Malcolm D. Shuster

Unprofessional Biography

I'm really lucky to have me.
Think about it;
Without me*, where would I be?*

This isn't a biography but a collection of tidbits meant originally to relieve the dull progression of facts in my professional biography. It is an enlargement (by a factor of three) of the "trivia" which I distributed at the symposium for me in June 2005. It is composed of interesting and amusing tales which, for the most part, say nothing about who I am, only a little about what is important to me, little of my great joys or my great heartbreaks, a bit more of the things that have made me angry. At best it is a heavily edited collections of things I might have related over drinks. Information on my romantic life has been studiously limited to minute oblique references. I have tried not to name names in any circumstances except in very innocuous cases. The result is probably not as funny as the original "trivia", and closer to a true biography. However, keep in mind that most of the content of this document consists of anecdotes, and there is little information on the past twenty years of my life. Also, I have told you only the things I want you to know, and too much of that.

I was born Malcolm David Shuster in Boston, Massachusetts, at 8:00 a.m. on Saturday, July 31, 1943, to Russian Jewish immigrant parents who had each come to the United States as children, my mother (born July 6, 1913) in 1914, my father (born January 31, 1910) in 1920. FDR was president. It was raining.

At birth I set the record for length at the Boston Women's Hospital, now part of Peter Bent Brigham Hospital in Boston, an achievement not borne out by my later stature. My poor mother was only 4 ft. 11 in. I share with Julius Cæsar not only the manner of my birth but a sinister ptosis as well.

I was nearly named "Charles Frederick Shuster" following the name pattern of my maternal grandmother, who was greatly revered by her children. Jewish tradition won out, however, and I was named for male antecedents, my maternal grandfather and a maternal-paternal great uncle.

My maternal-paternal great-grandfather was Samuel Sharfman, the owner of a candy factory in Odessa (Ukraine), who died before any of his children reached maturity. My maternal grandfather, Maurice Sharfman, was the youngest of his four sons, who together squandered the family inheritance but at least received excellent educations. My grandfather spoke Russian, Yiddish, Ukrainian, Polish, English, German, Italian, and French, and also read Latin, Ancient Greek and Hebrew, but he was the spoiled youngest child and learned no profession. My dilettantism and fascination with languages may be genetic inheritance from him. In the United States he sold coal for a living and died in poverty in 1929, leaving his wife and four daughters in even greater poverty.[1] My maternal grandfather was best remembered in the family for having insisted (at age seven) on taking his dog to his father's funeral. My maternal great uncle David, for whom I was also named, was a chemist in Russia, the only Ph.D. and the only attested scientist in the family before me. He and the rest of the Sharfman family remained in Russia and were murdered during the Holocaust of World War II.

My maternal-maternal great-grandfather was Mottel Waisberg, a glazier in a shtetl near Rzhyshch in Russian Poland (now Rzeszów in Poland). My maternal grandmother, Celia Fege Sharfman (née Waisberg),

[1]My mother told the story that her father would always give the children quarters (25-cent pieces), which her mother would take from them, so she could buy milk.

was one of his eight children. Although raised by a wealthy aunt in Odessa, she received little formal education but spoke a half-dozen languages. One of her proudest accomplishments was the ability to cook like a Romanian. She died in 1937. The Waisberg family was more fortunate than the Sharfmans during the War. In addition to my maternal grandmother and three of her siblings, who emigrated to the United States in 1914, eight of my mother's Waisberg cousins emigrated from Poland to Brazil, Argentina and Israel following new anti-Semitic violence in Germany in 1938 (*Kristallnacht*). They could not enter the United States because of anti-Semitic immigration laws during the 1930s and 40s. Those Waisbergs who remained in Poland were murdered during the Holocaust a few years later.

My mother's immediate family was almost extinguished before she was born. In 1905, following Russia's defeat in the Russo-Japanese war, in which my grandfather had fought; there was a great pogrom in the city of Odessa. My maternal grandparents survived by bribing the concierge to say that there were no Jews living in the building.

My mother's brother (born 1900) returned to Russia right after the Revolution, settled in Kiev, where he became a journalist, and was a member of the Communist Party of the Soviet Union until 1936. In that year he was sentenced to 20 years exile in Siberia. This probably saved his life, because it put him at some distance from the German occupation during World War II. His second wife was murdered at Babu Yar, outside Kiev, during the Holocaust. He returned to Kiev in 1956, reestablished contact with his sisters in the USA in 1964 (and became my penpal), and died in Kiev in 1968, leaving four children in the Soviet Union, one of whom emigrated to Israel in 1973. His descendants are all that remain of my family in Europe.

My father's family came to the United States from Pinsk in Byelorussia. My paternal grandfather, Jacob Shuster, was a barber by profession and a profligate and womanizer by inclination. He left alone for the USA, promising to send money for the passage of my grandmother Frieda Shuster (née Grechko) and five small children. The youngest of these children, apparently, died of malnutrition during his absence, in the disaster that followed the Revolution. My grandfather procrastinated for four years and then sent sufficient funds for the passage only from Rotterdam. Somehow the family managed to make its way across Europe by working at odd jobs and with the help of strangers. Except for his immediate family, my father's relations were all murdered during the Holocaust. I never met any of my grandparents.

Thus, thanks to Russian pogroms and German atrocities, my very extended family (descended almost entirely from my maternal-maternal great-grandfather, Mottel Waisberg) is spread over five countries on four continents and speaks five different languages. Important centers of my family are in Boston, São Paulo, Buenos Aires, Kiev, and Tel-Aviv.

My origins thus include the wealthy Russian Jewish upper class, the urban Russian Jewish lower class, and the Polish *shtetl*. It should be mentioned also that my parents came from different dialect areas of the Yiddish language. Specifically, my mother was a *Russishe* (literally: Russian), while my father was a *Litvak* (literally: Lithuanian). In the American Askenazic Jewish community before World War II, their marriage was considered "mixed." Although neither of my parents was a practicing Jew,[2] my "mongrel" descent came to the fore when it had to be decided whether my bar-mitzvah service would take place in the Russishe or the Litvak synagogue in our neighborhood.

To push my origins back 3500 years: I am a Levite, a member of the tribe of Levi, the only tribe of Israel which has maintained its separate identity and has not been "lost." Thus, some of my ancestors had become decadent long before the Europeans (except for the Minoans) had become civilized. My Hebrew name, "Moshe," which corresponds to "Moses," is originally Ancient Egyptian and means "son." It is a part of many ancient Egyptian names, such as Amonmose (son of Amon), Thothmose (son of Thoth), or Ramose (= Ramses = son of Ra) and is even attested in ancient Egyptian records as a name in its own right. In the synagogue, I am Moshe ben Shmoel Ha-Levi, Moses the son of Samuel the Levite.

[2]My mother kept a kosher home, but believed, like many Jews, that the dietary laws were suspended in Chinese restaurants.

My secular first name has a distinctly Christian origin. "Malcolm" derives from "Mael Colum," which means "disciple of Colum." Colum was Colum Cille (521–597), "dove of the Church," the name given to a sixth-century Irishman of royal blood originally named Cremthann (meaning "fox") when he entered the monastery as a young boy. He belonged to the Cenel Conail, now part of the O'Donnell clan. As a grown man, he was very involved in Irish politics and a hothead. He was eventually banished from Ireland after killing another man in a duel. He went to Scotland, where he founded many monasteries, the most famous at Iona, where he died, and converted many Scots to Christianity. He was sainted as Saint Columba. Mael Colum was the name given by many of his converts to their sons. The name is first attested in writing in 1186 as Malcolum.[3] Before the Norse invasions of the tenth century, Iceland had been settled by Irish monks, which may explain why Kolunkilla was a name given by the later Norse settlers in Iceland to the boogie man, as witnessed by Hálldor Laxness' famous novel Independent People (*Sjálfstætt fólk*). My mother picked the name, because she wanted an "M" name to match my Hebrew name and liked the play "Macbeth." Fortunately, she did not call me "Macbeth."

My father (born Samuel Joseph Shuster in 1910[4]) was a poor student but a very serious worker, who could do almost anything with his hands. During World War II, he could not enlist, because he had lost hearing in one ear due to a mastoid infection, but he wanted to serve and worked at the naval shipyard in Hull, Massachusetts. He was a cab driver for most of my childhood and adolescence and later became a one-man delivery service. His special hobby was building vacuum-tube high-fidelity amplifiers, preamplifiers, and tuners starting from schematic diagrams which he found in popular magazines. When I was very young, he would tell me bedtime stories every night and he would often take me for walks riding on his shoulders. He died in 1986 of Hodgkins' disease, a form of lymphoma.

My mother (born Sarah Bela Sharfman in 1914[5]), the family genius, skipped three years of public school, graduating at 15 in 1929, but was prevented by financial circumstances from attending college. She would have liked to have gone to Columbia to study history, and she had a secret desire to write children's stories. After the death of her father in that same year, she worked in her uncle Friedl's fruit store, where the Boston Pops conductor Arthur Fiedler was a regular customer. For many years she operated a yarn shop in the Dorchester section of Boston and did quite well. In the late Depression my parents even owned a car. She gave up the yarn shop to have me. (When I was seven she taught me how to knit.) Apart from reading, my mother had no special hobbies. She always belonged to a weekly mah jong group. She died in 1976 of congestive heart failure.

I am now afflicted with both lymphoma and chronic congestive heart failure.

My parents' marriage was not an obvious match, the high-school academic star and the high-school underachiever. My father was a dashing, angry young man when he met my mother, often in a black turtleneck sweater, romantic, and a very good dancer. My mother, always a nurturing soul, was attracted to him. They were married by a rabbi on September 18, 1938, in a back yard, under a tree which served as the *Khuppah*, the wedding canopy. Their honeymoon at the Aperion Plaza in Roxbury, Massachusetts, was disturbed three days after their marriage by the Great Hurricane of 1938, the greatest natural disaster in the United States before Hurricane Katrina and which killed nearly 700 people and caused enormous destruction to the New York and New England coasts. (Proportionately, the Great Hurricane of 1938 killed more people than Hurricane Katrina in 2005.)

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[3]Israelis often pronounce my name in this manner, because I insist on writing the silent "L" in Hebrew. In Israel, the name "Lincoln" has three syllables.

[4]Some documents give my father's birth year incorrectly as 1909. This was likely in order to circumvent child labor laws. Except by his siblings, my father was always called "Joe" as an adult.

[5]Some documents give my mother's birth year incorrectly as 1912. This was likely in order to circumvent child labor laws. That my mother was only 15 when she graduated from high school in June 1929 is not in doubt.

My father's reading tended toward adventure novels, especially G. A. Henty. My mother's tastes were more toward romantic novels and the classics. Both of my parents loved classical music. Frequently, after a meal, we would all be sitting quietly around the kitchen table reading our books.

A cousin from Boston was at Pearl Harbor on December 7, 1941. His buddy in the bunk next to him was killed by Japanese fire. He survived the war to die of a heart attack at age 40.

A cousin in São Paulo is the largest manufacturer of men's underwear in Brazil.

A cousin in Buenos Aires, a student activist, was murdered by the police in the 1970's during the Dirty War.

A cousin in Tel-Aviv was a colonel during the Israeli War of Independence in 1948.

I appear to be the only "Malcolm D. Shuster" in the United States. A "Malcolm A. Shuster" resides in Jeannette, Pennsylvania. In 1995, I telephoned this other "Malcolm Shuster," hoping to get acquainted. My "homonym" quickly hung up on me.

While I spoke my first words at six months and could speak in sentences before I was a year old, I did not learn to walk until I was nearly two. This disparity between my verbal and physical abilities was to characterize my entire life.

In the Brighton neighborhood of Boston, where we lived during my first year, one of our neighbors was the young musician, conductor, and future composer Leonard Bernstein (1918–1990), who was impressed with my precocious communication skills and, according to my mother, sometimes came to the apartment to talk with me. Most likely, we did not discuss Sartre or the conduct of the war.

Revere, Massachusetts, where I spent my formative years (1944–1961), is best known for its beach, the nation's first official public beach, established in 1896. This was the scene in 1907 of the arrest for indecent exposure of Australian swimmer and future film star Annette Kellerman, when she appeared in a one-piece bathing suit which had neither sleeves nor a skirt. The event is retold in the 1952 MGM film *Million Dollar Mermaid* with Esther Williams in the role of Kellerman.

Along Revere beach were two miles of Coney-Island-like concession stands and amusement rides (all since disappeared) controlled by the Mafia. The city is also home to Suffolk Downs race track and Wonderland dog track. In addition, it possessed the most corrupt city government of any city in the Boston area. One of our high-school songs had the refrain "we come from Revere, our fathers are the racketeer men." A hundred years ago, Wonderland was the site of an enormous amusement park. In the early twentieth century, Revere had a world-wide reputation, similar to that of Orlando, Florida, today. It began to degenerate in the 1950s, but not because of my arrival.[6]

Revere was the original home of rags-to-riches novelist Horatio Alger, baseball great Tony Conigliaro, and mathematician Norman Levinson (of Levinson's theorem), called "the duke" ever since high school, because he was a snappy dresser. Founded in 1626 as Rumney Marsh, Revere was the site at the dawn of the American Revolution of the Battle of Chelsea Creek, in which "Fighting" Parson Payson and his merrie minutemen took pot shots at the British in 1775 as they were returning from Lexington and Concord. The largest landowner in Rumney Marsh was Robert Keane, whose monument is the largest in the King's Chapel Burial Ground in Boston. (Benjamin Franklin's parents, Samuel Adams, John Hancock, Paul Revere, and Crispus Attucks) are buried across the street in the Old Granary Burial Ground.)

Until my tonsils were removed at age seven, I was a very puny and underweight kid. My favorite aunt always called me "Tarzan."

