

## OFF TO COLLEGE ...

**ELECTRICAL ENGINEER** (Huh, what's that?) – My path to becoming an electrical engineer was an odd one and very much colored by the experiences of my father in trying to survive the depression years of the 1930s. He was born in Uniontown, Pennsylvania in 1907 into a German farming family with the surname of Stumpf (his birth name was James Craig Stumpf).



Rachel, Jim, and James



Rachel and Jim



Jim at Military Training Camp

In 1914 the family moved to Lodi, California in an effort to ease the condition of his father, Craig Stumpf, who suffered badly from asthma. Although the move apparently helped, nevertheless his father continued to suffer, and in 1923 they moved again from Lodi to the Los Angeles suburb of Glendale in Southern California (in the summer between my father's junior and senior years in high school!). Just as my father was graduating from Glendale High School in 1924, his father died. My father had done quite well in high school and had received a scholarship to attend Stanford University in Palo Alto, California, but the death of his father shattered those plans when his mother, Rachel (who during her whole life never worked!), told him she had no way to support herself without his help. He gave up the idea of going to Stanford and took a job riding his Indian motorcycle to deliver newspapers for the Glendale Times, something he did for the next seven years, eventually learning to be a pressman and acquiring various newspaper printing skills (including the fascinating skill of being able to fold a newspaper into a "pressman's hat"! ). He eventually began taking night classes through a WPA program and learned engineering drafting, something he became quite good at. The bottom line, however, was that he never acquired a college education and suffered professionally throughout his life from the lack thereof. He was determined that his own son (that was me!) would have a college education, however, and when the Second World War ended in 1945 he enrolled me in a radio course through a mail-order school called NRI (National Radio Institute). I was, of course, only 7 years old at the time and, although I was anxious to please him, I struggled mightily to understand exactly what I was trying to do. He completed each of the mail-order lessons with me and, as the course continued, built the radios and other equipment along with me as best his time would allow. In the course of our subsequent

moves to Santa Fe, Lubbock, Marietta, and finally Atlanta, we continued the course at an intermittent rate, although in the end (after a period of almost 10 years!) we never completed it. My graduation from high school (in 1956) brought an end to things, although at his prodding and eventual insistence I went off to college at MIT in Cambridge, Massachusetts and re-started the whole EE thing all over again. My own preference had been to get a liberal arts education, and I actually managed to get accepted at Dartmouth without his getting wind of it. When he found out, however, he became quite angry and, after his tearful recounting of his own failed efforts to get a decent education and how hard it had made his life, I finally agreed to give his approach to the world of engineering a try. Once I had switched to MIT, however, there was no going back, and my vision of an Ivy League education vanished into the night. Later, after I had graduated from MIT in 1960 and had then spent 3 years in the Army and 3 years living in Europe without every working in EE, he came to realize that our interests in life were simply not the same. I eventually ended up working as an EE for over 30 years, an odd follow-on that his premature death in 1967 at the age of 60 never allowed him to savor!

## Craig to Head Management Club For Coming Year

Jim Craig, manager of Program Evaluation, 94-01, has been elected president of the Lockheed Management Club for the coming year.

Other newly-elected officers are Jason Tuggle, first vice president; Les Malone, second vice president; Grady Sewell, secretary; Bob Patrick, treasurer; and the following directors; Ed Burn, Doyle Garrett, John Bucher, Al Carter and Charlie Ellis.



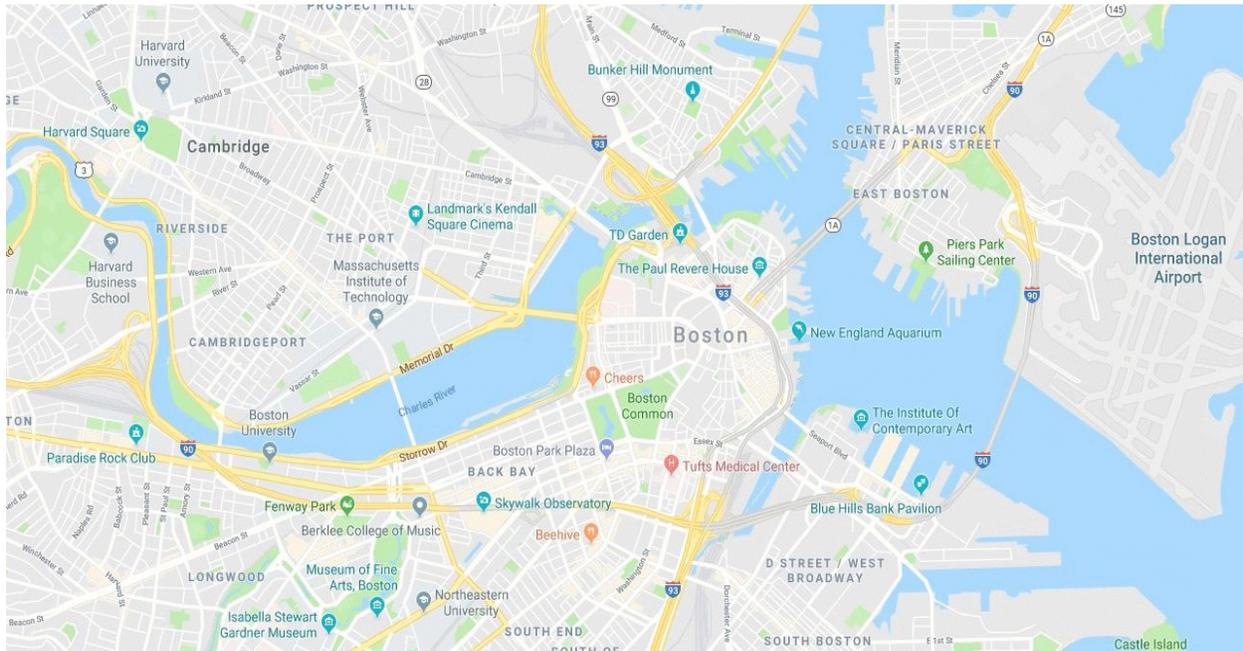
**Jim Craig** Craig has been active in LMC since becoming chairman of the Know Your Club committee in 1959. He has twice been man of the month, was elected secretary in 1964 and this year has served as first vice president.

