" Hayes to attend the University of Indiana, Hayes having been track coach at Mississippi State where Roy's older brother, Commodore Shelton Cochran, had become a national champion quarter miler and captain of the track team at State in 1922 and 1923; and

WHEREAS, Hayes and brother Commodore convinced Roy to turn down a football scholarship offer from Tulane to run track in basketball country at Indiana; and

WHEREAS, as a Hoosier track star, Roy became a national and world champion quarter miler, and he also became the best in the world in the 400 meter high hurdles; and

WHEREAS, Roy Cochran was named to All American track teams three times, in 1939, 1940 and 1941, while he attended the University of Indiana, and also won

broad jump competitions in Big Ten Conference meets, winning four Big Ten Championships; and

WHEREAS, in 1939, Roy participated in a European tour organized for the U.S. Track team as a prelude to the 1940 Olympics scheduled for Helsinki, and was chosen to run in the 1600 and 3200 meter relays, the 400 meters, and 400 meter hurdles; and

WHEREAS, Roy set a series of new records in the 400 meter hurdles and relays during the two-month tour, and he was a 1940 National AAU Champion, thereby securing his spot with the U.S. Olympic track team; and

WHEREAS, when the 1940 Olympics were cancelled due to the war in Europe, Roy Cochran entered the V-7 Navy officer training course at Notre Dame upon his graduation from Indiana in 1942, subsequently going to Miami for training in the Navy's Sub Chaser Training School; and

WHEREAS, the Miami Herald stated, "If Roy Cochran, Indiana's great runner and holder of numerous world records, can smash as many U-Boats as he has track records, the Navy's problems with undersea raiders would be considerably reduced"; and

WHEREAS, he served in the Pacific during World War II, believing his athletic career to be over, and at the war's end attended the University of Southern California in pursuit of graduate degrees in physiology; and

WHEREAS, while back in school at Southern Cal, he began to run again for pure fun and recreation, and was surprised to find that his times were faster than ever; and

WHEREAS, Roy returned to training for the Olympics and, during the tryouts for the 1948 Olympics in London, his times were remarkably world class, breaking the Olympic record in the final 400 meter hurdle tryout heat; and

WHEREAS, at the games in London, Roy won the 400 meter hurdles in new Olympic record time of 51.1 seconds and claimed his first Olympic gold medal, following up with a second gold medal as he ran the third leg of the 1600 meter relay for the winning U.S. Team; and

WHEREAS, Roy's gold medal victories were won 24 years after his brother's wins in the Paris Olympics, and it is believed that Roy and Commodore are the only brothers ever to win Olympic gold; and

WHEREAS, Roy was an humble champion, who rarely, if ever, mentioned his Olympic feats; and

WHEREAS, Roy is a second cousin to Mississippi U. S. Senator Thad Cochran and Central District Mississippi Public Service Commissioner Nielsen Cochran; and

WHEREAS, LeRoy Braxton Cochran died on September 26, 1981, at the age of 62; and

WHEREAS, Cochran's daughter, Janice Cochran Pendleton, attended the 1996 Olympic games in Atlanta, and still treasures her father's gold medals from London; and

WHEREAS, it is the policy of this Legislature to commend the achievements of its native sons, which the Legislature now takes great pleasure in doing on this occasion:

NOW, THEREFORE, BE IT RESOLVED BY THE SENATE OF THE STATE OF MISSISSIPPI, THE HOUSE OF REPRESENTATIVES CONCURRING THEREIN, That we do hereby commend LeRoy Braxton "Roy" Cochran upon his posthumous induction into the Mississippi Sports Hall of Fame, and congratulate his family, extending the sincere thanks of a grateful state for the honor brought to Mississippi by this great athlete.

BE IT FURTHER RESOLVED, That a copy of this resolution be given to the family of Roy Cochran.

Figure 2.11 SCR 581 "Roy" Cochran Induction into the State of MS Hall of Fame (*Dickerson 1997*)

CHAPTER 3

The Early Years: Ages 0-5

(The narrative is taken from Dave Cochran's biographical materials both from his written autobiography and our interviews. Images and other supporting materials by Lisa Cochran.)

My father, never spoke of his childhood to me or my brothers since the prevailing thought in the 1950s was that "children were to be seen and not heard" and our job was to stay out of the house and out of the way whenever possible. Our father was always more of a shadow figure who made sure we had a roof over our head and meals on the table. He had full custody all three of us and I do remember the three of us spending a lot of time climbing just about everything, digging tunnels, making forts, playing baseball, and generally staying active as a threesome. My older brother was the top dog, and my younger brother was the bottom dog, while I was somewhere in between depending on how well I could keep up with our activities. I do not remember very much supervision, but I do remember that we had to always be home by five o'clock sharp, and not a minute late.

What is written in the next several chapters is information my immediate family never heard before; as it turns out, everyone who thought they knew who my father was as completely surprised by these stories as I am. They offer a cherished view of what his life was like before we were born, when the world had experienced a debilitating depression and a horrific world war that touched every American family. It is interesting to know a little bit about what came before we arrived and the massive technological and social changes of the 1960s and 1970s. His memories of 1931-1936 are below and they let us peek into his private thoughts of his world and what it meant to him.

I was born in Peralta Hospital in Oakland as my parents (figure 3.1) were living in Petaluma where my father worked for Standard Oil (as a gas station attendant) north of San Rafael in 1931. Peralta that was the closest hospital. Remember there were no bridges then and it was probably a three-hour trip by car; there were also a lot fewer cars in the 1930s with the

depression in full swing. My mother told me that several months later we moved to the Belle Aire Apartments near St. Joseph's Hospital just up the street from my grandmother's home, located at 17 Buena Vista Terrace, where she had grown up and my grandmother still lived. My grandmother Laura Rosenau lived alone since my grandfather died a month before I was born, which also happened to be on my parent's fourth wedding anniversary, April 22, 1931. My mother was worried about her living alone, so we moved in with her in early 1932 when I was still a baby (figure 3.2).

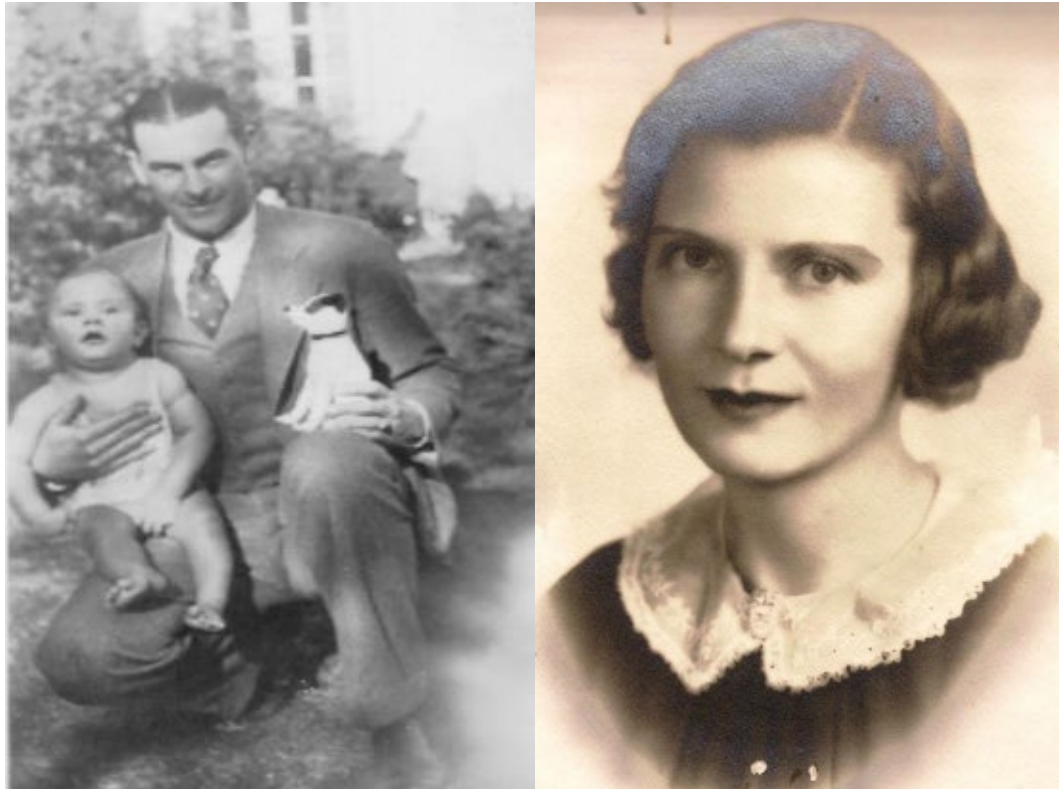


Figure 3.1 Parents Speed and Gwen, with David, 1931



Figure 3.2 Baby David, 1932

Even though they say you cannot remember anything before the age of five I have a recollection of Santa Claus coming to our place in the Belle Aire Apartments on Buena Vista Terrace in San Francisco before I was four (figure 3.3).



Figure 3.3 Speed with David in 1934

There were other privileges to being my mother's son. The Rosenau family home at 17 Buena Vista Terrace was impressive, two stories up from street level and about three stories down to the chauffeurs' quarters and garage which exited on Duboce Street down the hill. A butler, cook and maid complemented the help. I remember a dumbwaiter that brought food up to the dining room from the kitchen below; what a view from where the dining table sat in front of a large picture window overlooking Market Street and the Castro District, which was where my grandfather's laundry was located on Sanchez Street. I remember visiting my grandmother a few times. We entered a large foyer opening into the living room with a grand view of Market Street and downtown. I remember the dining room was on the same level, the street level. The

house was built on the side of the Duboce Street Hill, with the kitchen down one level and a dumb waiter to bring up the food. Bedrooms were below and the bottom level, the servants' quarters, and garage. There were three or four maids and cooks with maybe a butler and a chauffeur.

I had a lot of exposures to interesting people, places, and things too. As far back as I can remember I loved airplanes. My father was a pilot and had his own plane, a Stearman 75 biplane (figure 3.4), but he had to sell it before I was born. I am sure he was convinced that a family man should not have big dangerous toys. We used to go down to Mills Field, now called SFO International Airport, and my dad would point out the various models of planes. There were as many private planes on the field as commercial ones in the pre-war 1930's. We could walk out and look at the planes and my dad would introduce me to some of the pilots. We would watch them coming in for landings and taking off for hours. However, I don't remember ever going up for a little flight; my mother must have put the fear of God in him, I remember she told me later that the fella that bought my father's plane crashed on landing soon after the purchase.



Figure 3.4 The Boeing Stearman 75 “Kaydet” with a top speed of 124 mph (Brown 2022)

If it ever pained him to hear about his beloved plane being crashed, he never mentioned it to me. There were a lot of things my father never talked about. It was finally years later that I figured it out when I went to visit the farm for the first time while my dad was getting out of the army and had some extra time before his final discharge. Growing up on a farm with ten kids, life was very difficult. I am sure nobody dared to complain about anything, ever!

We also went down to Crissy Field just below the parade ground at the Presidio. I could watch those military planes landing and taking off again for hours. It was beautiful looking out over the bay just west of the Marina. When we lived in Sea Cliff, I swear I saw a plane landing at Fort Scott right down at the end of Camino del Mar. It must have been in 1936.

I once saw a Pan American Clipper taking off from the water over by Alameda; it flew under the San Francisco Bridge's eastern span probably twenty feet off the water but had reached more than 500 feet to fly between the towers of the Golden Gate on its way to Hawaii.

I remember we once went to Topsy's Roost, a real speakeasy during prohibition, which ended in 1933. Back then you brought your own hootch and were served the mix (figure 3.5). Now, the place was legal and very upscale. Everybody was dressed up in tuxedos and you could go up to the mezzanine level and jump into a slide down to the main floor. There was a dance floor with a big band playing. It could have been Alexander's Ragtime Band which played there frequently. The restaurant was right up the Great Highway from Playland-at-the-Beach just below and across the street from the Cliff House. I must have been 4 years old, and I remember walking up to the mezzanine level and sliding down in my tuxedo to the main restaurant and dance floor. My folks danced a little, perhaps a Charleston or two.

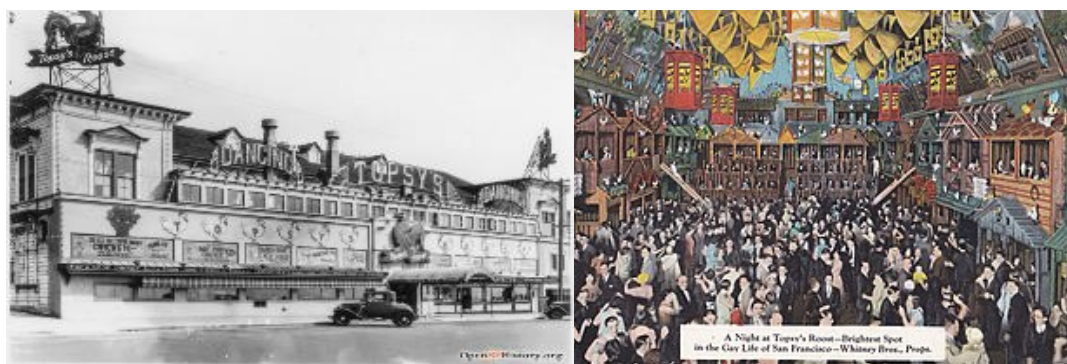


Figure 3.5 Topsy's Roost Exterior and Interior (SFGate 2022)

Topsy's Roost was located just down the road from the famous Cliff House, and it was a popular nightclub in its day. Anything chicken was on the menu, and it was designed so that patrons actually felt like they were in rundown chicken coops but with a swinging live orchestra next to the dancefloor! Seating was both on the main floor as well as the balcony area. From the balcony, you could slide down from your coop to the main dance floor just as my dad recounts. On the downside, Topsy was the main character from Uncle Tom's Cabin and the décor was based on the book as well. All the employees, with the exception of management, were African American. After the business got a racist reputation, Topsy's

closed down in the mid-1930s, just a year or so after my father remembered going there.

One weekend when I was about 5 (figure 3.7), my mother, father and I went to Ocean Beach when the waves were breaking (figure 3.6). Officials used to warn about the undertow. Everything was just fine until I started wading out a little far, just twenty feet or so. A wave knocked me down and started dragging me out, I was screaming my head off and my father started running down the beach to grab me. Just then a big wave came in and lifted me in toward land. My father, the Olympic star, leaped up just as I hit him; I think it was his big toe that got my eye, which made me cry.



Figure 3.6 Ocean Beach (San Francisco CA Ocean Beach and Great Highway 2022)

Then of course my mother goes berserk screaming bloody murder that my father had just killed me. It makes me laugh just to think about it; I can still see my father trying to jump over me. From then on, the only beach I saw was the 'white sand of Carmel' that my folks used to drive down to get for my sand box in the back yard.



Figure 3.7 David, age 5, 1936

CHAPTER 4

The Formative Years: Ages 5-12

(Narrative taken from Dave Cochran's biographical materials. Supporting material is by Lisa Cochran and is double-spaced.)

A lot can happen in a child's life during their formative years, and it is no wonder that these were impactful. A child gains their independence, sees themselves as distinct from their parents and is able to process events in ways that they can carry with them the rest of their lives. This chapter, more than any other, explained a phenomenon that affected me as well as my two brothers because it happened during the same period in our lives as our father experienced it. I never knew until this chapter how moving had such a profound effect on him. Up until the story about "Moving" came about, I had no idea that my father had moved around so much from his earliest days until his teen years. I have often wondered why we moved so often too, and once counted up that we had moved as a family at least a dozen times. This pattern began immediately after my birth when I was moved to Palo Alto from Long Beach, so that my father could attend Stanford and up until I graduated high school and left the area. Interestingly, I grew up in Palo Alto, going to the same stores, went to the same schools, swam at the same pools, saw the same sights as my father had as a child, but always wondering why we moved around so much! This chapter highlights not just the moves, but the changes in the family structure when adult relationships became strained with my father's long hours working. We moved from homes, into apartments as the family grew, then shrank with a divorce, a remarriage, more children, and a disquieting cycle of uneasiness. It is amazing to see the parallels throughout this period of time. Up until reading this chapter, I had not known of my father's angst with change and how it was passed down to my brothers and me. He takes these years on from here, having a child join the family, moving, having his

father disappear into the war for so long that he forgot what it was like to have a dad and have that special bond they had up until the war irrevocably altered.



Figure 4.1 Baby Jim, built to last.

Another Boy Joins the Family

My little brother, Jim, showed up one day in May 1936, just before my fifth birthday. He was particularly attached to my mother and she to him, which riled me a little. I remember him as a hearty little boy, with big blue eyes, curly blond hair and precocious as heck. My mother tried to keep him as her baby as long as she could. She used to dress him in these little knit short pants, dark blue as I remember. We lived on Divisadero Street, near the Marina when I was about six; my little brother Jimmy was crawling around. It must have been Halloween when I asked my mother for my goblin mask; she came in wearing it and I would not come out from under the bed for hours. One evening my brother tumbled down the stairs from the bedroom level; he seemed O.K. but I was blamed for leaving the gate open, my mother screamed “you’ve killed my baby!”

In fact, he survived exceedingly well. As he thrived, we started a bit of brotherly rivalry, He was a bit of a ‘Mama’s Boy, while I was definitely the apple of my father’s eye. I remember one time I was riding my bike in front of 119 Lowell; I was about nine. Sylvia Nichols was riding my brother on the bar of her brother’s bike. Jim stuck his foot in the spokes and hit the handlebars; he still has a little bird-foot shaped scar on his lip. I could almost hear the shrieking from blocks away, “You’ve killed my baby!” He was a little bloodied up and of course, I caught hell for not looking after him properly, but the incident was quickly forgotten after he got all cleaned up. He also learned to keep his feet out of tire spokes.

In 1938 we attended the World’s Fair on Treasure Island. What a great city to grow up in! My father took me to exotic places in town, a side-show tent near Fisherman’s Warf where we saw a woman with no head being controlled by electrical wires, a woman in a box with swords thrust through in every direction. We saw midget racers at an auto-race track called Geneva Speedway just above the Cow Palace. He once took me into the dressing tent of Barnum & Bailey and introduced me to Emmett Kelly, one of the most famous clowns in the world; my father knew people from all walks of life. I really loved all the times when it was just me and my dad hanging out when I was young.

Moving

We seemed to move around San Francisco and the bay area all the time. Every summer my mother would choose a place ‘in the country;’ defined as down the peninsula to places such as Redwood City, San Carlos, or Palo Alto. In the fall we would go back to ‘The City’ but to a different section of town. For some reason, I thought everybody moved around like that, but later I found out a lot depended on what job my dad was working and where. As much as I can remember the order, there was an apartment on the fifth floor on Lincoln Way near 18th Street a home in Sea Cliff: a flat on Divisadero Street in the Marina and a flat on Vallejo Street above the city section known as Cow Hollow.

In 1936 I went to Miss Kennedy’s School for Girls, but just kindergarten. My mother had heard great things about the school, and it was close by our home so that she could walk me. I remember I was cast as a spider in a play at the Palace of the Legion of Honor. The next year I went to Madison School on Clay near Arguello. I took fencing lessons that year, someplace near Union Square. I thought for a very long time that every little boy took fencing lessons. We were always going places and doing things. It was a great time to be alive and living in such a great place. I don’t remember ever getting bored or having nothing to do. Everything seemed fine just the way it was.

Then, suddenly in 1938 when I was in the middle of second grade at Madison, we moved with my grandmother, Laura, down to Palo Alto permanently. I believe my mother had made an arrangement with my grandmother to give up her huge home at 17 Buena Vista Terrace and buy the smaller house for us in Palo Alto at 119 Lowell but that had a full apartment over the garage. My Father was back working for the PG&E Company in San Francisco, as an inspector rather than a clerk, taking the train from the California Avenue Station. I still remember that my brother could hear the train whistle from our room at our house. It went through town several times a day near the old Palo Alto tree that the town was named after and loudly lumbered over the trestle tracks.

I don’t think my grandmother got very much for the Buena Vista Terrace house, but I think the Lowell house was only about \$6600. We later saw some statues that Rickey’s Restaurant

and Hotel had bought from the Buena Vista Terrace estate. My mother used to take meals up to her; she was in her late 60s in 1938. I don't remember my grandmother ever participating in anything with our family. I don't even remember her taking meals with us or even speaking to me as she lived above the garage, and I am not sure she came down very often because of the stairs. My little brother remembers interacting with her quite often when he was older and has said he used to have long conversations with her.

My mother would drive up to the city every month so that she could have meetings with Mr. Pelgram, the New Method Laundry manager, about the operation of the business. and I would pump the adding machine seeing how much paper I could produce. I occasionally walked through the plant, it was usually Saturday I remember seeing the huge complex that encompassed the facility, extending about an entire city block long. There were huge jackshafts with pulleys and belts running the mangles and ironers and lots of high-volume equipment. The laundry employed more than five hundred people in its heyday and had been the premier company in San Francisco handling most of the big hotels and some hospitals. My father was not involved in any aspect of the laundry, except when he was a route checker early on. Then he went a got a job back at PG&E, as he had worked for them as a clerk before he met my mother. Once we moved, my dad would just take the train the forty miles or so up to San Francisco for his job early each morning.



Figure 4.2 The Savage (*We Love Cycling* 2022)

One of the great things was, when we moved down to Palo Alto, I got my first real bike. It was blue, my favorite color, balloon-tired bike made by Savage (figure 4.2). Given that we had moved out of the city out to the country now, it seemed like it was safe enough on the quiet streets of Palo Alto. It meant more freedom as could get around pretty good. It would also allow me to feel more independent and was kind of a reward for making the big, permanent move away from my other school. Best of all, I could ride it to Walter Hayes Elementary School, about seven blocks away. It turned out my new schoolmates hung out with their bikes too and liked to explore around town too. It sure beat the toy car I used to use to get around (figure 4.3).

I don't remember if we always waited for my father to get home before we ate, because sometimes he was late. My little brother was about two. I don't remember anything we ate until the war years when my mom's specialty dish became Spanish Rice due to rationing. Also, my mother never let me drink Coke as a child as she thought it might still contain cocaine. After I left home, I started drinking Coke and at one time had seven cases a week delivered by truck to my home. It's still my favorite soft drink. But I remember I could

always eat like a horse, whereas my brother seemed to gain weight from just looking at food.

We were so different in so many ways. I really used to wonder if he was related to me or whether my mother just found him somewhere and brought him home. With the new bike though, I would eat fast and head outside to explore the area with my new friends, leaving my cares behind.



Figure 4.3 David, age 7 gets to park his car for a real bike!

Radio

I was about eight in the late 1930's when my school class visited a radio station in San Francisco, probably KGO or KYA. They were both large radio stations that General Electric sponsored in their Broadcasting Division, but KGO tended to have more radio theater but also transmitted lots of music, some church services, Public Broadcasting, and athletic events like baseball games. I still remembered the way they made the various sounds; rain was made by pouring rice onto a tin, horse's hoof-beats were a couple toilet plungers the soundman banged against his chest, etc. When they did all these various sounds you could close your eyes and it was real.

We saw the control booth and they showed us how they switched the mikes on and played the accompanying music from a 78 RPM record, lifting the stylus up and down to turn it off and

on. The people had to be really professional as all the radio programs were live, no retakes. The actors and radio announcers stood at a microphone and spoke their lines, reading from scripts. We often would listen to radio programs at home in the evenings. ‘One Man’s Family’ and ‘Night Editor’ were my favorite radio programs; they were stories about people in San Francisco. I later met the Night Editor, as his son, Hal Burdick Jr. was in my Palo Alto High School class. They lived on Bryant Street just north of Embarcadero; I remember my friend’s mother, Cory Burdick who was also one of the cast members in the early radio shows.

I once wrote to one of the stations I listened to and told a short story; it was about the Billy Goat who fell over the cliff because he thought it was just a big bluff. I missed when it was recited but many of my friends heard my name announced. Wow, my name on the air! My little brother Jim was also thriving too. When it was time for him to start school, he was so big he could not fit his legs under the desks in 1st grade at Walter Hayes. Since the second-grade desks were bigger, he was moved. But he seemed to take it in stride since he also skipped another grade in Jordan Jr. High, after 7th grade and went right into Palo Alto Senior High. Jim graduated high school at age sixteen, spent one semester at Culver Military and Preparatory Academy (Figure 5.5) and started at Stanford University in the Spring. Dr. James Alan Cochran graduated from Stanford with Honors in Physics at age twenty, his M.A. the next year and a few years later received his Ph.D. in Mathematics. Jim was the Chair of the Mathematics Department at Washington State University from 1978-1984. He was appointed to be the first Dean of their tri-cities campus in 1989 and finally retired as professor emeritus from teaching in 1998. They named a building after him, and he received their First Founder’s Award in 2003. All our lives I was competitive with him, like in this 1966 photo (figure 4.4).



Figure 4.4 My brother Jim; he will always be my little brother!

First Invention Attempts

I was young when I started taking things apart to see how they worked. My dad didn't get too upset about it; as he would often say, "Now Gwen, boys will be boys!" My mom was not happy at all about my penchant for deconstructing things. First, money was always tight, and we couldn't be trying to replace things I had broken. Second, she was sure I was going to get killed if it was something that involved a sharp tool, things that spun or things that ran on electricity. She would always get pretty excited about little stuff. I remember one time I took a little box, then cut a hole through the bottom, and packed the bottom of the box with cotton. I stuck my finger through the hole, put talcum powder on my finger so that it looked pale and then put some ketchup on it. I ran up to my mother to show her what had happened to my finger and that it came clean off! She became almost hysterical and didn't think it was the least bit funny. When my father when he got home from grinned and gave me a little wink. I remember that I had an early radio, an Arvin which didn't have a transformer; all the tubes were in series. If you plugged it in the wrong way, you might get a shock touching its metal case. I built a crystal radio with a coil that I wound myself with a slider to tune it. It didn't work very well and needed an antenna for it. I ran a wire from it out the window but that didn't help as much as I had hoped. It was at that point I thought maybe I wasn't very good at electronics.

When WWII first started, we used to see RKO Pathe Newsreels at the start of every movie we went to. Though I had not been up yet, I was enamored with flying, and I had several ideas how to make the bombers more effective at warding off enemy fighters. I figured that gunners could crawl out through the wings and shoot machine guns at approaching aircraft. They would be able to swivel the guns effectively and protect the bomber.

I had drawn a sketch of my idea and asked my parents to send it to the War Department (later called The Department of Defense). A couple of weeks later I got a reply thanking me for the suggestion. I wished I had saved the letter for my memoirs.

A Father's War

I was just ten years old on December 7, 1941, when my family and I all listened to FDR's "Day of Infamy" speech declaring the attack on Pearl Harbor by Japanese fighter planes. My father went down to the Army Air Force recruiting station the next day. His eyes were bad, and he was color blind, but he had always compensated by memorizing where colors should be. Flying was long his love, once he owned his own Boeing Stearman biplane for a few years before I was born but my mother made him give it up.

He had graduated college as a 2nd Lieutenant in the Army reserve but resigned his commission after deciding he wanted to do competitive running instead of play army. But here we were at war, and he wasn't going to shirk his duty. He managed to get the Army to take him and even get his gold Lieutenant's bars back after several months of badgering the recruiting office. He was colorblind, and although only forty years old, already had high blood pressure, so he had to lie down outside the doctor's office before his physical so that they wouldn't notice his high blood pressure and reject him.

He was first assigned to the coast artillery and went to camp Callen in Southern California. Once they decided that the Japanese were not going to attack California, he was sent to fort Bliss Texas with the field artillery. As he was forty, the military wasn't anxious to send him

overseas. There was not much need for field artillery in America, so he was transferred to the Military Police detail at Manzanar out in the California desert guarding the persons of Japanese descent moved off the coast.

His last duty station was Anchorage Alaska where he spent about two years. He would send pictures occasionally showing him with a bunch of buddies. He really loved the military life, swapping stories over drinks. I do not remember seeing him more than just for a day or two all during the years from 1942 till he returned after the Japanese surrender. Can you imagine not seeing your father for years and never knowing if your family would be getting a telegram saying he was killed in action?

In 1942 after Pearl Harbor everyone was trying to do their part. America pulled together as one country against our enemies and so many people were missing their fathers and brothers: a lot of single-parent families. Sacrifices were being made and everyone was trying to make ends meet. Families were encouraged to grow Victory Gardens and women especially spent a lot more time canning food for their families (figure 4.5). Everything became rationed, things like sugar, butter, coffee and especially meat, even shoes. That was tough because my feet were growing so fast, and it seemed like I was always hungry. My buddies and I collected scrap metal on weekends, and I tried to pick up odd jobs wherever and whenever I could. I also went to a farm to help to pick fruit, but it was hard work and boring, I got out of it after one day. Even my mother was appointed as Fire Warden for the entire block. Her job was to walk around the block every evening after dark and make sure everyone's blackout blinds were properly in place and working correctly. Those that had a problem she would knock on their door to inform the home's inhabitants. Fire Warden was a very important job that was taken very seriously. Another thing that people became aware of was plane identification in case an enemy plane was spotted anywhere in the air.



Figure 4.5 Food Rationing Images: part of the war effort! (Very 2022)

Just Three



Figure 4.6 Playing Monopoly

My father was gone for almost four years, but we made the best of it. We tried to keep some sense of normalcy in our lives, like going to church on Sundays and having Sunday dinners like when my dad was home, something he grew up with in the South. We still attended the first Christian Church down on Bryant Street near the Palo Alto clinic. My Dad had been a Deacon or Elder, sit up front facing the congregation during the service and help pass the collection plate and the grape juice with crackers for communion. Before he went off to war, I went to Sunday School but occasionally went to the 11:00 church service. When the war started though I spent more time at the regular service as I think it made me feel more like the man of the family. The church would regularly ask the parishioners if they would have a visiting serviceman for dinner. I remember we had Ira Tennyson, a navy seaman on his way to a ship in the South Pacific that we brought home for the afternoon and had dinner with. We also had an army private, Travis Byrd, a relative of my dad from his mother's side of the family. Private Byrd was passing through the area on his way to fight on some atoll. After my father came home, we seemed to try to continue to have some family dinners all together, but by then, I didn't much care.

Looking back, with my father gone, I got into a lot of things with my buddies that would have given my mother a heart attack if she knew. I sometimes ran a little feral and found all sorts of things to occupy me, though I tried to be home to spend as much family time as was possible, I was more than likely to be out with my buddies, climbing, riding, exploring, I spent lots of time trying to figure out how to make things go; the faster the better! By the time I became a young teenager, I was doing mostly mechanical things with old bikes and cars. Working with my hands was fun but trying to explore things out about how they were put together and how to make them work better was my true joy. I rarely felt the impact of my father's absence from our home or our lives. My mother felt it really bad, but she rarely spoke of it. I knew she missed her old friends in San Francisco; with the war on, there was strict gasoline rationing. She confided in me once that she was often lonely, even though Jim was

very good company for her always. She enjoyed spending time with him as he had fewer friends and was sometimes bullied. They were there for each other, and I will always be grateful that he was born.

I adore this photo of my father as an eleven-year-old (figure 4.7). He looks impish and a bit of a card. It gave me the first sight of him that I could really relate to because I remember myself at the same age. Also, his smile looks exactly like the smile my little sister, Elizabeth, had when she was that age.



Figure 4.7 David (far left) with classmates, autumn of 1942

CHAPTER 5

The Teen Years: Ages 13-19

(The bulk of this chapter is taken entirely from Dave Cochran's biographical materials with additions by Lisa Cochran noted by double-spacing paragraphs.)

This chapter is the most important section thus far in this odyssey of telling my father's life story. The stories in this section are more candid, personal, and detailed because of his age at the time of experiencing them. My father has a photographic memory and if the topic is of interest to him, it is even sharper.

Beyond that, the stories are amazing because none of his children were aware that any of these events were a part of his youth. Who is this wild teenager? Why had he shared no stories about these years of experiencing risk and thrill? They are his very intense memories of racing and crashing vehicles while in high school. He and his friends were sometimes injured, and one even died. My uncle recently mentioned that he thought during that time period a pedestrian was struck and came through the front window of a car my father was a passenger in. Except in his stories, there was never a mention of those years behind the wheel. He had tempered his wildness by the time he left for Korea and especially after becoming a husband at age twenty-one and then a father the next year. He had three children by the time he was twenty-five years of age and was also a student at Stanford and working part-time. One could say his pivot was due to a maturation process and the fact he had no free time to engage in anything else that could be construed as risky. His responsibilities grew so I imagine he had completely reinvented himself just a few years out of high school.

The essence of this chapter is like meeting a stranger for the first time. My father's teen years was a time of wonder and self-discovery, but also of struggle and family as well. My Granddaddy Speed was off at war until 1946, with a short stint at home in the summer of

1945 awaiting his final discharge from the army. The reunited family all piled into the car and headed on the first road trip that the Cochran brothers, aged eleven and fifteen, had ever experienced. My father was deeply affected by the things they saw and did on that trip, especially meeting so many relatives who came to celebrate the homecoming of the eldest son to the family homestead in Richton, Mississippi which he describes in this chapter. It influenced my father to the point that he made many visits throughout his life to see his family and took his children to let us experience what he had. He remained in contact as recently as 2014 for an aunt's 100th birthday celebration. The event was even recorded in the local newspaper, *The Kingsport Times News* (Staff 2018).

He starts of this section with an important influence brought about through scouting and how he enjoyed building things.

Since my father wasn't around during my early teens I went to my scoutmaster, Ken Grimm, if I needed fatherly advice, or influence. He was always a patient and kind man, not unlike my own father. But I don't know if I could tell my dad things the way I could tell Ken. Once, I had been picked on by the school bully and Ken went to the police who brought Norman Freitas in and scared him enough to get him to back off. I learned a lot in boy-scouts, and then later becoming an Eagle Scout. Obviously scouting and Ken made a huge impact on me because later on, as a father of several boys, I was often a scout master or co-master just because it wasn't always easy to find dads who weren't in Vietnam or building their careers.

I especially liked looking inside of things or making improvements on any design. I especially liked things that moved...the faster, the better! When I was about thirteen, I built a soapbox derby car with rope steering and baby carriage wheels. It was really a chore to drag it all the way over to Page Mill Road hill. My father was away in the service, so I talked my mother into buying a small one horsepower Briggs and Stratton gasoline motor. I do not think my mother thought I could really put the motor on the car made out of wood, sheet metal and rope. I got it going, and just ran it up and down Fulton Street at first, maybe getting up to 25 MPH, but with no brakes, I was wearing out my shoes really fast. I had already designed a clutch using an idler shaft and thought about using something similar with a stationary belt on the opposite wheel for a brake.