At the age of ten, I knew more dirty words in Sicilian than in English, and I knew all the best ones. My mother used the expression *mezzo mezz'* so much when she would talk on the phone with one of her sisters

[6]If you watch the 1998 film *Next Stop Wonderland*, you will see a part of Revere Beach which was a short walk from my home.

that I thought it was Yiddish. Most likely, my mother and her sisters had learned to say *mezzo mezz'* when they was growing up in South Boston.

I never learned Yiddish as a child, because I heard it very seldom. My mother's parents had insisted on speaking English at home. (They may have spoken Russian at home in Odessa.) My father had spoken Yiddish at home, but my mother did not learn it until after she had graduated from high school, when she worked in her uncle's fruit market. My parents would use it often as a secret language, but when at age seven I started to catch on, they simply waited until I had gone to bed and spoke English, which was easier for them. As a college sophomore I took a night class in *Yiddish*, offered by a Hillel student, but it was not the same as learning it as a real language.

From age six until age ten, when we moved to another part of Revere, I had a steady girlfriend, who would walk me home from school, because she lived farther away. Since my aunt was the leader of the Brownie troop in our area, and my mother often helped her as a chaperone, I would always accompany my girlfriend on Brownie outings proudly attired in my cub-scout uniform. My girlfriend's father once took us to see Dwight D. Eisenhower during his first presidential campaign, but the general showed up too late for us to see him.

My first and only transvestite experience came at age nine, when I and two other boys appeared as a female vocal group singing "How Much Is That Doggie in the Window?" at a cub-scout event. My mother knit a blond wig for me, and my girlfriend lent me one of her dresses.

I was an activist even as a child. When I was ten years old, the Pledge of Allegiance was altered to include the words "under God." As a Jewish child I was sensitive to the interdiction against saying the name of God or even the word "God," so I refused to recite the Pledge completely from that time. Now, I refuse to recite the Pledge at all.

I became very religious as a teenager and belonged to two Jewish boys' clubs, one of which conducted its own services on Saturday mornings and holy days. (The other boys' club was occupied mostly with arranging Saturday-evening house parties in the Boston area, so that nice Jewish high-school boys could meet nice Jewish high-school girls.) Eventually, I came to know the entire Saturday-morning service by heart in Hebrew. My mother was fearful that I would become a rabbi and place all sorts of restrictions on how she could run her home. The son of one of her friends had obtained a rabbinical degree and afterward insisted that she have meat shipped to Revere from New York City, because the local butchers weren't kosher enough. My religiosity and piety declined rapidly after I began university.

My earliest "scientific" project occurred around age nine, when I made a complete map of the Jewish area of Revere, which I would explore on my bicycle.

My former (Jewish) neighborhood in Revere is now the location of the largest Cambodian community in the United States. The Russishe and Litvak synagogues have now been converted to other purposes.

In my earliest years, I was a semi-motivated public school student. In the first three grades I was the best student in Arithmetic but was always placed in the slow-reader group (due in large part also to my undiagnosed need for eyeglasses). I needed speech therapy also, a sure sign of hearing problems. I was not a very robust child. In the fourth grade, with eyeglasses, I received the award for having read the most books. In the 7th grade I received a "C" in Mathematics. Fortunately, my grades improved dramatically when I began the ninth grade.

I was not an anti-intellectual child by any means, but I lacked the discipline to study consistently, a problem that would plague my entire education for more than twenty years. All the same, in the last years of elementary school, I was the student who always had his hand up to ask or to answer a question. I also loved discussing things. *Disputo ergo sum*. All of this had social consequences. The Irish and Italian kids often beat me up after school, usually five against one, for being the vocal puny Jewish kid who was too smart. I was never well adjusted socially. From a very early age, I lived in my comic books and in my books.

In my childhood years, I would always attracted by big-brother types, sometimes four or five years older than I. This continued even until adulthood. This was certainly a response to my poor relationship with my father. As a small child I would ride through the streets on his shoulders, he would pull my sled in the winter, and he would tell me the most wonderful stories at bedtime, which I think he made up himself at the spur of the moment. But things changed about the time I was seven. He was unwilling to let me be my own person with my own thoughts and ideas. He would constantly tell me I was stupid and lecture me for hours at a time from a limited repetory of subjects, with endless repetitions. In high-school and university his constant complaint was that I only knew things in books and that my friends, whom he did not know, because I wouldn't bring them home when he was there, were much better than I was. Any childhood or adolescent accomplishment was turned by him into something I had done wrong or at least not well enough. He was filled with racial and ethnic prejudice, and our relationship was made worse by my refusal to agree with him. His friendships with men of his own age were very few and short-lived. In the last decade of his life, long after my mother had died and he as very lonely, I took full charge of our relationship, visiting him frequently, and captained it on a fairly steady course. When his cancer began to take over, I left work for two months and went to Boston and stayed a few weeks after he died to settle his affairs. My father had grown up with abusive or neglectful parents and had wanted the best for me in his heart. He never struck me, but all through high school his badgering would bring me to tears several times a week. Nonetheless, there were frequent acts of kindness, he was generous with money, and he sacrificed for me for more than two decades of my life. It is hard to judge him. I hated all the arguments, but often wish I could have them again.

My mother was a kind and loving person, whom most of my childhood friends called "Auntie Sarah." She shielded me from my father's worst outbursts, and without her I surely would have developed severe emotional problems. She was my pal, in the way that many fathers are a pal to their sons. We didn't do sports together, but we would talk endlessly when my father wasn't home, and she would take me to movies and to the historical sights of Boston. She was my support for every activity, the parent I could talk to, the one who praised rather than belittled. She had a poor life with my father. He made it impossible for my parents to have other couples as friends. Fortunately, she had three sisters. When I was at college, only 20 miles away, I would often bicycle home on a free afternoon to be with her for an hour. All the same, I don't think I loved her enough, and my memories of my father are stronger. Like my father, I carry the hurts of my childhood more than the joys. I am both my parents.

From the age of 12, with the connivance of a good-natured uncle, I would always drink a scotch on the rocks at important formal family events. I would nurse it all evening and pretend I was drunk. At the time, I thought it tasted like soap. My parents began giving me a shot glass of wine at Passover at age six. As an adult, I never became more than an occasional drinker, even though eventually I developed a great love of scotches.

In high school, my favorite subjects (in descending order) were English, French, History, Mathematics, and Science. My most boring course was Physics. My most hated course was Algebra II, because the teacher was incompetent and anti-Semitic. My judgment of her may be questioned, but on the first day, she did arrange the class seating so that all the Jewish kids were in the back of the classroom. This was a very stupid move on her part, because the (Jewish) vice-principal of the high school was the father of one of the students in that class. She did not understand the material very well either. Before the end of the school year she was no longer teaching.

Mine was the first "accelerated class" at Revere High School. The school put what it thought were its best 23 students (reduced in the first year to 22 when one of our number became pregnant) with the hope of improving the school's academic image. Unfortunately, we were together for every class except language (the Jewish, Irish and WASP kids all took French, and the Italian kids all took Italian). The class was very tough for the students who weren't gifted at Math. It was bad for all of us, because we did not get to meet many of our classmates. In addition, a number of our teachers weren't up to the challenge. Our English

teacher, a Ph.D. stranded at the high school during the depression, certainly was. He had us reading an entire book every two weeks in the class program, and another book every two weeks outside, for which he had to write a book report.

By the age of 16, I had accumulated more than 1200 comic books, including nearly all of the *Walt Disney Comics* from 1946 to 1959. I still retain my nearly complete set of *Classics Illustrated Comics*. I had begun collecting the *Classics Illustrated Comics* at age 12, and they became my reading program. I began reading the classics in the numerical order of the series. (*Moby Dick*, which was number 4 in the series, was a tough read for a 14-year-old.) I would go into Boston and look for a nice used hard-cover edition at Goodspeed's Book Store. For classics, a paperback just wasn't good enough. I have always been a collector (stamps, US cents, books, LPs, CDs, videos, DVDs).

I learned about graft and corruption at an early age. As a small child I knew where to place bets for the numbers game, but never did myself. The 1950s were easier times then now. I frequently bought cigarettes for my father. The two Jewish boys' clubs I belonged to in high school both ran yearly scrap drives, mostly to buy ourselves baseball jackets or blazers and the like. I was a born organizer and, therefore, the member who ran them, finding the best price for scrap (only discarded paper and cloth), and getting transportation to pick up donations. To get the trucks, I simply called the city manager's office two months before, and the city proudly donated three trucks and paid drivers on the Sunday of the drive, as a show of good will to the Jewish community. The cost to the city was certainly more than we earned from the scrap drive.

In high school, I was very proud of my Pickett & Eckard log-log, dual-base, deci-trig slide rule in its leather scabbard, which hung proudly from my belt. This device, which cost nearly $30 in 1958 replaced its one-dollar predecessor, which I had bought from a novelty catalog in 1956. In my junior-high-school class prophecy, I was supposed to be awarded the Nobel prize for inventing the world's biggest slide rule. It still hung from my belt when I would bicycle to class at MIT, because otherwise it would have fallen through the openings of the basket, but I would remove it from my belt when I dismounted. Now, I seldom carry even a pencil or ball-point pen.

Right after high-school graduation, I went with three friends (my bridge club) to Montreal, where I discovered that even after three years of high-school French, I could not manage the language. One of my friends was a serious bridge fanatic (and a French fanatic) and wanted to play in a duplicate bridge tournament there. I agreed to be his partner (my first and only duplicate tournament), and he made sure that I knew the 28 words and expressions necessary to play bridge in French. Although we defended all but three rounds (our opponents almost always overbid their hands), we won, and I earned half a master point, which I never registered, since I never joined the American Contract Bridge League. I had read Goren and Kaplan-Sheinwold seriously, but bridge would never rule my life, and, after that summer, I never played bridge again. My friend, unfortunately, succumbed to the fever and played his way out of Dartmouth by majoring in bridge. It was the ruination of his life. A few weeks after failing out, he tried to commit suicide, then dropped from sight. After a series of unfulfilling jobs, he committed suicide at age 32. A year after my Montreal trip, I visited my old high school and chatted with my French teacher, "Ma" Hathaway (Mary MacDougal Hathaway, but even the vice-principal, who had also been her student, called her "Ma"). I told her of my failure to get by in French in Montreal the summer before. "Nonsense," she said, "you were an excellent student in French," and proceeded to extemporize in that noble language but with a very obvious Boston accent. I understood every word she said.

The summer before I started MIT, I worked as a silk-screen printer in a small shop under Fenway Park in Boston. Once I had to fill in a map of the United States on a large billboard. I had trouble staying within the outline, and my rendition of Florida was somewhat penile. Nonetheless, the billboard hung at the lower level of the Government Center MTA station for many months. *Qualis artifex pereo*! (What an artist dies in me.)

In the summers around 50 years ago, some of the MIT graduate students would offer free courses to ambitious high-school students. In 1961, I took the summer courses in General Physics and Relativity. The

first course covered almost the entire year of freshman Physics. These courses, and the fact that most of my popular science reading was in Physics and Math (much of it over my head), caused me to become a Physics major at MIT in the fall. In high school I had maintained that I would be a chemist. The MIT summer courses tipped the balance, and in September 1961, I registered as a Physics major. David Feldman and Al Krieger changed my life.

One of my classmates at MIT was Ahmed Chalabi, future head of the Iraqi National Council and future deputy prime minister and minister of oil in the first elected government of Iraq. My freshman Chemistry recitation instructor was graduate student John M. Deutch, who would become director of the C.I.A. during the Clinton Administration. Fellow Physics major Jim Wertz, future editor of *Spacecraft Attitude Determination and Control* and other excellent space books, was my neighbor in the Burton House dormitory. One of my friends at MIT was a nephew of Ernst Poensgen, one of the big German industrialists and an early financial supporter of Hitler.

From my freshman year at MIT, I had the reputation of being a "hacker" (general meaning "prankster," specialized in the eighties to "computer hacker." A prank at MIT was called a "hack.") MIT was definitely the place for hacks. A booker (or grind) was called a "tool." A dormitory at MIT consisting entirely of single-occupancy rooms had the affectionate name of the "tool shed." No student at MIT calls his school "Tech," a crime akin to calling San Francisco, "Frisco," which sends shivers up the spines of residents of that city.

At MIT, I was more interested in taking many courses than in getting high grades and finished with only a B average. Since MIT has a five-point grading system (A=5), I tell people that I graduated from MIT with a 4.0 grade-point average (called the cumulative average or "cum" at MIT). I took 35 percent more credit hours than I needed for a degree and sat in on a few other courses as well. Besides a demanding Physics program, I took all but one course needed to obtain a simultaneous degree in Mathematics, seven semesters of German and three of Russian. I had been offered the option of taking my freshman and sophomore Humanities courses in French, but I lacked the courage. Probably, that was a big mistake, one of many.

Although I had grown up on the Atlantic Ocean, I had never learned to swim, because I hated getting salt water in my eyes and was somewhat afraid of the water. I learned to swim finally in my freshman year at MIT, only because it was a requirement for graduation. I haven't swum since.

In the fall of my junior year at MIT, after staying up all night to finish a very demanding lab report, I fell asleep the next afternoon during my Modern Algebra lecture. I was awakened by the laughter of the entire class and the professor (a friend from freshman Calculus, who had introduced me to "Duke" Levinson). I came to the next Modern Algebra lecture to find the professor sitting in the very chair in which I had dozed off. "Are you going to fall asleep again," he asked? "I don't know," was my reply, "that sort of depends on you." He smiled and got up to give the day's lecture. Half-an-hour into the lecture someone asked a question, and he began mumbling into the blackboard. I put my head down and started to doodle. "Look," he shouted, "he's fallen asleep again!"