Active in Toastmasters International, he was a founder of the Marietta club and became its charter president. He also served as president of the Atlanta Peachtree Club and in 1958 served as governor of the Toastmasters organization for Georgia.

Craig and his wife Carley, a widely known artist, reside at 521 Spring Valley Rd., N.W., Atlanta. They have a son, a daughter, and three grandchildren.

My father's work as a manufacturing engineer (at Lockheed, in the Master Scheduling Department -- the organization responsible for keeping the aircraft assembly lines flowing smoothly) kept him very occupied, and when the time came for me to leave for MIT in the fall of 1956, I simply climbed onto a Greyhound bus in downtown Atlanta and spent the next 24 hours in transit between Atlanta and Boston -- a ghastly experience which involved long stretches of monotony buried in the back rows of the bus and accompanied by a dizzying assortment of bus-rider types -- none of them from the upper echelons of society! It's amazing the things people do on long-distance busses, many of which at the tender age of 17 I had never before witnessed nor experienced. In addition, busses in the mid-1950s did not have on-board sanitary facilities, something which now and then would make for very awkward and smelly situations! I made a total of about a half dozen bus rides between Atlanta and Boston, after which I became determined either to fly or to get a car, especially after a transportation strike in 1957 that caused the trip from Boston to Atlanta to stretch out from 24 hours to over 60 hours (I even tried hitchhiking in the pouring rain outside of Richmond, Virginia that Christmas after spending hours in the local bus station trying to get on a bus to Atlanta). In the summer of 1958 I actually acquired a car -- a 1951 Buick Special (low end of the Buick line!) and never voluntarily got on a Greyhound bus again.

**LEARNING THE LAY OF THE LAND** – One of the great advantages of attending a school like MIT is its physical location on the Charles River, virtually adjacent to downtown Boston.



Although there was plenty of good transportation available, including an excellent underground system (the MTA of Kingston Brothers fame!), downtown Boston was actually a very comfortable walk away from the oddly-named Back Bay area where the Harvard Bridge connecting Boston to Cambridge was located (the same bridge I walked across at least twice very day). In addition, Massachusetts Avenue ('Mass Av'), the street which crossed the Harvard Bridge, was a major venue for both commercial and cultural activities and was a stone's throw away from such spots as the Museum of Fine Arts, Symphony Hall, Boston University, New England Conservatory of Music, the somewhat offbeat Isabella Stewart Gardner Museum, and, not to be forgotten -- Fenway Park, the home of the Boston Red Sox whose games were played within shouting distance of our fraternity house!

**INTRODUCTION TO MIT** – When I arrived in Boston in early September of 1956, school didn't actually start for another two weeks. At that time there was a popular pre-school tradition of "Rush Week" – a time during which entering freshman could sample the offerings of the various MIT fraternities with residential facilities. My parents were not at all big on my pledging a fraternity, but fraternities were very much a part of life on the campus at Georgia Tech in Atlanta where I had grown familiar with them through various friends (in addition, my experiences in checking out dormitory life at Georgia Tech had not been very positive). Getting me to even agree to attend MIT had been such a traumatic experience for all of us that they didn't fight my desire to try and get into a fraternity as a way of softening the transition from Atlanta to Boston. I had been informally "rushed" in Atlanta by a couple of MIT underclassmen during the summer preceding my freshman year, so I had a couple of places lined up to visit, along with several others that looked interesting (MIT had a total of around 30 fraternities – no sororities, as there were only a half dozen or so women in each undergraduate class at that time!). I spent about a week visiting