The police caught me a couple of times but then the little derby car was garaged after flipping with two of us on it; there was only one driver's seat that my buddy sat in while I was sitting backwards on the hood. My friend Malcolm Clark was trying to see around me and steer straight with the unstable rope steering system I had managed to not upgrade yet. I was trying to turn far enough around to help him navigate, but still we managed to run it off the road and flip it. It was

pretty damaged, and my mother was horrified that we weren't both in the hospital. Somehow, we got it drug back into the garage and that is where it sat. Of course, my mother found out about the crash because of all the damage to the frame of the little soap Box car. She was so upset by our little crash in the soap box car and that I would kill myself with it, she made me take the motor off of it. But she didn't say anything about not putting it on something else. Not to be sidelined too long, it didn't take long before I had gotten it bolted onto my bicycle. Then I had to attach a special back wheel with a big pulley for the power transfer. Next, I rigged up a gas cable to the handlebars and sure enough when I started up the engine, was off and on the move again. I then drove it down Embarcadero Avenue, really fast, right past the police station.

I had a friend, Emmett Casey with a motorbike, so we would zoom all over. Back then the authorities weren't all that interested in kids on motorized bicycles. Even though now I had brakes, I still somehow also continued to attract the police. But they could not take away my license since I didn't have one yet!

Sometime later, I took the little engine apart to see how it all worked; I put it all back together, but it wouldn't start. I finally figured out that I had forgotten the insulator for the 'engine kill' button. After that, I learned to pay closer attention to the little details.

My First Real Driving Experience

When I was about fifteen and a half, my mother had finally agreed to teach me to drive our sedan (figure 5.1), but that only lasted about twenty minutes and maybe a few hundred feet. We were in a new subdivision in Palo Alto near Jordan Junior High. It was called Leland Manor and about four blocks square. I think there were only three or four houses built yet, so there was lots of room for error. Even so, my mother said I was driving too fast, too close to the curb, was going to hit a parked car, etc. She was very quickly a nervous wreck and couldn't handle it. She made me stop, saying, 'wait till your father comes home.'" But he was in the army and wouldn't come home for at least six months, which at the time seemed far too long to wait. I was always an impatient child. Impatience sometimes drove me to sometimes do wild things.



Figure 5.1 The 1940 Buick, Outside the Guinda House, 1945

I had such a desire to drive that I figured out that the key to the glove compartment lock appeared to fit the ignition. I removed the lock, took it to a locksmith, and had several made, replacing the lock with no one the wiser. The key fit, and I just bided my time.

One night my mother went to bed early, I got a couple of friends to help me push the '40 Buick out of the garage and down the street. I started it up and away we went; my first real driving experience. I was trying to put 100 miles on that night in case my mother checked the odometer (soon I would figure out how to disconnect the speedometer cable). Anyway, we had quite a time of it cruising around town, checked out the cactus gardens in Stanford to flush out any muggers or flash the high beams at people making out in their cars. One of them started chasing us and I side-swiped a very large hanging branch. I had to use a flashlight in one hand and light sandpaper to polish out the scratches before sneaking back into the house and quietly climbing into bed.

During another nighttime adventure, I was taking the car back home and saw a police car parked out front; I kept going and didn't return till after he'd gone. That night, my mother had sensed something was fishy and had checked the garage, calling the police when she found the car missing. I gave her the key (I still had a couple more) and promised I would never do it again. The policeman came out to talk to me the next day, yeah, blah blah, blah; what's he going to do, give me a ticket (he didn't actually see me driving). So, I dodged a bullet on that one.

I got another chance to borrow the car again; my mother was taking my little brother to the Mayfield Theater. I checked the show times of the movie, they were going a little early, but I thought they would stay for the complete film. I found the car, moved a construction barricade into the spot and I was off on a joy ride again. I didn't drink but just loved to 'cruise the drag.' I got back a little late and saw my mom and my little brother walking down the street. I waved to them, parked the car, and took off on my bicycle to get home before them. I was too big to crawl under the bed, so I just took my lumps and returned another key.

Finally, my father came home from the service while awaiting final release. The first order at hand was that I wanted to get my license. My father understood, and within a few weeks of my father's return from the Army, he took me to the DMV to get my learner's permit and soon I was ready to take my driver's license exam. I borrowed a '39 ford convertible to take the driving test as I thought it might be easier to parallel park. I passed the exam even though I was nervous, but my dad had let me practice a lot with him (besides, I had all that experience joyriding in my mother's car under my belt). The only problem was that I had the license but no car, though I knew I would work hard to figure out a way to get one as soon as possible.

The Big Trip

The next big event was my father driving me, my brother, who had just turned ten, and my mother, to the old Cochran homestead in Richton, Mississippi. Since my father had a couple of months leave before he was discharged, we used the time to take a long trip to the South where he was born and raised. It was summer so we tied a couple of burlap bags full of water to the front bumper to stay cool and twenty-five pounds of ice on the floor up front with the fan blowing across to keep the inside of the '40 Buick a little cooler as there was no car air-conditioning then. However, it worked fairly well! We did have to stop and get fresh ice pretty often though not so much while we were traveling east and north.

This was my first look at anywhere but the bay area. We stopped at the usual places, the Great Salt Lake; we swam with about half our bodies out of the water due to the buoyancy caused by the high salt content. We went into the Mormon temple with the great acoustics. We occasionally would stop along the way to visit with one of my dad's old friends from way back or a distant relative. We headed up north to South Dakota to see Mount Rushmore, which had stopped construction in 1941 when money ran dry. But we were awed by the scope of the carvings and the amount of work that were put into the fourteen years of construction. We stopped in Sioux City, Iowa and saw the Sergeant Floyd Monument at went to the top of the tower. It was a tribute to one of the members of the Lewis and Clark Expedition and has lots of information on their Corps of Discovery from 1804.

Finally, we reached Richton, Mississippi. Its only claim to fame was that it was home to the famous Cochran Brothers, who could run like hell. In more than 20 years my father had never been back. We drove out a gravel road (now named Cochran Road) and there it was the actual house that my dad had been born in back in 1904! It was what is called a shotgun house; you could fire a gun through the front door without hitting a room; it had a central hall with all the rooms to either side.

The farm was a section, one-thousand acres, one square mile which my grandfather Rufus had received from the government back in the late 1800s with a promise to keep at least forty acres under cultivation. There would never be any taxes on the property if he kept those forty acres growing food. My Grandfather's brother, Uncle Dow lived in the adjoining property section. I thought they had married sisters, Arizona my grandmother and aunt Vade (Nevada) back in Virginia and had come out West; Mississippi is west of Virginia. But actually, Aunt Vade was married to someone else and lived in a neighboring town (but the story sounded good to me, so I kept using it for many years). What really got me was how many cousins I suddenly seemed to have (figure 5.2)!



Figure 5.2 Mississippi Cousins, 1946.

The barn was the real thing with a hayloft and all. The cows would be brought in from the fields to milk. The tackle for the horses and farm equipment such as the plow was kept here. Off to the side was a pen for the pigs. Chickens just wandered around in the side yard. If we were going to have chicken for dinner, my grandmother would grab one, swing it by the neck and slit its throat. Next, she would dunk it in hot water to get the feathers off easier, gut it and get it ready to cook.

My father showed us where he went to school, a one room schoolhouse halfway to town. He was about seven when he started school as he waited for his younger sister Edna to be old enough. The old swimming hole in the creek, could you believe I was swimming where my father had thirty years earlier? We went into town; Richton had a population of about 700 which was down a bit from when the mill was running. They would set up chairs at the feed store to see a movie once a week.

It was a shock then to experience a rural environment with everyone knowing everybody else. I guess meeting my huge extended family, most still living close to each other, bonded together by kinship and kindness, left an impression on me. I remember the first time I met my Aunt Arluin, my father's younger sister. She was a jolly lady, somewhat plump, in her thirties with a good Southern twang and a couple of children. They lived in Ellisville, not too far from Richton where the farm was. We went to their home; they lived in the back of a country store in the crossroads just out of town. They sold gas, pumping it by hand and all sorts of groceries. I think I got my first RC (Royal Crown) cola there, maybe a dime.

Years later I would drive my own children to see the homestead and meet my dad's family. The first time I took my kids to Mississippi was quite an experience. I wanted to show everything off to them and we headed to bed early right after sundown to get an early start the next morning. I remember how hard it was to fall asleep because first of all, it was stifling hot, even with fans. Second was of the almost deafening noise of night insects that could be heard through the screened windows.

Well, I got up before most of my children, slipped my jeans on and was halfway down the hall before I felt the animals in my pants. Everyone started coming out of the bedrooms to see me running down the hall trying to get my pants off that were full of giant timber ants. My grandmother said, "See, I warned you!" and everybody else is hooting and laughing seeing me hopping around with my pants half off.

Later that morning I took the kids out to the pasture to get ourselves some horses to ride. I had ridden down there before so I took a halter out in the pasture to grab the young filly. Well, I walked up to her and started to put the rope around her neck, but she kicked a little and skidded off sideways. Hey, I was showing my children how to do it. I went up to the little horse again, started to put the halter over her neck, but this time she turned and kicked my right in my knee. I was sure the bottom half of my leg was gone; I took my pants down afraid to see a bloody stump. Again, my kids were rolling in the pasture splitting their guts watching me hop around with my pants half off for the second time that day. Amidst their howls, my psyche was wounded much more than my leg at that moment. That tale became a family favorite told and retold over the years by those who witnessed it.

I visited the farm many times since, taking my children with me on several occasions. I even went to Arluin's 90th birthday party, held in the local church meeting hall. I was so psyched I arrived several hours early driving up from New Orleans; this was about a year before Hurricane Katrina. I was wearing a suit and tie just like my father would have if he had still

been alive. Since I was so early, I looked for a place to have a drink, just like my father would have. Wouldn't you know it, Ellisville is a dry town. Since it was also Sunday, it might even be more difficult to find a bar. I drove to the closest big city, Hattiesburg, and got to the local watering hole just at 12 noon; the bar had just opened. A quick Jack Daniels on the rocks, just like my father would have had and I was back on the road to Ellisville.

I was still the first to arrive but soon the hall started filling, I think about 100 showed up and I met them all. Aunt Arluin was just beaming, joyful and jolly as I remembered her; Aunt Piney and Uncle Keith were there and most of my 27 cousins came many with their kids, there were ten children altogether in my father's family. It was great to see so many of the cousins, Sonny, the oldest all the way down to Noal the youngest; we had a group picture taken.

Soon we left the church hall and moved to Aunt Arluin's home, a typical Mississippi dwelling with cars parked on the lawn and a swing and chairs on the porch. I spent the afternoon reminiscing with her and others of my father's family looking at old pictures, etc. We shared quite a bit about the next generation; I talked about mine and met many second cousins. At dusk I drove back to New Orleans to catch an early morning flight back to San Francisco connecting with United 891 to Shanghai; crossing twelve time-zones and three cultures in as many days.

Ten years later my father attended Aunt Arluin's 100th birthday, bringing my sister Elizabeth, who had never been to Mississippi and had never met anyone in the Cochran family (her Granddaddy Speed died just weeks after her birth, but he made sure to say hello to her and her mother in the hospital). It was such a big event it was listed in the local paper, *the Kingsport Times News* in Arluin Cochran Kyzar's obituary at age 103:

In celebration of her 100th birthday in September 2014, Mrs. Kyzar enjoyed a party attended by family from across the country and by friends from throughout South Mississippi. She often remarked how blessed she was to have lived such a long life and had been able to see and experience such interesting things. She enjoyed growing up in a large family on a farm. She was thankful that her four brothers serving in WWII all came home safely. She was proud of her two brothers who were Olympic track and field athletes, one winning a gold medal in the 1924 Paris summer games and the other winning two gold medals in the 1948 London summer games. She was especially close to her sister Piney. After they were both widowed, they enjoyed traveling together, with a particularly memorable trip when they flew on the Concorde to London. Just a few years ago when one of her granddaughters was telling her about flying to London and how long it took, her grandmother told her that she should have flown on the Concorde since it was faster. The granddaughter then reluctantly told her that the Concorde was no longer in service (Staff 2018)

The Need for “Loco” Motion

Right after we returned from Mississippi, a friend of my mother’s had a ‘29 Chevy touring coupe for sale. It had a straight four cylinders with an updraft carburetor. My mom, ever the shrewd businesswoman, talked her friend down a little bit and I think I only paid about \$100 for it. Wow, my first car! I knew immediately what I had to do was to fix it up because though it started up and ran when we bought it, it had some knocking in the engine which quickly got worse. I enrolled in Auto Shop as one of my classes at Palo Alto Paly High that fall and got them to let me work on my own car in the school shop. It was common in those days because we needed projects vehicles and could bring in our own if there was room and it had something interesting that could serve as an educational opportunity for students. I promptly learned that the knock came from one of the piston rod bearings, but by the time I got through replacing the suspect bearing, and put the engine back together, it had an even louder knock! Despite my disappointment, I had definitely found out how to tear down an engine and put it back together. I learned a lot with that first car. I’m not sure it was running or in the shop more, but it sure taught me how to stick with it.

I also discovered that grease is a big part of working on cars and it gets in and on everything. It was hard for me to stay clean, especially my hands, and it made my jeans shiny where I constantly wiped them. I also kept wearing the same pants, which I stowed at the shop so that my mother wouldn’t just throw them away if she saw them. Worse she would probably have burned them. They’d probably still be burning with all the grease I had gotten into the material.

Even though I had a little driving experience, I also learned how to drive the hard way, occasionally hitting, or scraping something with a fender or two. We used to play our version of chase; the lead car would try to get away by turning his lights off at night through residential streets or preferably Stanford or Los Altos hills (dirt roads then). I learned how to drift corners, steer out and keep the pedal to the metal. You try not to hit your brakes through all this, as the lights will give warning you’re slowing and where exactly you are. I became fairly good at the game and think it made my reaction times much quicker. Later on, in my ‘33 Ford ‘hot-rod,’ I installed a switch to turn off all the rear lights which made the chase even better.

I once got a two-by-four through the windshield when we raced through Redwood City before the big game (Sequoia High vs. Paly). It was either Vitale or one of the Bumbaca brothers driving the other car. I hit a tree, but they smashed up their right fenders pretty good hitting my car; boy that Chevy was sturdy. We all got out of the cars and rumbled a bit, got punched around, but finally got the car out of town. Earlier one of us had walked across Broadway with a jug of gasoline pouring out; when we got to the side, we lit it and took off.

I got another windshield, even better looking, at the midnight auto supply I finally sold my first car, the Chevy for about what I paid for it and saved my money for my next car.

A Father’s Final Homecoming

As soon as he returned home from the military for good, my father signed on with the Veteran’s Administration; many of the GIs being discharged needed help transitioning back into society. His decision to take this job meant forgoing his old job at PG&E, his seniority

and bridging of his pension; but he really loved counseling the troops. Well, the VA job only lasted about a year, then he went back to PG&E but at lower-level position than he held before the war.

By that time, I was pretty much doing things on my own for a while. I remember he tried to help me with the '33 Ford I was rebuilding; I said that I had it figured out already. I think he recognized he hadn't been around during my formative years. But my father became the official track starter at Stanford; I remember him doing it for several years. He got me into various track meets and baseball games.

Early on, he tried a few times to do guy things with me. Once we went fishing in a rowboat in the delta; it was really boring, and all my dad got was very sunburned. Another time we hiked in from the Web ranch access on Alpine Road over to Searsville Lake. I had done that hike many times with the Boy Scouts, so it didn't feel very novel, even with my dad there. He also took a bunch of my high school buddies and I up to Yosemite skiing; he liked just hanging out with me and a bunch of guys.

I really don't remember much after he came back, other than getting my license. We seemed to try to continue to have some family dinners all together, but then being a teenager, I didn't much care. I was probably all wrapped up in cars and girls, or just felt so used to having him gone and building my own life of independence during the war years that spending time with him felt odd.

Still, I know I kept trying to make him proud of me. For one thing, I switched from the swim team at Palo Alto High to track to favor my father. I had even played a few games of water polo, but the coaches said I had to choose (figure 5.3). My parents came to my track meets and my dad was ecstatic when I won. They were in the stands when I won on the Sequoia High track in Redwood City, tripping and sliding across the finish line on my knees.



Figure 5.3 Swimmer David and brother Jim, 1947, converting to runner Dave, 1949

Although I wanted to, I never ran the 440-yard dash because I was just not good enough. I was tall and lanky, so it took me awhile to get going. My junior and senior year, I did very well in the half-mile posting the best time on the entire peninsula.

High School on Wheels

In 1946, my freshman year, I had a paper route in the mornings but then I started working at the Channing & Emerson Texaco station for fifty cents an hour. Regular gas was nineteen cents per gallon and ethyl high octane was twenty-one cents per gallon. The owners were the Branaman brothers, Sid, and Jim. I worked afternoons after school. I worked there until the end of my sophomore year when I went off to scout camp and then got a job doing some construction work which paid more but worked longer and harder hours.

It was a very interesting place to work with all kinds of people stopping for gas. I washed windshields and checked tire pressure as well as pumping gas, there was no self-service then. As a teenager I didn't mind washing the windshields of those cute ladies with their skirts pulled up just for me, or so I thought. I also learned my share of rough language from some of the people I worked with or came by. I only lasted a year, but it was enough to buy my second car.

We had one tank called white gas as it contained no lead; it had a hand pump to fill the large glass tank with markings along the side up to about ten gallons, and then drain the amount needed into the customer's gas can. White gas was used for cooking.

I remember Mr. Parish, the delivery mailman; his daughter had been in the special class when I was in the fifth grade. George Paddleford came in regularly from his Cadillac agency up Emerson and Homer Streets; now it's a Whole Foods market. I also remember an Italian guy who had an account marked "Special" and then found out his name was Speciali. Since they only had iceboxes for the most part back then, we had a small icehouse on the premises, it was my job to chop it into chunks and tie twine around it. I think it was only twenty-five cents for twenty-five pounds.

I had some savings from my paper route and added in some of the gas station money I had earned so I could trade in the Chevy and bought a '31 Model A Ford Coupe, four cylinders with the gas tank over the dash, in front of the windshield (figure 5.4).



Figure 5.4 The 1931 Model A Ford Coupe

The gas cap was right in the center, and you had to be careful not to spill onto the hot engine. It was rather decrepit when I bought it, so I started by removing the roof and inside door panels. The Model A did not have any running boards, so it was tough for a girl with a dress to get in. I remember taking a girl from the Harker Academy, then an all-girls school over behind the Lucie Stern Community Center/Rinconada Park to a dance. I knew I had to get myself a reliable and flashy car that the girls would want to climb into.

I did things to it to make it faster like adjusting the timing to generate a spark when the piston was in the right position in its cycle. I also learned how to enrich the gas flow in the carburetor. It went super-fast! I had just got it going really well and looking mighty fine. I raced it from Churchill Avenue to Embarcadero in front of Paly High one noon, probably hit about sixty-five mph. I was driving like crazy near Barron Park on El Camino Real, mostly in the center or passing lane when I came upon a car coming straight at us also in the center lane. I could not go to the right, there was another car there, so I dove off the highway to the left. There is where we collided, in the parking lot of Ernie's Liquors; me doing about sixty and the other car was going about forty. The other car was badly damaged, mine was totaled. In my car Glen was hurt the worse with a gouge in his arm from the missing door crank. I put my hand through the windshield; Emmet and Dixon walked around with limps for a while. But wouldn't you know it; those two got into another crash later that night while spinning brodies on the Stanford soccer field.

Well, I thought, win some, lose some, but I still got about \$60 for the transmission and differential, maybe another \$40 for some other random parts that we still in good shape. I wasn't one to wait long for another car, so with the money I got from what was left of my Model A, my fifty cent-an-hour gas station attendant and some birthday money, I bought a disheveled '33 Ford coupe that had 'Hot Rod' written all over it! I don't know where I got the idea that a '33 or '34 Ford coupe V-8 was the ultimate looking car, but even several of my friends bought ones that year in (1948). It wasn't much when I bought it from a guy that worked at the Palo Alto Bike Shop; but I had a dream.

A year before my parents had bought me a 3/8th socket set for Christmas. With those tools and a quarter-inch drill I could do anything. I looked though the parts list for a '46 Ford hydraulic brake system; I thought I could install that with 16-inch wheels and really have a nice running machine. The engine was eighty-five horsepower but that should be enough. I think my dad got me a discount through PGE for the brake parts.

Quite a few of my friends had the same model and we decided to channel our cars; remove the fenders and lower the entire body about six inches. First, I removed the fenders and running boards, then the rear body trim. Then I lifted the stripped-down body off the frame. It was pretty easy with the body out of the way; only needed a 1/8-inch spacer around the front axels. I then went to work installing some better brakes. My father had gotten me a real deal on those hydraulic brakes through his work at PG&E, so I put those on with several challenges in adapting them. I then wired the car so that I could turn off the total back-end including brake lights, an advantage while playing chase as your pursuer can't see your taillights.

Now it was time to put the body on and start deciding how I was going to accommodate everything in the lowered structure. I didn't need the seat frame anymore, so the cushion was right on the floor. Since the running gear was in its original height connected to the engine, I had to turn the pedal eyes for the clutch and the brake over to lower their position relative to the seat. I had designed a custom dashboard that a shop up on Potrero Street in San Francisco

made into beautiful burnished stainless into which I installed custom gauges. I had found a nineteen forty-something Buick nose that just fit the Chevy truck grill from a junk yard. My biggest problem was the hood; I didn't want the ugly hinge and I didn't think through the air circulation around the engine. In fact, I had even shortened the fan blades to fit within the confines of the new grill and nose. I therefore opted for a one piece of sheet metal that really looked cool but took two people to take it off. I had a custom front bumper chrome plated that was called a nerfing bar, designed to just fit between the frame rails and painted it grey-blue metallic; now I had a real hot rod! I started her up with no hydraulic leaks from anywhere and felt very accomplished. I did have only one. Accident doing all that work; the frame fell off the wood blocks and landed on my right toe, my penny loafers were little protection.

I loved that car, drove it around town chasing my buddies, them chasing me and occasionally a cop or two (figure 5.6). Even though my car was banned from the Paly High campus most of the time for spinning brodies in the parking lot, I don't remember getting a ticket ever while driving it, even if I did deserve quite a few. I broke a couple of wheels drifting corners going in at fifty-five mph and coming out above sixty. We were all pretty crazy then, no

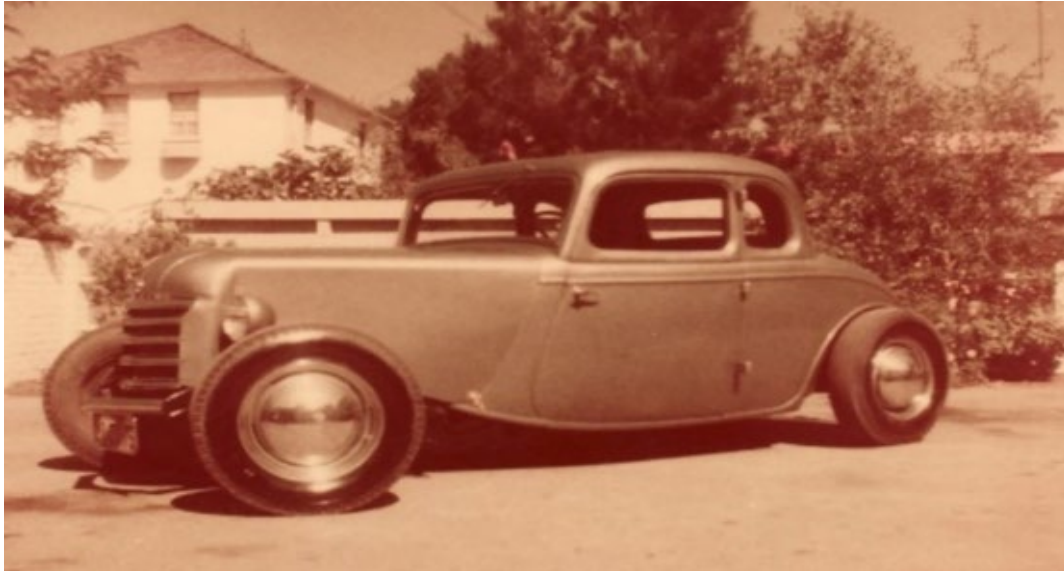


Figure 5.6 My beloved 1933 Ford Coupe V-8 Hot Rod which I sold when I went to Korea.

fear. Once I bet one of my buddies, Joe Bryant, that I could beat him in a race, but he lost crashing into San Francisquito Creek off of Newel Road. Joe never lived through high school; he would die in another car crash in the same place when the top he had spot-welded together broke loose and came down on him. He couldn't get out from the cab, and he drowned in the shallow water at the bottom of the creek.

A Shot at Flying, Appliance Repair and Podiatry

At sixteen I was given my first plane ride; well, all my anticipation and expectations almost came up when he banked a little. I thought I was going to fall and tried to lean the other way. I was in the rear seat of a little Piper Cub and my friend looked back in the mirror, saw my face, and leveled out immediately. He said that I had turned green. Even though my dad was

disappointed, I thought then that I should just stick to flying in cars.

When I was seventeen, Dad took course in radio repair using the GI Bill and wanted to go into business doing that. He found a small appliance repair shop for sale in Redwood City; we both thought I could have helped him out with it since I had learned so much working on auto wiring. My dad and I thought we could make a real good go at it too, but my mom said she didn't think it was such a good idea. It was the only memory I ever had of my parents discussing finances. I don't remember there being any kind of fuss. My mother just didn't think my father was good with money and would not do well owning and managing his own business. So, he just stayed at PG&E.

During that summer, my dad got me a job with PG&E working in Northern California near Eureka digging holes for new power poles. I was driving back by way of Redding on highway 99 when my car overheated from the custom hood not allowing enough airflow throughout the engine compartment and it stalled. I hitch-hiked back home, and my dad and I drove up and towed me all the way home.

Later, I was clearing brush in the Sierra foothills near Colfax to save up money to fix my hot rod when I chopped my foot right between the big toe and the one next to it with sharp axe. Got eight stitches and he came up and got me then too. I went into my senior year a little banged up but a lot excited that I was on the downhill towards graduating from Paly and starting a new chapter of life..

Culver Military Academy

I was always a very hard worker, but I was also a kind of a rebel and did not study all that much, only paying attention when I was in danger of being suspended from the track team for poor grades. Finally, my senior year, I realized with my grades I could not even get into San Jose State, let alone Stanford, which had been my dream. So, I thought maybe I would just go into the service instead. My mother especially did not like the idea of me leaving home so young to go into the military, so I asked my parents for help. They suggested Culver Military Academy, which was advertised in *Parents Magazine*; since my dad had gone to a military college, Mississippi State, he was all for it. They thought would help my grades, get a taste for the military as well as get me better prepared for the real world.

Culver had been around since 1898 and though it was a little pricey, it had an excellent reputation. Located in Culver, Indiana and situated on more than 1800 acres with a large lake front at its disposal, it seemed like an ideal solution to the problem at hand. I suspect money was borrowed from my grandmother. She must've loved me very much, even though I remember so very little about her and she was little more than a mysterious houseguest to me. But she changed my life forever. I hope she was as proud of me as my parents were that I would be going to an institution that instilled into its cadets real leadership skills, self-discipline, respect, and a sense of duty. The next year, my brother went for one semester and when I became a father, I sent my eldest daughter to summer school there. Later, my brother sent his two daughters to the full time Culver Girl's Academy that had just started, so the entire experience impacted our family for several generations.



Figure 5.7 Culver Military Academy (Culver Military Academy History, 2022)

Learning to Study

Culver was a preparatory academy and did the job. It turned my study habits around, since I was watched through a window in the door of my dorm room to ensure I was bent over a book for two hours each night, I read a lot. I got an A average and as well as continuing to run track. I ran the mile there finishing first in the Mid-West Prep Conference was accepted into the college of my choice, Stanford. My parents were immensely proud to watch me graduate from Culver with excellent grades. They even shot a home movie of the entire event. When I reapplied to Stanford with my grades from Culver, I was immediately accepted. I assumed I would be attending Fall semester, 1950, just a few months away. Little did I know how quickly *everything* would change.



Figure 5.8 Culver Cadet school year 1949-50

CHAPTER 6

A Big Decision

(These years are entirely written by David Cochran except for the introduction, noted by double spaced paragraphing and editing by Lisa Cochran.)

This was an important chapter in my father's life. Having spent one year at Culver in Indiana, he had already begun the process of leaving home, but just a little. He knew he would be back home, so he was not at all distressed or thinking of anything beyond going to college at nearby Stanford. I imagine he thought things would continue as before he had left the previous September, except that now his brother was to spend a semester at Culver to prepare him, at age 16, to enter Stanford the following spring. However, just weeks after returning home, Korea had suddenly turned from a U.N. managed conflict to an undeclared war by the United States. These years in the Navy really determined his life as an electrical engineer. It is where he got his first official taste of engineering, communications, design concepts and how things worked on a boat.

My dad never spoke about the war, either during our years as children or as adults. I knew very little about my father's stint in the war. This is because of two things; a trip and my daughter's fifth grade Veteran's Day assignment to interview a vet.

In 1996, my father took me with him on a trip to Japan for a week. It was a bit of a fluke, really as the trip had been planned for someone else, who ended up not being able to go. I think I was the only one of his children who was available during those dates so off we flew, first class, with Russian vodka and caviar for appetizers and rack-of-lamb for the entre. For desert were Godiva chocolates, and after that, a stretch out to watch a movie and sleep for the long trip to Osaka. We went to temples and took tours, but then one day he asked me if I wanted to see where he was stationed during much of the war. I thought that would be

interesting, so we took the bullet train up to Tokyo and then another one down towards the coastline down to Yokosuka. He reminisced a little and was amazed how much it had turned into such a modern city. He even showed me where he lived when not on the ship and unbelievably, the tiny house was still there. He had described how during the war there was a bar on every corner, full of military men and girls to entertain them.

The interview with my daughter took place in fourth grade when she was nine years old. He told her a few of the things he wrote about in his story below, but she asked him personal things, like about getting seasick, or getting fired upon, or his helicopter crash that left him uncomfortable with flying. He really enjoyed telling her about how he felt, but that was in 2006 when he made more effort to connect with children on their level. I was glad to see him begin to see children differently than when I was young in the 1950s and 1960s.

When I first found out that my grades in high school had not been good enough to even get into a local state school. I was pretty embarrassed because so many of my classmates and even quite a few of my buddies, had better grades that got them decent jobs or off to notable colleges. I didn't want to go to Foothill Jr. Community College, which was little more than a high school with ashtrays, so suddenly I was faced with what I saw were my options at the time. I had worked part-time setting up bowling pins at Galaxy Lanes but not only was the pay low, but I was always worried I couldn't move fast enough to get my toes out of the way of Smart Alec bowlers, many of whom I knew. The gas station hadn't paid enough and clearing brush almost cost me a toe. Setting telephone poles for PG&E was back-breaking as was the construction apprentice work, I had tried for a while. I had spoken with my Uncle Roy, who had been a Captain in the Navy and was doing some post-graduate studies at UCLA. I told him I was thinking about going into the service right after graduating from Paly and he said unless I wanted to sleep in foxholes and eat cold MREs out of a helmet, I should consider the Navy or the Air Force. I knew that the Air Force was out because when I was sixteen, a friend's dad took me up in his plane for 'the ride of my life' and I spent the entire time trying not to vomit all over his plane. It was unforgettable all right; I decided right then that I didn't like flying or heights. My uncle, who had done some mine sweeping duty in the Pacific before becoming a submarine chaser thought the Navy would be a great fit. Though I had never been on a boat except for a rowboat or a canoe, I thought a dry cot, three hot meals, and a chance to see the world in peacetime sounded like a good plan. I spoke to my parents about my plans, and they sent me to Culver Military Academy as a preparatory student to get my grades up and put me in a better position for higher education. Now, here it was a year later, I had applied to and gotten accepted at Stanford University, which lay only about a half mile from my high school, to go into their mechanical engineering program. I could save a ton of money by continuing to live at home, even though I felt the year at Culver had prepared me for dormitory living. But life often has a way of stepping in when you are making other plans. A month later, near the end of June, the North Korean People's Army

decided to invade the Republic of South Korea in a coordinated, but unprovoked attack. Russia and China were immediately supporting North Korea's military action. President Truman and United Nations forces just as swiftly responded by declaring assistance for South Korea to repel its Communist aggressors. Suddenly, Stanford didn't seem so important anymore.

A Son's War

I joined the Navy immediately (figure 6.1). I had missed the 'Big One' and here was my chance. My mother was beyond upset when she found out what we had done. She accused my father of sneaking me over to the recruiter's office, but I had just turned nineteen and felt old enough to make my own decisions; in fact, that event of taking me down to enlist was the last straw in my parent's already troubled marriage of twenty-four years (they would soon get divorced not long after I had gone to Japan).



Figure 6.1 Enlistment Day

While enlisting, they gave me some aptitude tests. One of the men said,

“Hey young man, would you want to go to electronics school?”

No, I replied, I couldn't even get my crystal set to work in Boy Scouts!

“Well, it's nine months duty on Treasure Island, so really close to your home. Why, you could visit your parents on weekends!”

That sounds great... sign me up!

Another perk was because I had already gone to Military School for a year, I was designated a Recruit CPO (Chief Petty Officer) in boot camp, so no watches and I carried a sword

(wooden) instead of a rifle when we marched. That was awesome because those rifles were pretty heavy, even if they were your new best friend. Still, Navy boot camp in San Diego, was ten weeks of what seemed to be an awful lot of running. I was really looking forward to going back up north to spend nine months in soon be assigned a ship fighting in Korea. About once a month the drill team would be in a parade in the bay area surrounded by local beauty queens. It was tough duty, but as the saying goes, somebody had to do it.

The other really cool thing was that Treasure Island Naval Auxiliary Air Facility was also located there so I got to go back to my childhood love of watching airplanes, sea planes along with airships, blimps and dirigibles in the nearby hangers and taking off and landing nearby. The airships were more recently used for surveillance since the fear of Japanese submarines was a huge concern in WWII along the west coast. They were extremely cool to watch their fairly quiet demeanor and even cooler to watch them slip into the fog. Thirty miles south in Mountain View, they had huge dome-shaped hangers that were covered on top with black-out paint down at Moffett Field near where I had grown up. One of them was the world's largest freestanding wooden structures sat on eight acres. Many of the other wooden hangers had been built in the last war as part of a network of costal patrol and defense facilities that stored dirigibles that used to guard the coast. There was rationing of metal, so they were built out of wood making them unique and staying cooler. The Air Force also used parts of the facilities for their jets. The Blue Angels would do air shows just after the war ended. After Korea when I was older and my children were young, we often watched airshows over at Moffett Field. Walking into the blimp hangars was always the most impressive thing because of their sheer immensity.

The Korean War was in full swing when I graduated from electronics school (figure 6.2). I volunteered for a minesweeper duty in late 1951, so first thing to happen was to be deployed. I had to take a long ocean voyage on a troop ship with several thousand soldiers going into battle in the Korean War. The first few days were rough; most of the troops were seasick, including me. I had never given it a thought before about boat travel, and here I was green as pea soup and queasy as if on a fair ride, in the Navy, heading to pick up a minesweeper in Japan. We landed in Yokohama, Japan and I was transported by lorry to the naval yard in Yokosuka and boarded the USS Condor AMS 5, which was in for replenishing and repairs. It was a WW II minesweeper put back into duty along the coast of North Korea to prepare the harbors and possible assault beaches for potential landing sites. The Condor was one hundred twenty feet long and just over twenty-four feet wide, basically only a little longer than four crewmen, placed end-to-end. Small boats move a lot like toys in a bathtub. You feel every movement of wind and water.