What everyone of my generation remembers: I learned that President Kennedy had been shot in Dallas when I returned to my dorm room after lunch. I sat through my next class (Modern Algebra again) with my transistor radio glued to my ear. No one objected. When the final news came, I put the radio down and looked up at the professor. He paused and stared back. "He's dead," I said. The professor then put down the chalk and dismissed the class. In the Boston area life stopped.

In the spring of my junior year at MIT, dissatisfied with the hard, stale dinner rolls served in the dormitory cafeteria, I mailed myself a roll without any packaging, just an address label and a postage stamp. It arrived unscathed. I posted the roll, cancelled stamp and all, on the cafeteria bulletin board with the caption "tough enough to survive the U.S. Mail!" To my deep regret, the quality of the dinner rolls after that incident did not improve.

While a senior at MIT and over 21, I and two younger classmates were denied service at a Howard Johnson's restaurant in Boston, because we were "unaccompanied." A complaint to the headquarters of Howard Johnson's ended that situation.

The MIT yearbook listed me incorrectly as graduating in Electrical Engineering instead of Physics. In fact, I had failed my single Engineering course at MIT (in Electrical Engineering) and was forced to repeat it. Seventeen years later, I obtained a master's degree (cum laude) in Electrical Engineering from The Johns Hopkins University,

In the 1960s and probably much earlier than my memories, the Massachusetts Institute of Technology had a very liberal attitude toward student drinking. Undergraduate students were always offered wine at official Institute functions, and the dormitory front desks would accept liquor and beer deliveries for undergraduates, no matter what their age. The students in my dormitory, although very raucous during beer parties, were never destructive or violent as a result of drunkenness. The great crime at my MIT dormitory at the time was not drinking, nor having a girl in one's room after visiting hours, but in having a hotplate, because of the ancient wiring in the building.

It was not until I was nearly twenty-two that I first travelled by train, plane or boat. Until that time, my rather parochial life had never taken me more than 50 miles beyond the borders of New England, and, except for local rapid transit (the MTA), my travels were always by automobile, bicycle, trolley, or bus. And then in June 1965, I took a charter flight to London and from there the boat-train to Bonn, West Germany, where I would be spending the summer of 1965. Except for short visits, I would never live in the Boston area again.

One evening in Bonn, while I was walking at some distance from the city center, I was accosted by two English-speaking African visitors, who had gotten lost and needed directions to the night life. I instructed them carefully and made them repeat the directions to make sure that they had understood and remembered them. As they were walking away, I heard one say to the other, "Unbelievable the way these Germans speak English!"

It was in Bonn that I developed a taste for beer. I never liked the American product, although I would drink it at dormitory beer blasts in order to fit in, but beer in Germany was absolutely delicious. The "imported" beer sold in the USA is not the same as the home-brewed product, as I found out when I returned.

One day, while eating at the *Mensa*, the university cafeteria, in Bonn, I was approached by an American student there who spotted my American clothes and asked to sit down at my table. He told me immediately that he was Jewish and that he was disturbed by the picture in his room of his landlady's son in his World War II *Wehrmacht* uniform. I assured him that his landlady would certainly understand his distress and remove the picture if he asked. He then said the most outrageous thing, namely, that he liked Germany all the same, because there were so few blacks there. Stunned, I immediately got up, told him that I too was black, and moved to another table. The German students at the table asked what was wrong and then left with me, leaving my new acquaintance to dine alone. Some people never learn.

The nuclear physicists in Bonn generally spent part of every afternoon taking a dip in the heat-exchange pool for the Cyclotron. The director of the Bonn Cyclotron developed cancer at an early age.

My landlady in Bonn (I rented a room in her apartment) would serenade me every morning with the German hit parade, which she would render in "Kölsch," the local dialect (the local variety was called more frequently "Bonner Platt"). To this day there is one old standard (*Min judter Kamerad*) which I can remember only in *Kölner Mundart*. My landlady was a wonderful person. After I had signed the rental contract, she replaced some of the nice furniture in my room with junk she kept in the basement.

I was nearly arrested in East Berlin in late July 1965 for jaywalking across the Alexanderplatz.

In August, I hitchhiked from Bonn to Zagreb, Yugoslavia, to visit a friend from MIT, who was working there on a summer exchange program. Through a misunderstanding, I nearly ended up in a summer labor camp. My friend, unfortunately, had come down with the flu a few days before and was sick in bed for my

entire stay. His friends took care of me and gave me a crash course in Serbo-croat, so that I could do his shopping. The showers in the Savski Most student dormitory, where I was staying, were coeducational.

In September 1965, I began life as a graduate student at the University of Maryland in College Park. One evening during my first week there, I went to Georgetown with another new graduate student and was promptly arrested for jaywarking accross Wisconsin Avenue. Bostonians of my generation always jaywalked. We were taken by the police to the local precinct and paid a fine. We were not handcuffed.

At the University of Maryland, I participated in Operation Match, the earliest computer dating service. Having just arrived on campus, this seemed to be a great thing. The system was still not very well developed. Every girl I met wanted to go to Europe, but otherwise had nothing in common with me. Half of them, who couldn't tell a Boston accent from a German accent, asked if I were from Germany.

In my second semester as a graduate student at the University of Maryland, I decided to take the undergraduate Physical Education course in *Equitation*. This gained me immediate celebrity at the Physics Department Tea, as I related to students and faculty alike the indignities visited upon me by my trusted steed of the day. Although the horses frequently humiliated me in the beginning, I never fell off, and eventually learned to jump three-foot hurdles (together with the horse).

In 1967, the Physics Department at the University of Maryland refused to allow me to minor in *Medieval Germanic Languages*, insisting that I minor instead in Mathematics or Chemistry. All the same, I sat in on the course on *Middle High German*. About the same time I taught myself enough Norwegian to read Ibsen's *A Doll House* (*Et Dukkehjem*) in the original. My goal (never attained) was to learn enough Icelandic to be able to read the Old Norse sagas in the original.

A frequent companion at the Physics Department daily tea at the University of Maryland during the academic year 1967–1968 was future astronauticist F. Landis Markley, who had completed his Ph.D. in Physics at the University of California at Berkeley and was a post-doctoral fellow in the Department.

While I was a graduate student, my favorite aunt decided that she wanted to buy me a guitar. She told me, when I was home on a break, that if I would let my hair grow long like the hippies, she would buy me one as a present. She hadn't taken account of whom she was talking to. Four months later, I showed up in Revere, Massachusetts, with an enormous jafro. At that point my aunt began pleading with me that she would buy me a guitar if I would cut my hair. I got the guitar a month later but never really learned to play in spite of nearly three years of lessons. My guitar teacher, for whom I kept a roll of TUMS in my guitar case, because he always complained that my lessons gave him an upset stomach, remains my close friend.

In the late 1960s, as a member of the National Society of the Classical Guitar, I helped organize several guitar recitals. Through these activities, I was able to meet guitarists Andrés Segóvia, Julian Bream, Christopher Parkening, and Oscar Ghiglia. I amused Segóvia once by demonstrating that the key to my guitar case could unlock his guitar case. I once split a pizza with Oscar Ghiglia.

In 1967, my car was nearly overturned and burned (with me in it) by an angry mob in the Cardozo neighborhood of Washington, D. C. That was the last time I took a short-cut into the city through Cardozo. (Cardozo, by the way, was the neighborhood of Klaatu's rooming house in the 1951 film *The Day the Earth Stood Still*. The trajectory calculations on Prof. Barnhardt's blackboard in that film were created by Sam Herrick, the thesis advisor of my good friend John Junkins.)

I was a very politically active graduate student, working in the 1968 presidential primary, battling the University Graduate Council, acting as a marshal during the student protest against the Kent State massacre, bullying the Physics Department Graduate Entrance Committee, and the principal organizer of the University of Maryland Graduate Student Federation.

In my last year as a graduate student at the University of Maryland, the Graduate Council issued an irrevocable ruling that that greatly affected full-time graduate-student status, and would have made many of us candidates for the draft. Our department chairman, Howard J. Laster, a member of the council, had even voted for passage of the ruling, hoping that it would die permanently at the hands of the faculty senate. To

hedge his bet, he also told his more outspoken graduate students, me among them, of the ruling. That same day, I organized a group of five students and wrote a joint letter to the 40 department chairmen on campus explaining the problems that the new ruling would make for Physics graduate students and stating that one of our group would visit during the coming week to learn of the impact of the ruling on their departments. The chairmen, most of whom learned of the ruling from us several days before they received official notice from the Graduate Council, were enraged. The irrevocable ruling was revoked ten days after it had been passed irrevocably.

Not satisfied with this victory, I thought it would be a good idea to be prepared for further University foolishness in the future. So a further joint letter was sent to the department chairmen, stating that we wished to create an organization for better communication between the University and the graduate student body. Thus, the five of us returned to the chairmen we had visited earlier to ask the names of their graduate student activists. In a month or so, we grew from five members from one department to about 200 from 37 departments. At this point, we decided to hold a caucus to elect officers of the new Graduate Student Federation. I was certain to be nominated for president, but decided it was more important to complete my dissertation. I didn't attend the caucus (or any future meeting) but sent a message declining the nomination and recommending the student I thought best suited for the post (a member of the original five students, who wore a suit every day). He was duly elected and eventually became a vice-dean at the University.

A Physics professor at Maryland once fixed me up with an art student who expressed a desire to paint me in the nude. (I was much thinner in those days.) I consented, provided that she also be nude while she painted me. The relationship did not endure.

It became obvious during my last year as a graduate student that money for research assistantships was drying up. Research assistants were being told by their advisors that they had better finish their dissertation in the current academic year or, possibly, be without future support. I decided to conduct a survey and went to every professor and asked how many graduate research assistants he had supported in the previous and current years, how many he could have supported in those years, and how many he expected to be able to support in the next year. Only my own research group refused to cooperate in my survey (familiarity breeds contempt). There turned out to be a large excess of funds for research assistantships in the previous year, a small excess in the current year, and an expected large deficit in the coming year. I reported my findings to the Department chairman, who had encouraged my survey. In the end, I presented these numbers to the weekly faculty meeting, which responded with shocked disbelief. They had each thought that the problem was theirs alone. The chairman, however, believed my results, and I found myself an unofficial member of the Graduate Entrance Committee, which was about to make its first offers of graduate teaching assistantships for the coming year. That committee proposed a ten-percent reduction in the number of teaching assistantships offered, in order that some of those teaching assistantships would be available to support current research assistants who would lose support. I persuaded them to make a reduction of fifty percent. (It demonstrates the remarkable openness of the Physics Department that a graduate student could have so much sway—I loved the University of Maryland!) It turned out, a few months later, that forty percent was the needed correction, and further teaching assistantships were offered to the waiting list.

After this, I was invited to be a member of the committee to renumber the Physics courses in accordance with new University guidelines. I was the only person who came to the first meeting prepared, and my suggested numberings were adopted. (You can tell from all of this, that I had gone quickly from student activist to the nerd who likes to run the projector.)

For many years, I was best remembered at the University of Maryland for having organized a very alcoholic Physics Department tea on St. Patrick's Day 1970, the first year that the University permitted alcoholic beverages on campus. This event, which consumed nearly six fifths of Irish whiskey as Irish coffee, had a deleterious effect on that day's Physics Colloquium, which immediately followed.

At 1:00 a.m. on that Saint Patrick's Day, I awakened the ambassador of Ireland (I had expected to be connected only to the embassy answering machine) to invite him to our festivities. He excused himself

politely but sleepishly because of a previous commitment at the Folger Collection. This turned out to be his formal installation as ambassador by President Nixon.

In April 1970, I was interviewing at Wellesley College for a position as assistant professor. After the interview, a car pulled up at the bus stop and kindly offered me a ride. The driver, a lawyer, was about my age, and his eyes lit up when he found out that I was about to fly home to Maryland. A girlfriend of his, the Wellesley student he had just dropped off at her dormitory, had gotten into trouble, and Massachusetts did not permit abortions at the time, but Maryland did. His girlfriend could solve her problem (he wasn't certain it was also his problem—this was, after all, 1970) if I would agree to let her say she was my niece and she was living with me, and thereby establish that she was a Maryland resident and could have the abortion there. I agreed, and a month later he came down with her and stayed overnight with me while she was having the procedure. I never met her. I'm not even sure I got a free meal out of the deal. I did get the offer of a place to sleep in Charles River Park and some free legal advice from time to time.

In May 1970, I was a student marshal trying to maintain some semblance of order during the UM demonstration against the Kent State massacre. After the demonstration turned into a riot, and the State Police began shooting tear-gas canisters, I retired to the Physics building, where I spent the entire night (under curfew) roaming the corridors making sure that the students didn't set fires in the stairwells or assault the cyclotron (whose dedicated IBM-360 model 44 computer was essential to my dissertation research). Shortly after the campus curfew was lifted, I was chased across campus one Saturday evening by a State-Police helicopter, which was trying to bean me with tear-gas canisters. Two weeks later, I watched in stark disbelief as UM undergraduates set fire to the North Administration Building, after which I spent another night in the Physics building. It is noteworthy that during the initial demonstration, the student demands in order that they free US-1 in College Park, were that the University cancel mid-term grades and suspend finals. *Sic transit gloria mundi*.

Like many students of the late 1960s, I experimented with marijuana, which a next-door neighbor would purchase for me through his connections. One of my Physics professors wanted to try it and asked me to act as intermediary for him. I suppose this made me a dealer. My use of cannabis was very infrequent, with often long interruptions, sometimes of a year or more, and stopped altogether in 1980, to a large degree because I did not like to smoke, and because I thought it would be inconsistent with my having a security clearance. In 1982, I was offered cocaine at a party and refused. (My date did not.)