the various fraternities that looked to be of interest and eventually ended up pledging a smaller fraternity called Theta Xi (I later learned that the Georgia Tech chapter of Theta Xi was referred to by other 'more important' houses as 'Theta Zoo'). The fraternities offered housing along with 3 meals a day for 6 days a week for about \$120 per month – not a bad arrangement at all. Virtually all of the fraternity houses were located on Bay State Road – just across the Charles River from the MIT campus and about a 15-minute walk each way – short enough to walk back and forth for lunch each day if one walked briskly! At the start of my sophomore year I acquired a bicycle, which made the commute to campus much shorter, although a bit brisk during the cold winter months when the Charles River froze completely over! Automobile parking on the Cambridge side of the river near MIT was quite limited (virtually non-existent!), so even having a car didn't help much in that respect. If you tried to park in any of the MIT lots without a sticker, the campus officers had a habit of opening your hood (not locked back in those days) and removing the distributor rotor, making it very difficult to start your car without retrieving the rotor from the campus police office!



Looking back, circa 2003 ...

**SETTLING IN** – Once school had started, the realization of what MIT was all about began to set in! The freshman classes were demanding – calculus, chemistry, physics, humanities, and an elective. For my elective I chose drafting, since that seemed to be the most “engineering-like” subject, although for an EE it was not really all that useful. It did come in handy during my subsequent summers working as a draftsman at Lockheed in Georgia, however, so I never regretted taking it. The real issue was that the educational playing field of a typical freshman class at MIT was not at all level – a large percentage of the class had either gone to New England “prep” schools or attended the large Northeastern “polytech” type of school, where they had taken plane and solid geometry, chemistry, calculus, and calculus-based physics for at least two years. This was in contrast to those of us who had attended public high schools where the curricula were nowhere as comprehensive – such as in a place like Atlanta, Georgia, where I quickly found out that things had been especially backward. My math background consisted of algebra and plane geometry with never a hint of anything resembling solid geometry, calculus, or its physics-based applications. And my particular high school (Northside High) had been considered to be one of the elite schools in Atlanta!

**COURSE LIFE** – The departments at MIT are divided up (and referred to) by numbers from Course 1 to Course 24, and today there are courses listed which didn't even exist back in the 1950s (I was there from 1956-1960).

- Course 1 - Civil and Environmental Engineering
- Course 2 - Mechanical Engineering
- Course 3 - Materials Science and Engineering
- Course 4 - Architecture
- Course 5 - Chemistry
- Course 6 - Electrical Engineering and Computer Science
- Course 7 - Biology
- Course 8 - Physics
- Course 9 - Brain and Cognitive Sciences
- Course 10 - Chemical Engineering
- Course 11 - Urban Studies and Planning
- Course 12 - Earth, Atmospheric, and Planetary Sciences
- Course 13 - Ocean Engineering (deprecated; now under Course 2-OE)
- Course 14 - Economics
- Course 15 - Management
- Course 16 - Aeronautics and Astronautics
- Course 17 - Political Science
- Course 18 - Mathematics
- Course 20 - Biological Engineering
- Course 21 - Humanities
  - Anthropology (21A)
  - Foreign Languages and Literatures (21F)
  - History (21H)
  - Literature (21L)
  - Music and Theater Arts (21M)
  - Women's and Gender Studies (WGS)
  - Writing and Humanistic Studies (21W)
- Course 22 - Nuclear Science and Engineering
- Course 24 - Linguistics and Philosophy

The standard curriculum involved Courses 5, 8, 18, and 21 (Chemistry, Physics, Math, and Humanities), along with courses in one's specialty, which in my case was Course 6 (EE). Course 21 (Humanities) and its various sub-categories have understandably been greatly expanded since the mid-1950s. Course 22 (Nuclear Engineering) was a new branch in the 1950s – a time when nuclear reactors were still a brand-new phenomenon! Many of the other courses represent the mainstays of a traditional engineering/scientific education, and it's surprising how many branches of engineering and scientific endeavor one can sandwich together under a single roof!

Our fraternity was at that time housed in a single building at 66 Bay State Road, along with a number of "annexes" consisting of rooms or groups of rooms rented from neighboring landlords. Each of the four undergraduate classes in the fraternity was comprised of about ten students, so

that the overall population of the fraternity at any given time was around 50 active members. Surprisingly, however, those 50 or so students were spread out over the majority of the courses, with only the rather specialized Courses 9, 12, 17, 20 and various later add-ons to Course 21 and 24 being unrepresented. This made for a fairly broad set of interests. During the four years of my residence at MIT I had close contact with folks from Courses 3, 6, 10, and 15 and frequent contact with folks from Courses 1, 2, 4, 16, and 18 – roughly half the courses in existence at that time. Even though the overall content of an MIT education was largely limited in scope to scientific and engineering pursuits, the interaction between the various levels of that scope was considerable, giving one a very good strategic view of the engineering/scientific profession as a whole.