Figure 6.2 A new recruit.

Upon graduation from nine months of school I had been promoted to the rank of ET3, Electronic Technician 3rd Class Petty Officer and I was taking the place of a Sonarman 1st Class. All the electronics and comm gear on these one hundred twelve feet long, twenty-four feet wide and eight-foot draft wooden ship was going to be my responsibility. My work would affect thirty-two officers and crewmen. Well, I sure grew up really quick when I realized that.

The boat was made of wood, so that it would not create an electrical charge that could accidentally set off a mine. A mine is like a floating bomb that is anchored to the sea floor and floats about fifteen feet below the surface of the water. When a large ship passes over a floating mine, the bottom of the ship will hit the mine and the explosion can very easily cause massive damage or even sink the ship. It was the mine sweeper's duty to clear an area of all underwater mines before the bigger ships came through. Our ship is much smaller than others so that the bottom of our boat does not sit very far below the surface of the water. The captain waits to enter a potential minefield at high tide so that they can pass safely over the tops of the mines. On the aft beam, the sweeper is dragging a big wedge-shaped device with giant steel cutters that slices the mine cables. When a mine gets cut loose, it will float up to the surface where it is easily seen. A crew member sharpshooter would use a rifle to shoot at the mine until it explodes. Usually, they will get it in one or two shots. Get the job done and not hang out any longer than necessary.

Aquatic mines were mostly located in bays or ports to keep enemy ships from getting in close to the harbor to attack. If there was a planned invasion by our forces, it was our responsibility to clear the area of all mines first. My biggest responsibility was to keep all the electronic equipment on the ship in top working order. That included radar, sonar, and all radio communications equipment. Up until now I was just learning from a safe position on bases. Now I needed to get ready to figure things out in enemy waters or while under attack. Out here if you mess up, it can be a matter of life or death. We have to learn to work together and have each other's backs and become like one fighting machine. But my first job of order was to stow my gear and see what the base had to offer this new recruit.

I arrived near the end of the day, stored my gear on my bunk, I think a middle one made of six feet of canvas laced into an aluminum frame. I only had time for a few introductions amongst the twenty-odd crew and it was time for shore leave to get in a little bonding. There were four officers on-board that seemed a little crusty, but for the most part we had little to do with them; they had their own mess and quarters amidships. Even on such a small boat as the Condor, we knew where our places were at and how to avoid getting into theirs.

New Experiences

We stepped off the ship. We turned left at gate and suddenly entered the Sakura beer hall, a world I had never seen before. Girls all over the place. Hey sailor, want to buy me a drink? About four of us settled at a table and ordered Asahi beers. After a few I had to go to the bathroom; a door marked Men and entered. Shortly a girl walks by, and I think I'm in the wrong room, so I go out and check, there were two doors, but both led to the same room. This was 1951, and they had seen American movies but hadn't gotten everything figured out yet.

In the next few days, I was shown all the electronics gear on the Condor (figure 6.3), as well as my ship duties which included scraping and painting. My direct boss was a 1st class petty officer named Paltridge, who had been sailing for twenty years, first in the British Navy, now


in the USN. He was one tough SOB.



Figure 6.3 The USS Condor, my first minesweeper duty.

USS *Condor* (AMS-5) Auxiliary Minesweeper

USS *YMS-192* in San Francisco Bay after World War II. The minesweeper was later renamed *Condor* (AMS-5).

United States Navy			
Name:	USS <i>YMS-192</i> Yard Mine Sweeper		
Builder:	Greenport Basin and Construction Co. Greenport, NY		
Launched	5 December 1942	Completed:	3 June 1943 1

Renamed:	USS <i>Condor</i> (AMS-5), 18 February 1947	Namesake: the condor bird
General characteristics		
Class & type:	<i>YMS-135</i> subclass of <i>YMS-1</i> -class minesweepers Minesweeper	Auxiliary
Displacement:	270 tons	Length: 136 ft (41 m)
Beam:	24 ft 6 in (7.47 m)	Draft: 8 ft (2.4 m)
Speed:	15 kts	Complement: 32 officers and men
Armament:	1 × 3/50 caliber dual purpose gun mount 2 × 20 mm guns	2 × depth charge projectors

Figure 6.4 The USS Condor (Wikipedia 2022)

A few days before we were to leave port, we switched everything on in preparation to going up to our assignment along the North Korean Coast. Guess what? Some of the radios and the radar didn't power up correctly and I had never seen any of this gear in school, I think one of the instructors had mentioned this pre-WWII equipment and hoped we wouldn't stumble on it. There was a technician from Raytheon in the yard who tried to help; I vowed never to shut working equipment off again, as the start-up surge could cause the vacuum tubes to burn out.

After replacing a number of tubes, we got it all working and left port travelling through the Inland Sea through Shimonoseki Straights and headed up to the line off the coast of North Korea. Most of us got seasick when we hit the open sea but found our sea-legs after a day or two. I stood navigation watches, either on the radar or top deck above the pilot house sighting us in through a transit (a telescope mounted to a compass) if land was close enough to recognize.

New Skills and Responsibilities

Our job was to sweep for mines off the coast of North Korea in anticipation of another landing by UN forces. Previous invasions had lost several minesweepers clearing the way for the troop transports. Most of our time was spent north of the 38th parallel near Wonsan Harbor. The North Koreans still had the original five and eight-inch guns left by the Japanese after WWII, and they would fire at us occasionally. We would usually have a Destroyer, either US or Dutch, as fire-support escort but were often too far away; by the time they returned fire the guns had been pulled back into the tunnels of Kalma Gak or Hodo Pando.

One day we were assigned to sweep an area that had not been secured. We had cables out about three hundred feet either side with cutters every fifty feet. We were sweeping for moored mines and the cutters were supposed to cut the mooring cables and the mines would pop to the surface. The bow lookout started shouting and pointing to both sides; we were going right down the line of mines. They started popping up behind us on both sides, the helmsman was so shook up he couldn't steer straight so the Capitan ordered me to take over. A twenty-year-old has no fear. We shot holes in the floating mines with our twenty mm guns, and they sank, corrosion would soon render the explosives harmless.

Another time we were sweeping similarly, and something snagged our gear. We started reeling it in and Wow! a mine rose up at our stern. We had found a new type of mine moored by chain instead of the standard cable. We snagged the mine with a little derrick and were really careful not to rock it because it did not have the traditional horns, so it was suspected to have an inertia trigger. 525 pounds of TNT, a little pendulum inside would make the circuit and poof.

Once we were far up North on the west coast of Korea near the Yalu River. We had magnetic gear out and I saw a splash behind the ship, I shouted I think we just blew up a magnetic mine. Just then we saw a Chinese tank lumbering along the beach. We could only do about seven knots with the gear strung out, so the Chief runs to the fantail with an axe and chops the cable. I was on the radio for air-support, but we managed. Sometimes we would be under fire from enemy fire onshore. I would transmit the gun positions so that we could direct an airstrike onto the beach. Sometimes I would radio ships farther out to sea that would then shoot their long-range guns onto the shore to protect us. For the next year I was up on the line in Korea sweeping for mines along the coast north of the DMZ in anticipation of another assault. We'd come back to Japan for refueling and supplies every month; the crew also refueled, as we only had to walk about ten feet outside the gate to the Sakura (Cherry Blossom) Bar, and it seemed like I was coming into my own (figure 6.4).

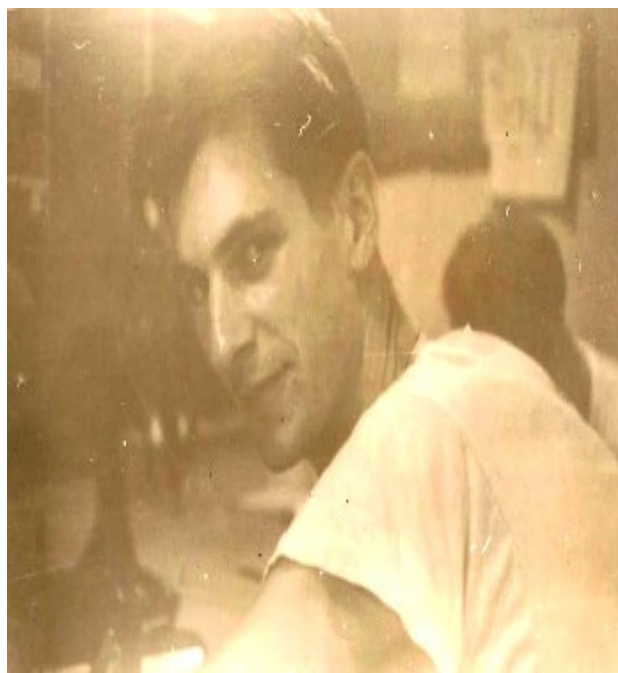


Figure 6.5 Settling into a life on a boat at war.

Life was exciting on board; we went up and down the coast of North Korea standing watches, four on and eight off. The bunks were three high, just rectangle racks with canvas laced within them. At night, my eyes were glued to the radar looking for flies a term for enemy sampans seeking to drop a mine comprised of five hundred pounds of TNT back into the harbor. One night, I must have dozed off; I heard the deckhand on top of the pilot house hollering in Japanese koko kinasai, which means, “come here.” I opened the pilot room door and saw a sampan with four North Koreans with their hands raised. Their boat had been blown out of the harbor by high winds; of course, they said they were volunteers for the South Korean Army. Sure, they were, and I’m Captain Kangaroo!

Shocking News on the Homefront

While on the Condor, I was shocked to find out my parents had divorced (figure 6.5). Maybe it was us kids that held them together. Also, my grandmother had died which meant my mother did not have to just depend on my father’s wages from PG&E. According to my younger brother, it always seemed like money was tight. The accountants had put my grandmother on a strict allowance every month so that kept everyone staying on a budget, though looking back it could have been a lot worse. During WWII, dad was a Lieutenant, so his pay was more than enlisted men were sending home to their families. When he came back and was discharged in February of 1946, he counseled Veterans for a while but eventually that job dried up and he went back to PG&E. Unfortunately, they had cut his salary significantly because he hadn’t gone right back to them after his return, and they could not hold his job open for him at the same seniority and pay rate as he had before he went to war. Basically, he was trying to do the right thing and loved counseling the young men that returned.



Figure 6.6 Parents during happier times.

I heard from my brother that our mother had gone to the hospital for a minor procedure and while she was gone, he was served with divorce papers. She also wanted him out of the home by the time she returned. I was shocked by the news of their divorce. I tried to write my father a very long letter while onboard ship in Korea, but I don't think it ever got to him. By the time I was discharged, my father was living in San Francisco, still working for PG&E but struggling since the divorce to find himself with his boys grown and gone and a single man with no real anchor. I invited him down to visit me and play with my son, now a toddler. I could tell he was lonely he was and though he said he had dated a little, twenty-six years of marriage was going to take some time to move on from.

New Assignments

After a year on the Condor, I was rotated back to Long Beach in Southern California. When I was on the process of being sent back home for reassignment, I saw what the Korean War was all about. I was in a lorry from Pusan to an airbase near Seoul when we passed a line of people stretching for miles walking south with everything, they could carry either on their backs or in carts. Fathers, mothers, grandparents, children; whole families fleeing the invading North Koreans. There were tens of thousands of people, trying to flee the north to get away from the horrible conditions, the regime, the war. They were trying to walk the last twenty miles in a mass migration towards freedom. Immediately after I had seen this, I heard the North Koreans stopped anyone else from leaving by shooting anyone who tried. In full circle to that event which I had seen with my own eyes, I recently described what I had seen in 1952 to a Korean friend. With teary eyes he said, "I was one of those children. Thank you for your service to my country. And for that I will always be grateful to America and to servicemen like you who sacrificed so much so that we could breathe free air." Back in Long Beach and across the Harbor I heard of an opportunity to get a billet on an LST which was being re-configured as a mine-sweep tender; get back into action in Korea and expand my skills (figure 6.8). After a few months I was promoted to Electronic Technician Petty Officer 3rd Class. We soon left port on our shakedown and headed for Honolulu for supplies. We were out only a day or so when the radio room started complaining that their range on the LF transmitter was very limited. This was critical as it was used primarily for long wave contact to other ships or land station. The antenna looked like it had been replaced during the recent refurbishment. I tried my hand at tuning the Low Frequency Transmitter (LFT), which involved varying the loading capacitance. I turned the knob, but the equipment would just arc-over, just like the radiomen had reported.

We had a library on the ship. Guess what? There was a book about the design of long-wave antennas. I quickly determined the problem; the antenna was integral to the output circuit. Due to its configuration, in the shape of a 'T,' the antenna appeared as a stub, not long enough to act as an inductor to the output. I reasoned an antenna of about the same length taking up similar space could be made in an 'L' shape, making it appear longer to the transmitter output design. Unfortunately, there was nothing I could do about it while we were at sea, so I had to wait until we arrived at our destination port at Pearl Harbor.

According to my estimates, I would need about two hundred feet of phosphor/bronze wire rope. The Navy Base of Honolulu had a repair yard, so off I went. They had what I needed, but the 1st Class Petty Officer said it would have to come through my ships supply officer and would take several weeks. I told him it was urgent due to our inability to raise another ship and asked if there was anything we could swap? With a twinkle in his eye, he asked If I

could find two bags of sugar? Great, now all I had to do was sweet-talk the cook out of the sugar. I went to our cook, whom I had known for only a couple of months and cried on his shoulder, we were in the great Pacific Ocean with no way to communicate if we needed help. He was funny but heard my plea and gave me the sugar for the welfare of all of those on board. I got the wire and strung the cable; the radio gang was so happy they were transmitting while I was still finishing tightening the bolts to the insulators (figure 6.6).



Figure 6.7 My Second Mine Sweep Needed a New Antenna Configuration to Communicate Properly.

USS LST-799 Landing Ship Tanker

Career	
Name:	USS <i>LST-799</i>
Builder:	Jeffersonville Boat & Machine Company, Jeffersonville, Indiana
Laid down:	25 August 1944

Launched:	3 October 1944
Commissioned:	21 October 1944
Decommissioned:	22 April 1946
Recommissioned:	26 August 1950
Decommissioned:	18 January 1960
Renamed:	USS <i>Greer County</i> (LST-799), 1 July 1955
Struck:	1 November 1960
Honours and awards:	1 battle star (World War II) 9 battle stars, Navy Unit Commendation & Korean Presidential Unit Citation (Korea)
Fate:	Sold for scrapping

General characteristics

Class & type:	LST-542-class tank landing ship
Displacement:	1,780 long tons (1,809 t) light 3,640 long tons (3,698 t) full
Length:	328 ft (100 m)
Beam:	50 ft (15 m)
Draft:	<i>Unloaded</i> : 2 ft 4 in (0.71 m) forward 7 ft 6 in (2.29 m) aft <i>Loaded</i> :

	8 ft 2 in (2.49 m) forward 14 ft 1 in (4.29 m) aft
Propulsion:	2 × General Motors 12-567 diesel engines , two shafts, twin rudders
Speed:	12 knots (22 km/h; 14 mph)
Boats & landing craft carried:	2 or 6 LCVPs
Troops:	140 officers and enlisted men
Complement:	8-10 officers and 100-115 enlisted men
Armament:	<ul style="list-style-type: none"> • 8 × 40 mm guns • 12 × 20 mm guns

Figure 6.8 USS LST 799 Landing Ship Tanker (Wikipedia 2022)

Helicopter Down!

On my new ship, not only was she bigger, but she also carried quadruple the number of officers and crew. There was a lot more that could go wrong, but more people affected by it. I was also responsible for keeping the plane guard radio system maintained as we carried the helicopter Huey for picking up downed airmen over in the north. I had to move the special radios for communication between the flyboys and the Huey over to another ship that came up to replace us in the mouth of Wonsan Harbor and would replace us while we went back to Sasebo, Japan to replenish. I loaded my gear in the helicopter, it had been shot up the day before while on a rescue mission in enemy territory, but they said they got it patched up, good as new. A bunch of other guys wanted to go along for the ride too; we lifted off and flew away from the ship. We started to lose power almost immediately, spinning around and within seconds we were going to hit the water. Quickly, the pilot flipped us over on our side so the hatch was above water. With the adrenalin surging I tried to get out off the bench seat, forgot to release my seat belt. The water's surging in, finally I pop the release and rip the shirt off the guy ahead of me getting out. I quickly moved away from the sinking Huey (figure 6.7); it's gone in about 30 seconds. The Chief popped up just as the tail rotor went under. Everyone got out O.K. but we swam like our lives depended on it, while the guys on board the ship with guns pointed at us looking out for sharks supported our fears. Even though the swim was short, our panic was evident. When we were hauled onboard after our short ordeal, we had all inflated our life vests, turned on our emergency beacons and were dripping with

green dye marker and shark-chaser powder. I realized then that things that go up can come down unexpectedly too!

It was some time before I let my buddies take me for a ride in a chopper again; we went for a visit in Sasebo harbor over to the aircraft carrier USS Bon Homme Richard. It was all I could do to let loose of the airframe when we landed on the carrier deck. I still have a fear of flying and think I've been in a helicopter only once since gripping the seat frame all the way.

I remember one time going over to a South Korean ship. They had been trying to fix their compass; I never saw so much friction tape in my life, all of a sudden, the eight-inch guns on the North Korean cliffs above Wonsan Harbor started firing and the ships scattered. I didn't get back to my ship for a week. I didn't speak a word of Korean. I knew a little Japanese which most of them spoke and some spoke a few words of English; we got by.

Another interesting thing happened to me when I was sent over to a South Korean minesweeper which was having radio problems. A few shells from the North scattered us, it would be several days before I got back to my ship. I ate rice from a metal bowl along with metal chopsticks but declined the fish-heads. I slept in the radio shack just behind the pilot house and when I got cold crawled under the mattress which felt like a thick quilt.



Figure 6.9 Helicopter crash, 1952

My time on minesweepers was really an experience; I remember one time we had porpoises diving back and forth under our bow as we motored along. Times could be scary too; we went through a typhoon written about in the Caine Mutiny, surviving by deploying both bow and stern anchors with the engines at one-third ahead to keep us headed into the wind. I would still get seasick in rough waters but none-the-less had to make sure the equipment was in proper working order no matter what the circumstances. I also always had a fear of the ship sinking and then being attacked and eaten by sharks. The story of the USS Indianapolis was always in the back of my mind.

A Sailor's Legacy Family

The Navy may not have been dull, but it was often dangerous. 36,000 American men and women did not survive their service in the Korean War. The realization that there were two levels of existence in the service and on assignment was reinforced in just about all situations; that there were two classes of people in the military: officers with college degrees and enlisted men. So, I submitted my application to USC while waiting for discharge. I had been in just shy of four years. I now had a wife and young son because I had spent so much in Long Beach during repairs and upgrades during the war. We had married quickly before I was shipping out again and I had been thinking if I was killed, I at least was leaving a legacy of some kind behind (figure 6.8).



Figure 6.10 My first child, Jimmy

I knew there were lots of opportunities for sharp, experienced, young vets like myself. It was time to be thinking of a post-war future with responsibilities, so I had three things on my mind while awaiting discharge; getting a higher education, getting stable employment and if I could do both simultaneously, then all the better. Two things I knew very well was being on boats and running electronics equipment. But I knew I was at another major crossroad, and I was excited to see what would come next for me. I had just turned 23 years old, when I got my separation papers. I was very confident in myself at that point, and I also knew that opportunities were everywhere; sometimes they just fell into your lap when you least expected it. Who knew rocket propulsion and then the Hewlett-Packard Company would be in my future?

CHAPTER 7

The Postwar Years: Work, School, and Family

(This section supplemented by interviews and edited by Lisa Cochran.)

My parents lived down near Long Beach where my mother's parents and grandparents lived. They were all happy to provide assistance with raising the baby. Though my father had applied to USC where his Uncle Roy had gone to school, there was some time left to decide what his options he had and what direction to take. This was a very critical time for him because after his discharge from the Navy as he now needed to provide for his wife and child, move into their own place to live and deal with expenses he never had before while in the service. It seems very coincidental that a closed office and a big sign would push him towards the next leg of his journey. It is interesting that I know so little about this time and only by reading his descriptions of his children did I realize how important we all were to him. That was an amazing revelation!

I was still awaiting my final discharge and had a little time and a lot on my mind about my next moves. Another major crossroad! However, I don't know if my next opportunity was luck, fate or what. One day, I drove up to Los Angeles to apply for a radio operator's license thinking I might join the Merchant Marine. As luck would have it, the Merchant Marine office was closed that day. Turning around to drive back home where my wife and child awaited, I drove past North American Aviation with a big **'Help Wanted Electronic Technicians'** Sign. So, I stopped by on the way back, took a test and got a job offer. Upon discharge from the Navy, I started work at North American Aviation in the pilotless test vehicle. It was on the development of the X10 (figure 7.1), a pilotless supersonic test vehicle. I was involved in the autopilot and navigation systems (Navaho program now on display in Smithsonian Museum of Aeronautics and Aviation) pre-flight department. The jet vehicle, an X10, was rocket propelled with twin 10,000 pounds of thrust and a top speed of about 1400mph (1.8 Mach). All of us young guys thought it was sissy to wear the earmuffs to muffle the sound from those jet engines; that's why I have hearing aids today. I met a bunch of new people and learned a lot about the aircraft manufacturing business. This gave me a good launch toward Stanford where I had reactivated my previous acceptance and I had the GI Bill to help with expenses. While I was only at North American Aviation for a brief time, the guys no longer teased me about being green to rocket propulsion. I developed a portable generator and test platform to bring up to the jet-aircraft. I received a hundred-dollar bonus for that, a week's pay.



Figure 7.1 The X10 Pilotless Jet-Propelled Space Vehicle (North American X-10 2022)

Even with the great job with North American Aviation, I had a wife, toddler, and a baby on the way to consider. I needed more education. Back then, children came fast and often for many families. I was just twenty-four years old, newly returned from war, an Aerotech Electrical Technician, a husband, and a father. My plate was already full, and I knew I needed to become a student on top of it. That's just what everybody did, make the unworkable work. So, I sent off college applications and put one foot in front of the other, moving towards the next chapter of my journey.

A Balancing Act

Though I had applied to USC, I also reapplied to Stanford up in Palo Alto on the GI Bill. I was accepted there, starting as a freshman the same academic year. 1955-1956, my younger brother was going to graduate with his degree in mathematics while I was heading into electrical engineering. He also helped me lay out a strategy for what I should take and luckily, Stanford had given me fifteen credits to start with because of all my training and experience in the service. While I still enjoyed working with my hands and doing mechanical types of things, it was quite evident that my future was going to be as an EE. Even with the GI Bill, money was still really tight with the two children. My mother had offered to help me attend Stanford, and she would occasionally grab one of my kids to give my wife a little break. My mother didn't have a high opinion of the children's mother and would complain that she wasn't able to keep the house, or the kids clean enough. My mother's favorite was my daughter Lisa, since she was the only granddaughter.

By the end of my first year, I was running pretty low on money. It was summertime and my wife was three months pregnant, due in mid to late October of 1956. I had always thought I might get a summer job at Hewlett Packard (HP) and gave it a try. I was assigned to the production line and worked full-time but managed to switch to just afternoons when school resumed that fall. Wisely, and with the advice of my little brother I had focused on accelerating my schooling by taking all the requisite labs during my first year, so I was able to cram all my courses of my remaining years into the mornings. My mother's sister, Auntie Roy, who never had any children of her own, also doted on me occasionally, as she often did my brother. As I mentioned before, she gave me a little money for tuition and bought a set of bunkbeds for the children. That next year, my sophomore year, a third child came along, another son. I even got another part-time job helping to design a metal detector for veterinarians with a guy from Redwood City.

After a few months at HP, I was chosen to be an engineering assistant in the development Lab, it was really fortunate that they continued to support my schedule while taking my classes. The company was just five hundred employees in 1956, which was considered a mid-range company. I worked on a digital voltmeter project, but I knew it had a lot of shortcomings. A few years later I was the project leader on another digital voltmeter that became the most popular product of its time. Bill Hewlett and Dave Packard had an environment that fostered innovation over profits. They took the most talented people they could find and gave them the support they needed to be able to make the company become the place where exciting things were always within reach, even if it took a while. Other electronics companies were in competition for being on top of the race to posterity companies like IBM, Fairchild but something was different about how this company was run that made the impossible possible. I believe we began to think more collaboratively and as a unified team within the divisions that the company was beginning to expand into. I had already started to show great promise and the company continued to acknowledge and give me more responsibility. I was learning to juggle all my other responsibilities as well, though it was taking a lot of finesse. By the time I graduated from Stanford in 1958, my brother had gotten his master's degree in physics and had enrolled into a PhD program at Stanford in mathematics.

Both my parents came to my graduation (with Distinction) in 1958, and then my master's ceremony in 1960. They also went to Jim's events as well. My parents had divorced while I was in the Navy, but they came together when it came to us boys. Those were good years, but challenging ones. My marriage was on the rocks because I was so rarely home and with three young children, my wife was obviously overwhelmed (wouldn't anyone be?). It was a mixed bag of emotions and challenges. Achieving what I had took time and energy with little sleep or down time, all requirements to move towards a better future. War had taught me that life can take a turn in an instant. A good life rarely just falls in your lap, but to achieve your goals you've got to reach up, hard and far. My dad always taught me to get up, dress-up, show up. And that is what I had been doing for six years. My education and my work were going to be essential tools needed to care for my family, but there was a cost too. Right after I graduated with my EE Master's, my wife took the children back down to Long Beach where her she would not feel so isolated. Her parents and grandparents again tried to help her while I continued to work for HP. Though I eventually got the kids back when I remarried, HP turned out to be a working relationship that was to last twenty-five years and through some incredible successes in the field of electrical engineering that would change the lives of other professionals, and even everyday consumers.

My Parents, 1954

At the same time, I was juggling work and family, I worried about my father. By then, both my parents were remarried. My mother had moved down to Naples, CA near to Huntington and was really doing well and loving it there. She even bought a brand new 1959 limited edition Ford Fairlane Galaxy 500 hardtop convertible (See Appendix 3C, under Cars Owned). She loved driving it around everywhere with the top down, a scarf around her head to keep her well-coiffed hair in place. At home, she had a kind and generous husband, who had doctorate in Pharmacology. Their home was nearby a series of canals, built to make the area feel like Naples, Italy. Bobbing boats were tied in front of homes and Pelicans rested on dock posts, while gulls flew overhead looking for scraps of anything. Huntington and Seal Beach lay just a few miles away and beyond that was the hum of cars on the 101. They had a gorgeous upscale modern home with two spacious floors with a marble staircase connecting them. There was an indoor pond underneath the bottom stairs stocked with koi fish. The sound of tickling water from the recirculating fountain could be heard throughout the home and it sounded so peaceful and serene. Just outside the front door grew big bushes of Birds of Paradise, her favorite tropical flowers. In the back was a swimming pool, with a privacy fence all around. It seemed her life very much agreed with her, and I was happy that she had found her paradise.

Once, she had all three of my kids over (figure 7.2); her peace and serene was shattered when she heard loud splashing outside and found all the kids jumping out her second story bedroom window into the pool below. Weren't they just a few minutes ago watching Art Linkletter's *Kids Say the Darndest Things*? After that incident, she only allowed one child at a time to visit as all three together was too taxing on her nerves. She had had enough of that when she was raising me!



Figure 7.2 The Three Musketeers!

My father was the opposite. He had remained in San Francisco. Despite his philanthropic activities, his job still at PG&E and his new wife, I could see that he had aged a lot and had lost the spark I remember him having when I was young. My brother had moved to the east

coast to work a Bell Labs with his new bride, Kathy, so I tried to meet up with dad occasionally for a visit or go up with the children for Sunday dinner. Sometimes we would meet at one of his favorite restaurants: Tarantino's, Val's, Sabella's were three of his favorites and he knew the waitstaff well. After I was remarried, we would have him down for dinner quite often in Palo Alto, not far from the home he and my mother lived in for so long while raising us boys. By that time, he had bought the old PG&E limousine, a Lincoln Town Car. He usually came alone because his wife, whom had been an administrative secretary at PG&E, did not enjoy either the travel or the kids.

My dad was quite active in the Shrine Lodge. He was a Freemason, like his father, and the Shriner's was a fraternal organization that was a spin-off from that. They were all about philanthropy, family and fellowship and had strict values about integrity and truth. He wore a fez during ceremonies and was part of the marching team which paraded in the East-West football game in San Francisco. I attended several of the Shrine activities that honored him. He was always so proud of the Shriner's Children's Hospital in South San Francisco which his own lodge had a large part in building. He took us on a tour of it once and the kids were especially delighted. My daughter Lisa became interested in medicine later in part because of that experience.

We also had attended those ceremonies that he was part of because it meant so much to him. The kids always wanted to see him in the little cars, but he preferred marching instead. He thought the little cars were too cramped and made him look silly and undignified.

Years later, I went to his retirement party at age 65 from PG&E; so many people both men and women came up to me to tell me what a great guy he was. I'm not sure if he wanted to retire but, in those days, companies didn't give you a choice. His retirement pay wasn't all the great, due to not going immediately back to PG&E after the war. His wife Alice had retired as an executive secretary also from PG&E. I could see his despair at feeling useless. He just didn't know how to retire' like other people did. My father tried to hide his melancholy and was trying to find some way to take up the slack, He even volunteered to be a crossing guard at a nearby elementary school but that he had been let go around the Christmas holidays. He died a few weeks later.

I know what it is like to need to stay busy. I never retired at seventy or even seventy-five. President Reagan had made it acceptable to keep working as long as you wanted. But as I got older, I had to work twice as hard as the younger employees just to make sure they my companies always saw me as an asset. Part of my job was to do quality control inspections, find bugs and make recommendations to the supplier of disc drives. Our main manufacturing plant was in Asia. I was known for leaving on a Monday to go to Malaysia to check inspect, do a report, work from the hotel on emails and other correspondences, do some touring, then take the red-eye out Friday (which is Thursday in the US) and be at work at Quantum first thing Friday morning. If I had taken any younger engineers with me, they always called in sick on Friday because of jetlag. They could never figure out how come they couldn't keep up with me. I was not a coffee drinker or anything like that, I just had a higher level of excitement and motivation than they did.

After I was let go at age seventy-nine, I would help my wife work on her home in her real estate ventures in the bay area. We had also bought a house just over the border of Colombia in Venezuela at a coffee bean plantation and rented it out to Colombian professionals. We would work on the place whenever we could until the revolutionaries took it away.

My Children When They Were Small

Jim: My first born, I remember in Little-League, he was really talented player, played center field, pitched, and a switch-hitter. A real rarity to have on any team. I noticed after he caught the ball, he would take off his glove and threw strikes over home plate with his left hand; I finally got him a left-handed glove as he's ambidextrous. I remember he originally tried to eat with his left hand; I just moved the spoon to his right. Although he took trumpet lessons and played first chair in Palo Alto High School band, he was a natural guitar player, with either hand. He played the trumpet in the Palo Alto Military Academy marching band.

Lisa: The first girl, I remember she won every event she entered in an all-city track meet when she was about nine. The next day a man came by and asked if she wanted to play tennis. I hollered upstairs to her, and she said she really didn't like tennis all that much. Maybe she could have been a tennis star? Always a good student; I'm sorry now that I criticized the B+ she brought home from Jordan Jr. High. She tested as a gifted child in middle school. She had spent two summer terms at Culver Summer Camp taking sailing, theater, horseback riding and really enjoyed the experience. I'm sorry now that I didn't sign her up for the Culver Academy for Girls which was just starting up. Lisa received a degree in Psychology from the University of Michigan and received a second BA in Philosophy from University of Idaho. She told me she had begun working on her MA in 1988 but took a twenty-six-year break while traveling and raising a child.

Alan: The second boy, I remember Alan following his older brother and sister often getting blamed for their misdeeds. He chose the drums to play and ended up toting the giant base drum in the Palo Alto Military Academy marching band; everyone marched to Alan's beat. Alan went to school in Hawaii for a while, but his hip surgery slowed his track and cross-country speed. After he came back, I found out the reason for Alan's poor grades were two-fold; he was part of a Stanford experiment, sight reading instead of phonics, and he also was diagnosed with dyslexia.

Steve: The next boy; his claim to fame is becoming the youngest duplicate- bridge life member at fifteen. He told me about the many celebrities he played against including Michael Calhoon (stage name Omar Sharif). Steve also tested as gifted. I remember he was bullied in one class at Jordan Jr. High. I went over to the house of the boy that did it and told the father. Steve went right through San Jose State in Business Administration, later getting an MBA.

Juliet: The second girl, I remember seeing her run a leg in the mile relay in the regional high-school track meet. Wow reminded me of my track meets and the quarter mile. After she had finished college, she had been working security administration but was looking for another job; we went to a job-fair together. One of the companies was from the East coast; I told her to get his card and send in her resume. Sure enough, she soon was off to Virginia.

Elizabeth: The next girl, she was learning to ride her two-wheel bike at Eleanor Park when some kid threw a ball at her. I threatened that I was going to his home and beat up his parents if he did that again. She really thrived in Montessori school and tested as gifted at an early age. I remember seeing her in the Princess and the Pea and her Girl Scout days. She used to love the story telling in the Secret Garden of the Community Center. After two years at UC Santa Cruz, she finished up at USF.

Jessica: The last girl, with so many older brothers and sisters to speak for her she was slow to speak, but she is making up for it now. Since she acknowledges growing up privileged in

Palo Alto and Los Altos she has donated much of her life to young people, in East Palo Alto, at an orphanage in Zimbabwe, in the classroom and now in the courts for children with special needs. She was doing O.K. in school but came to me when she was about sixteen and told me she had scored low in the PSAT, could I help? She went to the Pacific Learning center; doubled her vocabulary in six months and she started reading for fun. After UC Santa Cruz she put her own self through Law School.

Christopher: The last boy; after the Loma Prieta earthquake he rode his bike home from school marveling at the yellow haze falling (pollen from the trees) and the cars bouncing up and down. After graduation from Humboldt State in Philosophy (he had the most credits from those courses), he worked as an EMT at SeaWorld and was an ambulance attendant. After a stint in security and the San Diego Zoo he finally ended up as a U.S. Customs and Border Protection Officer starting out on the border in Douglas Arizona. He later was based in San Francisco to be closer to me and his several siblings but found the traffic congestion and hours spent just getting to a from work was taking a toll on his entire family. They have since moved north of Bellingham, WA at the Canadian border.