1970 was a very bad year to find a job in academic Physics. Congress had passed a bill prohibiting the military from funding basic research, so a lot of jobs dried up. (A lot of graduate research assistantships also dried up, as pointed out above.) I had sent out 50 job applications in the U.S. and had received only one seminar invitation from a school that wanted to interview all five post-doc finalists very strenuously to make sure they were getting the best possible person. They took too much time about it. Competing needs for this money developed, the funds for the post-doc position were not yet encumbered, and the position was eliminated. At this point I decided to look for positions abroad. I sent two applications (out of ten) to France, one to the University of Paris at Orsay; the other to the Center for Nuclear Studies at Saclay. In April, I received a letter from Orsay telling me that they had decided not to make me an offer, because Saclay was better positioned and would soon be contacting me. The letter from Saclay arrived a week later. This was very good for me because the physicist I wished to work with more than any other in the world was at Saclay.

I learned later that my offer had been influenced by the presence at Saclay of a visitor from the National Bureau of Standards (now the National Institute of Standards and Technology), who had entertained grave doubts that my dissertation topic would bear fruit. A few months earlier, I had sent him my first computer results, in which theory matched experiment with remarkable fidelity and which bore in broad bright green strokes the formula that had generated the plots and the inscription: "What do you say now?" I sent the oversized computer output to NBS, from which it was forwarded to Saclay, where it found a prominent place on the wall of my correspondent's office. Thus, in the months before I applied for a post-doctoral

position, every member of the Saclay theory group was given a little lecture on my results. It's good to be known. Every job I have ever had in my life (with the exception of one summer job in 1966) beginning with jobs in high school and ending with my last position in Engineering, has been the result of personal connections.[7]

Extremely nervous after a hectic week of selling or storing my possessions and making arrangements for my move to Paris, I went to my dissertation oral defense in late September 1970 with a coffee mug filled with Vat 69 scotch whiskey, hoping it would calm my nerves. It only made me tired. My thesis committee, anxious, perhaps, to be rid of me, didn't notice.

In fact, my committee didn't even stay for the entire defense. My defense had been scheduled for 4:30 p.m., and when it came time to go home, one by one my examiners excused themselves, signed the approval sheet, shook my hand, wished me luck, and left me standing alone in the conference room, signed approval sheet in hand and a eight-ounce coffee mug still one-third full of scotch. I sat for 20 minutes, finished my scotch, and went home to pack. A week later, I would be a world away.

One year after I defended my doctoral dissertation, my dissertation advisor at the University of Maryland abandoned Physics, moved to San Francisco, and built a skate-board park.

In Paris, where I had arrived in late September 1970 for a two-year position with the French Atomic Energy Commission at the Center for Nuclear Studies at Saclay, my apartment building in Montparnasse was frequently surrounded by security police because of its proximity to the Embassy of North Vietnam.

During the 1920's my neighborhood in Montparnasse had been the home of Ernest Hemingway, who had lived only a few doors down the street (rue Notre Dame des Champs) from me and who had described the neighborhood briefly in his book *A Moveable Feast*. Gertrude Stein had lived around the corner on the rue d'Assas. Victor Hugo had lived at the other end of my street. Marcel Proust, V. I. Lenin, Leon Trotsky, Henry Miller, and, of course, Hemingway had frequented the brasserie, *La Closerie des lilas*, at my end of the street. In olden days, when Montparnasse still had its wooded hill "outside the city," Blaise Pascal had also lived close by in Port Royal.

I had a very happy coincidence during my first month in Paris. When I was working in Bonn during the summer of 1965, I had recommended some books on the Mössbauer effect to a graduate student there who was thinking of making it the topic of his master's (Diplom) thesis. We didn't become friends in Bonn. At most we would shake hands or wave to each other on the street. When I arrived in Paris in September 1970, I didn't have a car for a few weeks, and would hitchhike from the nearest commuter train station to Saclay, where I worked. One morning, I got a ride in an old white Mercedes sedan with German license plates. I asked in my then horrible French if the driver could give me a lift to Saclay. It turned out that he was going directly to my building. It was obvious to him that my French wasn't serviceable, so he changed our language to English, which he managed with great hesitancy, but much better than my French. When we got to my building, I thanked him in German for the lift. Our conversation continued in German. "Where did you learn German?" he asked. "Mostly from books and classes," was my reply, "but I spent the summer of 1965 in Bonn." "I was in Bonn in the summer of 1965," he said. We stared at each other for a long while, and then he said, "You recommended the book by Frauenfelder to me." I looked back at him and said "K— !" And so began again my relationship with one of my closest friends.

My first experience behind the wheel in Paris was unforgettable. I picked up my new FIAT-850 Spyder in Suresnes, a suburb of Paris, one late afternoon, and then had to drive back to Montparnasse. Around 5:00 p.m., I was driving down the Avenue de la Grande Armée, approaching the Arc de Triomphe, that great monument to man's inhumanity to man, because it stands at the center of a great traffic circle, eight lanes deep, into which emptied eight major boulevards. I was terrified. I managed to get across the Étoile (as the circle was then called) and proceeded down the Avenue des Champs-Élysées. I did not escape unscathed,

[7]Waiting to get my first correct computer output of my results made me an hour late for a date. My date was not impressed. Her parents thought I was a bit strange. What sacrifices I have made for science!

however, but lost a hub cap. After a few months, I learned the rules of the road in Paris. Eventually, I learned to circumnavigate the Arc de Triomphe at 100 km/hr (62 miles per hour) in my little red convertible. A few women refused to ride in my car again after experiencing this thrill. Today, it is almost impossible to do during daylight.

Automobiles are not always an asset in Paris, as in New York City. Very soon I rented a garage near the commuter station Massy-Palaiseau and, except for weekends, used my car only for the last ten kilometers from Massy to Saclay. Thus, I could spend most of my daily commute reading.

The FIAT-850 Spyder was a miracle of engineering design and fun to drive, but was not very sturdy, especially the clutch. By the time I sold it in September 1973. I had learned how to say "throw-out bearing" in three languages.

Two months after my arrival in Paris, I managed to interrupt production at the FIAT factory in Turin, Italy.

While I was interrupting production at the FIAT factory in Turin (in reality at the Bertone factory, a FIAT subsidiary next door), I decided to pay a visit to CERN, the European Center for Nuclear Research, outside Geneva, where I had been two months earlier, and surprised my friends there by showing up in the cafeteria with a very young woman, whom I had met in Paris and who had accompanied me on my drive to Italy. On the way back to Turin, we stopped off at the Grand Passage, a department store in downtown Geneva, to look around (she wanted to look around) before continuing to Italy. Having separated and having finished my explorations first, I went from floor to floor looking for my companion. On the fourth floor, which happened to hold the exotic lingerie department, I stood outside the elevator and scanned the area intently. A salesgirl, cute and blonde like my companion, approached me. "Vous cherchez, monsieur," she asked, "are you looking for something, sir?" "Oui," I replied, "une jolie blonde, "yes, a pretty blond." "Mais dans la lingerie exotique," she exclaimed, "but in exotic lingerie?" I couldn't resist. "Tant mieux" was my response, "all the better!" At this point, she slapped my face.

I discovered in Europe that I had a remarkable talent for running afoul of the law. During my first year in Paris, I went to Saarbrücken in Germany to visit my German friend, and he suggested that we cross the border into France where his sister's father-in-law, a fascinating person, was drinking with friends at an inn. The drive to the inn in my little red FIAT convertible took us along little mountain roads in Lorraine. When we stopped in the inn's parking lot, two French customs agents, who had been following my car since we crossed the border, approached us, their machine guns raised, and demanded my papers. They were bothered that my car had white headlights rather than the French amber headlights (my car was the export model and had export license plates). One of the agents suggested taking me in for questioning. I countered that my car and my papers were in order, and if they did that, there would be a letter of complaint on their supervisor's desk on Monday morning. My German friend was furious and suggested a much stronger action, that would certainly have resulted in our arrest. Fortunately, the customs agents didn't understand German and relented from their plan, and I had one more story to tell.

One evening in Paris, the riot police (the dreaded C.R.S.) were massed in force on the non-commercial side of the Place St.-Michel waiting to put down a student demonstration announced for that evening. A friend of mine with good sentiments but poor judgment crossed the street to argue with the police about the Declaration of the Rights of Man and their mistreatment of students. I feared the worst. Unable to look on any longer as the riot police began to fidget with their truncheons, I walked across the street myself, grabbed my friend roughly by the arm, nodded to the policeman, and said to her in a loud scolding tone, "Excusez-moi, mademoiselle, ce monsieur vous dérange?" (Excuse me, Miss, is this man bothering you?) The police smiled, after which I yanked my friend back to the busy side of the street and the safety of a café.

In early April 1971, I attended a two-week Nuclear Physics symposium (called the SIN School, because it had been organized by the Swiss Institute for Nuclear Research) in Zuoz, in the Engadine valley, high in the Swiss Alps. This required driving over the Julier Pass (2284 m) during a blizzard in my little red convertible.

On arriving in Zuoz, I purchased *J'apprends le romanche*, a primer of the local Rhaeto-Romance language "Ladin," and worked through it during the Physics talks that didn't especially interest me. Deciding to take skiing lessons in the afternoons, I needed to rent ski boots from a local shop. Bravely, I entered the shop, walked up to the manager and said in my best Romansh: "Bun di, eu veuless fittar s-charpas dal ski!" ("Good day, I would like to rent ski boots.") The poor woman, who was probably a native Swiss-German speaker, looked at me puzzledly. Her reply in English: "You mean boots?" I still haven't figured out whether this was a victory or a failure.

My experience on the slopes was an abysmal failure for the most part. On the first day, using regulation skis, I continually fell. On the second day, I did much better on the mini-skis. I caught on right away to a turn which my instructor called a "Christiana," after which he had me herring-bone my way up to the top of a hill and see how many I could do on the way down. At Christiana number seven I lost my balance and fell. The safety locks did not release, and I sprained my ankle very badly, which ended my ski experience for the rest of my stay in Zuoz and, as it turned out, for the rest of my life. At least, I learned the Romansh names for the two skis, *ski dal munt* and *ski dal valada*. Back in Paris two weeks later, I was still limping. My then girlfriend thought I was faking and trod unkindly on my foot. I let out a scream that stopped traffic.

In 1971, Akito Arima, famous Japanese haiku poet, nuclear physicist, eventual president of Tokyo University, the doctoral thesis advisor of my office mate, and a frequent visitor at Saclay, offered me a position in Tokyo, for one year if all I would do would be to learn Japanese, for two years if I would do some Physics as well. Foolishly, I chose to apply for positions in Germany instead.

In Paris, I once had a date with twelve women. This was my *Cours Pratique* class at the Sorbonne. I had been disappointed by the *Alliance Française*, which treated students like 14-year-olds, and in the spring I took the meatier course for foreigners at the Sorbonne. This was mostly a literature course, but there was a lot of class discussion, more than at the *Alliance*. The class had only three men, an American of about 18, a stuffy Swiss music student, and me, and about 15 young women. The women had all been spoiled or sheltered at home. In the entire class, I was the only student who could explain the expression "reduire une sauce" ("reduce a sauce"). Toward the end of the semester, I decided to organize a class dinner party. Twelve female classmates, one my girlfriend (who suspected my intentions), elected to come. The other students and our lovely professor weren't interested. I was able to arrange a private dining room at a restaurant on the Boulevard St.-Michel. The bill came to only 165 francs (about $30 at the time), which I, probably the only member of the dinner party with a decent income, graciously paid. (I had even given the waiter 50 francs up front to be extra nice.) After dinner, six of the girls remained for coffee at the *Café Lutèce*. Then, we were four for banana splits at the *Drugstore St.-Germain des Près*. By this time we had finished these, the Métro had stopped running. I led a caravan first to the vicinity of the *Louvre* on the Right Bank to see one of my "dates" safely home, then back across the Seine to the neighborhood *Val de Grace* for another, leaving me finally with my girlfriend about five minutes from my apartment. Paris is a city of many opportunities.

In August 1971, I was flying back to Paris after a brief vacation in Boston. On the plane, I met an 18-year-old girl, who was flying to Spain to take a summer course in meditation with some maharishi. "Have you been to Europe before," she asked? "Yes," I said, "I've been living in Paris for a year, and six years ago I spent a summer in Bonn." "You must be old," she replied, "I don't have a 'six years ago.' "

In Paris in the 1970s, young couples really did kiss languidly on street corners in April, but it was mostly adolescents. I fell madly in love in one April under an eave of the Fontainebleau Palace, where I and my girlfriend had sought shelter from a sudden downpour.

In Paris in 1972, an Arab held a knife to my throat in the Métro. I was coming home after dinner to my apartment with my girlfriend and a girlfriend of hers, who was visiting us from Darwin, Australia. An Arab, sitting across from us in the Métro car, began taunting me that I was with two beautiful women and didn't have an erection. Apparently, he had had an unsuccessful evening accosting women on the street and asking them to go to bed with him. I pretended not to understand him. My more-refined girlfriend didn't understand him. When we got off at my stop, he followed us, held a straight razor to my throat, and said

in French that I wasn't a man and that he should kill me. I was wise, didn't answer him in French, but said gently and repeatedly in English, hoping he wouldn't understand, "are you alright, can I help you?" and interspersing those words with "H—, go get help, don't just stand there like a turnip, get help!" My girlfriend and our visitor were paralyzed. Fortunately, a new train arrives in the Métro every 50 seconds, so that he was quickly threatened with witnesses. He put the razor away, got into the next train, and departed. We spent an interesting night after that. The next day, my girlfriend and her friend went to England to explore the Lake Country, and I was left to my own devices. After work, I bumped into an American girl, the epitome of the Southern California beach bunny, whom I had met when I first arrived in Paris. (She was, in fact, the high-school friend of the girl I had taken to Italy.) We decided to have dinner together. Strolling down the Boulevard St.-Michel, who should be coming in the other direction but my Arab acquaintance from the night before, apparently, wearing even the same clothes. I pretended not to recognize him, but from the corner of my eye, I could see him constantly turning to look at us. It must have been devastating for him. At the corner of the Rue des Écoles, I stopped a policeman and told him that an Arab was walking up the street who had assaulted me with a knife the day before. The policeman looked at me and replied, "what are you, a student?" Furious, I pulled out my wallet, showed him my work card with its tricolor stripe and the words *Premier Ministre* (in France, atomic energy was part of the prime minister's portfolio), and said "No, I'm an engineer for the Atomic Energy Commission." The policeman was embarrassed but replied only that he could do nothing until I had filed a complaint at the Préfecture. I didn't bother, and I never saw my Arab assailant again.