**CLASS SETUP** – At the beginning of each semester (two per school year) each undergraduate was handed a card (roughly a 3x5 format) on which was a layout of all 5 class days of the week along with an hour-by-hour schedule of all the classes to be attended by that student.

Times	Monday	Tuesday	Wednesday	Thursday	Friday
8:00					
9:00		14.32 lec E51-376		14.32 lec E51-376	14.32 rec E51-151
10:00	17.01 lec 32-144	14.05 lec E51-376	17.01 lec 32-144	14.05 lec E51-376	14.05 rec E51-361
11:00					17.01 rec 56-167
12:00	15.310 lec E25-111		15.310 lec E25-111		15.310 rec E51-145
1:00	14.20 lec E51-395		14.20 lec E51-395		14.20 rec E51-149
2:00					
3:00		15.678 lec E51-361			
4:00					
5:00					
6:00					

This was something that I had always taken for granted, but in the years since then I have become aware of the fact that in many schools there is a great deal of jockeying to find room in the classes that are required for a particular major. When I tell people about just being handed that little card with all the classes laid out for me in advance each and every semester for all four years, they look at me in amazement (although in my day, the cards were definitely not in color!).

**CROSS-SECTION OF TEACHERS** – Like most technical schools the instruction was separated into lectures and sectional groups, with the lectures given by Professors and the sectionals

manned by Teaching Assistants (TA's), who by and large were graduate students, almost all of whom came from other schools. One of the oddities of MIT was the fact that you had to be a straight-A student in high school to get in, but since class average on quizzes and exams was assigned a grade of C, the tendency was to come out with a C-average even though we had all been A+ students in high school! This meant that the majority of graduate students came from outside the Institute, where they had been able to maintain A averages, despite having had much lower grade averages in high school. Many years after I had graduated, a certain correction was made for this fact by assigning class average a grade of B, rather than C, but the fact of the matter is that someone planning to pursue an advanced degree is much better off academically by not choosing MIT for an undergraduate education. If one wants only an undergraduate education, it remains an excellent choice. It's rare, of course, that someone graduating from high school can plan their future that far in advance, but such is the way the system worked. The issue of "grade inflation" (practiced by many schools) is one which has been bandied about a good bit, but appears to have never reached a really satisfactory resolution.

In addition to the odd collection of TA's (with varying levels of competence!), one of the additional oddities of MIT was that a large percentage of the course lecturers were of foreign extraction, again perhaps a partial result of the uneven grading system, but also apparently stemming from a certain bias that the faculty had in favor of European educational institutions. I never quite got used to the fact that one had to learn the particular accent of any given lecturer in order to make sense out of what he was saying (which often enough was already difficult enough!). There may have been some sort of unconscious bias on the part of the administration towards the technical dominance that Europe had exercised in the pre-War period, something that had perhaps carried over into the 1950s due to the number of European academics who had left Europe and immigrated to the United States to escape the chaos of the post-War period on the continent..

An unfortunate example of a TA that still sticks with me was a swarthy grad student from Yugoslavia who seemed to rarely shower (and/or shave) and who dressed very sloppily in chinos, sports shirt, and rumpled sports jacket – all only occasionally cleaned (in fairness I should say that quite a few of my dorm classmates also dressed in a similarly casual manner!). He was an instructor in one of the sectionals in the first half of my sophomore year (first real EE courses we took), and I had the misfortune to be assigned to his sectional. One day, after having had an exceptionally hard time trying to penetrate his strong accent, I very naively made an appointment to see him to try to get some insight into what he had been trying to say. When I told him I was having trouble grasping the material, he told me that perhaps I was unsuited to be studying at MIT and I might be better off looking for another school to attend – a rather surprising take on what I had thought would be a technically oriented discussion (I was only one of about 20 students in his sectional, and he couldn't have had the slightest idea who I was – we hadn't even had a quiz yet for him to be able to judge my level of competence!). In the ensuing years, and after having had a chance to visit Yugoslavia, I came to realize that impatience and a sort of in-your-face attitude are part of the cultural heritage of such areas. He was very typical of a certain cross-section of MIT foreign grad students (certainly not all, but a small, yet unfortunately rather noticeable percentage!). Perhaps things have changed over the years ...