Unforgettable Experiences with The Kids

Summer Vacation by Car:

Back when my first children were young a summer vacation meant; Hey kids, grab your blankie and get in the car. Although by today's standards it might seem grueling, it was a badge of honor to make it to Salt Lake City or Phoenix in one day. We'd start early in the morning, everyone with their favorite pillow or stuffed toy. We would stop for gas and meals along the way, occasionally at one of those giant orange or Dinosaur exhibits. We went to the Space Needle in Seattle; we got there in a little less than 24 hours. I believe I slept in the car while the family saw the World's Fair exhibits. I caught up with them later.

On one trip we stopped at a gas station to fill up, after we started driving again somebody asked, isn't Lisa coming with us anymore? I looked in the back and all I could see were pillows and stuffed animals. Turned around and went back to the last gas station. No Lisa so I went and knocked on the rest room door; she came out and hadn't even known we had left.

One trip we got to Dallas in about a day in a half; then I crashed in a hotel while the kids swam in the pool. Along the way I'm sure I pointed out the Grand Canyon, look to the right quick and cruised the strip in Las Vegas. Then after a few days in Texas we headed north to drop Alan off at Culver Military Academy Woodcraft Summer Camp near South Bend Indiana.

Then we were off to Aunt Piny's in Owensboro Kentucky. At the time, she and her husband, David "Wyndall" Smith, had the largest quarter horse farm in the entire country. As a Richton, Mississippi boy, he saw little opportunity there, so he and a friend left home at 16, hopped a train and hopped off in in Owensboro. Wyndall went to work for his uncles Thomas and Allen. He started working at their little grocery store as a bagboy and worked up to owning an entire shopping center. We left Lisa there for the summer and headed north to my brother, Uncle Jim in New Jersey where son Jim was going to stay for a while.

I hung out in New York for a few days; then headed back to California as my vacation was

just about over. Even with a brake job for the old '59 Plymouth wagon in Wyoming I still made it in about 72 hours, napping at rest stops along Highway 40 or a grassy area in front of the city hall in Anytown USA.

Remember, in the '60s there were no answering machines that would take your messages; if you had a secretary, they would take a message. I would come back to the office with a large pile of pink 'While You Were Out' message slips waiting, and I always heard from callers who complained that my phone just rang and rang because I wasn't there to pick it up.

Lisa came back in about two weeks; Aunt Piny sent her home early because she just wouldn't leave the horses alone and was afraid that one of them was going to step on her. Lisa just loved animals so much and still does.

Alan flew back after his camp ended; he roomed with the son of the town pharmacist' daughter with whom I fell in love when she was a nurse in the hospital when I had pneumonia at Culver in 1950, small world?

Jim came back at the end of summer after learning new songs with his cousins Cynthia and Sarah. My brother had taken the family on their summer vacation to the shore in an old Opel; I don't know how they fit in that small car! I'm sure son Jim remembers the time with a traditional family.

Hike to Evolution Lake:

When I was a Boy Scout, I signed up for Camp Farthest Out which was a hike up from Camp Oljato on Huntington Lake up to about 11,000 feet to Evolution Lake high in the Sierras. I remembered the beauty hiking above the timberline to snow fields even in summer.

The summer of 1965 I decided to repeat that adventure as the leader of my oldest three, Jim was 11, Lisa 9 and Alan 8. I went to Smith's-on-the-Circle in Palo Alto and bought dehydrated food, Dri-lite or Star-lite brands enough for about eight days. I knew there were streams all over our route so all we had to do was mix the contents with water and in thirty minutes it tasted like fruit or noodles, etc. I think the hungrier we were the better we liked it. Each of the children had a backpack custom sized and loaded with our supplies at 25% of each of my kid's weight. When they tried them on, they were so excited, each had new little boots. The pack would prove to be increasingly heavy in the leaner air as we hiked.

We set off early on a Saturday morning driving up through the Sierra foothills above Manteca. We drove past Huntington Lake and parked the car at Florence Lake about seven miles further. We hitched a ride across the lake on the local ferry, a rowboat with a motor and started our trek up a switch-back. We met some men were walking their packhorses down the trail. I remember they were leading one of the horses as he limped along, his pack having been transferred to the other horses. The man leading the limping horse told us the animal had misplaced a foot on the narrow trail and loose rock and fallen down the side of the steep switchback onto the part below.

Lisa was surprised, as she thought horses were always surefooted. "No, that would be mules," the man told her, "And we should have brought some instead of horses; our gear would be in better shape if we had!"

About halfway up the next set of slopes we saw the remains of crashed military aircraft; Hey, maybe the skeleton of the pilot is still in there? The kids were all excited but were disappointed that no bones were found. This was the way it would be for the entire week, seeing once-in-a-lifetime sights and getting excited between the bouts of trying not to stop in order to make camp and eat well before sunset.

Each day we would hike till mid-afternoon or whenever we found a nice meadow with a stream nearby. We tried to make camp under some trees in case of rain; the first thing I always did was to stretch out the hemp rope I brought placing it around our sleeping bag area to keep snakes away. It might have been an old wives' tale, but no snakes got us while we slept. Alan dug the latrine away from any poison oak, Lisa gathered pine boughs to place our ground cloths on for sleeping bags and Jim collected firewood for cooking and tried to catch some fish.

I can remember Jim yelling the first time he caught a fish; it flopped around so much that it slipped back into the stream while taking it off the hook. I suggested he walk a few yards from the water before trying to take it off, and then it flopped around on the ground till it died. I showed the children how to cut off the head and take out the guts before we cooked it. We had some flour and corn meal, so we ate pretty good that night. I remember the sleeping bags had red flannel inside, but we still slept with our clothes on; it was cold above 8000 feet. We only had two sleeping bags for the three kids, so somebody had to double up. Lisa reluctantly shared a bag with her younger brother, Alan. Apparently, someone wet the sleeping bag and it turned into a big argument when she refused to sleep with him again.

We got up soon after dawn every day and broke up camp; I had been an Eagle Scout and was very nature conscious. I taught the children how to ensure the fire was totally out with the ashes scattered, our latrine covered over and the branches we had used under our sleeping bags put back in their natural setting. We crossed several streams during our weeklong trek often walking up or down the bank to determine the best crossing. Sometimes I walked each of them across to ensure their safety; we always wore our boots and clothes across the rocky bottom, but they dried in an hour or so.

We skirted along beautiful meadows, once spotted a few deer a couple of hundred feet away. We saw gorgeous waterfalls and many forest animals, but very few people, maybe a dozen or so during the whole week. One afternoon we were taking a short-cut across a rocky area with a number of loose boulders. I was leading the way and hollered an alarm to the kids to watch their step just when the rock I stepped on gave way and I tumbled down about thirty feet. I was upside down when the kids found me asking, "Are you all right Dad?" I wasn't sure as I hurt all over, my shirt was torn, etc. I only broke a finger, but it reminded me to counsel the children as to what to do in an emergency. The truly hilarious thing was, while I lay there making noises and trying to compose myself, we heard the sound of whistling which seemed to get closer and closer. Unbelievably, a troop of boy scouts had come up to the trail where my children waited. By this time, I struck a nonchalant pose, as if sunning myself and taking in the view. Of course, the scout leader said, "Sir, are you in any need of assistance?" Of course, I was too embarrassed to say anything about my fall.

I had calculated the food for eight days and we had reached our goal of Evolution Lake at almost 11,000 feet, well above the tree line and eaten dinner. It was cold and everyone was still hungry; I proposed that we eat the next day's food and start hiking down. What took us five days to hike up we came down in two. We got the ferry across the lake back to the car

and down the windy road we spun; with the boys holding on to Lisa's legs as she hung out the window, car sick as usual. After a week of dehydrated food and at least fifty miles climbing each way up 4000 feet, we were ready for any greasy spoon diner, even Lisa. Almost fifty years later Jim, Lisa and Alan say today that that trip was one of the most memorable experiences in their life.

Canoeing:

The Boy Scouts were going to go canoeing down the Russian River. Steve was in a local troop, and I agreed to be one of the chaperones/parents; I had done several white-water treks learning how to paddle a canoe myself as a boy scout. We got our canoes up-river bringing along just a lifejacket for each of us. There were perhaps ten additional teams from the troop canoeing. Things started out pretty much uneventful, Steve up in the bow, I had shown him how to paddle, with me in the stern to control the direction. We splashed through a couple of little rapids, lots of fun.

Then we seemed to get off to the side where there were some low-hanging branches. I hollered, don't grab that branch; Steve grabbed it and it pulled him halfway out. The canoe got turned around and dumped us both out; it wasn't deep, and we were both in lifejackets. I hear Steve hollering that he's drowning, by this time gripping a stump half out of the water; what a sight, Steve clutching that stump like a drowned rat. I hollered back to just let go and we'd float down to the next sand bar; I saw our canoe folded around another stump.

We got out of the water and found another canoe apparently abandoned by some other scouts who had also dumped. Now we had a canoe, but I was pretty upset; my cigarettes had gotten soaked. By the time we had finished the river trip without further mishaps we were pretty much dry from the sun. Cigarettes don't dry quickly and taste terrible wet. I left the campground to find the nearest bar when you're on River Road there's has to be a bar nearby. Sure enough, I got a pack of ciggies, Benson & Hedges Menthol Light and a quick shot of bourbon to warm up a little.

Back at camp I found the Scouts cooking the steaks, but they started rough housing as boys will do. Whose steak do you think fell into the fire when they knocked the grill over? And whose sleeping bag was on top of the only rock in the entire campground?

Can you believe these are among my fondest memories when, fathers took (eventually) everything in stride?

The Big Drip Award:

I offered to be a chaperone at Camp Oljato High Sierras when son Steve was in Boy Scouts. I took Juliet and Alan as I remember, staying at the Family Camp. We would go to the dining tent for meals on Huntington Lake with Troop 55 from the Crescent Park area and go along during other activities the troop did during the day.

We arrived at the camp after about a five-hour drive through Madera and past Friant Lake and then an amphibious landing craft across Huntington Lake. I noticed just a mast from a small sailing vessel sticking up alongside of the dock. What's that I asked, "What happened?"

They told me that when the camp opened for the summer someone tried to launch the small 15-foot sailboat and sail across the lake. Since it had been out of the water for the winter the wooden planks had shrunk and it leaked like a sieve, sinking about the time it reached the camp shore. They said they would have to get a crane to lift it out of the water.

A few days later I went down to the dock to examine the sunken sailboat in about four feet of water. I estimated the weight of the boat and reasoned that maybe ten life preservers pushed under the gunnels along the deck should raise the boat to neutral buoyancy. I asked for about dozen life jackets from the waterfront crew. They said, "What for?" I said, "To float your sailboat." They thought I was crazy, but I took each life jacket and pushed it down in the water to underneath the gunnels along each side.

As I remember I got about three under each side and the boat started to rise, it was almost as if by magic or a biblical experience. The onlookers started hooting and hollering that Cochran had raised the sailboat all by himself. Hell, Archimedes knew how to do this, and remember, I was an engineer.

At the last campfire before we were to leave, I was awarded The Big Drip Award.



Figure 7.3 Boy Scout camping trip and the Big Drip Award, 1976

My Children Then and Now (figure 7.4).

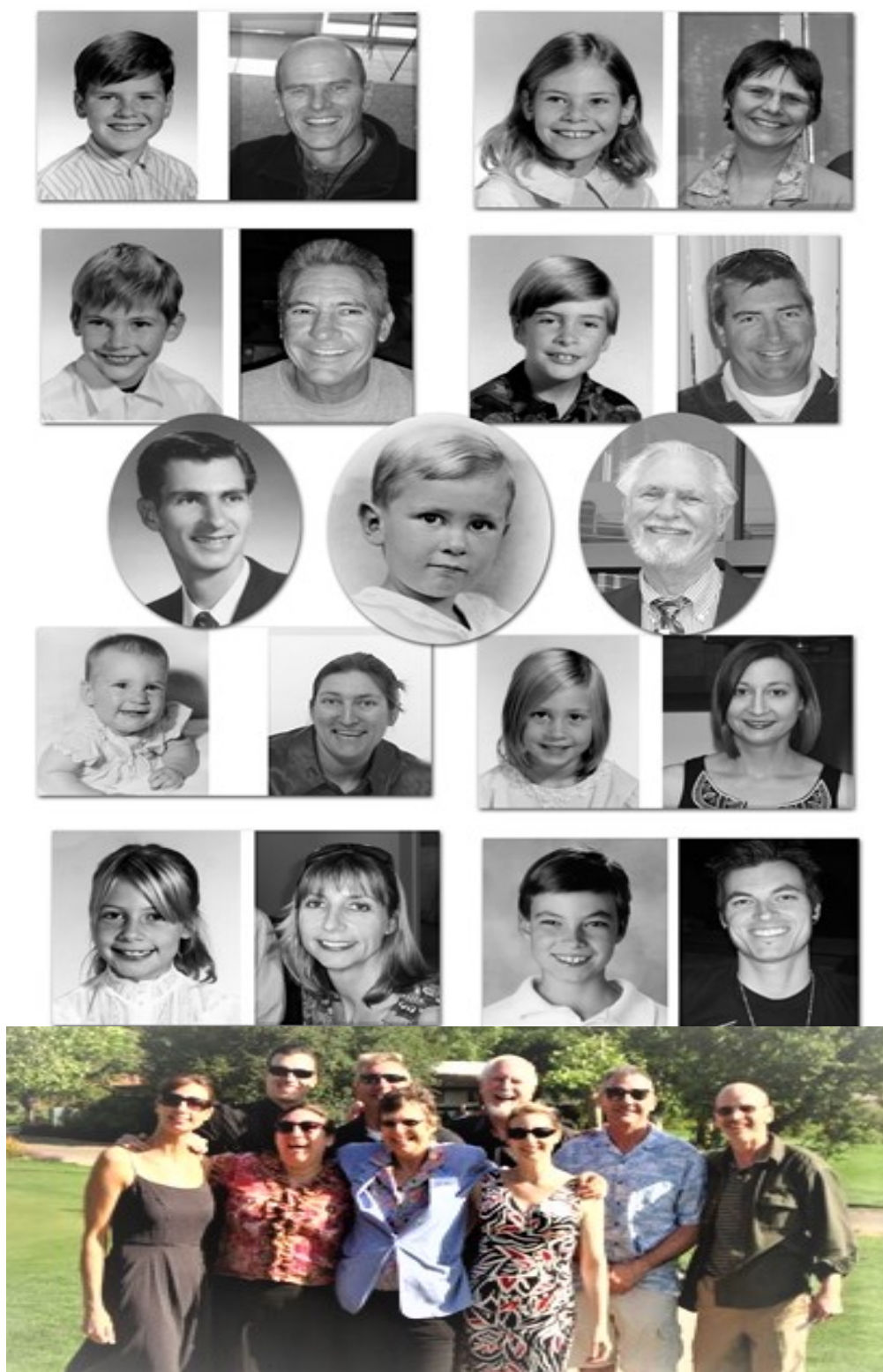


Figure 7.4 The very first time seeing all my children together for my 80th birthday party!

CHAPTER 8

25 Years at Hewlett-Packard:

Early Projects

(This section written by Dave Cochran from his autobiographical vignettes, supplemented by contributions from journals, published articles, interviews from talk shows, podcasts, and entries written by other people found in the supporting literature. The many streams of information were collected and edited by Lisa Cochran for supporting information, chronology, and flow.)

While my father was building his career, we saw very little of him. In our younger years, he would sometimes take us into where he worked, and we had a lot of fun playing hide-and-seek games until he would bellow out that it was time to go. I remember seeing projects in our garage, too. The oscilloscope was a common sight, and I liked watching the green wavy line in constant motion because it was a little hypnotic.

When we became more independent, we became latch-key kids at a time when others went home to their mothers. We were always out riding our bikes, usually just the three of us, but sometimes with my brother's friends, doing brodies in the dirt, playing on the train trestle, making forts, and basically getting into all levels of dangerous mischief. That changed after elementary school when the boys did not like me hanging around them as much. I became quite jealous because they always seemed to be having tons more fun than I, like playing on the Little League team and starting the creek on fire. I was expected to act more "ladylike," was sent to Charm School, took tap dancing, and tried the Girl Scouts for a little while. I quit pretty fast, when I found out they never went camping or chopped down trees in the woods like the Boy Scouts did. Soon, both of my brothers were sent to Palo Alto Military Academy (PAMA) to get them out of trouble and in line. Their hair was close-shorn, they marched like little soldiers and soon, their grades even picked up. It was a boarding school,

so I only saw them when they came home briefly on weekends. It was located near to our home, so it was not like I could not yell at them through the chain-link fencing that surrounded the school. I loved to see if I could trip them up while they were marching around the big yard.

The “staying in line” part changed when my older brother graduated after ninth grade, and he began to change rapidly after a year at the high school. He grew his hair out, had taken a position on the Vietnam war, and seemed to cause friction at home with his love and peace attitude. He and our father locked horns constantly, and then there was a new baby in the home that had already changed all the family dynamics. The morning after a fierce fight at the dinner table about an incident with the baby’s mother, my older brother got up and dressed as if going to school. Without saying a word to any of us, he hitchhiked out of town and out of our lives. My father went to the police station after Jim was reported absent at school and he did not come home for dinner. Our father listed him as a truant and a runaway. I remember being terribly hurt and disappointed that my big brother had left me behind.

I had grown up in Palo Alto, moving away while in the service, and then I came back, and I started Stanford. And after a year or so I ran out of money and the GI Bill. And I’ve always admired Hewlett Packard company. And in fact, growing up in Palo Alto, I had even driven a Hewlett-Packard Oldsmobile Woodie station wagon in a Get Out the Vote campaign in 1956. So, it was logical for me to interview at HP for a summer job just to tide me over and make some money so that I could remain at Stanford. I started. I started working as a full-time assembler on a line, then quickly promoted to Junior Engineer. When my classes started up that fall, I was moved into the HP lab building on a half time basis as a Junior Engineer just working afternoons after classes. Even as a junior engineer I had ideas about designing or changing a design to get the desired output. At that time there was only five hundred employees at the company, but it had a lot of name recognition, and I could see it was going to continue expanding products and locations. I had no idea that this company would become the cornerstone of what would become known as Silicon Valley.

I got quite a bit of experience in the lab. At that time, Hewlett Packard was primarily creating instruments for scientists and engineers in commercial applications. One of the first programs that I got to work on was called the 405 digital voltmeter. I was developing a stepping switch to do the voltage selection. It was very rudimentary, but it was still quite successful in the marketplace. It also taught me a lot about Hewlett Packard as a company. More importantly, it taught me a lot about engineering in general and really complemented the

courses and education I was getting as a student at Stanford. Upon graduation in 1958, I was offered a full-time job at HP Labs. HP had just expanded, again, constructing more labs buildings; near where the core lab was located. It later became the HP Corporate Labs and the other divisions constantly splitting off as the company grew; my work locations would sometimes vary, depending on what team or project I was assigned to. At the time, the company was mostly known for producing commercial grade electronics testing and measurement instruments with improved accuracy such as voltmeters to measure voltage in an electric circuit and oscillators were at that time lot of the products we were trying to improve on to be used in a variety of industries such as science, medicine, audio and visual, and even the film industry (Walt Disney studios had been HP's first big customer.) We also did a lot of work to develop semiconductor devices primarily for internal use so that our own engineers could do their jobs better.

Transistors were just becoming really big with the promise of improving performance and reduce hardware and architecture needs of just about anything and everything. I'd taken a transistor course at Stanford. The 3440 digital voltmeter was a follow on from there. I did invent a new logic gate; there were AND gates, there were OR gates, but not an AND/NEITHER gate which is exactly the logic we needed. One of the lab directors asked me if I wanted to work on an upgrade to a product that Bill Hewlett had originally designed, the low distortion 200 audio oscillator that HP had first become known for, especially since Disney used nine of them for the soundtrack in **Fantasia**. What I did there was to take his famous light bulb out of that oscillator and replaced it with a bunch of transistors and a diode. The device now actually had more distortion than with the original design, but it was so much more simplified. It was also much lighter and that was at least a start. Eventually it would lead to creating the 200A oscillator as a low-distortion, high precision transistorized instrument. I learned how to design with transistors by using them to redesign the original 200 model oscillator that was described in Bill Hewlett's thesis. I learned a lot about experimentation too and came to believe that creativity is developed, learned by trial and error. I used to tell people, if your circuit works the first time, you didn't learn anything.

Success

After that success, I began working on the 3440A RMS transistorized voltmeter which had incredible application for measuring voltage (figure 8.1). It was convenient, had a wide



Figure 8.1 Dave Cochran and Chuck Nearing working on the HP 3400A Digital Voltmeter in 1963, from hpmemoryproject.org

measuring range and used amplifiers to increase its performance. It was the first commercially successful digital multimeter when it came out in 1963. Now with a shot at its redesign, I approached it using a ramp architecture pushing the accuracy limits to new highs, 0.1% @ 1000 volts. I asked Horace Overacker who managed a small semiconductor lab at HP if he could make a duo-diode with a common substrate for the cathode. It was the first integrated circuit at HP; it worked perfectly allowing the diodes to track over range and temperature.

I remember when it came time to run all the environmental tests it got quite hot, especially when stacked in a rack with other equipment. I didn't want to put a fan in it and my boss was we had failed 'Heat and Beat.' Heat is death to electronics, so I said, 'Give us a couple of days.' With individual thermocouples and the finger test we determined the principal origin of the heat, right at the front digital counters. I asked the mechanical engineer on the project if he could make the sheet metal deck have a one-half inch gap at the back. I had taken a course in thermodynamics at Stanford and reasoned that the heat would flow towards the back where it was cooler by convection and circulate enough stay cool. With a few fins the back plate would serve as a radiator; wow did it, 15 degrees centigrade cooler. Back in the good graces with my boss and the HP 3440 Digital Voltmeter became one of the best-selling products. My notoriety at the company was cemented as both an innovator and a leader but I was also open to new ideas and able to think outside the box. While working on those products, I met a conglomeration of about thirty to forty top engineers, many of whom would start working on what would be the world's first desktop personal computer called the HP 9100A. It would revolutionize the world because it was like having a personal **ENIAC** (Electronic Numerical Integrator and Computer) or its successor, the **UNIVAC** (Universal Automatic Computer, (figure 8.2).

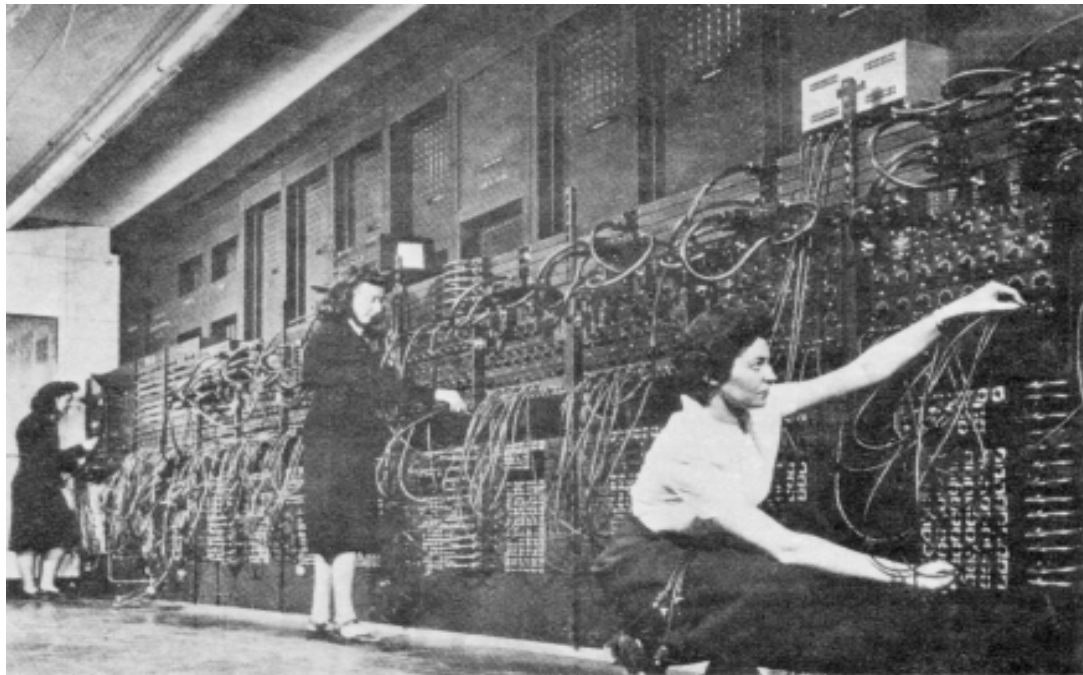


Figure 8.2 ENIAC, the world's first electronic computer, was not programmed but wired up to solve a problem. It became operational just in time for Stan Frankel and Nick Metropolis to run the calculations for "the Los Alamos problem," which sought to find out if a hydrogen bomb was feasible (The 9100 Project 2022).

One day in 1964, Barney Oliver, who had recently come over to HP from Bell Labs, called at least half of us into a conference. Once we were gathered, he says to our group,

'Well, you all may wonder why you're here. We're going to talk about a small, desktop-sized personal computer.'

You could have heard a pin drop. Nobody had worked on any type of calculating or computing machine, though a few of us had taken computer courses at Stanford recently. Computers were just coming-of-age, but IBM had that corner of the market's attention, but no calculators were around yet and we certainly knew that this was something very different. Since the early 1600's complicated calculations were done by using the slide ruler (figure 8.3). We couldn't imagine not using the slide ruler because that was the basic tool of engineers for over three hundred years! At that time, the closest thing to a highly functioning calculating device was the ENIAC, but it was huge, had limited access and applications, even in the post-war years.



Figure 8.3 The slide ruler; the basic tool of engineers, was invented in 1622 (*Wikipedia 2022*)

Barney was extremely well known, especially for his development of Pulse Code Modulation (PCM) that could be used for digital audio applications, in radar, telephone, television, and computer systems. He had a patent on it and several other things. Now he had developed and ran HP Labs as their chief engineer, worked closely with Bill Hewlett. He was once dubbed 'The Grand Wizard of HP Labs.'

I already knew a little about this project idea because Barney and Bill had approached me about doing a small feasibility study on a new product idea. I created a prototype of a computing device he had put together that he called it Athena. It had a fixed transcendental function for making complicated calculations. McMillian had figured out a way to incorporate a simplified algorithm (called CORDIC Algorithms) into its

A consulting theoretical and applied mathematician by the name of Malcolm McMillian had hardware which could theoretically easily multiply hardware functionality within a smaller amount of space. Space constraints were always a problem HP was trying to tackle with every upgrade to something, so I found this intriguing even though I did not know anything about the digit-by-digit equations McMillian used.

While McMillian had his mathematics down, Tom Osborn, known as an engineer, innovator, and entrepreneur who had created Logic Design Company, had built a small prototype of a calculating device he called The Green Machine. With it he had created a floating-point transcendental four-function machine to show Barney and Bill. Barney went on to explain why we were all there.

“Okay, I’d like you guys to listen to this, this. About a month ago, we were contacted by a couple of different people to buy their new ideas for a smaller computational machine. One machine used a fixed-point transcendental calculation and the other had a floating point four-function machine. And I thought, you know, here’s a product that someone like us might be interested in. Nothing really jumped out at us at first, but when Bill Hewlett and I got together, we thought perhaps if we were to merge these concepts, put in some floating-point architecture; we could make it a very functional type of machine that puts a massive amount of computing capability in a small amount of space. If we can have transcendental functions over a wide range that can be put into a small frame, we’ll be creating a calculating application for scientists and engineers that they could use at their desks! Oh, and we want to make it programmable too.”

Well, creating a device like this was certainly not in our repertoire. That alone seemed like shooting for the moon. But making programmable too? That was asking for the moon **and** the stars too! So, here we are in this meeting, it has been explained what we were going to be involved in and suddenly Barney starts to talk about assignments. But it was confusing because, remember, in 1964 we didn’t even know about some of these terms, let alone materials. Semiconductors made of monocrystalline silicon were out there but still pretty rudimentary, not made in huge quantities and they were also very pricey. Someone asked about the display interface. How will we project the numbers? There was no discussion of Nixie tubes (Numeric Indicator eXperimental tube to illuminate numbers), or LEDs (Light Emitting Diodes). So, it was going to be numbers written on a CRT (Cathode Ray Tube). And there was a whole bunch of concepts that had to be worked on in the internal hardware, the ‘architecture.’ Arms were going up. Somebody talked about ROM...geez, what’s that? Read Only Memory. I remembered going to a convention on calculators and computers and Lou Terman, who worked at IBM, gave a talk on the topic, he defined what a read only memory was; IBM was just developing them.

Finally, Barney had a few things left to cover and he knew who he wanted to work on this or that or needed volunteers, but then he asks,

“So, who’s going to investigate the algorithms?”

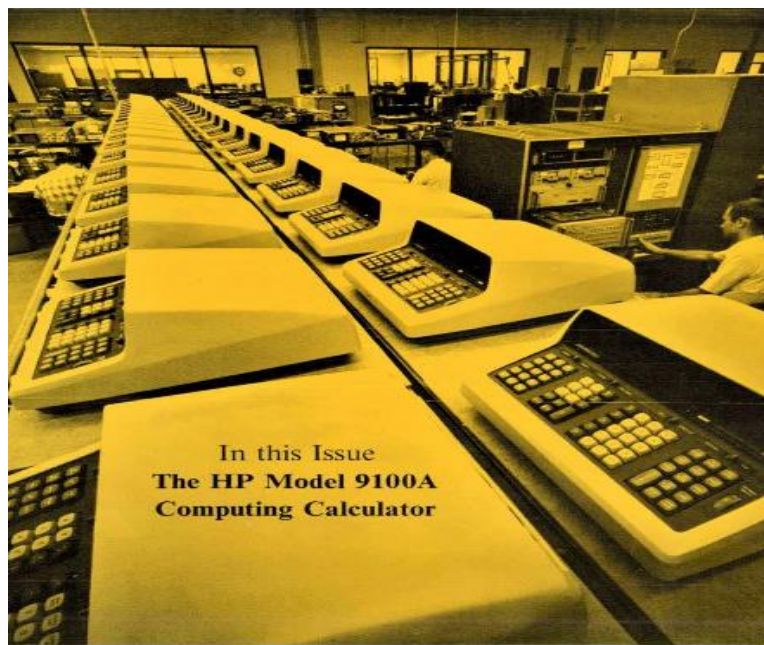
I dumbly asked, ‘What’s an algorithm?’ Barney bellowed back,

“Dave, you’re going to find out!”

I immediately thought, ‘oh what did I just do.’ But it was too late, because with Barney, there was never getting out of anything. Not only that but I had to find out about the topic very quickly, because Barney expected all the newly formed team members to report back to him in thirty days and give a thorough report on feasibility and methods to begin the project. I was looking at Osborne’s architecture and trying to figure out what an algorithm was. I even flew down to Southern California to talk with Jack Volder who had developed the CORDIC transcendental functions used in the Athena machine and talked to him for about an hour. He

referred me to the original papers by Meggitt where he'd gotten the pseudo division, pseudo multiplication generalized functions. I had discovered that algorithms are just a step-by-step process to solve a problem. I did a lot of research and used the HP librarian to help me look for literature on algorithms in particular about the way that CORDIC (Coordinate Rotation Digit Computer) which took complex numbers using constant values. I also needed to quickly grasp the basis for the transcendental functions, but it took longer to figure out how to increase the dynamic range and work in floating point numbers. It was quite a research project including discovering a treatise by Henry Briggs written in 1624 on common logarithms. Even though algorithms were really developed as a practical mathematical process in ninth century Persia, I was able to apply the knowledge to the various calculations desired for HP's first scientific desktop calculator. Upon prodding by a UC Berkeley professor, I even learned how to fine tune the algorithms to net out the average calculation error.

Now my job became to determine how many digits and what the operation time was required; what the architecture had to be; how many registers did we need, clock speed, etc.? Other people were coming back with their inputs on cathode ray tube display, keyboards [and so on]. Should we use transistors or small-scale integration? There was no large-scale integration, but there was medium-scale integration, MSI which meant maybe 10 transistors in a chip. Also, the design incorporating the concept of Reverse Polish Notation (RPN) which allows for faster calculations. Simply it means that one puts in their numbers first, then apply the operation. For example, to add two numbers (6+3) one enters the 6, then the 3, then the + function. For very more complicated equations, let's say something ten digits long with more complex operations such as square root, sine, or co-sine, this RPN entry allows for an almost immediate result. It was pure magic how fast it worked (figure 8.4)!



SEPTEMBER 1968

Figure 8.4 The World's First Mass Produced Desktop Computing Machine.
Image from hpmemoryproject.org

We had spent quite a few years, a lot of money and dealt with constant challenges on that project but it paved the way for the market to look to us as cutting edge, innovative, and able to successfully pivot towards a much wider consumer market. We were getting phenomenal attention for producing the world's first personal computer-calculator which was not only small and fast but programmable as well. It was a great compliment for the HP Measurement Product Line. Engineers and scientists could now work with variables from their measured data. It handled terrestrial up to atomic range of numbers. In sum, it was an incredible engineering and marketing success story. The 9100 was the first mass-produced computer in the history of the world.

The Famous Bill Hewlett's Desk Story

When we were working on the 9100, we were told to have the mock-up ready by the time Bill Hewlett came back from a trip. He traveled a lot, so we knew we still had a little time to get the final mock-up completed. He says,

“You know, I want it to fit on my desk. It's a Secretary's Desk with it's got a drawer that can be pull out to set a typewriter on. I'd love to have the 9100 fit right there. That way I could have with me all the time right there on my desk.”

And so, when we finished the first working prototype, we took his desk and since he wasn't in town yet, we sked the Secretary if we could see how the fit was. So, we opened the typewriter slot, pulled the drawer out and up, and the machine wouldn't slide in. It was really close but off by an eighth of an inch. Obviously, we weren't going to try to redesign the outer case of the 9100, so we called up the carpenter shop. And within a few hours, those craftsmen had the alterations made and it was done so well, we just breathed a sigh of relief when the unit slipped into the space like a glove (figure 8.5). Rumor had it that supposedly, he found out, but if he did, he never said anything, because he loved that everybody thought that they . pulled one over on him. Well, that desk is part of the official tour of the offices of HP. The story sometimes gets shared by the tour guide, though I love to retell it whenever I tell the HP9100A story



Figure 8.5 The famous Bill Hewlett Desk which the carpenters tweaked. The drawer is tucked next to the garbage bin. Image from the hpmemoryproject.org

More Success

A few years after the success of the desktop calculator from which there were multiple spin-offs, Bill Hewlett asked me in 1970 if we could do it again but hand-held and fit in his pocket. In other words, take a forty-pound desktop machine, with one integrated circuit in it, that runs 70watts of power off a wall plug, miniaturize it and run it off some small rechargeable nickel-cadmium batteries. He wants all that computational power in his shirt pocket (figure 8.6) I now got a chance to probe the semiconductor technology to try to map an overlay of the goals with the moving target of technology. I happened onto a shift-register architecture that looked like it was a match for the densest integrated circuit technology at the time. But this time the timeline was considerably shorter because we had heard a few other companies were vying for that distinction. Spies were everywhere and everyone had to work not just quickly but with utmost secrecy. I even told my children they were not to mention what I was working on. Luckily, they didn't seem interested...typical teenagers.