I was appreciated by my French colleagues for my discoveries of many excellent inexpensive restaurants in the city. When my laboratory organized a conference in Aix-en-Provence in 1972, a city that none of us knew, I (an American!) was tasked to find a restaurant in Aix for the organizers' after-conference celebration. I, of course, did the smart thing and asked a Saclay colleague who had been a student in Aix, for advice. I should have trusted my books instead. The food was ok but not exceptional.

I could not drive all the way from Paris to Aix in one day, because my little red convertible developed alternator problems half-way there, and I was forced to stop overnight in Lyon rather than run down the battery with my headlights. The evening was not a complete loss, because I managed to pick up the cashier (a very cute art student) at a BP station on the Autoroute. (Where, oh where have you gone, golden days of my spring?) Sadly, on the trip back, she wouldn't go out with me again, even though I had brought her a big bag of pastilles from Montélimar. I guess she had been expecting more from me on the first date.

While in Aix-en-Provence, I was nearly arrested for supposed seditious activities. The French had decided to test an atomic bomb during the conference to show solidarity, I suppose, with the nuclear physicists at the conference. The Aix students were up in arms. One day, I was walking down the Cours Mirabeau and spotted some students passing out flyers protesting the nuclear test. I thought I would have some fun. "Oh," I said, "you're protesting against me!" Immediately, I was surrounded and made the target of all the student complaints and pleadings about the test. I assured them that the people at the conference were all peaceful, harmless academics. If they wished contact with the bomb makers, they should go to the nuclear facility at Caderache, near Marseilles. At this time a policeman came up, looked at one of the flyers, decided that we were engaged in seditious activities, and asked for our identification papers. The only other adult there, asked to be allowed to retrieve his papers from his car. We never saw him again. So there I was, an American living in Paris who, obviously, had come to Aix to stir up trouble and, equally obviously, was corrupting the morals of the two high-school girls who were there with me. I protested that I had done nothing wrong. The policeman threatened to take me to the precinct. At this point, who should be walking up the street but my colleague, the famous physicist Albert Messiah, who had written an excellent two-volume book on Quantum Mechanics, which I treasure. I stopped Messiah, introduced him to the policeman, and asked if he wished to demand the identification papers of Monsieur Albert Messiah, director of Physics for the entire French Atomic Energy Commission. Messiah asked if there were something wrong, the policeman said no, and he continued up the street. The policeman continued to takes notes in his little book. Suddenly, the

other shoe dropped. “You’re not with the two girls?” he asked. “No,” I replied with a smile. “You’re with the other gentlemen?” “Yes,” I replied with a bigger smile. Now came the apologies: “Oh, monsieur, you know, whenever anything happens in Aix it’s the poor cop on the Cours Mirabeau who has to investigate.” I expressed my sympathy, suggested that the two high-school girls had done nothing more than express their opinion, which should be protected, shook hands with him, and went on my way.

I was offered the job of managing a small hotel in the Latin Quarter of Paris during August 1972. I had stayed in that hotel for a month when I first came to Paris and was looking for an apartment, and had come to know the family who ran it very well. The family had never been able to take a vacation together, because someone had to stay behind to run the store. I had lived in Paris for two years and knew my way around, I spoke the three principal languages of the clientele, and I could be trusted, not only not to embezzle hotel receipts but also to call a plumber or an electrician or the family in Pépignan if necessary. I seemed the perfect solution. Unfortunately, a previous commitment in Karlsruhe, West Germany, (my next position) forced me to decline this offer. Another big mistake.

A research group at Saclay privy to my earliest thoughts on the true nature of a long misunderstood physical process, tried to plagiarize my ideas and publish them before me. I became aware of this situation very quickly and kept particularly quiet after discovering serious flaws in my earlier statements. The other group, whose “intellectual” efforts were limited to supposed simulations using my earlier flawed model, published a string of papers claiming impossible results. Their results were later exposed as irreproducible in the journal *Nuclear Physics* by a physicist at the University of Chicago. My correct theory, published before those of my “competitors,” has remained the basis for studies of this effect for more than three decades.

What was most galling to me about this plagiarism was that the Thoeretical Physics Service at Saclay split along group lines in its support of me or the plagiarists. The nuclear physicists were solidly behind me, while the particle and field theorists defended the plagiarists, who were from their group. Worst of all, I had learned about the effect from a member of that group, who was looking for a nuclear effect (one that was obviously wrong) to help explain it. I told this person exactly what the cause of the effect was and offered to work out the details and the simulations with his graduate students so that they would share the credit for the solution. After two weeks of collaboration, the graduate students or their boss decided that they could finish the job without me.

Despite this unpleasantness, this research had enormous value for me. It was the first time that I had learned about a problem, found the solution independently, and directed the research effort (I found a new collaborator in the experimental group at Saclay that had done the most recent and most extensive experiments). It was this research that truly made me a physicist. I was, in fact, carried away by it. I was to meet a friend for dinner in Paris that evening. When she found me in the Denfert-Rochereau Métro station, I was sitting on a bench with a publication of the Saclay experimental results, a block of paper, and my slide rule checking that the experimental results was consistent with my model.

One of my friends at Saclay was a Russian physicist rumored to be a KGB informant back home. Another was a Hungarian physicist who was the secretary of his party cell back in Budapest. When the Russian was leaving to return to Moscow, I gave him a copy of *1984* by George Orwell, with the annotation “to D—, a novel which began as a parody of your country, but which has become a parody of mine.” He left the book in his desk. My Hungarian friend found it and took it with him to Budapest.

In 1950, Hemingway told a friend, "If you are lucky enough to have lived in Paris as a young man, then wherever you go for the rest of your life, it stays with you." It is even more than that. Three years after I left Paris, I planned to spend a week there on my way to the States for a vacation. I was living in Israel then, and sending money out of the country was complicated. But I wrote to the hotel in the Latin Quarter where I always stayed, hoping they would hold a room for me. When I got to the hotel, the managers’ son was there, and when I asked if they had a room for me, he said “yes, but my mother has a deal for you.” The family was vacationing in Pépignan in the south but had just bought a new apartment, which was complete

except that the stove was not yet connected. If I would promise not to use the stove, I could stay there for free. Of course, I agreed.

The apartment was only a ten-minute walk from my old neighborhood in Montparnasse, so I decided to go to my old café for breakfast. I stopped at the papéterie next door to buy a newspaper, and the old man who ran it, who hadn't seen me for three years immediately asked, "where have you been for so long, monsieur?" At the café the same waiter who had brought me breakfast for almost two years came to my table where I had usually sat, smiled broadly, and asked "un double exprès?" I replied, "oui." "Avec des croissants?" "Comme toujours!" The café (*Le Cosmos*, across the street from *La Coupole*) was not busy, and the waiter and I enjoyed a long conversation. I walked to the Latin Quarter by the same route I had taken for two years, and visited a mens' clothing store, *Dorven*, now gone from the Boulevard Saint-Michel. The owner, Monsieur Wolf, immediately asked me where I had disappeared to. We spoke for a while, and I asked if a credit I had from more than three years before was still valid. "If it is on our books," he said, "of course!" At that moment, his wife spotted me from the back of the store and came running. "Monsieur Shuster, Monsieur Shuster, do you know that you have a credit for 207 francs which you have never used?" The rest of the day was spent more anonymously, but was equally wonderful.

A friend of mine was in Lyon for business that day, but was to meet me for dinner that evening. He called from the airport to say that there had been a slight change of plans. His girlfriend had been waiting for his arrival, and he decided that now was the time to propose. He asked if he could bring his new fiancee along. I took them to my favorite restaurant in Paris, a wonderful little place located in a 14th-century cave in a little street not far from the Panthéon. I had told them in the car about my experiences and told them also how this restaurant had become the favorite restaurant of many of my friends in Paris. The fiancee asked if I received a discount for bringing in so many new customers. I said no, but it was nice that the maîtresse d'hôtel called me by name whenever I arrived. My friend wagered a bottle of wine that she wouldn't recognize me after three years. Since wine was included in the price of the meal, I accepted. We descended into the cave. The maîtresse d'hôtel looked up at us. "Une reservation pour trois," she asked. "Oui,"" I replied. She looked in her book: "Monsieur Shuster?" she asked. Again I replied "oui." This meant nothing, because my name was in the reservation book. Then she paused for a long time and said "it has been a long time since you've been here, Monsieur." I love Paris like I love no other city. Sadly, I have not lived there for 35 years. It remains my city like no other, but only in my dreams.

In the spring of 1972, I met a professor from Karlsruhe in West Germany, who invited me to join his group the following fall. This was the beginning of one of the worst years of my life. The position, as I learned after I had arrived, because it was in the civil service, required me to take an oath stipulated by a decree of the Third Reich (RGBl-I, S. 351, version of 22 May 1943). I refused. The chairman of the Physics Department, whose father had come close to being executed during World War II for disseminating dissention among the troops and had become a Nazi hunter after the war, sheltered me from repercussions. That I had not signed the oath, however, was well known in my institute, which made me the object of constant taunting, because I stood against German law. My landlady turned out to be a monster. I was not a happy camper. By February I had an offer of a lectureship at Tel-Aviv University, which I kept quiet until the end of the semester.

In Karlsruhe in late 1972, a very charming eleven-year-old, who shared my birthday, named her guinea pig after me. For a long time, I would write to the family via my god-pig. Mousie, the eleven-year-old, eventually wrote a master's thesis on American Rap Music at the University of Munich. We had dinner together in Munich in 1989, but Malcolm had passed away long before, Mousie was already 28, and it was just not the same.

Karlsruhe was a very unpleasant place to live. My neighbors would inform on me to my landlady if I kept my shutters closed during the day, when the apartment was empty. The police in Karlsruhe would regularly stop me to check my identity papers if I were driving down the main street after 11 p.m. And of course, there was the loyalty oath.

German bureaucracy has no equal in other countries. As an American academic working in Germany as an academic, my first two years of salary were non-taxable by international treaty. When I went to the Finanzamt in Karlsruhe to obtain the necessary paperwork, I was first asked my name, to which I replied "Malcolm D. Shuster," and then my profession, to which I replied "wissenschaftlicher Assistent" (research associate). The clerk was flabbergasted. "But to be an Assistent," he said, "you must have a doctorate." "But I have a doctorate," I replied. To his great consternation the clerk had left no place on the form to insert the prefix "Dr." His face reddened as he wrote "Dr." in the margin. Then he turned to me and shouted angrily "That is also part of your name," and then in the most subservient tone added "Herr Doktor."

Despite my problems because of the Nazi loyalty oath, my friends in Germany included a former member of the Nazi party during World War II and an interpreter for the *Oberkommando Wehrmacht* assigned to the Gestapo in Paris. These were two excellent people, whom I was proud to have as my friends.

At the Institute Christmas party in 1972, I resolved to teach my colleagues to sing "Rudolph the Red-Nosed Reindeer." I wrote the words on the blackboard and led the singers, tapping out the beat with the pointer. The director of the Institute, a man who had reached adulthood before Hitler came to power, was not participating. This I found unacceptable. I looked at him sternly and said, "Herr H—, Sie singen nicht!" To everyone's relief, he smiled and became a gleeful chorister.

There was an Arab (Lebanese) student in my Institute, with whom I would argue Middle East politics. We took the obvious sides. Our discussions became so heated at times that the Germans would intercede. They just didn't understand. After these discussions, which took place at our Institute coffee hour in the late afternoon, his girlfriend would sometimes come by, and we would all three go out for pizza.

In May 1973, I think I came close to having a nervous breakdown in Germany. My self-prescribed cure was to spend a long weekend relaxing with Canadian friends in the suburbs south of Karlsruhe, playing with their three-year-old son and their two schnauzers, and getting a lot of sleep. For a year afterward, I could not speak German without frequent stuttering.

In June 1973, I resigned my academic position at the University of Karlsruhe in protest, writing to my department chairman, the rector of the University, and the minister of culture in Stuttgart. The chairman of my department wrote a letter to the Ministry of Culture of Baden-Württemberg defending the moral principles which prevented me from signing the oath and suggesting that "a more noble wording be found for German law." The Ministry of Culture never answered my letter or that of my department chairman but simply rebuked the University for having allowed me to resign rather than firing me. The professor in my institute, who had invited me to Karlsruhe the year before, threatened to label me a troublemaker if asked for a recommendation. Nonetheless, my protest bore fruit. The oath was eliminated a year later.

In October 1973, I traveled by boat from Venice, Italy, to Haifa, Israel. The first stop was Bari during the cholera epidemic, where, fortunately, we did not take on provisions. In Korfu, Greece, I risked missing the boat by renting a bicycle in port and riding alone about the island for two hours. In Athens, I had just enough time to visit the Acropolis with ship friends, one of whom became my girlfriend in Israel. My table companions in first-class dining were the sister of German novelist Lion Feuchtwanger, a young British Anglican priest, and his mother, who commented incessantly that her son was her father. The first-class food was copious and excellent. I gained four kilos in six days.

I arrived in Israel to become a lecturer at Tel-Aviv University only two days before the outbreak of the Yom Kippur War in October 1973. I spent part of Yom Kippur 1973 driving my cousin, a colonel in the War of Independence, to his mobilization point. For the next three years I would regularly staff a guard table in the lobby of the Physics building examining briefcases and bags for concealed weapons and explosives and paying scant attention to the many students walking around openly with automatic weapons slung over their shoulders.