**FRATERNITY LIFE** – Theta Xi was (is?) typical of many MIT fraternities, most of which are located on Bay State Road, on the Boston side of the Charles River directly across from the MIT campus, which lies within walking distance on the Cambridge side of the river. Theta Xi is located in a four-story building with a kitchen and a rec area (ping-pong table and small bar) on the basement floor, a dining and living room on the first floor, two floors with living/study quarters, and a top floor devoted to a large number of bunk beds! When an incoming freshman is first “pledged” to Theta Xi, he is assigned a desk and closet space in one of the study areas on the second and third floors, along with and a bunk on the top floor. The desk is typically in a room with one other freshman and at least two upperclassmen, who are available for asking questions about academic issues (calculus, physics, chemistry, etc). This setup is required for the first year, after which the “brothers” either continue living in the house proper or pair up with someone else in their academic year and move into one of the “annexes” – rooms rented from owners of other buildings on the block. Because conditions in the main fraternity house can be a little crowded and sometimes noisy, I lived in the fraternity house proper only during my Freshman year, after which I spent the next 3 years living in one of the annexes with various roommates from my own class of 8 “brothers.” (Since my time from 1956 to 1960, the fraternity has apparently bought an adjacent building and expanded considerably, perhaps obviating the need for the “annexes” which by now have probably become exorbitantly expensive to rent!)



The fraternity employed a cook named Smitty and a maid (Vera, Smitty’s wife) who commuted regularly from a nearby suburb, using the MTA (subway) to get to and from their home. The cook and his wife had worked in the fraternity house for many years, having essentially made a career out of the job, and were well liked by everyone in the house. Breakfast, lunch, and dinner were all served 6 days a week with dinners requiring a jacket and tie. Either a “bag lunch” or “late dinner” could be ordered if there were classroom or other conflicts. Sundays we were on our own,

which actually provided a nice respite to get out and sample some of the local restaurants. We had regular hangouts we frequented – a Chinese restaurant on Mass Avenue which featured a big bowl of fried rice and a cup of tea for 99 cents, a pizza joint called “The European” in Haymarket Square a subway ride away down close to the port area of town, and various other small “buttery” style restaurants not far away, most of which were either within walking or subway distance.

**CROSS-SECTION OF FRATERNITY BROTHERS** – In general, folks in the fraternity tended to hang out with others from their own academic year. The 8 eventual “pledges” in my freshman class were from places like Memphis (TN), Washington DC, Chicago (IL), Wauwatosa (WI), Pittsburgh (PA), Brazil (!), Aruba(!), and, of course, myself from Atlanta (GA). It was a very geographically mixed group of people and was a typical cross-section of the MIT population (sometimes known as “Tech tools” especially by our Harvard brethren up the river). Of these eight freshmen, two (Pittsburgh and Aruba) failed to finish the four years, but the rest of us slogged our way through, graduating with BS degrees in a variety of specializations – Chemical Engineering, Metallurgy, Business, Mathematics, and Electrical Engineering. The Math major went on to get a PhD from another college and teach in a small mid-Western college, but the rest of us spread out into industry and research (the Metallurgy major also picking up a PhD along the way).



**SOCIAL LIFE** – One of the attractions of a fraternity was that it came with something of a built-in social life – something that was missing in the dorms, which tended to be cavernous buildings full of “two-in-mate” rooms. (Naturally, fraternity types looked down on dorm dwellers, and vice versa!). The fraternity would typically have some sort of social gathering right in the house most Saturday evenings – typically involving dark lights, a beer keg, along with music and dancing in the basement bar/rec-room area (to 45-rpm records!), and occasionally opening up the first floor living-room/dining-room area for larger events. The parties usually avoided the upper floors, so that those who needed to study could get in their time (as long as the music and noise didn’t get too intrusive). Since MIT was essentially all-male at that time, finding a date involved either getting “fixed up” by one of the older house members who had a girl friend living in a dorm (along with other potential dating material!), or attending one of the frequent “mixers” held at one of the numerous girls’ colleges and/or professional schools (secretarial, nursing, etc) in the Boston area. One of the problems with dating in that area is the fact that the majority of the girls were of local extraction, i.e., were from the New England area, and were therefore raised from infancy to speak with a very nasal “Boston” or “New York” or “New England” accent – all of which sound almost like a foreign language to people from other parts of the country (who New Englanders feel speak with a very “flat” sort of accent). In any case, the academic demands of school were so intense that foregoing dating during the academic term wasn’t that hard to do!

**ATHLETICS** – I have always enjoyed participating in various sports on a casual basis – in particular tennis, badminton, softball/baseball, basketball, football, and track – the typical sports one grew up with in 1940s-1950s mid-America. In New England, however, the big sports included soccer, lacrosse, hockey, and squash(!) – all of which I had never even seen played, much less participated in. I had run the two miles and mile in high school with moderate success and so tried out for the freshman track team in the mile. However, I had never run on an indoor track before (necessary in the bitterly cold and snowy weather of the Northeast) and quickly encountered the phenomenon of “shin splints” (medial tibial stress syndrome!), where one experiences a throbbing pain in the bones of the lower leg from the impact of running on the wooden boards of an indoor track. So much for that! I then decided to give swimming a try, but didn’t last long at that either because of the hectic nature of swimming in crowded lanes in a rather dank indoor pool (again, the weather was usually extremely cold outside). I’ve always enjoyed swimming, but only in outdoor pools where the air is fresh. MIT also had freshman and sophomore football teams at the time. I had always enjoyed playing pickup football games, but had never played organized football before. One of my new fraternity brothers (a former high-school end) talked me into trying out with him, and I enjoyed the practices and playing a little at end in the road games, which gave me a chance to see some of the area “prep” schools – a New England phenomenon I had heard about but never before had any contact with. The football “season” consisted of playing two or three road games at area prep schools (usually losing – to the great glee of the local preppies who could say they had beat a college team!), after which a freshman/sophomore game was played to round out the “season” – all pretty low key!