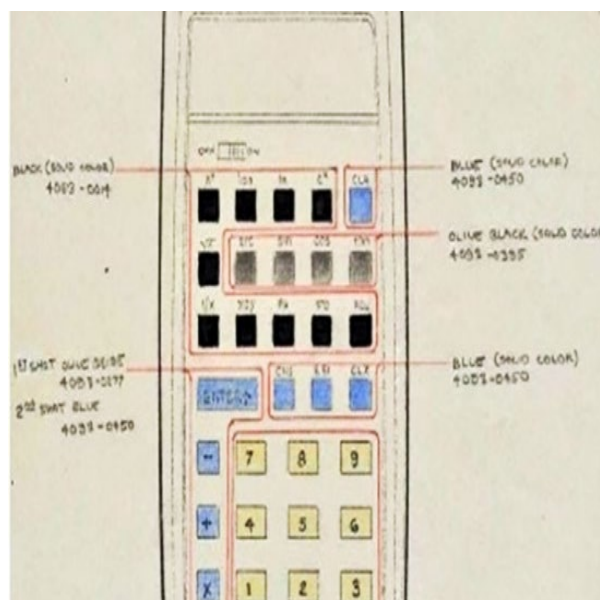


Figure 8.6 An Early Sketch Design for the Pocket Calculator.
Image from hpmemoryproject.org

In just two weeks I had designed the architecture (now called firmware) to embody all the goals and we were off and running, managing a great team to do the detail work and we had a prototype in less than a year. Tom Whitney and I went down to Fairchild Semiconductor on Ellis Street, Mountain View, and they wanted to show us a calculator architecture that they were planning to provide to various companies that wanted to build calculators and semiconductors. So, we went down to look at it. And I looked at it, and oh, this could do the algorithms. See, I knew. By this time, I had already fit the algorithms into a small-scale integrated machine, the 9100. I knew exactly what architecture I needed, the capabilities of the architecture. I didn't know what it was going to look like, but I knew what its capabilities had to be. Then I had an epiphany. It was I think September of 1970; I saw a design that was different than anything else. It was not your classic computer architecture as taught at the universities. It was all shift register. It was designed for the technology at the time. When talking to the people at Fairchild I meet a fellow, Rich Whicker, who later came to work at

HP. I said, God, this design, did you think of this? He says, No. We got it from Sweda, the cash register company. Sweda at the time was trying to make an electronic cash register or point-of-sale products and they were using shift registers.

Shift registers were the densest form of integration of integrated circuits at the time; you had to keep the clock moving and so on. It had no static memory. So here was a design using shift registers a 20-digit chipset that could satisfy anybody making a four-function machine. Add, subtract, multiply, and divide. It could give you the numbers as big as most people wanted, but it was all fixed point. 20 digits should be more than enough for anybody. You could have the decimal point anywhere in that stream.

I got really cranked up about seeing that architecture at Fairchild, I got very excited. And I'm whispering in Tom Whitney's ear, 'God, this is great.' And I'm trying not to be too excited while I'm there. When we drove away from there and, I said, 'God, that's exactly—you know, I can tweak that architecture just a little bit. We don't need the full 20 digits; we can do this and this and this. And gosh, yes, I can do it, I can do it, I can do it. I then designed the unique instruction set to program all the proposed functionality in a space that could fit in Bill Hewlett's shirt pocket. The world's first scientific pocket calculator changed HP forever. Barney Oliver, as Chief Engineer, the visionary who brought projects to HP and had Mr. Hewlett's ear, made things clear. He said,

“Bill, this object will change the world!”

The product encouraged enormous attention to detail; the industrial design was already in prototype, driven by Bill Hewlett's personal encouragement before any of the electronics was done. The size of the entire product, individual key placement, display angle, etc. was essentially completed; all we had to do was to make the electronics fit.

Months were spent on the key action, based on a child's cricket sound, and feel; nothing was trivial. My concern over the readability of the seven-segment display resulted in each of the segments being optimized for brightness and addition of seraphs to aid in recognition. During this study it was discovered that strobing the segments at a one-percent duty cycle increased the LED output by about seven times. A designer's prayer Let each problem solved result in solving additional problems and enhancing performance.

The design of the HP-35 was unique in my opinion; I already had the architecture in my head; just looking for a suitable technology to execute the various algorithms needed. Once I found a shift register technology in P-MOS which would accommodate the architecture and execution speed I had the total block diagram including instruction set finished in about a week. The rest was just turning the crank.

In my opinion, the HP-35 Pocket Scientific Calculator stands out head and shoulders above every other program. It took a perfect storm of emerging technologies to achieve the size, performance, and cost goals, with sales ten times even the wildest expectations, an excellent measure of innovation. Many notable scientists could not believe the amount of functionality that fit in their hand.

We did not know how intense the impact was going to be, but I would say that at the time HP was completely unprepared for the success of the HP-35. Even at a cost of \$395.00 (equivalent to \$2,100 in today's dollars), about 300,000 of the devices were sold in just two years. Trying to find enough parts and stay on top of sourcing materials was perhaps the

biggest challenge after its initial release (figure 8.7). But we knew we had something when:

- ✓ The engineer at the next bench wanted one.
- ✓ It was very popular with non-engineers
- ✓ The world's largest slide rule manufacturer goes out of business within 12 months after your product goes to market, because it eliminated the round-off errors of the slide rule
- ✓ The HP-35 ruined cocktail parties. Before, if there was a piano player at the party, everybody would cluster around and either listen or sing. With the new toy, the men were now gathered in the corner because someone brought the most amazing hand-held device ever seen. The women would be wondering what 'what the heck was going on.'
- ✓ GE has asked for a quote for 20,000 HP-35s
- ✓ It changed the way engineering and mathematic classes were taught.
- ✓ In classrooms the question was no whether to allow a calculator inside rather than using the slide rule or do computations by longhand.
- ✓ It became used in airplane cockpits.
- ✓ It was even called the Eighth Wonder of the World by Louis Alvarez, the Nobel Prize winner in Physics from Berkeley.
- ✓ The HP-35 was the bestselling product of all time and broke all marketing projections and caused the marketing people to have absolutely rethink everything!
- ✓ It took on Superstar Status (*Hewlett-Packard Staff Writer 1972*).
- ✓ It would lead to a version going to the moon (figure 8.11).



The Design of Consumer Electronics

Figure 8.7 A revolution was about to take place. Image from the hpmemoryproject.org

“The HP-35 was the innovative culmination of mechanical design, state-of-the-art technology, algorithm development and application; all unique at that time” (figure 8.8).

**Dag Spicer, Senior Curator for The
Computer History Museum 5/31/2022**

The HP-35 turned out to be the best-selling product line in the history of the company. More importantly, the world’s first calculator spun off the Pocket Calculator Series that lasted forty years. In the 1970’s alone there were fifteen pocket calculators that were created: HP-10; HP-19C; HP-21; HP-25; HP-29C; HP-32E; HP-33C; HP-34C; HP-41; HP-45; HP-55; HP-65; HP-67; HP-80; HP-97 (*HP Calculators 2022*)(figure 8.9).



HEWLETT  PACKARD



Figure.8.8 The HP-35 and Dave Cochran on top of his game.



Figure 8.9 From the IEEE Milestone Inductions that Changed the World, April 2009 (photo from R. Lopez)

Wow, I thought, how often does an engineer get such a chance(?!)...not to mention that this device had to use low-power voltage with a battery that could last eight hours. So many challenges to overcome, but I always said you saw one and you didn’t create more, you were making headway. And each challenge was another learning opportunity as well as an opportunity to stretch your goals. So, while problems kept arising, I was fueled by the excitement of doing something this challenging. The last year alone kept me working on the project about twelve-fourteen hours a day, almost seven days a week. When I did get home, I would sleep like a dead man but then I was always back up and into work before the kids even knew I had been there the night before.

After the HP-35 really hit the market, I was on top of the world, invited to speak at various universities, etcetera. I was written up in many publications and journals, even making the bi-centennial issue of *Time Magazine* (figure 8.10 with full article in Appendix 5).



Figure 8.10 The Time Magazine spread that sits on my wall. Photo by R. Lopez. For full article, see Appendix 6. Image from Time Cover Archives (*American Ingenuity: Still Going Strong 1976*).



Figure 8.11 After its introduction in 1974, the HP 65 became a standard tool for every crew of NASA astronauts (*Another Decade of Space Conquest 2022*)

More Success Means More Responsibility

Increasing Diversity at Hewlett Packard

The original R&D Laboratory was later split up amongst the various divisions as HP kept growing and started to geographically diversify. It was also important to diversify internally.

I recently went through Albuquerque on my way to visit some friends in Santa Fe. It reminded me of the many times I visited New Mexico as part of our college recruiting effort.

In the early 1970's HP recognized that we were hiring in our own image. The recognition could have even come from Dave and Bill? Stanford graduates went to Stanford to recruit, BYU graduates went back to Brigham Young, etc. It was logical; we knew the programs, the professors, and our way around. Many of us were asked to be on recruiting teams to visit schools which were lesser known but would have a greater percentage of minority graduates.

I was assigned University of New Mexico in Albuquerque which had a number of Native American students. There were about four of us whom would go down there twice a year for both the fall graduation and the spring. The city was renowned as the end of Route 66, so we often got there a day early and party a little.

When we got down to serious work, assigning the students we were going to interview. I remember Mike Cuevas who was from El Salvador who said he didn't feel qualified interviewing a PhD candidate as he only had a Masters. We started with an introduction with snacks the night before, then interview each student for half an hour and usually finish by noon. Actually, the interview lasted about 25 minutes, then write like crazy for the remaining five minutes before the next student arrived. By the late afternoon we were on the plane back to Palo Alto.

As diversity recruiting increased, I started going down to New Mexico several times in between to develop a relationship with the professors and staff, even joining the UNM engineering industry advisory panel. This was a great way to help shape the curriculum; after all, the university was producing a product, students, and we in industry were the end customers. I met with students informally, occasionally giving a talk and got leads on good students from my professor friends

Soon after I added New Mexico State in Las Cruces to our recruiting sites which brought in more candidates, many whose parents worked in government laboratories such as White Sands, Los Alamos, etc. I also got to know several of the E.E. professors and on the industry advisory board at New Mexico State. Now we would fly into Las Cruces and rent a car, do our interviewing at New Mexico State and drive to Albuquerque to finish up at UNM.

I happened to hear about a computer science program at a very small college nearby in Socorro, New Mexico Institute of Mining and Technology. It happened that one of the chemistry professors needed greater computational power and started a course in compiler architecture and construction. Socorro was put on our recruiting schedule. It is said that Conrad Hilton started his first hotel in Socorro.

I discovered that El Paso had the University of West Texas, a potential source of minority students. Now some of the team started in El Paso for a few interviews, drive to Las Cruces, then on to Socorro and finally meet the remainder of the team for the big push in Albuquerque at UNM. It took the whole week but over the years our New Mexico Team

(including El Paso Texas) added greatly to the diversity of engineers at Hewlett Packard.

Other Projects:

Train Protection System

During my career at HP, I garnered some twenty patents on various products and designs. Because of my successes I was asked to review public ventures such as the Bay Area Rapid Transit system (BART). During system start-up in late 1972 the Train Control System had a component failure during a test run and crashed into the end-of-track barrier. This caused considerable public alarm regarding safe train speed and braking. The system was immediately subject to manual mode for train movement with train headways limited to station-to-station separation. The California State Public Utilities Commission required assurances that the system was 100 percent safe; with no fatalities predicted.

After on-site detailed inspection and design review we came up with a train speed control design to maintain close headways safely throughout the system. The guiding principle was that each section of track had a maximum speed monitored on board in a fail-safe manner; in other words, if something fails the train will slow safely to a stop.

The entire BART train track is separated into various length sections or blocks. Electrical signals for each speed are transmitted individually to each block. The speed-control system design includes a base safe train speed for the entire track system for each block. However, several trains can be on the tracks at one time, so the system must recognize that the train can come upon a station, a train ahead or a foreign object on the track ahead. Therefore, the train control system is aware of the headway of every train in the system and transmits the correct speed signal to each individual train by design for close headway environment. Embedded in the system design is the safe stopping speed profile which is transmitted to the train as it crosses into each block based on the environment ahead, whether it be a station or another train. Within each station is a special design stopping profile to ensure the train passenger doors line up with the station platforms. For special operations such as routing around a stalled train or for maintenance a manual operational mode is available with a maximum speed of twenty-five miles per hour. The design is used on other similar systems elsewhere in the country.

Even Bill Hewlett noticed my father's contributions to the safety of public rapid transit systems (figure 8.12). Years later, the Public Transit Department in Medellín, Colombia, requested my father's opinion on the design of their system and how to make it safer. A family member said that he wrote to the United States Department of Transportation and suggested this design could be used all around the country to make train systems safer and thought of forwarding his comments to Secretary Pete Buttigieg after the 2020 election.



From the president's desk

In the past there have been several instances that serve to highlight company policies in action. I think it is interesting to look at these when they occur, and to report them when they have general interest to Hewlett-Packard people. We recently had a good example in connection with a problem in the San Francisco Bay area with the rapid transit system known as BART (Bay Area Rapid Transit). BART has had a wide variety of problems that have prevented it from operating at full effectiveness and which have delayed opening trans-bay service.

A little over a year ago, the State Senate appointed a "blue ribbon" panel of scientists—including Barney Oliver, HP's vice president for research and development—to look into BART and assess the safety of the automatic train control system. The panel made a number of recommendations for improving BART's safety, but one main problem remained unsolved. The train detection system would not always give warning that a dead train—one that had lost third rail power—was on a signal block ahead, particularly when that train was standing still. As the saying goes, this is no way to run a railroad.

Barney got interested in this problem and together with Len Cutler and Dave Cochran in HP Labs, decided to try out some innovative ideas. The concept was simple—mainly that trains do not merely disappear into thin air, nor do they materialize out of space. Thus, it must be self-evident that if a train entered a block it must still be there unless it came out the other side. This is a simple theory, but like most simple theories, its practical application can lead to complications. By working out specific solutions to some of these practical problems, Len and Dave ultimately devised a general theory on how to resolve the overall problem. When they finally were satisfied with their answer, they, along with people in our Corporate Industrial Design department, built a small section of circular track on a sheet

of plywood to test their system. The model included a simulation of the existing detection system, and, in parallel, their modification to make the system more effective. They then took this model to a meeting of the Board of Directors of BART and demonstrated it. The Board was greatly impressed (both by the logic and the beautiful execution of the model by the ID group), and as a result issued a change order to their contract with Westinghouse to adapt Barney, Len and Dave's ideas to the whole BART system.

One of the nicest things about their contribution was its simplicity. It used only four integrated circuit flat packs for each section of track. Thus, the electronics involved were quite modest in cost.

Outside of the intrinsic interest of this kind of approach, I feel that this is an excellent example of the application of "good citizenship." Barney and his gang spent a lot of time and personal effort on this program—one that hopefully will allow BART to go ahead. Although HP has patent rights on the idea, the full use of the concept will be made available to BART at no cost. We are content to get BART going and thereby help to reduce automotive traffic, fuel consumption, and smog.

Bill Hewlett



With Dave Cochran as observer, Len Cutler makes successful first test of the new train-detection system created by HP Labs team for the San Francisco Bay Area Rapid Transit District. Next day, Barney Oliver staged a demonstration of the system for the directors and engineering staff of BART, again with much success.

Figure 8.12 Bill Hewlett's Take on the BART Project. Dave Cochran is on the left observing Len Cutler. Article from MEASURE Magazine (Jan. 1974, pg. 15). Image from hpmemoryproject.org

An Introduction to Dave Cochran's Contributions to the history of HP
by John Minck, Onetime HP Microwave Division Marketing

As evolution has developed, it seems that human talents are distributed in a manner that is uneven and perhaps even unfair. Some seem predestined to be good, better, or best athletes. In the Arts, some brains are wired for sound and music, patterns, color, style, and form. And for Math and Science, many are attracted to the numbers, complexity, correlations, equations, and the challenging functions of our physical universe.

Dave Cochran is one of those Math and Science talents who SEES THROUGH algorithms. He THINKS in algorithms. And we should all be grateful that he ended up in Barney Oliver's R&D Lab at HP. Looking back, it was logical that he should end up at HP; born in Palo Alto, with service in the U.S. Navy just thirty miles north at Treasure Island, and with a brother already enrolled at Stanford, leading to his own schooling there.

Dave's early projects were the typical stuff of HP engineers, starting as a part-time test technician while at Stanford, then designing an audio oscillator and a couple of digital voltmeters. I first met Dave when he was assigned to adapt the tunable HP 204B audio oscillator for a special push-button version for Western Electric. WECO had determined that their test technicians could save considerable time by not having to tweak a dial setting thousands of times during their tests.

But Dave's lasting contributions to Hewlett-Packard really started with the first scientific desktop calculator, the HP 9100A. Barney's lab was the only place to center the development of this revolutionary new product since all the divisions of the time were instruments only. The story of how HP married several outside suggestions into a coherent project strategy, all the time working on computer functions such as ROMs (read-only-memory) which weren't developed yet, no integrated circuits, etc., were impressive and challenging. A unique 16-layer printed circuit board was just one of the innovations, which of course would later be done easily on a small silicon chip. The HP 9100A became the stuff of history

But Bill Hewlett kept nagging Barney and Dave to shrink the functions of the 9100A so it would fit in his shirt pocket, unlikely as that seemed. But those technology days of the late 1960s/early 1970s were fermenting with integrated circuits, light emitting diode digits only 1/10 inch high, and the personal visions of that HP Labs team of geniuses. The HP-35 scientific pocket calculator is well recorded as a unique product of science and technology history. But Dave was there, on the inside of the project, and his HP Memory here is full of interesting stories of the various challenges that they faced and conquered.

Taken from John's work as Contributing Editor for hpmemoryproject.org (Minck, A Quarter Century at HP 2022).

CHAPTER 9

Other Employment Opportunities

Silicon Valley: The Mecca of Innovation and Invention

(From Dave Cochran's biographical materials, with editing and imagery by Lisa Cochran and added research notated in double space.)

Palo Alto had been considered the intellectual epicenter of Silicon Valley because of its natural overlap with Stanford University. Over time, Silicon Valley expanded outward to include all of Santa Clara County. Silicon Valley quickly became the premier location for start-up companies because of its proximity to San Francisco and the many established companies already in the area. NASA had been in the area since 1939, the same year Dave Packard and Bill Hewlett formed their new company out of a tiny garage at 367 Addison Street in Palo Alto. It is now considered a California Historic Landmark because great things came out of there that quickly became part of a new start-up revolution (the HP200A covered in Chapter 8 and pictured in figure 11.1 of Chapter 11). Both young men were promoted by Stanford's Dean of Engineering Fred Terman, who encouraged his students with innovative ideas to engage in a local entrepreneurial spirit instead of taking their ideas away from the area. Their capital investment was just \$538.00, but with sales of several units to the Walt Disney Company, they were well on their way to making an impact with measuring devices for audio equipment (Wikipedia 2022). In 1956 Shockley Semiconductor Lab arrived. By then, Stanford University made a move to increase its relationships with industry. Stanford had vastly enlarged its scope. In 1962 it had helped develop the Stanford Linear Accelerator Center (SLAC) and soon after expanded campus even more with the Stanford Industrial Park (SIP). In 1970, the university developed the Stanford Research Institute (SRI) with the new complex, the Palo Alto Research Center (PARC) made for Xerox. Stanford was more than just a university; it had a state-of-the-art medical center and deep ties into local communities and industry. It also was gathering a global influence with its research and expansion programs global influence with its research and

expansion programs (Why is Silicon Valley Start-up Heaven 2022). HP became recognized as the symbolic founder of Silicon Valley (Hewlett-Packard 2022).



Stanford University officials attracting prospective clients to settle businesses in the South Bay, c. 1950

Figure 9.1 Stanford leaders deciding to grow the campus and invite more industry (Brownstein 2022)

While at HP, it seemed that every development project I worked on needed a new something to enable the design to meet the goals of the project. About 70% of the projects, I worked on in HP labs were successful in the marketplace, the true test of success. Few inventors or innovators have that high of a success rate, and to get there you need to have had a lot of failure to learn from and seed failure in a positive light as an opportunity to learn and keep trying until you succeed. It is said that success breeds success. After the success of the 9100A, and especially after the pocket-calculator and its successes, I started getting some offers from other companies. Offers came from different industries. I once received a call from Ford Motor Company asking if I could teach micro-programming to about 5000 engineers. I had no idea they were moving to electronic ignition and carburetion.

Once I met Nolan Bushnell the founder of Atari, it might have been after I finished the HP-35. After chatting for a few minutes, he offered me a job at twice what I was making; But at the time HP was the kind of company where I felt I could really grow and there was security of the known versus the unknown of a new company.

I remember a friend of mine Randy Olsen, a salesman from GE asked me if I wanted to start my own business as he knew someone in the East Bay that was interested in funding me. Again, I didn't pursue it even to the point of asking who it was; I didn't want to leave the security of HP. But in the back of my mind I began to increasingly realize that the HP that I grew up on since 1956 and watched it grow into a global powerhouse was again morphing and had become a much different company by then. I wasn't sure that I was comfortable with the new direction it was taking away from engineering and more towards marketing and the bottom line.

Different Views

I believed that the fundamental technology for electronic products of the future would be CMOS (Complementary Symmetry Metal Oxide Semiconductor). The HP-35 experience had shown me the power savings of MOS over BiPolar; remember I grew up with vacuum tubes. I headed up a development team on Silicon Gate at a time when IBM was dropping the technology. John Moll a famous researcher of silicon technology was on my team. Still there were many folks at HP that were advocating NMOS as faster and denser; today CMOS is pervasive winning the density race due to much lower power. Gut instincts and experience had shown me how to stick with the best options. Eventually, I was put in charge of developing a silicon gate process including a mass production processing facility when other companies had given up; it is now pervasive. Later I was put in charge of the CMOS design center. I was working with the Data Terminals group for a while, one of the guys was Steve Wozniak who was writing micro-code. Wozniak said that HP turned him down five times, but that his loyalty to HP made him hesitant to start Apple with Steven Jobs. I had taught him how to program the follow-on calculators to the HP-35. He was taking prototype terminal boards home (I signed his property passes) and converted those boards into CPUs, i.e., computers. He soon left the Data Terminals group to form Apple with Steve Jobs. Wozniak sent me an email a few years ago and stated that,

'He thought of me as his God because I had taught him to program.'

I managed a super mini-computer project for a while, couple of the team members developed a RISC architecture-based alternative on their own under-the-table so to speak but there were too many vested interests at HP. I should have gotten more involved as they formed Ridge Computer and were later helped by Arthur Rock, one of the premier Silicon Valley venture capitalists to be acquired by Intel.

Names like Atari, Apple and Oracle were changing how Silicon Valley was perceived. In 1980 came Sun Microsystems as well as what would become a hardware giant of the world, rebranded Seagate Technology, with their commercial hard-drive technology. The start-up craze was in full swing with plenty of jobs for everyone (figure 9.2). HP had begun to change, maybe brought on in part by the success of the HP-35 which required new sales strategies. The success of the many products that followed caused a seismic shift in how the company saw itself. The engineer was being replaced by the MBA and HP was not the same.



Figure 9.2 Job opportunities were becoming more abundant. Image from britanica.com (Brownstein 2022)

In 1985, after 25 years I chose to leave Hewlett Packard to join a consulting group called ICE (Integrated Circuit Engineering) out of Scottsdale, Arizona. Boy did my life change! Now, people were paying to hear me speak, give lectures and consult. I was now giving seminars and consulting around the world. I set up an office in Sunnyvale. My first task with ICE was assisting the Swiss how to design with semiconductors, to incorporate integrated circuits in their watch products. Within a month I was on a plane to Europe giving lectures to the ASUAG the Swiss horological group, and voila, the Swatch was born from those relationships. Other than my Navy duty I had not travelled much; all that changed, now I learned how to search for airline routes, book business class for international trips and joined several frequent traveler clubs. I've been up in the air ever since.

The Boom or Bust Economy

About 1987, a few years after I started working with ICE, one my clients, Xebec, offered me a Vice-Presidency Vice President of Quality and Reliability and 0.1% of the company stock options. However, Xebec was at its zenith when I joined. I couldn't refuse the VP position and generous benefits and options package, and I started commuting to Nevada. They were a key supplier to IBM on one of their first desktop computers. It was an exciting work life commuting to work by private plane, but I hated the bouncing around. I switched to commuting by jet to the Reno airport and living in the Ormsby House casino hotel in Carson City during the week. I flew first class all over the world and attended lavish parties in Lake Tahoe, South Shore, and Las Vegas.

While there I created The Accountant's Timekeeper. I met an accountant by the name of Greg Hock; I knew his father who had worked with me at Hewlett Packard. Greg only worked as a consultant as he had his own accounting business. We became casual friends and would occasionally go out for dinner when he was in Carson City, Nevada where Xebec offices were located.

I think Xebec was already heading towards bankruptcy when Greg came to me with an idea for a Time Tracker for accountants. He knew of the development of the HP-35 I had done, and he wanted to hire me to find a company that would build his idea. He had bought a Japanese hand-held four-function calculator with up to 100 storage locations that had the look and feel for what he had in mind. He asked me for my opinion on the feasibility. His idea was to provide accountants with an easy-to-use machine to keep track of the time they spend on each client during the month for billing purposes. We looked at several other brands; with a little research they all seemed to have similar architecture. Each contained an arithmetic circuit and the multiple memory cells to store interim values.

During my work with Xebec, I had traveled many times to the Orient, principally Japan to work with potential sub-contractors. I had developed some good contacts, one in particular, Henry Harada. I sent him a message and asked if he could arrange for us to meet with the right people at Sony to explore a new calculating engine design for sale in the US? He wrote back affirmatively, and we were on our way. Due to my long legs, Greg even paid for me to fly business class. We checked into the hotel and met Henry in the morning about nine. After the introductions he asked for details of what exactly Greg's idea was. Since there was no patent underway, we were very reluctant to say any more than a calculating engine that would use the exact same circuits and chips of the Sony calculator yet reprogrammed to behave differently. We hemmed and hawed for the better part of an hour; Henry said he couldn't

arrange the requested meeting without more information. I had known Henry for several years, but the Japanese feel a very strong allegiance to country and family before all else.

Greg and I decided we had no alternative than to trust Henry; without him we could go nowhere. Pledging him to secrecy Greg told him of his idea; Henry was astounded, he thought it was a super plan, there would be a huge market. Henry excused himself but was back in half an hour; our meeting was scheduled for two that afternoon.

We met in Sony headquarters and there seemed to be all the right people in attendance including the calculator architects. We made our presentation in English, and they started discussing our request in Japanese among themselves. Henry had kept his word; they didn't seem to quite understand what we wanted. Joto Mate, Kudasi, just a minute please I exclaimed proceeding to explain in English that all we wanted was to keep the existing architecture with only a change to the programing which we were prepared to do. Different lettering on the case would also be required. We left with a good feeling and Henry later informed us Sony would sign a manufacturing contract providing the calculating engine for less than \$50 each with no development cost since I would do the programing.

We came home happy; all Greg had to do was raise about two million dollars for the purchase of the fifty thousand units, marketing, and distribution costs. Unfortunately, Greg didn't find investors as interested as he was in supporting this Accountants Timekeeper. I contributed with several patents but Xebec, like so many other start-up companies, didn't make it. I was at a crossroads.

I flew to Hong Kong to interview with Commodore Computer to be Director of Materials. I would have lived in Hong Kong with a car and driver as well as membership in the Happy Valley Jockey Club. But I didn't get the job, and anyways, it would've been hard working for Jack Trammel (a man with a number tattooed on his forearm is a tough hombre).

A former HP friend asked me if I wanted to join a start-up called 'SCALD,' a new Supercomputer. I didn't like the name and just wasn't all that impressed with the credentials of the team or the need for another super-computer. I would have had to contribute \$20K or more and wouldn't get a paycheck for a while. I wasn't in a position to take on that kind of risk.

When Xebec crashed into bankruptcy I was out on the street with no pension, for the first time in my life. But every day I would get up, dress up and show up to wherever a possibility of an interview took me. I'm actually calling all my contacts in my old card rolodex asking for work. One day while going from job interview to interview I thought about a product I called PIM (Personal Information Manager) which you would talk to and store all your contacts, make calls, etc. in a hand-held device. I mentioned it to Blaine Fields an attorney friend who said it sounded great and I should come in to write up a patent application. Patent applications are very complicated, full of legal requirements, most of them get rejected for a redo or start-over, and they can take years, a lot of frustration and patience to acquire. Wow, if I had only filed for a patent or two for that idea, Apple and many other companies would be paying me about one million a month. Hindsight is always so much clearer.

The electronics world was changing; I was drumming up little consulting jobs to keep some cash flowing but it really meant a lot of time pounding the streets and long hours behind the wheel on over-congested highways. I had to clock hours on the phone daily (there were only landlines and payphones back then) as well making my own schedule, trying not to over-book

or create conflicts. I finally landed a job through a former contact from HP, Joe Shepella head of HR at Quantum Corp, a disk drive company. He offered me a job which was closer to home. I managed their reverse logistics (product returns) for the next 20 years. It gave me a chance to see a different side of the world; Mexico, various countries in Asia and Europe, accepting customer returned products for testing and replacement. I kept my head down and survived acquisitions by Maxtor and Seagate, was contributing to a 401K and deferred compensation enabling me to get along. I survived several downsizing attempts over the years when suddenly, my position was eliminated, and I was forced into retirement in 2010 at age seventy-nine. I wasn't ready to retire at seventy-nine any more than my father was ready and sixty-five. But fortunately, I lived in a new age of being valued for your accomplishments, so I continued to keep engaging, in life as fully as possible, grateful for the opportunities that continued to come my way.

CHAPTER 10

Giving Back: ABET and Other Ways of Giving

(Taken from Dave Cochran's biographical materials. Comments and background research from Lisa Cochran is double-spaced.)

All the while working several jobs and traveling the world to maintain his VIP 100K status with United Airlines, somehow my father figured out how to also be giving back to students by joining alliance with a well-known university accreditation company. The Accreditation Board for Engineering and Technology (ABET) sends teams of experts in a variety of disciplines to ensure high quality education is maintained in universities worldwide. They also assist universities who have lost their accreditation to be able to get it reinstated. It is critical that all institutions of higher learning, particularly in fields of applied science and engineering, engineering technology, and computing to give the best value education to all levels of graduates by endowing them with technical and professional skills sought out by employers. This company is both national and global. It began in 1932 as a professional licensure company to improve and standardize high-quality technical education. It has grown today to over four thousand programs at over eight hundred colleges and universities in forty-one countries. Each year, several thousand volunteers from thirty-five member societies contribute to ABET's goal of assuring training standards in applied and natural science, computing, engineering, and engineering technology education. The company is comprised of program evaluators, committee and council members, commissioners, and members of our Board of Directors. (About ABET 2022)

Accreditation is critical to assure that quality education and training reaches as many people as possible. Even in countries that do not encourage women to seek higher education, ABET has launched Women in Engineering and Science programs in many parts of the

world. Since most women cannot inherit wealth or property in some of those countries, it is very important that they be able to raise their own potential and access to job markets that are only accessible by highly skilled professionals. The most interesting classroom observation my father had was when he went to observe a class in a conservative Muslim country. The professor was male, and the men got to sit in full view of him as he taught but on the other side of a heavy curtain partition were the women students, all straining to listen attentively.

Accreditation is an intense eighteen-month process because teams are organized, itineraries made, project information is compiled and translated, then studied by team members. Finally, the volunteer teams go to the institutions after having spent six months studying everything from curriculum, syllabi, student satisfaction, go-on rates, class sizes, professor quality, number of applicants, student to professor ratios, class level, support staff, anything that is related to the quality of both the department as well as the quality of the experience for the student. Recommendations are made by individual team members with a list of objectives and a write-up detailing their assessment. An emphasis is on improving as well as innovating and pulling in diversity and inclusion so that standards can be or have been met for further follow-up geared towards continued or reinstated accreditation.

Volunteers then arrive at the city and are housed in the same facilities in order to work together as a cohesive team after days spent doing interviews of people and touring facilities. They spend about five to seven days at the location and then do a follow-up report to be handed in to ABET.

I wrote to the communications director for ABET and received the following information about what Dave Cochran brought to the table: Computer Engineering, Electrical and Electronics Engineering and Systems Engineering. You may also see Appendix 7 for a

complete listing and location of the universities he visited. Between 1996 and 2014, he participated in twenty-two evaluations which included seventeen states in the United States and five countries abroad. If one were to add up the time involved just for his volunteer work with ABET, it is about 11 years of time while simultaneously working several other jobs, including as a self-employed sub-contractor since 2009 with Cochran Technology, Incorporated.

At age eighty-four, Dave Cochran was not ready to slow down yet. Even since his last ABET assignment (University of Bahrain, October of 2014), he continued to travel, be interviewed, consult with engineers, give input on Systems Management for a Metro Rapid Transit System, share with students, and give talks on the HP-35 as a study in innovation. His last talk was in 2018 when he received a standing ovation from the crowd while tears streamed down our family's faces in overwhelming pride.



Figure 10.1 Collage of giving back.

CHAPTER 11

Conclusions

(This chapter is a synthesis from all sources. My additions are double-spaced.)

I conclude that people who have the ambition and potential to be great rise to meet their moment; the culmination of a series of moments if and only if the conditions are right. My father not only met his moments in his life as a great innovator, but others proclaim that sentiment as well. Phil McKinney said in his introduction of his podcast: June 20, 2009:

“This is the first in a series of interviews with individuals who created truly killer innovations, innovations that changed the world. This podcast is an interview I did with David Cochran. David was the product manager of the calculator that literally changed the world. The very first scientific calculator, the HP-35, released in 1972”
(McKinney 2009).

After collecting and illustrating through text and images of my father’s upbringing, opportunities and experiences, the simplified framework that I believe led him to the way his life played out was first based on certain known intersections. In the preceding chapters, I have broken down and used information that my father and others wrote or said about his experiences. In total, I believe they illustrate well that my father, David Shelton Cochran was:

1. In the Right Place
2. At the Right Time
3. With the Right People
4. While Being the Right Individual
 - a) Possessing the Right Values
 - b) And the Right Attitudes

In the Right Place (The Perfect Place)

Palo Alto was where the semiconductor industry really got hot after William Shockley moved from Bell Labs, located in New Jersey. The company was the center of high-technology research in the 1930s and 1940s. Shockley had worked with a group to create the first transistor in 1947 but moved to Palo Alto due to conflicts with management at Bell Labs and to be closer to his ailing mother. He was thoroughly convinced that the properties of silicon could improve transistor functionality and opened up Shockley Semiconductor Laboratory using his sources of silicon in their manufacturing. This in turn helped companies like Hewlett-Packard grow by using semiconductor innovation and manufacturing access to head full speed into digital territory.