A first cousin from the Soviet Union, with whom I had corresponded from 1964 to 1968, had arrived in Israel a week before I did and introduced me to his mostly American friends at his immigration center as "his

brother," an acceptable designation in Russian ("first cousin" = "second brother") if not in English. This aroused suspicions that "his brother" was a KGB spy, because I had travelled so much outside the USSR and spoke English perfectly. I did not dissuade them from this notion, and even spoke with a slight phony Russian accent. When they finally summoned the courage to ask me how I had been able to travel so much, I replied: "For some of us, there are ways."

I was nearly machine-gunned in 1974 by the bodyguard of Shimon Peres, Israel's then minister of defense. This incident occurred roughly a week after I was received by the president of Israel at Beth Ha-Nasi, the Israeli White House in Jerusalem. My department chairman, Yuval Ne'eman, a very famous physicist, was then the deputy minister of defense intelligence.

My brush with death at the doorstep of the Israeli minister of defense is worth retelling. Early in my second year in Israel, I became friends with a former New-Yorker who lived not far from me and who invited me to come meet her family. I did not know that she lived in the apartment adjacent to that of Shimon Peres, the minister of defense, near the top of a high-rise apartment building. The high-rise had odd-floor and even-floor elevators, and by chance, when I went to visit, I got into the wrong one. I simply went up to the floor above my friend's apartment, and went one floor down the stairwell. When I came out, I was greeted by an Israeli soldier who pointed his Uzi at me and shouted "What do you want?" By now, I had learned the proper way to address Israelis. I gave him a look of exasperation, walked past him as if he were a panhandler on the street, asking him nonchalantly "Haven't you anything better to do?" The soldier, convinced by this that I was ok, sat down and placed his Uzi in his lap. When my friend opened her door, I said "E—, I think the neighborhood is going downhill." She smiled and explained the situation. It seems that her son, who became my insurance agent in Israel, was offered the same posting during his mobilizations. Afraid, however, that his mother would be offering him milk and cookies every hour, he elected instead to ba a guard at the home of the prime minister, Itzhack Rabin.

In 1975, I was nearly the victim of the bombing of a movie theatre in Tel-Aviv in which 14 people were killed and more than 50 injured. I avoided the incident only because my girlfriend couldn't get her kid to go to sleep, so we stayed home.

In Israel, I was a participant in a love pentagon. My girlfriend's husband was having an affair with another woman whose husband was having a homosexual affair. Who says that nuclear physicists lead dull, sheltered lives?

For the most part, I found life in Israel unpleasant. In Karlsruhe, I was annoyed by German inflexibility and the desire to denounce one's neighbors; in Israel it was the frequent dishonesty and the common mistreatment and verbal denigration of non-Jews that spoiled almost every day. The Israelis did not try to short-change me, but they often gave me something different from what I had asked for without telling me first and were extremely angry when I refused to accept it. My girlfriend, who had been raised a Catholic, and who did not look Jewish, felt the prejudice toward her. My girlfriend in Paris, who had visited a kibbutz for three weeks and, as a very sincere Christian, had regarded Jews as heros of her faith, came back from Israel completely disheartened by the experience. I thought she was exaggerating, until I saw for myself years later.

I was arguing politics once with an Arab acquaintance in the Old City of Jerusalem. In 1976, before the Jewish settlements on the West Bank, before the Intifadas, and while Yitzhak Rabin was prime minister, I was optimistic about peace. "Hayeel," I said, "in fifty years, the Palestinians will forget the war, and there will be peace between the Jews and the Arabs." "No," he responded, "not until the Arabs are permitted to return to their homes in Israel." "Well," I continued, "maybe after a hundred years." "No," he shouted back, "not even after five hundred years." "What about a thousand years?" "No!" "Two thousand years?" "Still no!" I had steered my friend to the desired point in the discussion and could resist no longer. "Hayeel, my brother, let me embrace you. You are a Zionist!" The last I heard, Hayeel had moved to Florida.

Israel shares one characteristic with the Palestinian Authority: both of these governments have succeeded in driving Christians from their domain. Bethelem, for example, was 62 percent Christian at the signing of the Oslo accords, now it is only 20 percent Christian. The judification of Tel-Aviv and the gradual eviction of both Moslems and Christians is well documented even in the Israeli press. Neither, certainly, is near the worst of the ethnic cleansers, even in the late twentieth century.

A professor at Tel-Aviv University threatened to blackball my promotion to tenure, unless I made him a co-author of a publication. This was the penultimate straw at Tel-Aviv.

On February 6, 1976, I lost my faculty position at Tel-Aviv University when the University rector (often called the "rectum"), to demonstrate his power during a dispute with the University president about who should control funds, abruptly terminated the positions of all 800 non-tenured faculty. (Reasoning: If he couldn't control funds, then he couldn't pay his faculty.) This was front-page news in the Israeli newspapers. It was also the last straw.

Miraculously, on February 7, I received a telex from the Physics Department at the Virginia Polytechnic Institute and State University in Blacksburg, Virginia, notifying me that I had become one of five finalists for a tenure-track position, and inviting me for an interview. I had not even applied, but, I suppose, my name had come up frequently in discussions. I did not get the Blacksburg position, but I was able to arrange a visiting position at Carnegie-Mellon University while I was in the States. My position in Tel-Aviv was later reinstated, but not before I had made commitments to CMU. I returned to Israel only to complete the academic year.

When I was in the process of leaving Israel, I learned that I was regarded as an Arab lover by many of my colleagues, because I was friends with the one Israeli Arab graduate student (a Christian, liked by everyone) in the Nuclear Physics group, because I would spend most of my Saturdays in East Jerusalem or on the West Bank, and almost certainly, because I often complained about the appalling vandalism of Arab property on the West Bank and the harassment of Arabs there by bored Israeli soldiers. (I had been a frequent eye witness.) Jews, I told my colleagues, should not behave like this. That I had a vaguely Christian girlfriend (not an Israeli) probably didn't help my status.

In fact, I was attracted to East Jerusalem and the West Bank because of the Jewish historical sites, and because Israel proper was very boring on the Sabbath.

I never learned Hebrew well. my greatest feeling of loss from my time in Israel. Although I could get by, my Hebrew wasn't good enough for teaching nor for making friends. Part of this came from having a girlfriend who also didn't speak Hebrew. Partly, this was due to my general unhappiness with Israeli society.

I was sorry to leave Israel, not because I wanted to stay, but because the country had been a bitter disappointment. I have met many fine Israelis, people I have been proud to know, but overall, I found Israel to be the most arrogant and dishonest country in which I have ever lived. In the United States I have felt the effects of antisemitism many times, but this never made me feel less than proud to be a Jew. It is only in Israel that I have felt ashamed to be Jewish. During a thirty-year career as an engineer, it has only been Israeli colleagues who have republished my work as their own. I have returned to France and Germany many times since the 1970s, but never to Israel.

The Christian graduate student in the Nuclear Physics Group at Tel-Aviv University also left Israel eventually. Shut out because of his religion from possible employment in his field in Israel, he came to the United States.

In Pittsburgh, where I was a visiting assistant professor for the academic year 1976–77, I dated the estranged wife of a local drug lord and took a course on nude photography. I still looked younger than my years and dressed like a graduate student, so the undergraduate women I taught would sometimes come to my office with candy or soft drinks to flirt. They were only slightly confused by the fact that I had a much nicer office than the "other" graduate students. I told them simply that it was because I was "important."

In October 1976 in Pittsburgh, I was mistaken for black. I had spent the previous week and a half in Boston, where I had buried my mother, and I took the Greyhound bus back, because I wanted to put some time between Boston and Pittsburgh. On the bus, I was sitting next to an African-American man of about 60. Boston, with its tightly-knit ethnic neighborhoods, was then experiencing race riots over busing, and we were discussing this calmly, trying to understand how the problem could be fixed. There was a young African-American male, maybe 20 years old, who didn't care for our conversation. We reached Pittsburgh after 10:00 p.m. and decided to share a jitney cab, since we were all three going in the same direction. I sat in the back seat with the old man, and the young man was in front with the driver. The young man immediately turned around to us and said he didn't think it was right for us to be talking about what we had on the bus. I answered that if you don't talk about problems, they don't go away, to which the old man and the driver both said "Amen." The young man got off first. As we were driving to my destination, I said "that boy has a chip on his shoulder. I hope he gets rid of it before it gets him into trouble." To this the driver replied, "well, being black doesn't bother you none." When we got out of the cab, so I could pay my fare, he saw that I was not black. I have wide lips and (at the time) very curly hair, so he couldn't tell in the dark that I was not, and I was in a jitney cab with two "other" black men late at night, not a common practice for white people. He began to apologize. I looked him straight in the eye and asked "what the hell are you apologizing for?" He smiled and shook my hand. A tiny victory, to be sure, but better than a loss.

My year in Pittsburgh was a turning point for me. I had had my fill of the pettiness, the backstabbing, and the dishonesty of academia (these were not absent at CMU); my mother died early during that academic year; and I finally ended what had been a long, very intense and heart-rending long-distance relationship. I was looking for a clean break with the past. I was to give the Nuclear Physics seminar at the University of Virginia in February 1977 and planned to visit a friend in Maryland along the way. The friend suggested that I interview with his company. I did, and I did enough free consulting during my interview to get my name on a company conference report, my first publication in Astronautics. A short time later, I received an offer of employment. As a result, at 5:00 p.m. on May 14, 1977, I ceased to be a nuclear physicist, and at 9:00 a.m. on May 17, 1977, I suddenly found myself a rocket scientist. I have never looked back.

On July 1, 1977, by an act of the Praesidium of the Supreme Soviet of the Union of Soviet Socialist Republics, I became a citizen of the U.S.S.R., a distinction I held until the dissolution of the U.S.S.R. on December 26, 1991.

At CSC in the late 1970s I created the persona of CSC "employee" Lamont Cranston (named after "the Shadow"), who was regularly paged over the intercom system and who was even profiled as "employee of the month" in the CSC Attitude Operations Newsletter (this with the noble conspiratorial assistance of Dr. James R. Wertz, the newsletter editor, I was the newsletter photographer). Many people were convinced that Lamont existed.

The company softball team was called the "CSC Bytes."

The development of the QUEST algorithm for attitude estimation, my best-known work, was also my very first task in spacecraft attitude estimation at the Computer Sciences Corporation, where I worked from May 1977 until October 1978. This was a subject about which I had known absolutely nothing three months before. I managed to stumble through this work in about one year and fiddled with the software for years afterward, never expecting it to have more than local impact.

When I presented the QUEST algorithm to my CSC colleagues in early 1978, the lecture room was packed. I think this may have been because I had announced that the seminar would be preceded by a slide show on "Girls of Tel-Aviv Beach"

An event which preceded my joining CSC by a few months is indicative of how foreign attitude was to me. My friend, Jerry Lerner, who would bring me into the company, dictated a differential equation over the phone, which I was to solve for him. Ten minutes later, my result flabbergasted him. Instead of a sinusoidal

solution, I had found a hyper-sinusoidal solution, because from hearing alone I had misinterpreted I, the moment of inertia, as i, the square root of -1.

My research program in Spacecraft Attitude Estimation began with an illness. In early 1979, I had a very bad case of bronchitis, which kept me out of work for almost two weeks. I had little desire to watch TV or to read, so I took a pad of paper and began to derive from scratch all of the relationships satisfied by the attitude representations. This was followed an outline of what I thought were the main tasks of Spacecraft Attitude Estimation, many of which had never received serious attention. I began to supply that attention, first redoing the things I knew and then trying to derive the things I didn't know. Two year later, I began to write a book (never completed, but there is still hope). Two years after that, I began teaching a graduate-level course in spacecraft Attitude Determination at Howard University. Thus began my research plan. Most of my research program is now finished, but a few things remain to be done. I am working on them now, and I will almost certainly find more.

In my second year at CSC, I was approached by an American physicist I had met in Bonn to apply for the position of American representative to an international (Big Seven) energy committee. My friend was then the current holder of the position. The idea of shuttling between the capitals of the most important industrialized countries and going on fact-finding missions to more exotic locations was certainly appealing, and I applied. Although, I was told, the search committee at Brookhaven National Laboratory had decided that I was the best candidate by a wide margin, I was not offered the appointment. I was told later that one important member of the search committee had vetoed my appointment on the grounds that the previous two members had been Jewish, and it was time for a change. I was not even sent a letter of rejection.

In 1979, despite having close relations (first cousins) in the Soviet Union, despite having had an uncle who had been an active member of the Communist Party of the Soviet Union, despite having changed my official country of residence six times in the previous fourteen years, despite having been in the employ of three foreign governments, despite having visited two communist countries, and, although I was still unaware of this fact, despite having Soviet citizenship myself, I applied for a security clearance, so that I would be available to work on CSC's classified projects. The project manager, sensing an easy score, made a bet with me that I wouldn't obtain the clearance within a year. As it turned out, I received a "secret" clearance within seven weeks. The project manager, who never recovered fully from his astonishment, happily bought me a magnificent meal at a French restaurant in Georgetown. In the end, however, I never worked on classified projects at CSC.