It turned out that in any given freshman class there were only so many who had ever played lacrosse (at that time only a prep-school sport), and the Athletic Department at MIT (and other Northeastern schools) encouraged people who had never played it before to show up and learn

the sport! So it was that in the spring of my freshman year I tried out for lacrosse and actually ended up playing on attack for most of the games – almost all of us were totally new at the sport, so trying out was on a fairly level playing field. The practices ran for a couple of hours a day with a game usually about every other week, again involving a bus trip to one of the area prep schools. I also played lacrosse for the other three years of my time at Tech, although my playing time was much more limited, what with quite a few older, more experienced players on the varsity team. In addition, we actually finished quite high in our league the three years I played varsity – meaning we had some very good older players who had had a great deal of prep school experience and were quite good “stick handlers.” The athletic atmosphere at MIT was fairly unique in that it was reasonably non-competitive and was specifically intended to provide non-academic activities to as many students as possible to give a break from the intense pressure of the classroom experience. Playing sports also freed me from having to take Phys-Ed, an otherwise mandatory requirement and a major waste of a class period which could otherwise be used to take an elective. (The major disadvantage of team sports in college was the fact that one was required to show up for all the games – at home or away – something that could seriously impact one’s class work.)



1960 VARSITY LACROSSE

Third Row (l. to r.): Ed Strachan (Manager), Mitchell Brodtkin (Ass't Mgr.), John Kancavicus, Joe Skenderian, Phil Robinson, John Stuart, Robert Morris, Hans Schroeder, Coach Ben Martin.

Second Row (l. to r.): Alan Brennecke, Alvin Pollard, John Castle, Tom Burns, Robert Lytle, John Rothschild, Ed Linde, Alvin Martin, Gary Gustafson.

First Row (l. to r.): Nat Florian, Bobby Williamson, Charles Conn, Phil Frink (Co-Capt.), James Kesler, Don deReynier (Co-Capt.), Bruce Craig, Dan Michael, John Cadwallader.

(Dug this out of <http://www.mitathletics.com/sports/m-lacros/TeamPhotos/TeamPhotos> -- 1960 was the last year the archive had the team pictures still available!!)

**GETTING AROUND DOWNTOWN BOSTON** – When I first arrived in Boston I quickly became aware of the fact that I was no longer in “little ole” Atlanta, Georgia. Although Boston is not New York City, it is nevertheless a major metropolis which has an amazing variety of offerings of all kinds – music, theater, museums, a plethora of historical sites dating back to the American revolution, a major river running through the city, a large active commercial harbor, large downtown