Palo Alto remains the area's intellectual center because of Stanford. As noted in Chapter 9, Stanford University made a move to increase its relationships with industry, including NASA, Xerox, and IBM. Its own Stanford Linear Accelerator Center, Stanford Research Institute, the Stanford Industrial Park, and a multitude of spin-off companies in STEM industries, helped establish Palo Alto as the place to be to grow and launch companies. It also drew employment, referred to by chroniclers of San Francisco Peninsula history, as the Swarming of Silicon Valley (Brownstein 2022). There was a massive influx of people and talent who came just as companies were rapidly developing and growing. My father turned out to be one of those people, and he found a second home at HP that was to last twenty-five years. While at HP, and later with other engineering companies, he garnered much success and registered many patents. He says,

So, it was logical for me to interview at HP for a summer job just to tide me over and make some money so that I could remain at Stanford. Stanford not only brought me back 'home' where I had grown up but also got my head in different directions about applications. After graduation I was selected to join Advanced Research & Development. There, I got a chance to participate in many of the directions and developments that Hewlett-Packard explored for a

quarter of a century. HP took me the rest of the way into both design and application. Exposure to other ideas and teamwork, collaboration and networking made it so much more possible in my long career.

The following are excerpts from an interview Phil McKinney did with my father posted on the internet on June 20, 2009. He talks in depth about what made the company special and the pocket calculator project, in particular, quite unique. It was set up for a collaborative process that drew the talents and energy of so many people close together that may have been the recipe for the company's reputation for transformational product development such as the HP-35. I edited, with the show's blessing, for brevity (McKinney 2009).

I mentioned that earlier in the HP-35 development, people were anxious to get on it, because they could see that it was going to be something, and they wanted to be a part of it. And, perhaps they were even more anxious to use it, too. Heretofore, like I said, the setup in the laboratory was you had a desk and behind it, you had a bench and I think there was some there'll be two desks and two benches; there'll be a couple of people with some bookcases in between. And then across the aisle, you'd have a few other workbenches, bookcases, a desk, kind of staggered that way on an immense floor space that stretched out in all directions. It was like a sea of engineers in all different stages of their projects, and naturally, you're always looking over what your buddy was doing. Naturally, you were curious, and sometimes his project was more interesting than yours. Sometimes you'd even see things that were really exciting. And you'd say, ah, oh, gosh, yeah. Oh, that, I could use that right now. Can you give me a prototype? Or, if I am a little stuck which direction to go at this point. Maybe someone else can give me a fresh perspective. So, there was that back and forth. But the thing is that you were constantly looking at what other people were doing because of the lab layout. There were no walls. And everybody's wandering around and picking parts and, talking to one another, sharing ideas and so much freedom of communication. Also, the attitude up top was that the bottom line wasn't the here-all and be-all. It was just a part; the most important thing what was happening on the floor because that was where the collaborations were creating new designs and improved products. It was such a pleasure to work under those conditions.

A lot of people that started out working at HP (figure 11.1) would work for a while and a lot of them had such good ideas and be participating in some really exciting things. Sometimes they would have that inner urge to go out and do something on their own and leave the company that acted as a product incubator underlying the innovation support. Many actually offered Hewlett Packard, their inventions, and sometimes HP would either buy their designs outright or offer to do the manufacturing and give them a percentage of the profits. Many brilliant people and ideas came out of HP. I'd say more than a hundred people came out of HP, if not thousands.



Figure 11.1 David Packard and Bill Hewlett. Note their famous oscillator that started HP's ball rolling. (Hewlett-Packard in the 1960s 2022)

At the Right Time (The Perfect Storm of Goodness)

McKinney: This is the first in a series of interviews with individuals who created truly killer innovations, innovations that changed the world. This podcast is an interview I did with David Cochran. David was the product manager of the calculator that literally changed the world. What was the unique conditions that allowed the HP-35 to come into existence?

Cochran: Within HP, we had something very going on it was extremely unique. First, Packard was away in Washington, though, this, this had an impact, because now Hewlett was running the company. Secondly, Hewlett was just he was so intense about wanting the calculating power that he had sitting on his desk, all the functionality that was in the 9100, to fit into his pocket. He was also incredibly persistent, hunting me down every few weeks and asking what progress was being made. He'd asked me, because I was working on algorithms, and I was looking for architecture, and what technology that would fit within that architecture structure (what is now called firmware), that could put it in the shirt pocket. what we got from Hewlett though, was his blessing, or whatever we wanted to do. We had eighteen engineers working on this thing and using the Labs budget. Packard would have been bugging us about nuts and bolts and costs, and he was gone working as the Department of Defense Secretary in the Nixon administration. Also at that time, Barney Oliver was away at SETI; he had taken a year's leave of absence to work on the Search for Extraterrestrial Intelligence down at NASA Ames. Barney would have been interjecting his ego into the project and moving it in a particular direction, and he was gone. Packard is gone and Oliver's gone, so that freed us up in so many ways. Just enough management was out of the way. It felt like suddenly like we had no walls, which in turn gave us excitement and inspiration.

There were challenges to be overcome every step of the way. For example, there literally was no technology that we were aware of to make this little calculator, needing an integrated circuit technology with thousands of gates, high functionality with accuracy up to ten decimals, able to be charged up and use on a low-power energy source, so we all were thinking both inside and outside of the box. And here we had no walls, just inspiration and sheer excitement. The Industrial Design Group was doing mock-ups for us and one day

Hewlett said I'm going to have Industrial Design make a design of what I want. The guts be damned! He had them make the outside shape, with keys on it and one of the designers thought we would only need keys about the size of an eraser and so we had an idea of how the calculator would look. Basically, we were going to solve this working backwards to figure out the micro processing hardware that would fit into that space, run by an operating system that wasn't even designed yet. Even the investigation into marketing such a product was coming in on the weak side and how do you know what the market will even bear for cost per unit? It wasn't even recognized at the time to be created as a mainstream consumer product since our product lines were testing and measurement instruments. Would anybody even want one? But Hewlett was clear that he wanted it, even if we only sold enough to break even. No one knew that we literally were going to unleash a marketing monster that had production and manufacturing backlogs. Rather quickly, we had to move production to Singapore just to keep up with orders.

Out of all my career at HP, it was perhaps the epitome of a perfect storm of things coming together, exactly how and when exacting how it needed to. It was innovation coming together and of technologies being ready at the appropriate time. Timing cannot be understated, even with all the style and potential that a new product has. The Xerox PARC was full of things that were maybe ahead of their time or later that just weren't quite ready. And in the HP-35 was itself at a crossroads of technology. Just the situation, the people being available in the company, where we had more freedom than the normal as in other projects. And so, it was it was really good. It was a terrific time. **I think it was a Perfect Storm of Goodness.** That's all changed and now, and there are a lot of walls, cubes, and offices. It's become increasingly hard to get that level of communication and, and awareness of what everybody's doing. This is especially true nowadays where people are instant messaging somebody all over the world now; yeah, it is communicating but at the same time, so distant and unconnected. I just heard this last night on the radio, people are communicating so much through instant messaging or whatever platform all over the world while at the same time they're not communicating with their kids sitting next to them eating dinner because they he's got his earphones on, and he's listened to whatever. I think the same dynamic thing holds true even when you're in this a group in close proximity. The fact that you're sitting there with eight other engineers means nothing because you're not communicating with them as much as you are across the world.

With the Right People (The Perfect People)

Packard could walk the length of the building and in half an hour's time, tell you everything that was wrong and tell you what you were doing right. But he could tell you, hey, you've got too much inventory, you've got too much work in process, and you've got this or that. This machine is out of tolerance. He would just listen and talk a few minutes to one person, then the next and so on. Dave Packard was very involved with many different aspects of the company until he went to be Secretary of Defense in the Nixon administration. After his departure, the company just wasn't the same, because of his special combination of ability, business sense, very grounded and just truly a lot of nuts and bolts whereas Hewlett was the visionary. Bill Hewlett ran things so differently than Dave Packard because he was an engineer's engineer, and he could look at your work and he could talk to you about it, and you could reason with him. But combined they were a powerful force for change in not just an industry, but in the way it was changing the world. Unfortunately, Hewlett and Packard, the epitome of their personalities, could not be rubber-stamped into the various divisions and so especially with new people coming and going, HP was in constant flux (McKinney 2009).

The Right Individual (With the Right Capabilities)

(Dave Cochran is quoted as saying the following, unless credited to another identified source.)

I discovered I was a graphical, spatial thinker, imagining shapes in my mind. Actually, somebody wrote a paper on that, on me, a graduate student from Princeton, they did a study on my thinking ability after I'd been in a few publications, they wanted to know how I thought and if I need to visualize it.

Dave Cochran is one of those Math and Science talents who SEES THROUGH algorithms. He THINKS in algorithms (John Minck's full quote is at the end of Chapter 8).

Barney Oliver credited your dad with an amazing ability to cram so much serious math functionality into very limited memory (from an email from John Minck to me and referencing an interview John did with Barney Oliver in hpmemoryproject.org).

While at HP, it seemed that every development project I worked on needed a new something to enable the design to meet the goals of the project. About 70% of the projects, I worked on in HP labs were successful in the marketplace, the true test of success. Few inventors or innovators have that high of a success rate, and to get there you need to have had a lot of failure to learn from and see failure in a positive light, as an opportunity to learn and keep trying until you succeed. If you solve one problem without creating two more, you are doing pretty good (interview with Steve Leibson in 2007)

Having the Right Values

I believe creativity is developed, learned by trial and error; I used to tell people, if your circuit works the first time, you didn't learn anything (from his hpmemoryproject.org contribution, pg. 5, pt. 4).

It would have been simpler to make the oscillator with a nonlinear dial; that would have been the easy way. However easy usually never leads to a great product or innovation. Furthermore beg, borrow, or steal to accomplish your design goals; let the lawyers worry about infringement. The discussion on non-linear rotation led me to research some articles on the subject, well before the era of Google. Yet HP was able to design things based on libraries, research, publications and networking the old-fashioned way (from the vignettes).

Working on mechanical things like bikes and cars taught me a lot about how thing worked and how they can always work better with the right tools and materials. The Navy Electronics School and then Minesweeper duty taught me a lot about electronics development of the X10, a pilotless supersonic test vehicle. I was involved in the autopilot and navigation systems. Stanford pulled concepts into focus and gave me a familiarity with ideas and relationships. HP was the perfect training ground to be creative and learn (from the vignettes).

Having the Right Attitude

Having the right attitude may be more important than aptitude. Outside the home, my father spent most of his life with like-minded people, particularly those who possessed what is now referred to in STEM teachings as *The STEM Mindset*. My father's generation saw the explosive growth of a generation of mostly men, who shared particular 'engineering practices' or 'engineering habits of mind.' Thinking in relational systems, the engineering mindset refers to the values, attitudes, and thinking skills with an understanding that nothing is stationary, and everything is linked (Madhavan, 2015). Engineers are trained to take larger systems models, deconstruct them, and then reconstruct them to create useful, innovating, and amazing improvements to existing things. My father has said in his vignettes that,

There is an easy way to design. You just take what's done and make it better, the easy way, and whatever fits. It is important to not be afraid of challenges or failure. One has to 'stretch' towards a goal. So it was along the way that I learned things, not just how to invent but by 'stretching forward towards that goal too. The 204B Audio Oscillator was really good to teach me how to use transistors, how to lay out printed circuit boards. I got involved in every aspect of the design.

In the 1960s, I really didn't understand the concept of 'stretch goals.' I often make the point that HP never succeeded when it didn't stretch. And the company learned relatively early it seemed to me, that stretching was always the way to succeed. Beyond that, success breeds success.

Success in life rarely comes to you, but you've got to reach up to grab it. My dad always taught me that to succeed you need to always get up, dress-up, then show up.

When we drove away from Fairchild, I said, 'God, that's exactly—you know, I can tweak that architecture just a little bit. We don't need the full 20 digits; we can do this and this and this. *And gosh, yes, I can do it, I can do it, I can do it!* I then designed the unique instruction set to program all the functionality proposed, in a space that could fit in Bill Hewlett's shirt pocket. The world's first scientific pocket calculator changed HP forever.

Dave Cochran is likely one of the most important people you've never heard about in the annals of low-power design. When Dave said, 'I can do it, I can do it, I can do it,' in response to seeing some specialized shift registers and a 20-digit chipset from a prototype of an electronic cash register. That's when the HP-35 Pocket Scientific Calculator crossed from the realm of the impossible to the realm of the possible. When Dave Cochran thought it could. Two years later, in 1972, it became a reality. The rest, as they say, is history. (Interview posted on the hpmemoryproject.org on September 19, 2011, by Steve Leibson).

Finally, in the Right Attitude category, I can say that my father had an essential ingredient to success not mentioned elsewhere and that is optimism! In fact, I believe optimism may be the most important part of “right attitude.” My father never ever said, “I can’t do this, “I give up” or, “It’s just not possible.” I never saw him defeated or want to quit. He was the ultimate “Can-Do” guy. There is always a way, even if it takes an overwhelming amount of trial and error or failure. Without optimism, there is rarely a breakthrough or the kind of “stretching” my father spoke about. Though he associated the stretching with goals and achievement, I think part of stretching is to maintain an optimistic attitude that keeps you reaching out, heading forward. The words, “I can do it!” is the optimistic confidence which all inventors, innovators and real explorers must have to carry them through the rough patches and get them to their dreams.

Some say you have to “fake it till you make it.” I would summarize my father’s attitude was that you have to think it and keep trying until you accomplish what you set out to do. Learn from your failures, do not give up, and always keep your eye on the final goal until it is at hand. Then, take a step up and forward and do it again.

Not An Ordinary Life

“Behind every invention, there is a story.”

Motto of The Smithsonian’s Lemelson Center for the Study of Invention and Innovation located in the National Museum of American History in WA, DC

The HP-35 was once called the Eighth Wonder of the World by Louis Alvarez, Nobel Prize winner from Berkeley (Development of the HP35, The First Handheld Scientific Calculator, 1972 2022).

Forbes ASAP magazine called the HP-35 one of the twenty products that changed the modern world. The HP-35 and its descendants would sell more than 20 million units for Hewlett-Packard, making them the most popular products in the company’s history (Development of the HP35, The First Handheld Scientific Calculator, 1972 2022).

Hewlett-Packard Co. (Palo Alto, Calif.) received the IEEE Corporate Innovation Recognition honor in June 1989 for the creation, development, and introduction of the first full-function, shirt-pocket-sized, scientific calculator- the HP-35 (Development of the HP35, The First Handheld Scientific Calculator, 1972 2022).

In the spring of 2009, five siblings and myself went back to 1501 Page Mill Road in Palo Alto, where all the Cochran children had spent time when we were small. We remembered it as an amazing structure that stood on top of the hill, filled with floor after floor, for as far as our little eyes could see, with tons of great hiding places while our father worked on whatever project would bring him in on a Saturday or Sunday. The only thing we were instructed back then is that we could look, but not touch. Then, when he hollered at us that it was time to go, he would not tolerate any dilly-dallying. We would tag after him, scurrying like little corgi puppies, trying to keep up with his long stride. He always moved like this, going places as if on a mission, and you did not want to be the child that could not keep up, or quite literally, you could be left behind! Now, in 2009, the building seemed so much smaller, just a few corporate offices and banquet rooms. Our father, along with his still-living team, gathered one last time, as the world's first pocket calculator was being inducted into the prestigious IEEE Milestones Award for Electrical Engineering and Computing (figure 11.2).



Figure 11.2 April 14, 2009, Induction into the IEEE Milestones Award with some of the HP35 Team. Photo courtesy of Steve Leibson

Honoring the achievements of HP and the HP-35 team with IEEE Milestone Award

On Tuesday, April 14, 2009, the IEEE recognized the HP-35, world's first pocket scientific calculator, as a milestone. The original design team present received awards for their participation. From left to right: Rich Marconi, France Rode, Lew Terman, Dave Cochran, Donna Whitney (representing husband, Tom Whitney), Tom Osborne, Ken Peterson, Chung Tung, Dick Osgood, Bill Mission. Dave Cochran, fourth from the left on the photo above, was the product manager of the original HP-35. Dave was HP Laboratories' top algorithm designer and micro programmer, having performed those functions for both the HP 9100A and HP-35 calculators (event write-up and photo above in hpmemoryproject.org by Steve Leibson).

After almost 30 years away from HP, my dad realized at this event that no one had forgotten his name! He also came to more fully understand that the HP-35 touched more lives in more ways than anyone realized except for museum curators and other scientific history buffs. Most older engineers can always tell you what model HP calculator they had and when they bought it. Many keep those old models because they recognized how it immediately changed their ability to work, study and get answers to complicated equations. They also keep them because they are a memento of a time when suddenly everything changed.

Any statement you care to make about it in the way of praise will probably be an understatement. -written by an engineer from the *HP Journal* article [A Star is Born](#). (For a complete listing of engineer's comments, see Appendix 5- Media.)

It was truly my delight and honor to see you again. Thank you so much, Dave, for launching a revolution for HP, allowing me to become a fanatic HP Calculator user, and ending up with my dream job – managing the HP Calculator Division. -written in a letter to my father by Sam Kim, after a talk given in 2018 (see below).

Our special guest speaker, Dave Cochran, is to be thanked, and I believe that he had a precious experience as well. His two daughters were ecstatic at seeing their aging father being recognized for his engineering work with the only HHC (Hewlett-Packard Hand-held Users community) standing ovation I can remember. - Richard Nelson, leader of the HWC group. I met your dad at the Museum a while back and we had a lovely extended talk. I felt truly privileged to have had that experience. -Deg Spicer in an email to me listed in Appendix 9 – Permissions.

Dave Cochran is likely one of the most important people you've never heard about in the annals of low-power design. -written by Steve Leibson for hpmemoryproject.org.

Dave Cochran Changed History

June 27, 2021 / in News & Views, Uncategorized



What I find incredible about RVM is the number of people who have had fascinating careers. Dave Cochran is one of them. David Packard introduced him to a navy admiral as the man who invented the HP-35- the pocket calculator that changed the world. One year after its invention in 1972, slide-rules were a thing of the past. While numerous people worked on it, Dave was HP's Project Chief for the HP-35. Basically, he was responsible for how it looked and how it worked. For his part in the development of architecture and algorithms of the HP-35, he was included in

Figure 11.3 Portion of an article from a staff writer at The Complement at the Rogue Valley Retirement Facility. Comments are listed below. Full article at <https://thecomplement.info/2021/06/27/dave-cochran-changed-history/>

Dave was a pioneer in the technology that we take for granted today. Great article and homage to Dave and his HP-35. -posted by E. Blake on *The Complement* website.

I lived in Los Altos, CA, before we moved to Oregon. One day in 1970, my front doorbell rang, and it was Barney Oliver, the Vice-President for Research at Hewlett-Packard. How I came to know Barney is not the intent of my message. He did hold in his hand an object which seemed very strange to me. He found a wall plug in my living room and plugged in this strange machine. Then he said, 'Give me some outrageous numbers to add, subtract, multiply and divide.' Barney was not a person to scoff at; he was always serious in his endeavors. So, I gave him some numbers; he touched keys in the machine, and surely the results were significant, but not clear to my non-engineering mind. Barney said, 'This object will change the world.' Of course, he was serious; I passed it off, thinking Barney had been drinking in the middle of the day. I offered coffee. We talked. Indeed, it was the first attempt at a calculator made by Hewlett-Packard, and it was earth shattering. That machine now lives in the Hewlett-Packard Museum, as well as the Smithsonian. My story surrounds Dave Cochran, whom Barney Oliver taught algorithms and who worked with Barney on the Bart system in the Bay Area. It's a very small world, and one never knows if another person knows someone close to you. I loved Dave's story. -posted by D. Mraz on *The Complement* website.

Finally, Chuck House recently wrote about his fifty years of memories regarding my father:

A note for Lisa Cochran, about her father, David,
whom I have known and worked with for more than 50 years...

It is difficult to write something remotely encompassing about Dave Cochran's engineering prowess. Dave's Stanford degrees (BSEE 1958, MSEE 1960) surely gave him the technical horsepower for product innovation. But CREATIVITY is a human intellectual exercise that seems to be born into some people. In fact, it could be asserted that creativity may not be teachable, you are born with more or less as hidden in your genes.

John Minck recalls a video training film, sponsored by the Kaiser Corporation, which began with animation which declared that the production team started with the objective of teaching how to be creative. Even with extensive research, they concluded that it could not be taught, so instead, they decided to just produce a creative film.

He remembers that one sequence of the seeker of creativity was climbing a circuitous stairway (presumably to achieve a creative idea) and bumps into a horizontal ceiling. But he discovers a partly hidden trap door, which upon pushing open, finds another upward staircase. Which seems to imply that creativity might be more related to persistence, keep seeking the objective.

Minck has tried for decades to find references to that Kaiser training production. Some people in HP's Training Dept had obtained it from Kaiser, but of course Kaiser, which was once a huge industrial conglomerate during WWII, had pushed into healthcare and those earlier people retired. Later Minck discovered from Dave Kirby, the HP Public Relations manager, and an ex-Kaiser Aluminum employee, that Dave did not recall that film. So that mystery video was never solved, except, sadly, only in Minck's memory.

The Kaiser creativity connection to Dave seems born out in his own words of his HP Memory Project memoir. In the case of the HP 204 oscillator, he needed to transform the entire circuit from high impedance vacuum tubes (and candelabra bulb) to low impedance transistors. Even more so in his recounting of his stunning ability to manipulate the complex algorithms of the HP 9100 desktop computer and shoehorn them into a TINY read-only-memory of the time. Somewhere there is a flashback moment where several decades later, Dave realized that with some sort of "fold-over" routine, he could cut memory size by 50%. One hundred percent Dave!

But instrumentation design isn't taught in any university either, even today. And it is only in the past couple of decades that entrepreneurship has come into vogue. Innovative skills are still often felt to be innate, hardly amenable to being taught. And Dave Cochran exhibited just about the highest level of innovative instrumentation design imaginable, and remarkably, in a company that prided itself on such efforts, Cochran stood out from even the best of the best.

Working as a design technician while an undergraduate, not yet certified as 'an engineer,' he drew the assignment to work on making Bill Hewlett's original design 'solid-state.' This meant negating the negative-resistance neon light bulb that Hewlett ingeniously used (garnering a patent and starting a fantastic company). Some 24 refinements of that original model had been produced before Dave jumped in, but he not only was able to replace the neon bulb that no one else had, but he innovated a very special gear assembly to obviate the need for hand-calibration of the frequency dial. In his words, "these two exponential spirals

produced the desired non-linear output. We used a tuner cable of 20 strands of phosphor-bronze covered with plastic in a “Figure 8” configuration.” Novel, innovative, typical Dave Cochran.

For the next project, he conceived and commissioned what probably was the first integrated circuit ever produced in Silicon Valley, a decade before that name was applied to the area. It was a dual diode, to allow dual-slope comparison voltage measurements. It took the world by storm, and cemented HP’s lead in voltmeters for four decades. No one told him to do it; he just puzzled through the issues, and then decided that they could be solved in this unique way.

Long before the fabled HP 9100A desktop calculator, and its successor the HP-35 handheld scientific calculator, Dave helped solve the BART transportation system issues for the Bay Area Rapid Transit authority, a task that had stumped Westinghouse engineers

And then, two individuals showed up at HP, touting algorithmic state designs for mathematical functions. Dave asked, “What is an algorithm? And Barney (Oliver, VP of HP Research) said, ‘Dave, you’re going to find out.’” Basically, the world had never heard of algorithmic state design; Dave again did a lot of investigating, and learned it incredibly well—in the process, inventing the world’s first mass-produced computer.

The sequel to that machine was miniaturized, to fit a shirt pocket. It was the progenitor of the iPhone, although no one suspected that at the time. Again, Dave had to do leg work in fields he knew little about—first, to adopt an architecture and locate some appropriate Integrated Circuit chips (very novel at the time), and then redesign those, and eventually develop a whole new semiconductor process so that battery life could be extended. No one, not SRI’s fabled market research team, nor Hewlett himself, predicted that this little marvel would sell 25,000 units per month in its third month. Dave had once again outdone the pundits, and even himself.

These tidbits hopefully illustrate Dave’s inventive genius, which wasn’t constrained to any one discipline. He solved thermal issues, electronic issues, mechanical contrivances, solid-state physics problems, and more—before moving on in other pursuits, including serving on many university advisory teams. The world was all the better for this man’s pursuits and accomplishments.

-Chuck House, August 18, 2022

Contingent Crossroads

Thus far, I have told this story and found many areas of historical contingency, where my father’s path was directly altered by an event whose cause and effect are directly noted.

Here are some examples of moments that altered my father’s life as told in his own words.

I had spoken with my Uncle Roy, who had been a Captain in the Navy and was doing some post-graduate studies at UCLA. I told him I was thinking about going into the service right after graduating from Paly and he said unless I wanted to sleep in foxholes and eat cold

MREs out of a helmet, I should consider the Navy or the Air Force.... Though I had never been on a boat except for a rowboat or a canoe, I thought a dry cot, three hot meals and a chance to see the world in peacetime sounded like a good plan. Luckily, I spoke to my parents about my plans, and they sent me to Culver Military Academy as a preparatory student to get my grades up and put me in a better position for higher education (Chapter 5, pg. 65).

After graduating from Culver and near the end of June, the North Korean People's Army decided to invade the Republic of South Korea in a coordinated, but unprovoked attack. Russia and China were immediately supporting North Korea's military action. President Truman and United Nations forces just as quickly responded by declaring assistance for South Korea to repel its Communist aggressors. Suddenly, Stanford didn't seem so important anymore. I immediately enlisted in the US Navy (Chapter 5, pg. 66).

While enlisting, they gave me some aptitude tests. One of the men said, *"Hey young man, would you want to go to electronics school?"* (Chapter 6, pg. 66).

One day, I drove up to Los Angeles to apply for a radio operator's license thinking I might join the Merchant Marine. As luck would have it, the Merchant Marine Office was closed that day. Turning around to drive back home where my wife and child awaited, I drove past North American Aviation with a big Help Wanted Electronic Technicians. So, I stopped by on the way back, took a test and got a job offer. (Chapter 7, pg. 80)

By the end of my first year, I was running pretty low on money. It was summertime and my wife was three months pregnant, due in mid to late October of 1956. I had always thought I might get a summer job at Hewlett Packard (HP) and gave it a try (Chapter 7, pg. 81).

The fact that I was given the freedom to discuss problems with those who could best solve them was critical to the success of the HP 9100. I was lucky to have been chosen to be on the team to develop the 9100. Some people would have given their eye-teeth just to have been chosen to be on that team. - interview with Steve Leibson on a notable anniversary of the HP-35, The Eighth Wonder of the World Show (February 27, 2013).

Webs of Connections

I was told during one of our frequent chats about an interesting coincidence. A woman named Nancy Lem, who was the HP Librarian in the 1960s, had helped him compile his research on algorithms so that he could come up with the firmware for the desktop computer. It turns out that she currently lives on the fifth floor of his Medford condominium. Another resident of the same building used to also work at HP and was even at the baby shower of his youngest son back in the fall of 1980.

While my father worked for ABET in 2014, the Director of the organization at the

time used to be a good friend of mine in Moscow when our children were young. We swapped babysitting dates so that she could work on her Ph.D., then later on to ABET. Stranger yet is that her best friend, Claudia, is someone she met and was roommates with at the Sorbonne in Paris during a high school exchange program. Claudia also just happens to be the daughter of my father's own wife.

My father's scout leader during WWII left California and ended up in Moscow, ID during the early years I was here. Had I known before he died from back surgery at Gritman Hospital, I would have certainly loved to meet him and tell him how he meant so much to both our families.

I have discovered through this work that part of the constant unfolding of events I have written about here was nudged along by crossroads and connections (examples above) as well a lot of intentionality on my father's part. Looking back at his life, he was sometimes pushed in certain directions, such as having opportunities and exposure to interesting and novel things his parents afforded him. I also know that my Grandma Gwen was a hard-headed woman who made sure he not only got off to a good start but also that a lot was expected from him. The fact my two brothers and I were always in our father's care and not with our mother is a good example. My grandmother hired an expensive attorney for my father to make sure he got sole custody of us. In his professional life, Barney Oliver made sure that my father took control of the algorithm portion of the research into the 9100 and the pocket calculator, knowing that my father would run with it. At Quantum, concerned over downsizing, my father did what he was directed to do, keeping a lower profile to stay on the payroll.

His own agency was best exemplified in his personal life, like whom he chose to

marry, his purchase of cars and homes, and trips he wanted to take. He was a deeply driven man in perpetual motion, never giving up reaching for that brass ring. The perseverance and tenacity that made up his psyche always took him to the next level. After researching him for this thesis, I believe he would have been a great man because of who he was and how he always moved upward to the next great thing. The intersections are there, the crossroads acknowledged, and the connections established as well as his confidence to reach his goals. We belong to a vast web that brings us together, sometimes with seemingly unrelated things, and yet I believe that his path was built by a combination of factors, with the opportunities had, the decisions made but always living a life he was grateful to have.

A Life Fully Lived

A great life is nothing more than a series of days well lived strung together like a string of pearls. –Robin S. Sharma (Sharma 2022)

One wonders how it is that some people pack more into one life than several of us mere mortals put together. For him, constantly being on the go was the biggest thrill of all. He used to write us emails detailing where he has just been and give us an itinerary of where he was just about to go. The excitement of novelty and the unknown gave him the motivation to keep up that pace and squeeze the most he could out of every opportunity to go somewhere, meet somebody, and ponder a new project. He was the guy you wanted to invite to your parties because he could enthrall, entertain, and lend you his ear if you had a problem or proposal. If nothing else, you always knew he was an eternal optimist with endless energy to do more every day of the week with some power napping in between.

My father's mind was sharp, and to some people, amazing. He worked hard at almost everything he put his mind to. But he was always a mystery, and I have yet to meet a person

who thinks they know his whole story. He was a flawed but a deeply interesting person. He studied news, science, trends, and travel, and could drop a story describe people, places and ideas in endless detail and seemed to never run out of stories.

This is not to say that my father was not deeply flawed. There were definitely subjects he did not cover in his autobiographical writings other than what he said in earlier sections. From what I know, he often found human relationships challenging, especially in his personal life. He was prone to loneliness and unless he was working on a project, had trouble being alone with his own thoughts, often not sharing them with others. His biggest shortfalls involved his personal life, and he once told me that, “it was easier to read a blueprint and solve a technical problem than it was to figure out people.” He married multiple times but for different reasons and several of them quite noble. While at war, he wanted to leave a legacy in case he didn’t make it home, with ongoing government payouts for their support in his absence. After getting his master’s in engineering degree, he was a single parent and joined forces with other single women with children so that they could support each other. He married once because he was being a man of his word, and another time to help a woman with a serious medical condition afford her treatments and medications. But he also married for love and always enjoyed bringing more children, biological or not, into his large family. In that way he was much like his father’s side of the family. Through it all, he always did his best with the tools he had, constantly moving forward with renewed hope and faith. Though imperfect and full of mysteries, all of us that knew him have treasured stories that will endure and be shared at family gatherings throughout our lives to share with our children and grandchildren.

One of the biggest mysteries was how someone who was terrified of flying after his helicopter crash in the war, managed to constantly put himself through it; he said it was

because it meant getting places faster; the farther, the better. Racking up 100,000 miles a year in the air was a game for him. A classic line of his was when he would always remind us of his flight status: He said, “I was not one to be content with sitting in the back. I do everything I can to maintain my elite status so that I can upgrade, board first and wait for my flight in the United Lounge or the Captain’s Club. Several years ago, I even bought my own ticket to Hong Kong and flew back the next day just to make the 100,000 miles for the year.” On page 51 in Chapter 5 he said that after leaving Richton Mississippi, “I drove back to New Orleans to catch an early morning flight back to San Francisco connecting with United 891 to Shanghai; crossing twelve time-zones and three cultures in as many days.” That was my father, and he took as many of his children on trips as possible, to places like Hawaii, The Orient, Indonesia, Eastern Europe and South Asia. He has been to fifty-four countries, often for work but combining it with pleasure by meeting up with family and colleagues. He came to visit me in France in 2007, and we stood over the Beaches of Normandy to contemplate the lives sacrificed there while admiring the beauty of the English Channel and seeing across to Dover.

Do I feel I got to know and understand, even appreciate him better? It would have been impossible not to. I found out he never said an unkind word about anyone. I found out he never complained. When engaged in a conflict, he always stayed on point, raised logical and sound arguments, had the information to back it up, and never made it personal. I found out he gave an experienced perspective to anyone who sought out his counsel. My sister pointed out that the best advice he ever gave her was, “Never say anything disparaging about a co-worker as they may one day become your boss,” and, “the key to success in an organization is to always strive to make your boss look good.” I was also delighted to

discover from many people that my father spent more time these past several years bragging about his children and that he considered us to be his greatest accomplishments in life. When I showed this work to my siblings, each was amazed by some new information they were learning about him, which drives the point that it is never possible to know the whole story about anybody. We all carry some mysteries, sometimes even to ourselves. I also found out many things about myself I had never realized. I agree with the great post-modern cultural anthropologist Lila Abu-Lughod has said, life stories are meant to be a collaborative process that can be profound and life changing for the subject, the researcher, and the reader (Abu-Lughod 1991). My biggest hope was that as my father read this compilation he found himself satisfied that I told his story as accurately as possible, and I believe that I achieved that. My next hope is that anyone else who reads this account will agree that these pages illustrate a life truly well-lived.



“Experience everything; leave no regrets; use up all there is and
leave death nothing to claim.”
Love, Dad

Epilogue

Our father passed away peacefully surrounded by family while I was in the process of editing this work. In many ways, this thesis serves two main purposes: as a family legacy and an extended eulogy. I am thankful that I was able to send him his own personal copy of the rough manuscript as well as to many of my immediate family. My father was immensely pleased; the sign of a good ethnography is that the subject believes you have hit the mark. From my family, the thing I hear most is, “Wow, I never knew that about him.”

People who worked with my father during his lifetime have giving me some gems which are the stuff of eulogies; meant to remember, share, memorialize, and more importantly, change people who hear or read his story.

In a recent obituary published by his friend John Minck, he shared that, “Dave Cochran literally changed the science and engineering world, with his genius creation of computation algorithms for the HP-35, the pocket scientific calculator in 1972. It was a blockbuster product that rolled out right in the business recession of 1971-72. It prevented layoffs and welcome profits from the HP-35 boosted revenues.”

Knowing that our father made a difference in the lives of so many has made a difference to our entire family. It has changed our perceptions of what we thought we knew about him, but more importantly, gave us great pride and comfort during our time of loss.

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APPENDIX 1- Interview Questions

Non-Work-Related Topics:

- How is it that your grandfather developed the New Method Laundry? What do you remember about his business after your mother, aunt and uncle took over after their father died?

My grandfather had developed a new design on how the laundry equipment kept the clothes moving through the system. I don't know if he got any patent rights, but he took the new name and really ran with it. The business t got by for quite a few years, after my grandfather's death but it was apparent that the family just couldn't hold onto it. Everything was changing and it was a responsibility that Auntie Roy, Frank Jr., or my mother wanted to continue to be involved with. The sale of the business came at a good time for all involved.