In December 1980, I decided it was time to leave CSC. My position seemed to be stagnating, and the job was beginning to feel old. A customer at NASA Goddard Space Flight Center suggested that I accompany him to the Christmas Party hosted by Business and Technology Systems, Inc., a small company founded by Andrew Jazwinski, a famous name in Estimation Theory. I had seen the film *Kramer vs. Kramer* not long before, and the analogy did not escape me. I, however, was in much better spirits than the fictional Ted Kramer. I was introduced first to Andy, to whom I announced proudly: "I made you rich!" "What do you mean?" he asked. "It means," I told him, "that I bought your book." "Ah," he responded striking his forehead with his palm, "another five dollars." I continued: "I come to you as a supplicant!" "Now what does that mean?" he asked. "It means I'm looking for a job." "What do you do?" "In my operation at CSC," I continued, "I'm the hot-shot analyst." "Well," he said, "we can probably use you," and he introduced me to one of his young turks. The young turk, I soon found out, had been my classmate of at MIT, and had worked at a company I knew in Boston before joining BTS. "I interviewed there once," I told him between bites of shrimp cocktail and caviar, "but I had the impression that the company put people into little boxes when they arrived and kept them there forever." My former classmate gave me a very strange look. "You learned that in one interview," he responded, "it took me seven years to learn that!" And so I left CSC a month later. A week after I joined BTS, my first journal article in Engineering, on the QUEST and TRIAD algorithms, appeared. My work at BTS was mostly on submarine-launched ballistic missile systems, but I

kept up spacecraft attitude estimation as a hobby. In retrospect, my three years and eight months at CSC were the most enjoyable period of my professional life as an engineer.

I am probably one of the few nuclear physicists turned rocket scientist to have enjoyed a brief career as a "porn star." In 1981, as a favor to a photographer I knew, I, a girlfriend, and another couple posed nude in various "artistically" entangled groupings for a series of photographs. The pictures were later exhibited to the public, often eliciting shocked and derogatory responses from gallery visitors.

In 1981, a friend asked me to spend the weekend cooped up with her in her apartment, so that we could catch a predatory former boyfriend who was breaking in regularly during her absence and stealing her underwear and pantyhose. We stocked up on food, hid our cars, and waited. The former boyfriend, in fact, owned a 38-calibre revolver, but we didn't think he'd come armed. I was armed with an axe handle. The very next evening, he showed up and entered with a key, which he had stolen, apparently, during an earlier break-in and duplicated. My friend occupied him while I telephoned the police. A search of his home revealed a large assortment of my friend's personal items. Less than a year later, she moved out of state. He followed her but eventually lost interest.

In 1982, while deeply involved with submarine-launched ballistic-missile systems, I offered to take the photograph of a Russian family in Georgetown. I learned later that the head of the family was a KGB attaché to the Soviet Embassy.

On Christmas Eve 1982, I saved the life of a very cute stark naked 14-year-old girl by executing a Heimlich maneuver. She never even told me her name.

One day in Montreal in the 1980s, where I had been visiting friends, I invited one of my friends to lunch. When the cashier saw "Dr. Malcolm D. Shuster" on my credit card, she began to describe her back problems. "No, no, Miss," I tried to explain, "I am a doctor of philosophy. If you have a sick philosophy, I can make it better." Unaffected, she continued to elaborate on her back problems. I listened patiently and told her, "you know, your problems may be purely symptomatic, or they may indicate a more serious condition. I suggest that you consult your personal physician." She was very satisfied with my free "consultation."

In 1984, Mickey Rooney stayed in my apartment. I, however, was no longer living there. I had just purchased a townhouse a mile from NASA Goddard Space Flight Center. Rooney was playing in *Sugar Babies* in Washington, D. C. just after I moved out of my high-rise apartment in College Park. Apparently, when he is on the road, he prefers to stay in a quiet apartment in the suburbs rather than in a hotel downtown and became the next tenant in my apartment, he and his bodyguards.

An incident in my personal life in 1984 and some events surrounding it were classified as confidential by the F.B.I.

In the summers of 1985 and 1986 I was a member of a group house at Dewey Beach, Maryland. By chance, I had joined the "toga house," which held the toga party in mid summer, when my birthday also occurs. Wanting to improve the authenticity of the toga party, I littered the house that Saturday with cards giving the Latin name for each of the refreshments, for the restrooms, etc. I had even bought an elaborate toga from a costume shop in the Los Angeles area a few weeks before. During the party, the house organizer suddenly announced without warning that "Professor" Shuster would give a lecture on Roman orgies. This turned out to be a ruse to get me into a more central location, so that I could be surprised with a birthday cake, but not knowing this, I decided to give a short lecture on the Roman Art of Kissing. I asked the party guests to pair up for the laboratory exercises and obtained a female volunteer. I discoursed first on the *basius*, the "basic" kiss, which consisted of a peck on the cheek. After demonstrating the *basius* and observing the success of my audience in their experiments, I went on to the *osculum*, or "little mouth" (from *os*, *oris*, "mouth"), which consists of puckering (i.e., making a small mouth) and touching briefly lips to lips. Finally, came the real business, the *svavius*, or sensuous kiss, what we call "deep kissing" and the French call "the shovel." My assistant balked at a demonstration of the *svavius*, although much of the

audience showed great enthusiasm for this part of the lecture. It was at this point that the cake was brought out.

BTS went through a lot of changes during my nearly seven years there. A great deal of animosity had developed among the principals of the company, and many of the top management had left. It stopped being fun to work there. The former vice-president of the company had migrated to The Johns Hopkins University Applied Physics Laboratory and had suggested to his new supervisor that I be invited to give my course on *Spacecraft Attitude Estimation* that I had been teaching at Howard University. I did, and they were sufficiently happy with it that they wanted to write a contract to BTS, Inc., so that I could spend time there as a consultant. I suggested that they hire me full-time instead. And so I joined APL. At this point, at age 43, my professional career and my personal life began to become more traditional.

In July 1990, I was asked to serve as a *rapporteur* at a Ph.D. thesis defense at the University of Nice in France. This was a great honor, as the *rapporteur* is the acknowledged expert on the thesis jury. (In this case, there were two *rapporteurs*, but I was the one with real clout.) The student had taken a short course from me in Toulouse the year before and wanted very much for me to be a participant in his thesis defense. The Ph.D. thesis defense in France is often only a formal affair. Not only the thesis jury is there but also many of student's professors, classmates, friends, and family. While the defense is taking place, family members are often outside the hall setting out the champagne and hors-d'oeuvres for the celebration which follows. I decided to have a little fun. I began my interrogation by discoursing on the difference between the thesis defense in France and in the United States. I stressed that American culture derives not only from Europe, but also from the Native American peoples, who often celebrated rites of passage with horrible tortures, sometimes demanding the tearing of flesh. At this point the entire audience gasped. Little remains, I told them, of these brutal practices except in the Ph.D. thesis defense. My questions which followed weren't very hard, but I asked them in an almost threatening tone, occasionally not letting the student finish his answer. When he began nervously to speak more quickly, I admonished him sternly to speak more slowly, because I did not speak French as well as he. The rest of the jury did not know what to think. When we left the lecture hall to deliberate on our decision, the president of the jury explained immediately to me very cautiously the possible outcomes: passed with very honorable mention, passed with honorable mention, passed, and failed, fearing all the while that my vote might cast a dark cloud over the affair. They had misjudged me. "Gentlemen," I told them, "if one is going to praise, it should not be by halves. I vote for passed with very honorable mention." At this point the rest of the jury immediately concurred and got up to return to the lecture hall. "No, no, no," I told them, "our decision must seem to have been very carefully considered. Let's sit and talk for ten minutes and let the others sweat a while." After ten minutes, we returned to the hall. The student looked uneasily at me. I looked down. At this point the president of the jury approached the podium and announced to the fearful audience that the student had passed with very honorable mention. The audience gasped once more. At the celebration which followed, the student's mother-in-law approached me and asked "why were you so hard on my O—?" "Madam," I answered, "if someone ever makes you the gift of a thoroughbred, I hope you will make it run." She then went to every person at the celebration to tell them what the "American professor" had said. I like to think that I made the experience more memorable.

The Astrodynamics community is not very large, and most senior people know each other as friends. This leads sometimes to extreme casualness and joviality at meetings. At a symposium in the fall of 1992 at NASA Goddard Space Flight Center, one of my former colleagues at CSC brought his two-year-old child to one of the sessions. The child was bored and began to make noise while I was presenting a paper. For a brief moment I stopped and the audience looked around at the child perched in the back row. Never missing an opportunity to clown, I shouted from the podium, "Be quiet Phillip, or Uncle Malkie is gonna' get you!" and continued my talk.

I have visited Brazil six times between 1989 and 1994. I find the Brazilians a constant delight and am always at ease there. In Brazil, I am always "Malcolm" or "Doutor Malcolm." "Doutor Shuster" does not exist there. I have never been mugged in Brazil, but the Brazilians have sometimes been afraid of me. During

my first trip to Rio de Janeiro, I was wandering around the Lagoa at 3:00 a.m. with a Brazilian woman I had met in a bar (Lord Jim) in Ipanéma. I was trying unsuccessfully to hail a taxi. None would stop. I guess I must have looked dangerous.

My second trip to Brazil had an amusing beginning. I arrived at the São Paulo airport in August 1990 to attend the first Brazilian symposium on Aerospace Engineering, to be held at INPE, about 50 miles away. I was to be one of the plenary speakers. A Brazilian friend was waiting for me on the other end of the Customs barrier. I motioned him to come in. The customs officer tried to stop him, at which point I told him "Esta OK, ele está o meu interprete!" (It's ok, he's my interpreter.) The customs officer let him in, not noticing that I had given this information in Portuguese. Brazil is a wonderful easy-going place.

I began my plenary talk at the symposium with the story of how I had become acquainted with the INPE Dynamics and Control Division. I had become well known in the 1980s for a paper on an attitude determination algorithm, which I called QUEST, which was unusual for its time and which a lot of people found difficult to understand. The Brazilians, however, had become interested in it, and had done some good work on it, unpublished except for a Portuguese-language conference report and a Portuguese-language master's thesis. I became aware of the master's thesis, and wrote to the thesis advisor expressing my interest and asking if that group had done any more related work. I was studying Portuguese at the time, and wrote them in Portuguese. I knew I was dropping a bomb. I soon received a letter from an engineer at INPE complaining that a professor at the University of Saint Paulo used my QUEST paper as a hazing for graduate students. Another INPE engineer called me at home to complain about the headaches that QUEST had given him. Both of these people and many other Brazilians became my good friend. I began my symposium by telling these stories and then paused, asked the head of the Dynamics and Control Division to come up to the stage, whereupon I presented him with a plaque bearing the inscription "From Malcolm D. Shuster to his colleagues at INPE" and a full bottle of Bayer aspirin for future QUEST-aches. The plaque is now mounted on the wall of the Division secretary's office, and it has become a rite for new INPE engineers in the division to take a pill from the bottle. For nearly two decades now, I have been sending giant bottles of Bayer aspirin for refills.

In 1993, the Brazilian National Space Research Institute (INPE) in São José dos Campos raised the American flag for a week in my honor.

In 1993, at a conference in Victoria, British Columbia, a friend from the University of Florida asked me to apply for a position there as full professor in aerospace engineering. In 1994, the next stage of my career, the gator years, began.

In October 1994, the head of the new Brazilian space Agency called me at home at 10:00 pm to invite me to attend a workship he was sponsoring at INPE. The problem was, he needed me to be there in 48 hours. I was expected, given my personality, to keep the discussion moving and entertaining. The problem was that the Brazilian consulate requires a full week to approve a visa. The consulate received a direct request by TELEX from the head of the Brazilian Space Agency, to no avail. The chief of staff of the Brazilian Air Force also had no influence. The consular visa office was adamant: one week. Finally, I called the Brazilian airline VARIG to cancel my reservation and told my sad story. The VARIG travel agent asked me to wait while she phoned the ambassador's residence. The VARIG office in Washington, D. C., had done many favors for the ambassador and his family. In half an hour, my visa was approved. Such is the distribution of power in Brazil. The visa, unfortunately, couldn't be issued until the next day, because the assistant consul had locked the stamp in the safe. Sadly, that was my last trip to Brazil. But it was a very nice trip, and the Argentine Space Agency, CONAE, learning that I would be in Brazil, invited me to spend a few days in Buenos Aires. These trips also gave me the chance to meet my Brazilian and Argentine relatives.

In August 1994, I joined the Department of Aerospace Engineerong, Mechanics and Engineering Science at the University of Florida, although I did not arrive or draw a salary until Decemver of that year. My office at the University of Florida was very close to Lake Alice, an unfenced alligator refuge on the University

campus. Occasionally, an emboldened and hungry reptile would begin roaming the campus and would have to be put down.

One of my freshman advisees at the University of Florida was a Moroccan student, whose first name was Yassir. At our first meeting he told me that he had been given the name in honor of Yassir Arafat (not true). I made him shake a little when I told him that I had spent three years as a lecturer in Israel. Although I never got to teach him, he was obviously extraordinarily bright. I decided to get rid of him and encouraged him to apply for transfer to MIT. He was turned down, but only because he had had low TOEFL (Test of English as a Foreign Language) scores when he arrived in the US. I told MIT they had made a big mistake. He retook the TOEFL exam and was admitted. On my advice, he repeated the sophomore year, because the last three years of the MIT Aero & Astro program are very closely integrated. For the next six semesters, he was the best student of his year in Aero & Astro at MIT. He continued at MIT through the Ph.D. We still keep in touch.

In the summer of 1996, I was working in Canada and enjoyed teasing a young cute employee at the local supermarket, who worked at the deli counter. She was very sweet but without any ambition and very uncritical. I convinced her that the reason deli ham was rectangular was that pig farmers put the piglets into rectangular boxes and kept them there until they were slaughtered in order to achieve a rectangular shape. She never asked what happened to the bones. By the end of summer I had gotten her to sign a petition against this inhumane tratment of pigs.

A French graduate student in my department looking for an advisor in Space work was the nephew of a physicist I had known in France, and of another physicist who would soon receive the Nobel prize. He was a jet pilot in the French Navy at the time and was annoyed throughout his career by the fact that his superiors kept telling him that with his family credentials he should pursue a career in Physics (which for the French navy meant nuclear submarines). Naturally, as soon as he introduced himself, my first comment was "with a family name like that, don't you belong in the Physics Department?" He could not escape. We also keep in touch.