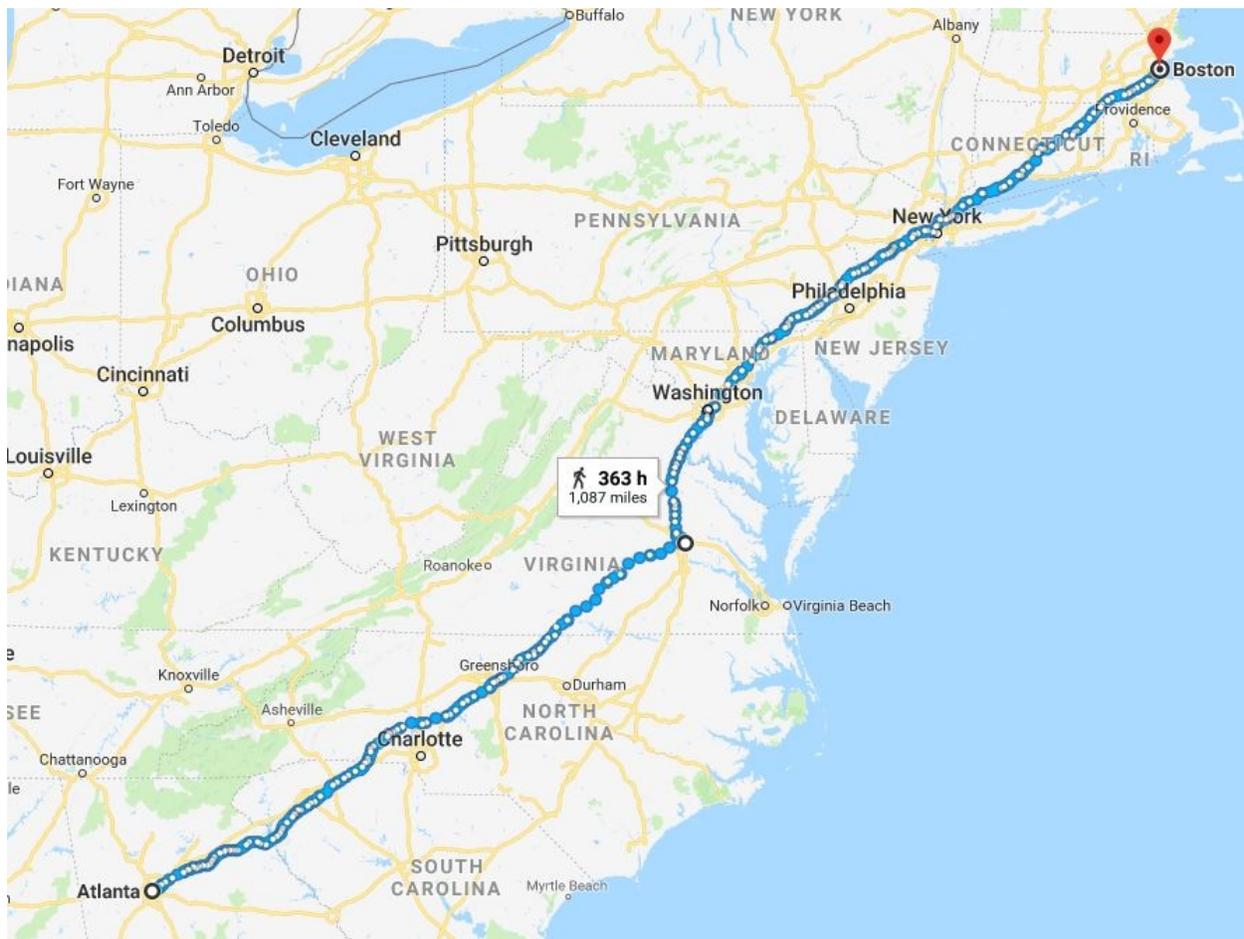
parks, an airport (also almost downtown!), and two major universities (Harvard and MIT), along with a host of other schools, including Boston University and Boston College. The fact that all of this was virtually within walking distance of the fraternity house made living in the downtown Boston area a real treat. The fact that Boston had a major transportation system already in situ was also a bonus – the MTA (Metropolitan Transit Authority) encompasses large portions of the city and makes it possible to get almost anywhere without a car (the Kenmore MTA station was no more than 50 yards from our fraternity house door!).

**GETTING A CAR** – Despite the ease of getting around downtown Boston, after a couple of years I had an itch to be able to get out of the city a bit and familiarize myself with the surrounding countryside (at least on the occasional weekend that I could break away from my desk!). There was also the issue of getting back and forth from Atlanta to Boston, as well as perhaps indulging in the occasional date with one of the local Boston lovelies (!). With this in mind, during the summer of 1958 (between my sophomore and junior years) I began to poke around Atlanta used car lots and read the classifieds looking for something that wasn't too much of a heap that would get me up to Boston and back and be available for weekend jaunts. I was working at Lockheed during the summer, as well as at part-time jobs at school for about a dollar an hour (in various labs and in the library weekday evenings, where I could study during the mostly off times), and so had painstakingly acquired the requisite funds to be able to invest in a vehicle in a modest sort of way. In the end my parents offered to sell me their 1951 Buick Special – a vehicle they had initially bought for \$450 (about \$1,500 new back in those days) and which was serving them as a sort of second car. It had about 85,000 miles on it – a lot of mileage back in a time when American cars were subject to industrial “planned obsolescence” to ensure they wouldn't make it past 100,000 miles, thereby requiring their hapless owners to invest in a new car. Nevertheless, it ran well and they offered it to me for the irresistible price of \$250 – perhaps a feeling of guilt on the part of my father as to what I was having to go through at his insistence in order to obtain a technical education! That fall I returned to MIT in my new wheels (well, sort of!) and claimed a parking spot in the back yard of the fraternity – one of only a half dozen cars owned by various “brothers.”



Photo of a typical 1951 Buick with its big mouthful of “teeth”  
(Watch out, ladies, wolf's on the prowl!!)

**GETTING TO AND FROM BOSTON** – The trip between Atlanta and Boston was one which I had to navigate twice each school year – up in the fall and back in the spring, along with a quick round trip for the two-week Christmas/New Year break.