- Did you remember anything else about your uncle Frank Jr?

Nothing except what my mother said about him. He was a bit of a disappointment; he was nothing like his namesake, my grandfather. Considered lazy and uninspired to make something of his life considering the upbringing he had. He was expected to take over the family business. Instead, my mother had to, which she really did not like at all. Her older sister and mother had put in their back-breaking time when they were just building the business. They both had had enough of the laundry, and Frank wasn't interested, so here was my mother, with a newborn and then a toddler, then a few years later, another newborn. I think she saw it as her duty though. She was happy when it was sold.

- Mr. Oliver P. Weyman was grandfather's attorney but swindled your family by selling the Belmont Hills Land Development Company as well as a frontage parcel on El Camino Real at way under market price for quick sale. But then he turned around and took a 30% commission on the sale so that he would still handsomely profit from the deal. He lied to the family by saying the land was lucky to get sold, but really it was a goldmine if the sale had waited. In essence he swindled your family to make fast and easy money. Your mom only found out about it because she overheard Mr. Weyman's wife bragging about it to another lady at the hairdressers. The story is that your mom was devastated when she found out.

It was pretty much her undoing, being taken advantage of by someone her father had trusted so much. She thought she could trust him too. It crushed her spirit in a way. Maybe that's why I have the attitude of easy come, easy go because I have seen fortunes lost by many people and I've had fortunes lost too. My mother thought of herself as very business savvy. Actually, her older sister really managed her money well and always lived a very nice lifestyle in San Francisco near Nob Hill. It was a very old but prestigious part of town. Whatever happened in that land sale didn't seem to affect her very much and I never heard her mention it.

- Did you always know that your father had been a track star at one time, an Olympian, and a world-record holder? Do you remember your earliest memories of this and seeing his gold medals?

I knew at some point when I was young, but he didn't really talk about it to his family. As much as he wanted to relive that glory, it was good conversation with friends or at bars, but not at home where he had responsibilities.

- Why did your parents elope?

They knew that my mother's parents would have a fit if they knew. So, they snuck down to San Luis Obispo where it was unlikely that anyone my mother's parents knew would read about it and tell them.

- Certainly, the identity and status of your parents must have had a huge impact on your upbringing. There was always friction between your mother having been a socialite and your dad a farm boy. You said it was an improbably match. How did this friction affect you? Did you take sides or try to appease them both?

No there was really no sides to take. Neither one complained, especially in front of us children. My dad kept a lot of things in, and I think my mother did too. They had chosen their lot in life, made their bed together and that was that. If there were a problem, I guess I didn't see it because I was so surprised that they got divorced when I was in the Navy.

- What were some of the things you remember your dad doing for work when you were young?

I don't remember when he worked for the laundry, but my mother had said my dad was a route checker, but she had him checked up on too. I think he would run into someone and get involved swapping stories. He'd lose track of time. I remember that fall we were living on Vallejo Street in Pacific Heights when he was late coming home and brought a live crab to crawl around the kitchen floor with a pencil in his claw, which diffused his lateness.

- You have mentioned that you were both pinned into your bed and harnessed to your playpen as a toddler. Was this a normal child protection mechanism or particular to your mom's difficulty in keeping you safe while her back was turned? Was your brother treated the same way or was he more compliant? Where did she get that idea?

I don't know but I imagine it was the only way she could be sure I was safe when she had her back turned. I was known to be quite active. In my playpen, they would have a harness on me and usually they could hear me dragging it around and would go out and catch me. They learned to tie the playpen to a tree to keep me from running off with it or being hit by a car or bit by a mad dog or fall into the bay. I don't remember anything about my brother being as active as I was, and he hung out at home a lot. I think if I were born fifty or sixty years later, they would have put me on something to slow me down. But I think when it comes to kids, sometimes the more active ones just explore their environment more and maybe it helps them become active and inquisitive adults. Anyway, that's been my experience with having eight children. Most of you got into a lot of things when you were kids. But you were all pretty good and you all grew up very unique from one another. I always brag about my kids because you all have lived such interesting lives.

- Your dad seemed to have a more relaxed attitude about raising children. After all he had nine brothers and sisters and had probably seen it all. Your mom came from a small and more sheltered upbringing and seemed more anxious. Did this cause any friction between them?

Sometimes. My father would say, "Now calm down Gwen, they're just kids and they're tougher than they look. They need to experience ups and downs like we all do. If they don't learn from their mistakes, how are they going to succeed in the real world? Just put a band aid on it and they'll be as good as new in the morning."

- Did your wild side as a youngster seem to worry your parents at all? How did your dad react to some of your adventures? Was he a "boys will be boys" type of father? Did he have a wild streak too? What was his form of discipline? What was your mother's?

It worried my mother horribly. She always was anxious that something was going to happen to any of us. Well, she didn't have to worry about my brother Jim. He wasn't as outgoing as I was. And she didn't have to worry about my dad since he had sold his plane. He did drive his PG&E car off the road when he was a tracker going all over the place for them. He didn't get hurt, just a scratch behind one ear, but they didn't let him do that job anymore either. But she was very concerned about me as it seemed I was always getting into something or another. My father had an incredible amount of patience and very little seemed to faze him. He sometimes would try to keep my mother calm. I believe that losing her father suddenly made her on edge about things happening to the rest of us. My dad did not seem to have any kind of wild streak. He was a husband, a father and even though he had a playful side, he was a grown man. My dad sometimes got a kick out of my shenanigans and used to chide my mother with the "Boys will be boys" line. Then he was gone for four years and when he got back, it

was like I had grown into someone he didn't know. He only hit me once when I was fifteen. I just looked at him and said, I hope that made you feel better. It had the opposite effect, and he never struck me again. My mother would chide me or give me her special look.

- When did you first realize that you had the ability to fix things and make them better?

When I was about five or six. I was always fascinated with how things worked. It wasn't until a few years later that I began to be even more fascinated with how to make things work better.

- What do you remember about growing up during the depression and then during war?

I don't remember the depression very much, but I do remember once a man in khakis, hat in hand came to the back door asking to work for food; my mother gave him a dollar. Otherwise, we must've made it through the depression fairly well, because we had the laundry and my father was working at a service station, then the laundry and then PG&E. I remember the war very well. It hit everybody at the same time. Remember, I listened to FDR's famous speech, just like everybody else. I wished I were older so I could go fight. My dad was too old, and he even laid down outside the doctor's office so that his blood pressure was lower for the physical at the recruiter's office. They let him in even though he couldn't do anything about being color blind, but he went to do his duty just like sixteen million other guys.

- Did your mom ever feel lonely while your father was away for so long? What did she do for company all those years?

She had some good friends, but not a lot of really close ones like she had in the city. She mostly still had her old acquaintances from college, such as Yvonne Lindbloom or her sister, my Auntie Roy. When I joined the Cub Scouts, she was a den-mother for a while. She was pretty lonely, especially after my dad left. She relished the letters he would write her. Sometimes she'd read parts of them aloud to us boys, then she would give me the stamps from the envelopes so that I could put them in my collection. I do remember that she had saved some love letters from him before they were married and gave me stamps from those when she would re-read them while he was away at war. I remember she let me have the 24-cent airmail stamps off of the envelopes of those, too.

- Were you a philatelist?

No. Just collected the stamps from my father's letters. I sure wish I had those letters. I would know so much more about both my parents from reading them, especially my dad.

- Did your dad ever come home on leave or send letters from where he was posted?

I only saw him a few times for just a few days after he was deployed. He wrote quite a few letters, especially at first.

- I read **Farwell to Manzanar** about the Japanese Internment during WWII. Of course, we know that he was one of the guards there for two years. Did he ever talk to you about his war experiences at all? What did your father think of that action against the Japanese, and did he ever talk about it? Do you think it bothered him that people who had lived in his community had been moved to these camps?

He was first assigned to the coast artillery and went to camp Callen in Southern California. Once they decided that the Japanese weren't going to attack California, he was sent to Fort Bliss Texas with the field artillery. There wasn't much need for field artillery in America, so he was transferred to the Military Police detail at Manzanar out in the California desert guarding the persons of Japanese descent moved off the coast that was an executive order from President Roosevelt. He never ever once spoke about his time there or about any of the families or what he thought about the camp. He was an MP there. He was a Lieutenant, but he did what his superior officers told him to do. For him it was the military, and it was his job. Nothing more and nothing less. He was just doing his duty. It was his job. He never spoke of it, not a peep. But he drank quite a bit more when he came back from the war, like a lot of guys.

- Did your dad ever talk about his two and a half years stationed in Anchorage?

His last duty station was Anchorage Alaska where he spent about two years. He would send pictures occasionally showing him with a bunch of buddies. He really loved the military life, swapping stories over drinks, but he never said anything to me about it.

- How did your dad enjoy his trip to the homestead when he took the family there once when you were about 15? Did you enjoy meeting your very large family and having all those cousins to explore the farm with?

He loved showing me and Jim all the places he went to as a boy. The house was exactly the same, there still was no electricity so everything had to be done by the time the sun set, which luckily, because it was summertime, the days were long. When darkness fell, we used kerosene lamps. If you wanted a drink of water, you worked the pump on the back porch. The toilet was outside behind the house. You bathed with a cloth dipped in a pan of water heated by the wood burning stove. Watch out for the creepy-crawlies or no-see-ums, the bugs could get you. I could tell my mother just tolerated the visit. She was very polite and gracious of course, didn't complain, but felt completely out of her element. There were all these chickens just walking around. There were some cows and horses in the field and some pigs in a pen. We were warned about staying away from those pigs because they were huge and mean. Our dad showed us the creek for swimming, his favorite fishing holes and even the school he went to wasn't changed much. Of course, his family had gotten a lot older, but they still seemed very close, though I didn't get to meet them all because some had moved away with their husbands or wives. I was experiencing what a large family must have been like to grow up in and on a farm with lots of places to go and things to do. There were animals and woods and long dirt roads and old bridges and neighbors that were related to me. There was even an old family cemetery not far from the house where my great-grandparents and a few kids that died young were buried. It was just really something.

- You came from a small nuclear family with just a few older relatives living nearby. What did you think of your first trip to Mississippi with all those cousins running around everywhere?

I thought, well, this is sure different from anything I had ever seen or experienced. Kids running around in the dirt everywhere, but they seemed to having lots of fun just doing simple stuff like swimming or playing games. Everything seemed to center around church, work, and meals. I loved the meals especially. I was a little shy at first, but they all welcomed home my dad, whom they called Brother, not Speed or Commodore and made me feel like I had always been there too.

- Why do you think your dad had not returned once in 20 years to see his family?

He had just outgrown that life once he started getting well-known for his running abilities. He was traveling, doing a lot of Exhibition Meets being sponsored by The Olympic Club. Eventually he ended up going to Europe and I don't think he ever looked back after those experiences.

- Did you go to church growing up? What denomination?

Yes, in the city we went to a Baptist church for a while since that was what my dad liked but then went to a different denomination because my mother was not raised Baptist. I think she was raised protestant or Methodist. We used to attend the first Christian Church down on Bryant Street near the Palo Alto Clinic. My dad was a Deacon there. We never missed church. Even with my dad gone to war, it was a staple in our lives.

- Were your parents Democrats? How did they vote?

Both voted Republican, but it was a different party back then.

- Did your mother approve of Women's' Rights or the Suffragette Movement?

No. She was pretty traditional but seemed to think very highly of her own independence. I don't know if she thought that all women should be unless they were better educated.

- You were athletic as a child, and you have said your mother was quite the tennis player. What was your favorite sport and why?

Water Polo. I could almost touch the pool bottom and use it to shoot high into the air to get the ball. I was good at it too, but I had to give it up because I couldn't do two sports at a time. My coaches made me choose, so after my dad returned back from the war, I went out for track.

- Your mother's mother, Laura, eventually lived with your family until she died. Do you remember her at all? Did she tell stories about meeting your grandfather around the turn of the 20th century?

I really don't remember talking with her, eating with her, or going on family outings very often with her. She mostly stayed at her own place until I was nine and then we moved onto Lowell Street, and she stayed mostly up above the garage in her own little space. My younger brother remembers talking to her though.

- What did your mom feed you?

I know she had to have cooked because she always took meals up to my grandmother's room every day. For us boys, I remember a lot of oatmeal. She could at least cook mush. Other than that, and her famous lamb, from before and after the war, I remember a lot of her version of Spanish Rice during the war. It was like I had hollow legs. I was always hungry, but I can't remember too much exactly what I ate. I do remember having a tablespoon of cod-liver oil once a month and absolutely no Coca-Cola! She really thought it still had cocaine in it!

- What kind of jobs did you work while you were growing up?

All sorts of jobs. I remember going off to pick fruit once. Of course, we collected scrap metal and tires during the war. I had a paper route, worked at a service station, did some construction as a helper, worked for PG&E on a few different jobs my dad got for me. I was a hard worker. I liked to be outside and busy. Dependable too (except for that fruit picking job which I didn't go back to after the first day because it was so boring).

- Did you ever get to go up in a small aircraft? When and why did you not want to become a pilot?

When I was sixteen, I went up in a small plane and it just made me realize that I was afraid of heights and also, I got very airsick. All those years my dad talked about how great it was to go driving between the clouds, but in the end, it was a short trip up for me.

- Why did you choose the Navy instead of another branch of service?

My Uncle Roy told me that at least in the Navy, I would always have a cot and hot food. He served on one for a time during the war, and he said it was pretty good duty.

- How did you feel about the Korean Conflict?

It was a job that needed to be done. There was something so very wrong about what was going on there. It reminds me of what is going on today in many places around the world, especially with the Russian invasion of Ukraine. The sad part is that 36,000 Americans lost their lives in that war and basically nobody won, and nothing has changed in 60 years except a large number of troops amassed on either side of the 38th parallel. Such a shame. But I would do it again, no questions asked.

- Why did **you** elope?

My father liked your mother well enough. He was always kind and polite to her. But my mother snubbed her nose at her for being the wrong kind of girl she had envisioned for me to

marry. We eloped to Reno Nevada after stopping by to see my folks and really feel the situation out. We didn't want to wait either. I had to ship back out soon.

- What did your dad think of Laura (his Mother-in-Law)?

I don't know because he never spoke about her. My mother was the one who interacted with her the most. I think my grandmother tolerated him but not much more. They steered clear of each other for the most part. I never heard my father speak disparagingly of anybody, actually.

- Did your parents ever argue?

No. my father came from a large family where arguments or complaining was not tolerated. It also certainly wasn't my mother's style. I think because it was considered undignified.

- Did your parents ever discuss finances?

When it came to finances, my mother was obviously in charge. They did have a discussion over money that I ever knew of, but only once. When my dad wanted to buy a little appliance shop in Redwood City and do small appliance repair. She just said that he wasn't good with finances, and he said OK, and that was that.

- I remember riding on your motorcycle with you as a kid. My brothers did too, and we all loved going for rides. Whatever happened to that bike and why did you get rid of it?

I sold it after I realized I could easily kill myself on it. Slid on some slick trolley rail tracks after a light snow and thought I was going to go down. I didn't have to wear a helmet and I liked to be able to hear if there was anything behind me. But I scared myself going too fast one time too many and sold it.

- What else did you do after your mother passed away that you knew she would not approve of?

Well, she might have had a say in how you kids were being raised. She did not approve of me not taking you to church on a consistent basis. In fact, which was the topic the last time I spoke with her. That was when she visited me after I was living in an apartment with you older children on Webster near Forest Avenue. She had called and asked what I was planning to do about your religious upbringing. Your brother was 12, you were ten and the rest of the kids just went down from there. She chastised me a little about it. I wish it were not our last conversation because it was not a very cheerful one.

Questions- Work-Related Topics:

- Did you know at the time that a revolution of ideas was taking shape during the 60s and 70s and how did you feel being part of that?

No none of us knew. We just knew that the company was looking to get first a desktop version of a calculator and move ahead with creating something we thought every company would want. Later, we were asked to reduce the 9100A into the size to fit into someone's shirt pocket (Specifically, Bill Hewlett's) to replicate the larger model to something low voltage, portable and affordable. No one, not even Bill Hewlett knew what we were doing to change the world as fundamentally as it did.

- Did you plan to go into engineering as a young man and what kind of engineering were you interested in. Why did you go into electronics and not mechanical?

Actually, I was interested in both electronics but more so in mechanical. I had a lot more experience in mechanical while working on cars, but I also had to deal with certain aspects of their electrical components too. Also, I did rewire all of my cars and put the instrumentation into my custom-built dashboards. It wasn't until the Navy recruiter offered me to go to Electronics Training School on Treasure Island that the dial got moved over to Electronics.

- Tell me more what about working on rocket and propulsion technology at North American before you moved up to northern California? Did you ever work for McDonnell Douglas?

Well, they had already been working on taking jets and adding rocket propulsion to them to become basically a precursor of the space-plane. Space shuttles are a lot like space-planes, but they have to take off vertically like a rocket and land horizontally like a jet. Only the X-15 was available to both take off and land horizontally, but it was more experimental than practical. I only worked at North American Aviation for about a year before being accepted into Stanford.

- How did you get your job at HP?

I was in need of funds for school and family, so I went and applied because they were such a well-known company already in the 1950s. I interviewed and was surprised when they hired me to work full-time in the summer at the bottom and then part-time as soon as my sophomore semester started.

- You once mentioned that you had met Steve Wozniak but that you were not very impressed with his ideas to sell custom computers and may even have insulted him by calling them "homebrews" that people would not be interested in buying. Is that true?

Well, I thought custom-building was going to be too slow and too expensive. I thought there wouldn't be a market for it. It turns out that I taught him about programming, and that was enough to get him started and where he is today.

- Why were you assigned to work on digital voltmeters and how did that affect your move to calculators?

The Voltmeter HP had produced early on needed an upgrade. HP was an instrument manufacturing company primarily, and unless you can measure it, you can't improve it. Improving meant increasing accuracy and speed. As the technology was changing from analog to digital, we were given one of HP's successful products, their famous Voltmeter, and we just dove into it. After Chuck Near and I had good success with it, we were seen as folks that could handle the innovation concept of the 9100-desktop calculator. That rolled right into the pocket-calculator. Innovation builds upon itself constantly. It sure did with personal computers and calculators.

- How is it that you got to be in Time Magazine?

Someone came out and interviewed me and thought I would be a good edition for their article. I think they interviewed quite a lot of people, but they only had two pages of space in the Technology Section of that edition. It was the Bicentennial Issue, so it was very full of all sorts of story. American Ingenuity was a great article because it highlighted some of the biggest innovations to happen in the country.

- Were you surprised when Marilyn Vos Savant from Parade Magazine published your response to the question about using the new technology of hand-held calculators in school?

I had agreed with her on her comments in her column about how useful a calculator can be in our educational system. She realized I would be a good source for that opinion. It was a bit of a sore point with teachers around the country to think in terms of allowing students use this new tool in class and on tests. Both she and I agreed that it was going to change STEM education in fundamental ways.

- Did you think the HP-9100 and later the 35 would be such a commercial success?

None of us knew. We weren't even sure what technology we were supposed to use because though the UNIVAC was the first commercially used computer weighed over 16,000lbs used something like 5,000 vacuum tubes and took up a lot of space, it was really hard for any of us to wrap our heads around reducing that kind of machine into something that could fit on a desktop. Idea itself took us by surprise and then it took on a life of its own. It became the world's first mass-produced personal computer. Hewlett called it a calculator because he thought it would do better commercially, and it did.

- How did you feel when you were able to get the HP35 into The Smithsonian National Air and Space Museum? Have you visited it and what did you think of it?

Yes, I have been there a few times. We used to own a little studio in Washington DC, and we loved to see all the sights, especially once the 9100 and the 35 made it into the Smithsonian.

- How long did it take to get the HP 35 recognized as a milestone in the IEEE?

It only took a year or so after the application was submitted. It especially helps if an anniversary is coming. Did you know this year is the 50th anniversary of the HP-35? HP is doing a big spread to cover all the interesting things about it. I mean, people are still excited about it even a half century later!

- Did you engage in work to develop successive calculators after the HP 35 or was it time to move on to another project?

I did work on some of the calculators that followed. But really the foundation for internal architecture had been set up so it was just a matter of somebody tweaking them for the functionality needed. I had set the initial blueprint using algorithms in an efficient way in the 9100, then refined them for the HP35. Beyond that it was just a matter of someone turning the crank. I went on to generate the next generation of semiconductors.

- What were some of the other calculators that came out in the 70's?

The HP-80 came next. It was the first one built towards financial customers. It was a pre-programmable model and assisted in computing the things most commonly found in financial tables with six decimal places. You can input financial data and compare it with other known data or plug in interest rates, compound interest, portfolio info and such for comparisons or to forecast performance on various business and financial products. The HP-45 was called The Slide-Rule +and had a shift key and nine. The HP 55 had a timer function that was incredibly accurate because it was the first one to use quartz crystal technology. The HP-65 was fully programmable and used a lot by a larger group of specialties like scientist, medicine, pilots, and astronauts. It is in the Smithsonian Museum of Flight and Aeronautics. Apollo 15 was the first to use it. The HP-25 was a low-cost programmable handheld. It used phases to minimize keystrokes. The HP-21 was the next generation of the HP-35. It had more ROM with all the updates in PC technology. The HP-67 was an upgrade to the 65 and it and the HP-97 had built-in reader/recorders. The HP-10 was a pocket-sized adding machine and had a tape printout. The HP-31E was the third generation of the HP-35 and was very cost-effective for consumers.

- You traveled to many countries either directly or indirectly because of your career. Which was the most important one and why? What kinds of programs did you present and who were the audiences?

I have been by myself, with teams or with Reina to 54 different countries plus the US Virgin Islands. Sometimes I knew who my audience was going to be in advance and sometimes not. For example, I was in Medellin, Colombia, and stopped by the Metro offices that have a transit system there to see how they ran their trains. I went to the University and spoke to some of the students. Then the local TV station heard I was in town and wanted to get an impromptu interview with me and then the Newspaper heard I was there and did that great article about me. One of my favorite visits was with Esquela Morano in Honduras School of Agriculture was very different and unusual to talk with them about agricultural projects. People and places are so interesting; you learn so much!

- What was your favorite country to visit?

Geneva, because it is the heart of time. I also always enjoyed going to Hawaii. Once, I went to Hawaii after graduating from Stanford but just before entering graduate school. While I was there, I met Duke Kahanamoku; he was in the '24 Olympics with my father. My dad told me to look him up when I went to Hawaii. I remember he was really nice guy but not as tall as his statue on Waikiki beach. Hawaii was one place my mother always adored going to. When I went with my daughter a few years ago to visit my granddaughter at the University of Manoa on Oahu, we all sat on the veranda overlooking Waikiki beach to our left and the Hotel Manoa to our right. I pointed up to the window where my mother always stayed when she was here. It really brought me back to those days when she was alive. She always would send you muumuus and taught you how to hula dance.

One of the most interesting was Mapua IT in the Philippines. All the instructors were women. There was also an uprising while we were there by some armed anti-government group. We had to stay put in the safety of the University for a few days.

- I remember when you were a consultant with your own company where you would subcontract yourself out to other companies or organizations. How long did you do that for?
I remember you saying you would make upwards to \$150 per hour.

I did that from the time I left HP and I kept up with it until about three years ago when I could no longer fly and had a hard time traveling.

- I also remember you being a specialist in court cases for the State of California involving technology litigation. What can you tell me about being an expert witness and what was your most memorable trial?

I was pretty psyched at first, working for The State of California. State Board of Professional Engineers. I had a contract with them to provide Expert opinions on violations of the Professional Code. I would study the cases very closely and then write up a report. Sometimes I would go testify in person which was kind of fun. Oh, there were quite a few mundane trials to be sure. Squabbles between parties that if both parties had just followed the statutes or codes or honor their word or follow the contract as written, they wouldn't need to be in this legal mess. Mostly expert witnesses and lawyers make out in high-level litigation. I was so excited to hand in my first timesheet.

- When you volunteered to do accreditation reviews of Engineering departments at colleges and universities across the world, what did you find most exciting?

Just being able to travel around like that and help make such a huge impact for students, especially, who were pursuing technology degrees in a fast-paced world that is constantly changing and needed more people with the right education and the right training to hire. There is a big lag right now between job openings and qualified people to fill them. It could make all the difference for the employer but think about someone whose family depends on them to financially take care of extended families. Some families only have enough money to send one child to higher education, usually the eldest male. Everything rides on them and their ability to compete in highly competitive fields like engineering.

APPENDIX 2- The Olympic Club

Monday, July 11, 2022

Lisa,

It was great to talk with you! See attached for the short bio we wrote up for his induction into the Hall of Fame.

Here's additional background information that we have:

Application for Athletic Membership from C. Cochran, age 22, clerk with Pacific Gas & Electric, residing in the Presidio. Elected March 4, 1924 – confirmed in Athletic Committee minutes for March 4, 1924. Approved by Charles F. Hunter (named OC head coach in 1924).

During the Northern California tryouts, he ran a 400m with a time better than the 1920 Olympic gold time.

Thank you again for reaching out,

--

Jessica Smith

Collections Manager, History & Archives

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COMMODORE COCHRAN TRACK & FIELD



C.S. "Racehorse" Cochran in 1924.

Born in Mississippi as the first of 10 children, Commodore Shelton (C.S.) Cochran (1902–1969) attended Mississippi State University. A track and field star, he won the NCAA Championships in the 440y in 1922 and 1923. After graduation, he traveled the country for track and field exhibitions. He settled in California after meeting his wife during an event at the University of California, Berkeley.

During the exhibitions, he also attracted the attention of fellow OC Hall of Famer Dink Templeton and was convinced to join The Olympic Club. He won the 400m at the Northern California tryouts for the

1924 Olympic Games in Paris, France, besting the 1920 Olympic gold medal time.

He traveled east for the Olympic Trials, but failed to qualify — he believed the long-distance train ride, which arrived a day and a half late due to raging storms, impacted his performance. While he led for most of the race, he was unable to hold off his surging opponents. The Olympian reported that “Those who defeated Cochran on that day...in all probability will be beaten by this same Cochran when they meet again.”

OC Coach Charley Hunter pled his case with the U.S. Coach Lawson Robertson and he was added to the team for the 1600m relay.

In Paris, he ran the first leg of the gold-medal-winning 4x400m relay, the fastest anyone had run a quarter mile to that point. The relay team set a new world record of 3.16.0.

After the Olympics, he and his family stayed in the Bay Area where he continued his career at PG&E. He joined the Army during World War II, serving as a 2nd Lieutenant in the Military Police. After the war, he took a job in the Veterans Administration, but always stayed involved in the track community, including serving as an official starter for Stanford track events.

APPENDIX 3A- Homes from 1931 to 2018



Buena Vista Terrace, 1933



Burlingame, 1933



The Canty House Redwood City, 1934



Camino Del Mar, San Francisco 1935



Lincoln Way, 1935



Divisadero 1937



Vallejo Street house, 1938



Harker House, Palo Alto, 1937



Lowell St. Palo Alto 1938



Guinda St. Palo Alto, 1940



Ashton St. Palo Alto, 1955



Evergreen St. Palo Alto, 1958



Lincoln St. Palo Alto, 1962



Coleridge House, Palo Alto, 1966



Cuernavaca Circulo House, Mountain View, 1988



Pacific Ave. San Francisco, 2004

The Coleridge House, by Dave Cochran

In 1966 I was living in a three-bedroom apartment on Forest Avenue, recently remarried with my three older children living with me. I had really never lived in an apartment and was not used to the lack of privacy and noise of other tenants. I complained to the apartment manager who also sold real estate as his day job. I told him kind of what I was looking for in Menlo Park, Atherton, or Palo Alto. He started showing me about one house a week.

One weekend we pulled up to 570 Coleridge Avenue: a corner house on about half an acre. It was a beautiful forty-year-old English Tudor style with gables and a shake roof, more than 4000 square feet of living space. I had attended Walter Hayes grammar school just a block away. I think the price was about \$78,000; I said I'd take it, let's offer \$75,000? The realtor said, "Don't you want to see inside?"

The house was set back almost fifty feet from street with an ancient stone bench off to the right. The front door opened into a foyer with the spacious living room to the right, the dining room straight ahead and the grand stairway on the left, what an entranceway.

The living room had large windows extending out a foot or so into the front garden with bench/seats below; hung with Austrian puff curtains. The player grand piano (Bosendorfer) would later be set up near the entrance towards the front. There was a very high vaulted ceiling up to the roof with wrought iron trusses extending between the front wall and the back with a large fireplace against the back wall. When we decorated, we hung The Man with the Pearl Hat above the mantel. At the far end towards the back a small secretary fold down desk was placed against the end wall primarily for decoration. The living room had a small chandelier in one quadrant over four chairs with a small table for a conversation area. A bible stand won at a KQED auction was towards the front. Austrian puff curtains above the window bench seats set it all off.

Next to the desk glass French doors opened into the garden room which doubled as a library or playroom opening onto a porch leading to an expansive back yard. This room would be used as a library and TV room. The porch would be used a place for barbeque when the swimming pool was built in this corner of the yard.

The swimming pool really added a great play area, for relaxation and enjoyment. However, I remember spending more time cycling the filter mechanism than actually enjoying the pool.

The garden was well planted I hired Shig Ogasawara to manage the garden maintenance, mowing the lawns, front, side and back and replacing the seasonal plants periodically. I found out later that he also had the contract for the Presidio. The garden had a little area in one corner to store plants, fertilizer, etc. The entrance had an entrance/gate with a half-round support on top. We used to comment that it looked like an Asian shrine of some sort, so I placed a small Japanese stone lantern.

The dining room also opened into the garden room while at the other end was the traditional swinging door to the kitchen. The widows toward the back of the dining room

looked out into the garden. There was even a button in the floor near the head of the table to call the cook as needed. Louie the Fourteenth furniture in grey and white from my Auntie Roy with a painting The Juggler by Watteau appointed this room perfectly.

Behind the stairway descending into the foyer was a hall to a front guest bedroom and bath. The front downstairs guest room and bath was decorated with dark fabrics. It may have discouraged guests as I don't remember having many.

The hallway towards the back also led into the kitchen/breakfast area and back porch.

The kitchen was quite large with an island in the center and a counter to the left separating the breakfast area. The appliances were quite old, and none built in but there were the amenities of the homes built in the twenties. There was a walk-in pantry and the cabinets had glass doors. There was both gas and electric service to the kitchen so upgrading wouldn't be a problem. A portable dishwasher stored under the counter that could be connected to the sink as needed was quite unique.

The back porch housed the washer/dryer and ironing board recessed in the wall. I noticed a cabinet near the washer and found the laundry chute from the second floor.

Off the back porch were the maid's room and bath as well as the outside door leading into the rear garden and detached two car garage that fronted on Webster Street. A gate let you out onto the street.

The stairs from the foyer made one right turn halfway up to ascend to the second floor. Overlooking the entryway was an open hallway protected by a banister leading to a small garret with a window looking out onto the front walkway. This room with an antique wall lamp became a sewing room.

Continuing down the hall was a door to a small storage room/attic which was remodeled by lifting the back roof over the garden room making a large dormitory/bedroom connecting to the bathroom at the back of the second floor. Several large windows were installed following the original architecture of the home. The closets were over the vaulted living room ceiling and therefore the floor had a tilt, just right for shoes.

The bathroom was upgraded with modern plumbing yet with fixtures reportedly removed from an estate in Atherton keeping the old-time appearance. Due to the depth of the floor joists in this area special modification had to be made to the toilet plumbing to accommodate these fixtures.

To the left of the second-floor landing was the front upstairs bedroom looking out on the front lawn. This would be furnished for a young lady with a matching set of white with gold trim, canopy bed, full dresser, make-up table and nightstand.

This bedroom connected to the bathroom at the side of the house. This would become the master bath after considerable work moving the stall shower to over the tub to make room for the sink counter to be expanded. The toilet was moved over to where the shower drain was. Trying to match the floor tile was difficult; I wish I had spent a little more money and

had custom tile made to match.

Next to this bathroom towards the back of the house was a large room that would become the master dressing room and office. It had several closets; I remember refinishing the door strikes, handles and mechanisms that were no longer made. I tried to maintain the look and feel of that old house. It took several tries at texturing the ceilings to get the sand finish look. Later a desk was added to also provide home office space. The décor selected for this room was Asian with a number of pieces from my mother.

This room connected to the upstairs sunporch which served as the master bedroom but without any closet space required the dressing room next door. This was originally a sunporch with windows on three sides that slid down into the sills. There was no ducting from the furnace so auxiliary heat was needed. A unique self-contained thermal-electric closed-system radiator was installed along the base of one wall. It contained a fluid that circulated by convection through a metal coil with fins to allow the heat to radiate into the room.

A door under the grand stairway led to a half basement, only under the Webster Street side. The furnace and water heater along with a storeroom/wine cellar was in the basement. However, every eight feet or so was a supporting post for the main floor. This made the basement almost unusable for any kind of activity space such as billiards, partying, etc. Installing a large single wooden beam spanning the joists for the downstairs floor provided the necessary support allowed the removal the six or so posts allowing the room to be used for many things, music practice area for example.

The detached garage fronting on Webster Street had sliding doors. The Guinda Street house where I grew up was only a few blocks away; I had scraped several cars on those sliding doors. An overhead door was installed requiring a full supporting beam across the front to replace the center post. The garage was also expanded about eight feet into the back yard for a workshop and bicycle/motorcycle parking.

Several rooms of the Coleridge House were left unfurnished for the better part of a year providing ample space for entertainment, parties, etc. My brother had all his Stanford buddies over once. The house was finally fully decorated with each room having a different mode or period with the dining room of course the centerpiece with the French accommodations was illuminated by a non-traditional chandelier.

The parties and catered events started with many written up in the society pages of the Palo Alto Times. I tried to have a diversity of guests, and the entrance foyer provided a perfect reception point particularly if the hostess was descending the grand staircase at the time.

I loved that house.