In Florida, an event occurred which I thought was something of the past. I was plagiarized once more. A well-known Israeli engineer, a chaired professor, plagiarized one of my articles. He claimed to have developed a new algorithm by simply changing the order of two steps in my published algorithm, which could be made in either order. Essentially, he had done the equivalent of claiming that he had found a new and more basic and better recipe for a culinary dish by adding the salt and the pepper in different order. His resulting "more basic" algorithm was, in fact, more complex. His paper repeated only two-thirds of my published article. He published the remaining third in a conference report, but never got to publish it in a journal, perhaps because I had alerted the journals of the first plagiarism. Later, he and two Israeli colleagues published an "enhancement" of his earlier plagiarism, whose dependence on the plagiarism he tried to hide by making making the citation of my work very obscure. One of his coauthors, a chaired professor at the same institution in Israel, boasted that if I made the matter public, five of his relatives were lawyers, who would do anything for him.

My homage to W. C. Field: It would be a euphemism to say that I am overweight. At a conference at NASA Goddard Space Flight Center in May 1998, I apparently startled the young Goddard engineer manning the registration desk when I said my name. "A name that will live in infamy!" I responded with gusto. "Oh, we know who you are, Dr. Shuster," she replied. "I see that my reputation has preceded me," I continued, "a privilege usually delegated to my stomach."

While I was a professor in Florida, I sat in on the intensive courses in Latin and Ancient Greek.

In 1999, when I was beginning cancer treatment, I asked my oncologist how, a century from now, the medical profession would describe the treatment he had just prescribed for me. His answer: "barbaric!" At that point, I knew I had found the right oncologist.

Since the summer of 1999, my life has been dominated by my health problems. In May 2001, I even ceased to have an official employer. For several years, I simply languished and did nothing except to go for treatments and examinations at the Washington Hospital Center. In September 2002, at the end of a very debilitating five-month course of relapse chemotherapy, I feared that time was growing short for me. I quickly put fourteen completed but unpublished journal articles into proper shape for publication. Most of these had already been accepted for publication by *The Journal of the Astronautical Sciences*, but during a very long bout of depression, I never returned the final revisions, even though I had made them. I sent all fourteen to the JAS over a period of six weeks in the fall of 2002. The papers appeared two or three per issue from the late fall of 2003 (real date) until the spring of 2005. John Junkins called this "the greatest burst of creativity [he] had ever seen." It was really the greatest burst of trips to the post office that "I" had ever made. Some of the papers had been accepted eight years before. I suppose that the appearance of fourteen articles in less than two years appeared impressive. When I was in good health at APL in the 1990s, I could handle a full-time job and write on average four journal articles every year. Now that my backlog has been taken care of, I can manage only the same number of journal articles each year with no other demands on my time. The well may soon run dry, but there are still a dozen articles I want very much to write.

Currently, I suffer from coronary artery disease, chronic congestive heart failure, obstructive pulmonary disorder, restrictive pulmonary disorder, diabetes, and depression. My lymphoma may have returned for a third visit. My credentials in potentially fatal diseases possibly rival those in Spacecraft Attitude Estimation. Somehow, I manage to survive each crisis, though always a little weaker.

I have no illusions about my prowess as a researcher. Simply put, there is none. In Engineering, I was lucky to have fallen into an area which had been largely underdeveloped at a period when it needed development and to have had an employer who paid me to carry out that development. It seems also that I had just the right preparation (as a nuclear physicist!) for this work. My talents lie mostly in my ability to see what needed doing, in my difficulty in separating research from teaching (the latter aimed primarily at me), and in my capacity for hard work, enhanced, I suppose, by a lack of family to make demands on my time. I am driven to do research, much as a runner is driven to run. (Decades ago, I was that too.) I have been fortunate not to have been too smart or to have seen things too quickly. If I had been otherwise, my articles might have been more numerous, more concise and have presented better research, but perhaps, they would also have been less helpful to others, especially to newcomers, and probably more directed at great problems rather than at practical ones. Like St. Paul, I thank God for my infirmities as well as for my blessings. I am not a dummy, obviously, but my skill has been more in being able to use what I understand than in understanding many things or in understanding them deeply. Nonetheless, I am drawn to solve the most general problem that includes my current task, rather than the most restricted one. I am drawn also to publish. Six-and-a-half years of university Physics courses and a decade of research and teaching in Physics had not been completely for nought. My career has also benefitted from my having focused my research efforts for thirty years on one narrow area, so that I haven't needed to learn very much, and that area has become associated with me, although, fortunately, not with me alone. My "research" topics have been dictated primarily by the needs of real missions. QUEST was a work assignment, not an inspired calling. I will not deny that I have turned out a significant body of work, but there is no genius in my articles, only a great deal of hard work and self-criticism. A careful examination of my work will disclose that most of it relies on a very small number of ideas and techniques. Writing also does not come easily to me. I often spend years on an article and revise it 50 times or more. That other engineers have found my articles helpful has been my greatest reward.

I am fortunate to have gained only a small amount of fame and only among a very small group of people. I like it when someone compliments one of my papers or one of my ideas, but when they praise me personally, it cuts through me like a dagger.

My work has been as much a matter of the heart as of the mind. I tend to throw myself into my work body and soul. My research has always been a very personal activity for me. In difficult periods, unfortunately,

when I was suffering greatly from depression, I worked less well and often did not work to completion. Such periods occurred during my last three years as an academic physicist, when the dishonesty and backbiting began to overwhelm me; during my last few years at BTS, when the company was riven by discontent; at the University of Florida, where my colleagues were uniformly wonderful to me, but the graduate students I encountered, though equally nice, were mostly not up to the material (unlike my Howard University students of a decade earlier); and finally, during the first years of my cancer. I would sometimes do good work during those periods, but I wouldn't publish it, especially not as journal articles. A histogram of my publications over the last forty years of my life will reveal the long and frequent periods of my despair. These periods make up a third of my career. I might have accomplished much more had I had greater strength of character.

My relationship with religion is complex and inconsistent. I have always been aware that I was Jewish and aware of my requirements as a Jew, especially requirements of character. My life, however, was largely secular, its religious aspect confined to Hebrew-school classes until I was nearly fifteen, the Saturday-morning service or the celebration of the holy days, and little of these since adolescence. My parents were almost totally devoid of religious education, upbringing or fervor. There was never any mention of God in my home, no prayers at table except at the Passover seder (and then by me). By having gone to Hebrew school for the full six years, I became the religious authority of my unreligious extended family. During high school, I was often the cantor for the religious services conducted by one of the Jewish boys' clubs to which I belonged, but at sixteen, I was already questioning my beliefs. By the end of my freshman year at MIT, I had gone far beyond questioning. But the mind and the heart have different needs. Judaism and Jewish culture have always remained important to me. Jewish topics have always been a large segment of my reading. I hold Jews to higher standards than I hold other people, my single but constant act of Jewish chauvinism, but I am not a Jewish exclusivist. The great majority of my friends are not Jewish. My romantic interests have almost always been directed at non-Jews. If I watch a movie like *The Song of Bernadette*, then for the duration of the film, I suspend my Jewish identity feel myself a Christian. At the same time, I am painfully aware that I live in a country the majority of whose citizens believe the atrocious calumny that Jews conspired in the execution of God.[8] I have often proclaimed myself an atheist, but when chance, usually a bar-mitzvah, brings me into the synagogue, I pray sincerely. At those times I always volunteer to be the "hagba," the person who at the conclusion of the Torah readings grasps the open Torah scroll with two outstretched and widespread hands and raises it above his head for the congregation to see. In those moments, I sing louder than the rest: "This is the Torah which Moses set before the Children of Israel, according to the will of God and by the hand of Moses!" By the same evening, however, I will have reentered the world of pepperoni pizza and kung pao shrimp.

I am sometimes a hypocrite on the subject of religion. Once, I attended the Reform bar-mitzvah service of a second cousin. I was offended somewhat by the female cantor, the organ, and the choir. Most of the service was in English. At the end, someone asked me how I enjoyed the service. My response was that it had been very nice, it reminded me a lot of Judaism. And those, in fact, were my honest feelings at the time. I had become like the Jews of my grandfather's generation, who, if they were *Russishe*, wouldn't set foot in a *Litvak* synagogue, even though the service was identical.

I have been robbed at gunpoint twice in my life. The first time was in 1985 in the parking lot of a restaurant in Fort Lauderdale, Florida, by a soft-spoken man who was satisfied to show me only that he had a gun and agreed to let me keep $20. The second time was in 1991 in front of my townhouse in Greenbelt, Maryland, by two inner-city thugs who pressed a gun to my temple, forced me to the ground, and completely emptied my pockets. One of these two was later arrested after running a red light while driving a stolen car and was found to be in possession of my stolen American Express travellers' checks. Just before his trial,

[8]From adolescence, I have always rooted for the Muslims in crusader films. I knew that Richard the Lion-Hearted had financed his crusade in part with the property of the London Jewish community, massacred shortly after his coronation in 1189, while Saladdin had as his chief body physician the famous Jewish philosopher Maimonides. The massacre of the Jews of York in 1190, which opens André Schwarz-Bart's brilliant novel *The Last of the Just* (*Le Dernier des justes*), gives a truer picture of the treatment of Jews during Richard's reign than does Scott's *Ivanhoe*.

this young thug was released on bail without my being notified. Fortunately for me, he was killed in a gun battle before he could eliminate me as a witness.

What were the happiest years of my career? (1) My last two years as a graduate student at the University of Maryland, when I was doing my first important research and had the satisfaction of playing a rôle within my department and in the university. (2) My two years at Saclay. These years had their drawbacks, but they were the years in which I developed into a real physicist. Saclay was also the best place technically where I have ever worked, and of course, there was Paris. (3) My nearly four years at CSC. Beginning a new career is always a source of enjoyment and excitement. It was also the time during which I developed the QUEST algorithm, a frustrating experience, but the one from which I learned Spacecraft Attitude Estimation.

Truly bizarre blind dates: (1) a masochist and algophile who wanted very much for me to beat her black and blue for days on end; (2) A distributor of adult-size infant and children's wear for people attracted to infantilism; (3) the daughter of a famous novelist and screenwriter whose father's connections had gotten her a position first as a Playboy bunny and later as a lounge singer in Playboy clubs; and (4) a documentary filmmaker looking only for someone to help finance her next project. None of these relationships lasted past dinner.

I suffer from incurable chronic cinephilia, with a film library containing several thousand titles. I am an equally chronic reader and music lover with thousands of books and thousands of CDs and LPs. Nonetheless, for the past few years, I have not read a single novel or played a single CD or LP. I lack the concentration now to read or listen to long works,. Very much I have become a monomane, concentrating my efforts on producing the last of my publications. I watch films only when I am too tired to work and then mostly in segments.

Favorite authors: Fitzgerald, Faulkner, Hawthorne, Roth, Crews, Le Carré, Simonin, Pagnol, Kleist, Kafka.

Favorite composers: Bach, Mozart, Beethoven, Schubert, Chopin, Dvořák, Nielsen, Gershwin.

Favorite film directors: Hitchcock, Allen, Kurosawa, Truffaut, Rohmer, Chaplin, Wyler, Wilder, De Sica, Almodóvar, Eisenstein, Kieślowski, Antonioni, Ozu.

TV addictions: NYPD Blue (now recovered), Jeopardy, the History Channel, Turner Classic Movies, Maigret (the Bruno Cremer films, not the British television trash), Law and Order, and Tatort.

The Great Wheel of Rocket Science

My earliest professional ambition, while still in elementary school, when my favorite TV programs were *Space Patrol* and *Tom Corbett, Space Cadet*, was to become "some sort of rocket scientist." I did not see myself as a space cadet. I was particularly impressed by the white coats that rocket scientists often wore in the movies.

At age 12, in love with my electric train and my model car kits, I decided that I would become a civil engineer and build roads and bridges.

At age 14, I bought an old "College Chemistry" book, which I devoured, and decided I would become a chemist, a goal I maintained throughout high school, although most of my science reading was in Physics and Mathematics, some of it well beyond my comprehension.

At age 18, soon after high-school graduation, I decided to become a Physics major and remained true to that career choice for the next sixteen years. I flirted with being a Math major for one semester as an undergraduate, but always with the intention of becoming a physicist.

By age 24, I had narrowed my field of research to Nuclear Physics and, a year later, narrowed it still further to the study of the interaction of elementary particles with nuclei.

At the age of 33, however, unhappy at being an academic physicist and for numerous personal reasons, I took a job as an analyst/programmer for a software company with a large support contract from NASA. Here, after a few months, I was tasked to develop a faster attitude estimation algorithm. This became QUEST. From the moment that QUEST was developed, perhaps, one could say that I had become a rocket scientist. Nonetheless, I was largely invisible except to my local community and constantly looking for opportunities outside space work. When I gave notice at the company in 1981, there was still not one single article by me on spacecraft attitude in the journal literature.

At age 37, I began seven years of analyzing mostly defense systems, especially submarine missile systems. So much for my dedication to space. I was now posing as an electrical engineer, and even acquired a master's degree in Electrical Engineering. But I did a little spacecraft attitude work for my NASA clients and, in my spare time, wrote several articles on spacecraft attitude estimation for the journals and taught a graduate course in the subject. Clearly, I was still attracted to space work. My continued friendship with colleagues at my former company had much to do with this.

Finally, at age 44, I returned to spacecraft attitude work full-time. By this time I had seven published journal articles on spacecraft attitude estimation, including two of my three most frequently-cited works, and the beginnings of a reputation. My dedication to Astronautics was now firm and unwavering. Thus, in the end I did indeed become "some sort of rocket scientist." Occasionally, when I was working on a real spacecraft, I even got to wear the white coat.

And so it goes.