APPENDIX 3B- Schools Attended 1937 to 1960



Ms. Kennedy's School for Girls, SF 1936



Madison School, SF 1937



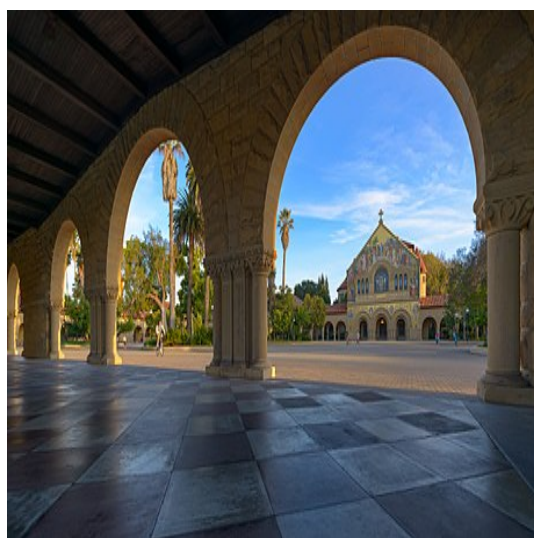
Walter Hayes School, Palo Alto 1938



Jordan Jr. High School, Palo Alto, 1943

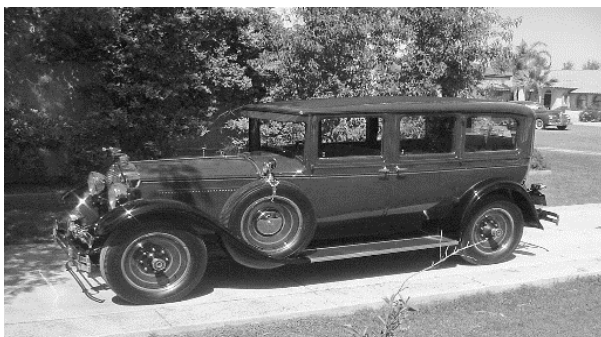


Palo Alto Sr. High School (Paly) Palo Alto, 1945



Stanford University Inner Quad, 1955-1960

APPENDIX 3C-Cars Owned



1930 Packard



1940 Buick Sedan



1929 Chevrolet Roadster



1929 Model A Coupe



1933 Ford Coup Hot Rod



1949 Nash



1950 Studebaker



1959 Plymouth Station Wagon



1959 Ford Fairlane Galaxy 500 Hardtop Convertible (Limited Edition)



1970 Camaro z28



1998 El Dorado Cadillac

(<https://www.specialtiesales.com/vehicles/>)

APPENDIX 4 – Algorithms

Algorithms and Accuracy in the HP-35

A lot goes on in that little machine when it's computing a transcendental function.

By David S. Cochran

THE CHOICE OF ALGORITHMS FOR THE HP-35 received considerable thought. Power series, polynomial expansions, continued fractions, and Chebyshev polynomials were all considered for the transcendental functions. All were too slow because of the number of multiplications and divisions required. The generalized algorithm that best suited the requirements of speed and programming efficiency for the HP-35 was an iterative pseudo-division and pseudo-multiplication method first described in 1624 by Henry Briggs in 'Arithmetica Logarithmica' and later by Volder¹ and Meggitt². This is the same type of algorithm that was used in previous HP calculators.

An estimate of program execution times was made, and it became apparent that, by using a bit-serial data word structure, circuit economies could be achieved without exceeding a one-second computation time for any function. Furthermore, the instruction address and instruction word could be bit-serial, too.

The complexity of the algorithms made multilevel programming a necessity. This meant the calculator had to have subroutine capability, as well as special flags to indicate the status and separations of various programs. In the HP-35, interrogation and branching on flag bits—or on arithmetic carry or borrow—are done by a separate instruction instead of having this capability contained as part of each instruction. This affords a great reduction in instruction word length with only a slight decrease in speed.

The arithmetic instruction set was designed specifically for a decimal transcendental-function calculator. The basic arithmetic operations are performed by a 10's complement adder-subtractor which has data paths to three of the registers that

are used as working storage. Partial word designators (word select) are part of the instruction word to allow operating on only part of a number—for example, the mantissa or the exponent field.

Sine Algorithm

The sine routine illustrates the complexities of programming a sophisticated calculator. First, degrees are converted to radians by multiplying by $2\pi/360$. Then integer circles are removed by repeatedly subtracting 2π from the absolute value of the argument until the result is less than 2π . If the result is negative, 2π is added to make it positive. Further prescaling to the first quadrant isn't required. The resulting angle is resolved by repeatedly subtracting $\tan^{-1} 1$ and counting until overdraft, then restoring, repeatedly subtracting $\tan^{-1} 0.1$ and counting until overdraft, and so on. This is very similar to division with a changing divisor. Next the resulting pseudo-quotient is used as a multiplier. Beginning with an X vector of 1 and a Y vector of 0 a fraction of X is added to Y and a fraction of Y is subtracted from X for the number of times indicated by each multiplier digit. The fraction is a negative power of 10 corresponding to that digit position. The equations of the algorithm are:

$$\text{pseudo-division} \quad \begin{cases} \theta_{n+1} = \theta_n - \tan^{-1} k \end{cases}$$

$$\text{pseudo-multiplication} \quad \begin{cases} X_{n+1} = X_n - Y_n k \\ Y_{n+1} = Y_n + X_n k \end{cases}$$

$$\begin{aligned} X_0 &= 1, Y_0 = 0 \\ k &= 10^{-j} \quad j = 0, 1, 2, \dots \end{aligned}$$

The pseudo-multiplication algorithm is similar to multiplication except that product and multiplicand are interchanged within each iteration. It is equivalent

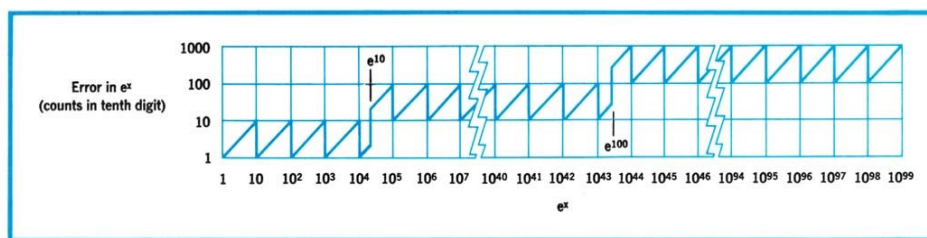


Fig. 1. Accuracy of exponential function in HP-35 Calculator. Error bound is approximately δe^x , where δ is the error due to prescaling and the algorithm itself. δ is estimated to be equivalent to one count in the tenth significant digit of the argument x .

lent to a rotation of axes. The resultant Y and X vectors are proportional to the sine and cosine respectively. The constant of proportionality arises because the axis rotation is by large increments and therefore produces a stretching of the unit circle. Since this constant is the same for both sine and cosine their ratio is identically equal to the tangent. The signs of each are preserved. The sine is derived from the tangent by the relationship

$$\sin \theta = \frac{\tan \theta}{(1 + \tan^2 \theta)^{1/2}}.$$

Accuracy and Resolution

Determination of the accuracy of the HP-35 is as complex as its algorithms. The calculator has internal roundoff in the 11th place. In add, subtract, multiply, divide, and square root calculations the accuracy is $\pm 1/2$ count in the 10th digit. In calculating the transcendental functions many of these elementary calculations are performed with the roundoff error accumulating. In the sine computation there is a divide, a multiply, and a subtract in the prescale operation, and there are two divides, a multiply, an addition, and a square root in the post-computation. Roundoff errors in these calculations must be added to the error of the basic algorithm to get the total error.

Accuracy and resolution are sometimes in conflict; for example, the subtraction of .999999999 from 1.0 yields only one digit of significance. This becomes very important, for example, in computations of the cosines of angles very close to 90° . The cosine of 89.9° would be determined more accurately by finding the sine of 0.1° . Similarly, the sine of 10^{10} wastes all ten digits of significance in specifying the input angle, because all integer circles will be discarded.

For many functions there is no simple exact expression for the error. The exponential function is a good example. Let δ be the accumulated prescal-

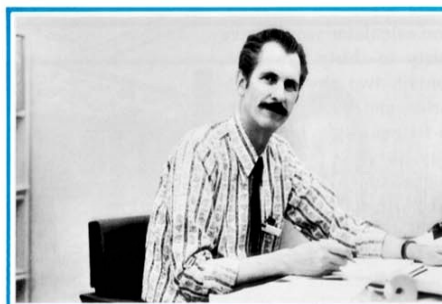
ing error and computational error in the algorithm, referred to the input argument x . Then for $\delta < 1$,

$$e^{x+\delta} - e^x = e^\delta e^x - e^x = e^x(e^\delta - 1) \approx \delta e^x.$$

Fig. 1 shows the error bound for the exponential function for various arguments, assuming that δ is equivalent to one count in the tenth significant digit of x .

References

1. Jack E. Volder, 'The CORDIC Trigonometric Computing Technique,' IRE Transactions on Electronic Computers, September 1959.
2. J. E. Meggitt, 'Pseudo Division and Pseudo Multiplication Processes,' IBM Journal, April 1962.



David S. Cochran

Dave Cochran is HP Laboratories' top algorithm designer and microprogrammer, having now performed those functions for both the 9100A and HP-35 Calculators. He was project leader for the HP-35. Since 1956 when he came to HP, Dave has helped give birth to the 204B Audio Oscillator, the 3440A Digital Voltmeter, and the 9120A Printer, in addition to his work in calculator architecture. He holds nine patents on various types of circuits and has authored several papers. IEEE member Cochran is a graduate of Stanford University with BS and MS degrees in electrical engineering, received in 1958 and 1960. His ideal vacation is skiing in the mountains of Colorado.

APPENDIX 5 –Media MEASURE Magazine

A superstar is born!

Dear Hewlett-Packard:

"The HP-35 is by far the most fascinating piece of electronic gear I've ever owned, and I call it a 'Gee-Whiz!' machine because that is the comment most of the hundreds of persons I have shown it to usually make!"

T. A. P.
Kokomo, Indiana

"It is a very rare event when one finds a product so well conceived, of such excellent electronic and industrial design, and so matched to user needs that it rises head and shoulders above anything like it, both in relative and absolute terms. I believe your HP-35 calculator . . . is such a product!"

D. S., Ph. D.
Potomac, Maryland

"I'm saying 'thanks' to Hewlett-Packard and applaud a great service to technical people as well as society!"

T. M. C., Jr.
Sacramento, California

"Science fiction put satellites in space and men on the moon. It will be interesting to see how closely they've come to your hand calculator!"

M. I. T. Science
Fiction Society

"This is without doubt one of the most remarkable devices I have ever seen—or even dreamed of!"

E. F., Jr.
Carrollton, Georgia

"Congratulations on what has to be the most perfect product design accomplishment of the century. After one month of flawless performance I can only say I am increasingly in awe and more enthusiastic than ever . . ."

R. C. B.
Hot Springs, Arkansas

"You don't have to convince us that you have 'the finest little hand-held calculator now available.' The HP-35 is currently the talk of the campus."

H. C. M.
California Institute
of Technology

"If I were a grade-school math teacher I would want one just so the kids could play with it!"

G. E. T.
VP-Engineering
Palo Alto, California



"After seeing a demo I can truly say that I am not the least envious. Nay, insanely jealous would be the more proper mood feelings. I have never been so impressed by a single piece of merchandise in my life . . ."

A. E. K.
Hollywood, Florida

" . . . your HP-35 has to be one of the outstanding technical developments of my lifetime!"

F. W. K.
Rochester, New York

"In a world moving so fast one often becomes apathetic toward new developments, it is difficult to explain the actual excitement I felt when I first saw the HP-35, truly a remarkable device!"

J. A. M.
Berkeley, California

"I feel very privileged to have lived long enough to see such a tool come into existence!"

F. L. M.
Altadena, California

"I cannot recall ever before having written a manufacturer to compliment him on a product, but . . . I felt compelled to share with you some of my ecstasy. Thank you for causing this amazing contribution to happen."

P. A. McC.
Mountain View, California

"What a fantastic . . . machine!! This will probably make the slide rule obsolete!"

D. B. F.
Santa Maria, California

"You've done it. This is just exactly what I've been looking for . . . I've been like a kid with a new toy . . ."

J. W. B.
Program Manager
Ridgecrest, California

(Hewlett-Packard Staff Writer 1972)

\$1.00
JULY 3, 1976

*Birthday
Issue*

TIME

THE PROMISED LAND



★ **AMERICA'S** ★

NEW IMMIGRANTS

THE BIG 200TH BASH

**HERE
COME
THE
TALK
SHIPS**

CHILDREN OF THE 
FOUNDING FATHERS

**THE RED, WHITE
AND BLUE LOOK**

JAZZ: THE 1976 SOUND

DOWNTOWN AMERICAN 
COMES BACK | INGENUITY LIVES

TECHNOLOGY

American Ingenuity: Still Going Strong

The nations of Europe, Asia and Africa mostly owe their existence to accidents of geography or language, the fortunes of war or interference from imperial powers. But the U.S., to a very great extent, is the product of its citizens' own ingenuity. Faced with an untamed wilderness and distances their European forebears could hardly comprehend, the settlers who came to colonize the new land responded by becoming a nation of tinkers, backyard inventors and, ultimately, technologists. Now, lacking a wilderness but confronted with challenges as great as those faced by their ancestors, mid-20th century Americans are responding similarly. In university and corporate laboratories, in basement and attic workshops, they are busy trying to invent their way out of an energy crisis, the worst recession in a generation and, toughest of all, what appears to be a global shortage of raw materials and finished products of many kinds.

From the time it was first founded, the U.S. has been the world's foremost innovator. Eli Whitney's cotton gin turned the South into a profitable agricultural kingdom that could rival the industrial North. Cyrus H. McCormick's reaper enabled farmers to transform the Great Plains into vast seas of grain and feed a growing nation. Canals and railroads made long-distance travel possible, while the telegraph and, later, the telephone made it unnecessary. Mass production—another 19th century American invention—turned out a plethora of consumer goods, from automobiles and radios to fiberglass boats, all of which helped make the U.S. standard of living the highest in the world. Plenty gave the nation the opportunity to look beyond its own rapidly closing frontiers and explore the poles, the moon and now the surface of Mars (see SCIENCE).

But, however, there have been fears that the U.S. may be giving up—or letting go of—its lead in technology. The National Science Foundation reports that foreign inventories now account for nearly a third of the 1,300-patent patents issued each week by the U.S. Patent Office. Foreign countries lead the U.S. in the development of supersonic passenger jets and the introduction of new drugs and are catching and surpassing the country in the areas of electronics and textiles. From corporate boardrooms to garage laboratories, there is a widespread concern that the U.S. genius for invention is going the way of the passenger pigeon.

This is not a baseless worry. Foreign companies have expanded enormously in recent years, partly by importing, and in some cases improving upon, American technology. Meanwhile, resentment and the inflation of the past decade have taken their toll in the U.S. research and development community. Many American companies have cut back on investment in potentially risky new products. Federal funding for research has also been in increasingly short supply. The U.S. investment in R. and D. actually decreased during the early 1970s, and still remains too sparse for the scientific community's satisfaction. For example, funds for space projects, which stood at \$6 billion a year in 1966, now total a mere \$1 billion.

But any request for American ingenuity would be premature, as today's patent oppositions powerfully suggest. In recent years, U.S. inventors have found ways to take layer-by-layer pictures of the body's organs, engineer factories that can digest spilled oil, build a shuttle craft for round trips into space. Within the past few months, patents have been obtained on a light bulb that will last ten years and a toothless pen, while inventors have devised ways to dispose of nuclear wastes and make good use of discarded beverage bottles. Now, inventive Americans are turning their attention toward finding alternatives to oil, increasing food production and further improving the speed and ease of communication. Says Dr. Simon Razin, vice chairman of TRW: "The cry of science Olympians is over: the future is far more down-to-earth stuff. Much of what happens in the future is related to how American inventors respond to current challenges in energy, in food pro-



CLOCKWISE FROM TOP: EDISON'S ELECTRIC LAMP, VACUUM TUBE & TRANSISTOR, SOLAR HOUSE IN NEW MEXICO, INTEGRATED CIRCUIT CENTER, APOLLO 17'S COMMAND SHIP AMERICA

duction. Only the U.S. has the unique combination of resources, the people, the science and technology to respond."

And only the U.S., say some social scientists, has the right atmosphere for innovation. Says Clayton Mason, an associate professor of psychology at the University of Southern California: "There are three things that keep the spirit of invention alive. First is our form of government, it encourages more independence than most. Second is the high rate of competition. Finally, this country just seems to spawn a little craziness."

A tolerance for eccentricity may have helped Edison or the Wright brothers. But what large-scale innovators need more is money. Most of this now comes from the country's major industrial companies, which have been hard-pressed to maintain research budgets against the pressures of inflation and recession.

The companies, which maintain large well-organized laboratories, readily admit that the tinker approach to invention is less romantic than the notion of the inventor as a lonely visionary working in his basement or garage. But the days when information was simple and equipment inexpensive are past. The explosion of new patents, new concepts, new materials, new applications, new chemicals and new machinery that has occurred during the past two decades makes it virtually mandatory that a creative person have major support if he is to solve major problems. Says Bernard Ghossein, head of research and development at Hewlett-Packard in California: "Idea do not come out of committees but from individuals. But a team effort sets the inventor up to make the one last leap and test it."

Team research has allowed some large companies to do exactly that. G.E. has improved the design of nuclear reactors and introduced many consumer products, including front-free refrigerators and microwave ovens. Bell Labs has developed ways to communicate by sending beams of light along hairline glass fibers.

Other firms have been working ways to create cheap energy

(American Ingenuity: Still Going Strong 1976)

Parade Magazine

Question: Should Students Use Calculators in Class?

- **MARILYN VOS SAVANT**
- **AUG 24, 2014**

M. Sparks, Md., writes:

Do you think students should be allowed to use calculators when solving math problems?

Marilyn responds:

Absolutely! Calculators don't do your thinking for you. They just follow your instructions. After middle school, doing rote arithmetical operations by hand is a waste of precious time that could be better spent on learning the mathematical reasoning that underlies what those instructions should be.

Consider the process of doing a square root by hand. Do you have any understanding of why the steps work? Nope, and why should you? It won't help you solve problems. You probably don't even know why the process of doing long division by hand works. You simply follow the steps you've memorized. Doing that is no better than pressing calculator buttons in a certain order.

Of course, everyone should know how to do basic math operations for everyday life, and they're part of younger students' math foundation. But older students should be using their mental energy understanding which operations should be performed, not going through the mechanical labor of doing no-think calculations by hand.

David Cochran in Mountain View, Calif., writes:

I think your answer regarding students using calculators to solve math problems was right to the point. In 1970, I invented the HP-35 Pocket Scientific Calculator, which was a huge success; but almost immediately, many schools and universities challenged its use by students. Some institutions banned its use altogether; others arranged for students to each have one at \$395 each. It was exciting to see the maturity of problem-solving over the next few years; no longer did problems have to be limited to whole numbers but could contain real numbers found in the workplace.

You are absolutely right, let the student go to the next level of understanding beyond memorization of formulas or even times-tables.

By the way, did you know the ancient Greeks had an algorithm for square root? It's the inverse of a number whose sum is the odd consecutive digits starting with one: $1 + 3 = 4$ (2), $1 + 3 + 5 = 9$ (3), etc. So, the square root equals the number of consecutive odd digits that result in the sum.

Marilyn responds:

Thank you, David!

<https://parade.com/342352/marilynvossavant/from-an-inventor-of-a-calculator/>

APPENDIX 6 – Patents Created

PATENTS

<u>Patent Number</u>	<u>Date Issued</u>	<u>Title</u>
3,041,535	06/1962	Electrical Measuring Instrument
3,114,112	12/1963	Transistor Amplifier having Power Limiting
3,144,619	08/1964	Oscillation Generator Having an Amplitude Stabilizing Circuit
3,168,702	02/1965	Voltage Comparator
3,225,298	12/1965	Impedance to Voltage Converter
3,308,400	03/1967	Frequency Adjustment Circuit
3,517,199	06/1970	Converter Employing a Diode
3,522,516	08/1970	Power Supply
3,576,983	05/1971	Digital Calculator System
3,668,697	06/1972	Non-contacting Keyboard
3,781,820	12/1973	Portable Electronic Calculator
3,800,168	03/1974	Synchronized Time delay
3,863,060	01/1975	General Purpose Calculator with Capability for Performing Interdisciplinary Business Calculations
3,867,649	02/1975	Driver

3,901,468	08/1975	Logic Backup for a Train Detection System in an Automatic Block System
3,946,218	03/1976	General Purpose Calculator with Capability for Performing Yield-to-Maturity of a Bond Calculations
3,986,186	10/1976	Automatic Display Segment Intensity Control
4,001,569	01/1977	General Purpose Calculator Having Factorial Capability
4,816,938	03/1989	Process for Determining Data Disk Track Centers
4,870,332	09/1989	Voltage-Boosting Motor Controller

APPENDIX 7 - ABET

Hi Lisa,

Thank you for contacting ABET. I will be happy to help. I'm going to reach out to a few people here to see who your father might have worked with and search our database for any records we might have. I'll get back to you soon!

Best regards,

Lisa

Lisa Lance

Director, Communications and Marketing

ABET

415 North Charles Street

Baltimore, MD 21201

443.310.3378

llance@abet.org

ABET Volunteer Information for David S. Cochran

ABET Program Evaluation History

He went on 22 visits as an ABET Program Evaluator, representing our member society, IEEE. His listed program areas included Computer Engineering, Electrical and Electronics Engineering, and Systems Engineering.

EVALUATION HISTORY

ROLE	YEAR	ORGANIZATION	VISIT
Program Evaluator	2015	University of Bahrain	10/09/14
Program Evaluator	2014	Sultan Qaboos University	11/10/13
Program Evaluator	2013	Taif University	12/10/12

Program Evaluator	2012	University of South Carolina	10/09/11
Program Evaluator	2011	Qatar University	11/06/10
Program Evaluator	2010	Mapua University	10/25/09
Program Evaluator	2008	Rensselaer Polytechnic Institute	09/30/07
Program Evaluator	2007	University of Florida	10/22/06
Program Evaluator	2007	University of West Florida	10/22/06
Program Evaluator	2006	Clemson University	10/09/05
Program Evaluator	2005	Capitol Technology University	11/07/04
Program Evaluator	2003	University of Wisconsin - Madison	10/20/02
Program Evaluator	2002	Northeastern University	10/21/01
Program Evaluator	2000	Lamar University	Not Entered
Program Evaluator	2000	Southeast Missouri State University	Not Entered
Program Evaluator	1999	Northwestern University	Not Entered
Program Evaluator	1999	University of Michigan	Not Entered
Program Evaluator	1999	University of Oklahoma	Not Entered
Program Evaluator	1998	Boise State University	Not Entered

Program Evaluator	1997	Embry-Riddle Aeronautical University - Prescott	Not Entered
Program Evaluator	1997	Utah State University	Not Entered
Program Evaluator	1996	The University of Illinois at Chicago	Not Entered

ABET Training Sessions Completed

TRAINING INFORMATION

SESSION	SOCIETY	YEAR
INTAC Evaluator Training	ABET, Inc.	2004
EC2000 Update	Institute of Electrical and Electronics Engineers	2002
EC2000	Institute of Electrical and Electronics Engineers	1999
EAC Topics	Institute of Electrical and Electronics Engineers	1996

ABET Annual Reports

He is mentioned in the Program Evaluator lists in these years:

- 2015
- 2014
- 2013
- 2012
- 2011
- 2010

Other Information

- Senior Fellow, IEEE

He is entry #400:

Cochran, David

R6 -Western USA

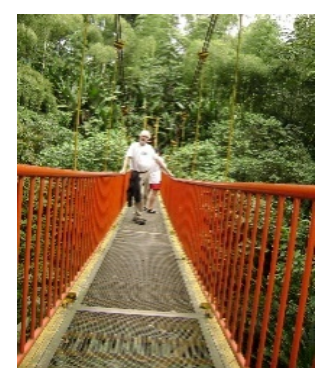
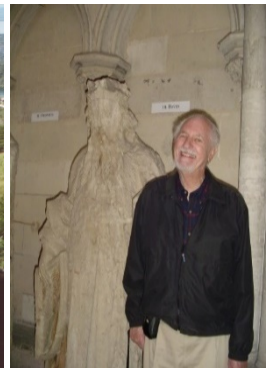
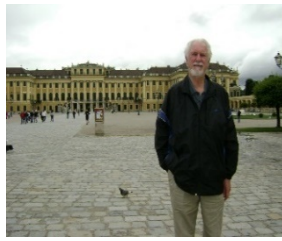
2013

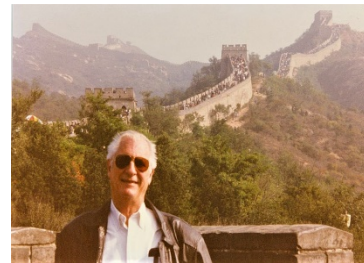
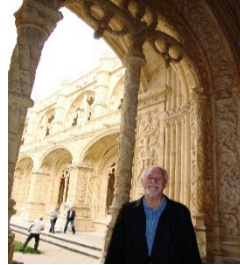
Application Engineer/Practitioner

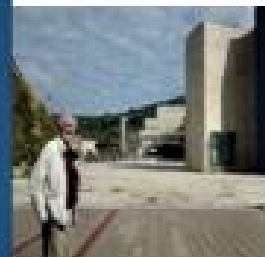
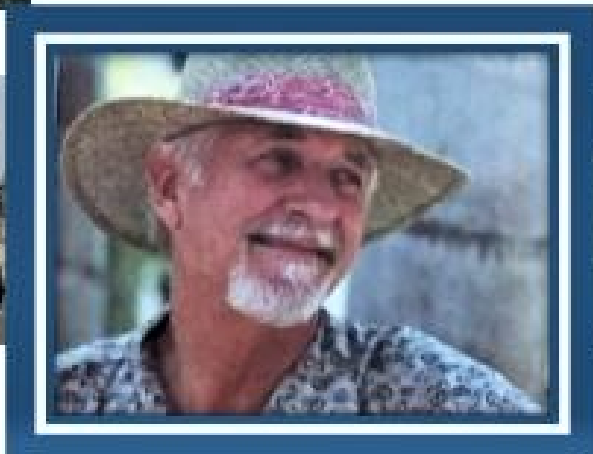
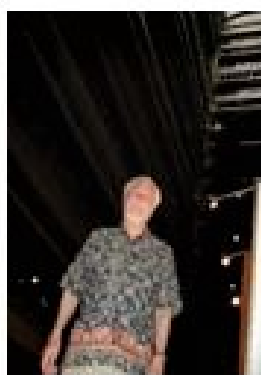
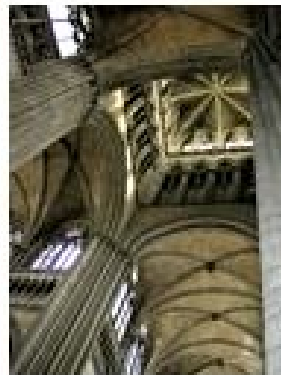
For contributions to design, architecture, and algorithms for HP-35, the first pocket scientific calculator

- Professional Engineer (PE) licensure – State of California

APPENDIX 8 - Traveling 1980-2018







APPENDIX 9- Permissions

On Sun, Jan 9, 2022, at 8:08 PM Lisa Cochran wrote:
Hello Ken,

I am working on my thesis in Anthropology and would like to use your interview material from my father in my work. I have read the policy guidelines but still wanted to touch base with you.

I recently spent time with my dad in Medford Oregon where he is in assisted living. At age 91, he is not doing too well. I would like to do an Ethnography on him for my final work. He is as excited about it as I am! But since I must abide by university policy, I just want to make sure that I have everything in order which includes intellectual property as well as copyright law.

I would love to hear from you to make sure I have followed ethical and legal guidelines for the reprint of the Hp Memory Project material of my father's story.

Many thanks,

Lisa A. Cochran
Department of Graduate Studies
University of Idaho
Moscow, ID 83844

From: Kenneth Kuhn
Sent: Sunday, January 09, 2022, 6:32 PM
To: Lisa Cochran; John Minck
Subject: Re: My graduate thesis based on my father DAVID S. COCHRAN

Lisa,

I am an electronics engineer (semi-retired) and relate to your father's work. I have a 204B and 3440 in my collection as well as HP-35 and other calculators. Typically, the various memoirs on the hpmemoryproject site are written specially for the site and edited by John Minck and all material is considered to be public domain. I noticed that the one for your father was excerpted from an interview at the Computer History Museum in Mountain View, CA and they own the copyright. I am not an expert on copyright law but to me as long as you make the proper references then I see no issue in using any material from the website, just like any other publication. To be completely safe you might contact CHM and John Minck who lives only a few miles from CHM and has contacts there might be of help if you need it. I am copying him on this reply as I am sure he would like an update on your father. I receive occasional inquiries from people who want to use some material from the site and the answer I provide is always yes. I can't speak for CHM but if you need any written permissions for other material, I will be glad to provide.

Best regards,
Kenneth A. Kuhn (Ken)
Electrical Engineer
Vestavia, Alabama, U.S.A.

From: John Minck
Date: Mon, Jan 10, 2022, 10:46 AM
Subject: RE: My graduate thesis based on my father DAVID S. COCHRAN
To: Lisa Cochran >, Kenneth Kuhn >

Hi Lisa,

I called the CHM to find out about approvals. I talked with Mr. Petrozzi who said a footnote credit would suffice.

If you email him, you will have an actual documented approval. I'm still not sure if it is needed since the oral history is interview format, and I reworked it into narrative, and we added more content.

I'm attaching a doc here for more background. I'm also looking for the Barney Oliver recollections of the beginning HP work on desktop computers, in it he credits your dad with an amazing ability to cram so much serious math functionality into very limited memory. It is especially noteworthy that the story goes when Barney assigned your dad to working out the algorithm, Dave answered, What's an algorithm? Essentially starting from scratch.

John

From: Cochran, Lisa

Sent: Wednesday, July 20, 2022, 2:52 PM

To: Massimo Petrozzi mpetrozzi@computerhistory.org

Subject: Written Permission to Use Some Archival Materials on Dave Cochran

Dear Mr. Petrozzi,

I had spoken to John Minck some months back about using materials from the hpmemoryproject.org and archival materials from the CHM that pertain to my thesis study on my father, David S. Cochran. John said giving credit would be fine, but I also would love having something in writing because graduate committees can be finicky.

There is so much information on my father's career that I feel a little overwhelmed! He has also extensively written about his work but there is just some information I am unable to get from him. At 91, he has good days and bad and his memory has gotten very bad this past year.

I would appreciate your blessings, and of course citations are a must. Also, if you know of any information after my father left HP that would be lovely too, as I am doing a chapter on his post HP years as well.

Many Thanks,

Lisa A. Cochran

Department of Graduate Studies

University of Idaho

Moscow, ID 83843

Hello Lisa,

I hope this email finds you well and thank you for contacting the Computer History Museum. Absolutely you can quote any of the documents you found in our collection in your thesis.

For any information regarding HP, I let our Senior curator Dag Spice (cc'd here) reply to you. I'm sure he will be able to suggest resources and even people you could contact to get the necessary information you need to complete your thesis.

Thank you again for contacting the museum and please do not hesitate to contact me for any

further questions you might have regarding the use of the collection.

Thanks,
Massimo

Massimo Petrozzi, PhD (he/him/his)

Senior AV Archivist and Digital Asset Manager
CHM Oral History Program Coordinator
Computer History Museum
mpetrozzi@computerhistory.org

From: Dag Spicer dspicer@computerhistory.org

Sent: Thursday, July 21, 2022 9:48 AM

To: Cochran, Lisa **Cc:** Massimo Petrozzi mpetrozzi@computerhistory.org

Subject: Re: Written Permission to Use Some Archival Materials on Dave Cochran

Hi Lisa,

So nice to hear from you. I met your dad at the Museum a while back and we had a lovely extended talk. I felt truly privileged to have had that experience.

As you may know, we have your Dad's oral history:

<https://www.computerhistory.org/collections/catalog/102743058>

As well as a brief special Case Study on the HP-35 I worked on him with in 2011:

<https://www.computerhistory.org/collections/catalog/102746048>

Have you interacted with HP chronicler/historian Chuck House? He did the oral history above. He's still around and I can connect you if you like.

Please wish your dad well from me and the Museum and do let me know if there's anything else I can do to help.

Warm regards,

Dag Spicer

Senior Curator

Computer History Museum

Editorial Board, IEEE Annals of the History of Computing

1401 N. Shoreline Blvd.

Mountain View CA 94043

From: Cochran, Lisa

Sent: Thursday, July 21, 2022, 10:56 AM

To: Steven Leibson

Subject: Permission Request for David S. Cochran Interview Material for Thesis

Hi Steve,

I have been working on my thesis which is based on my father Dave Cochran. He is greatly excited that I chose to do an ethnographic telling of his Life Story, which as you know is pretty incredible. Sadly, he is in assisted living in Medford, OR and is losing his memory, but who doesn't at 91!

I did a series of interviews with him about his personal history from youth to retirement (he never really retired, he just got busy speaking to groups around the world about the HP-35).

I have seen your YouTube interview with him and also John Minck had sent me an interview

that was used for the hpmemoryproject.org. Everyone has been so gracious to allow me to take excerpts of my father speaking about his 25 years at HP and especially his work on the desktop and the pocket calculators.

I have no intention of using anything for commercial use or publication other than submitting the thesis to the College of Graduate Studies. It is a wonderful legacy to my father and his children (I am just one of eight and turn 67 very soon).

Many thanks,

Lisa A. Cochran
College of Graduate Studies
Department of Anthropology
University of Idaho

From: Steve Leibson
Sent: Thursday, July 21, 2022, 11:53 AM
To: Cochran, Lisa
Subject: Re: Permission Request for David S. Cochran Interview Material for Thesis

Hi Lisa,

I'm delighted to hear from you but sorry to hear about Dave's memory decline. Please use anything you can from my interviews with him. Those are his stories, not mine. I was simply fortunate to be there to capture them. I'd love to see your thesis when it's done. There's a large community of HP enthusiasts who would also like to see it.

--Steve

From: Lisa Cochran
Sent: Monday, 10 January 2022 11:04 AM
To: andrew@techtrend.com
Subject: PhilMcKinney.com

Dear Sir,

This is in regard to your 2009 interview with my father DAVID S. COCHRAN concerning innovation and the Hp 35.

I was a child when much of his work was taking place and in high school when the Hp 35 launched. Frankly, I learned more about him and his career from your interview than I ever heard or knew of at home. Upon graduation from high school, I left home and my father, and I had more of a distant relationship for about 25 years of my adult life, but we have gotten closer around the year 2000. He is now in assisted living and at 91 each day is a gift.

I am writing because I have been a graduate student in Anthropology and would like to do an Ethnographic themed topic for my master's thesis at the University of Idaho and would like permission to include your interview in my research. There is no commercial value sought, only fleshing out of the story of my father as a man who made a culturally significant impact in his time. I require permissions from all sources which will be used in part or whole in my thesis work and the university is quite strict concerning such permissions.

I appreciate your time and assistance. Your interview was one of the biggest thrills of his life as an elderly man. Though the link to the interview is useful, may I use portions of a transcript of it to highlight his post career memories of his work at Hp and life?

Many thanks,
Lisa A. Cochran
Graduate Student
University of Idaho
Dept. of Anthropology

From: Andrew Pasaporte andrew@techtrend.com>

Sent: Tuesday, February 8, 2022, 7:51 AM

To: 'Lisa Cochran'

Subject: RE: PhilMcKinney.com

Hi Lisa,

I work with Phil on the show and the website. You have our permission to use the interview for your research. I assume this won't be used anywhere else.

I hope this response isn't too late.

TECHTREND GROUP

Andrew Pasaporte / Associate Producer
andrew@techtrend.com / (303) 835-7856
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