My first year was all via bus, but the grueling nature of those trips, coupled with a transportation strike during the Christmas break of my second year (resulting in a 60-hour one-way-trip from Boston to Atlanta over the Christmas break!) led me to begin looking around for other options. I managed to get a ride home in the spring of my second year from an upperclassman who lived in Atlanta and was driving back, and in the course of that summer came by my car – the 1951 Buick Special. In the course of my last two years, however, I began flying home and back over the Christmas vacation – something that may sound completely normal now, but was definitely not in the late 1950s. The planes were propellor-driven and went through a great deal of turbulence both taking off and landing, something that made many people (including myself!) quite airsick. I would make the 1000-mile drive up and back by myself during the Spring and Fall, and, although it was an interesting one, it could take as long as two days if driven alone. Since my resources were limited, I couldn't afford to stay in a motel, and so I simply pulled off to the side of the road and slept when I got tired – something that I didn't realize at the time was not a very safe thing to do in many areas. On one occasion I made the trip from Boston to Atlanta accompanied by another Atlanta student, thereby cutting the trip time from two days to one day, but he was a year ahead of me and graduated soon after. Another problem that I encountered almost immediately had to

do with the fact that I had never made a long-distance driving trip by myself before, and I immediately became aware of the fact that I had vision problems in reading road signs at night! I had never worn glasses, even though I sometimes had trouble reading the blackboard when sitting in the back row of a class in high school. Even though I was aware of the problem, it simply wasn't practical to ask Tedi about getting an eye exam – that would only lead to long sessions reading Science and Health!! It really only came to the fore when I was trying to drive by myself at night for long periods of time, and then it became a real problem. At the beginning of my junior year I went into the MIT medical clinic and had an eye test, during which the doctor expressed astonishment that I had been able to get that far in school without glasses. Getting the glasses solved the problem immediately, but I also became aware of the fact that I had suffered needlessly through many years by not being able to see the blackboard properly from a distance. I don't remember having had a problem earlier (in elementary school), and now (at an advanced age – almost 80!) my vision has returned to almost normal without wearing glasses (apparently due to the normal progression of becoming more far-sighted as one ages). Nevertheless at that period of my life I felt as though I had been exposed to a very marginal, if not downright dangerous, set of conditions, one of the things that contributed to my many differences with my mother!

**GETTING AROUND GREATER BOSTON (CAMBRIDGE)** – Obtaining a car gave me something of an elevated status in the fraternity, in that people would often approach me offering to fix me up with a date (the assumption being, of course, that it would be a double date using my wheels!). I was usually too busy keeping up with studies to take advantage of such offers, along with the fact that I was still struggling with the Boston accent! Having the car did allow me to get outside of Boston a bit, however, and also broadened my Sunday evening culinary experiences (almost always accompanied by a carful of 'brothers'). One area of considerable interest was the area north of us around Harvard Square – the center of Harvard and Vassar (the Harvard women's equivalent at that time), just up-river from us in a very attractive "Ivy" sort of neighborhood. There was a sandwich shop there at the time call "Elsie's" which made killer huge roast beef sandwiches, and I could ingratiate myself with my house-mates by making an occasional weekday evening sandwich run, something I had no objection to since it gave me a chance to visit the area around the Harvard campus at a time of day when there was a lot of evening activity. Harvard life was quite different than Tech life, and we were only too painfully aware of our status as 'Tech tools' or 'Techies' as we were derisively called! Ah, but that was all a long time ago – we're all cool now!

**SEMESTER AND SUMMER BREAKS** – As the end of each school year approached, there was typically a mad dash among underclassmen to find some kind of paying job for the summer. I was spared this agony by the fact that I had received a four-year scholarship from Lockheed in Marietta (just North of Atlanta where my father worked) and was thereby guaranteed a summer job (along with a free place to live!). This meant, of course, that I spent each summer back in Atlanta – something that had both good and bad sides – the good being that I had a ready social circle to return to, the bad being that I had to move from the urbane East back to the rather provincial South! It wasn't so much that I had myself become urbane (far from it – I was still basically a hick!), but the fact was that it seemed very much a step sideways to go back to the relative backwardness (along with the stupefying humidity and heat) of Atlanta each summer after having spent 9 months in an eye-opening place like Boston.

My summers at Lockheed were actually quite productive. I first worked (during the summer between high school and college) in a group allied with Master Scheduling (where my father worked) and I was able to get a good insight into what it was that he actually did (up to that point a mystery to me!). The second summer I worked as a draftsman, revising engineering drawings for the C130 aircraft by updating a set of corrections that none of the “real draftsman” wanted to do, feeling it was beneath their dignity to correct drawings, rather than originate them. The third summer I worked in a group called Flight Test, where the results of flight testing were processed and made into reports for further action. The last summer I was back in a drafting group, this time doing drawings for the cockpit instrument panels in the C130 – a reasonably interesting job which allowed me to occasionally descend to the assembly line to look at a “real airplane.” It was during this summer that I got a taste of real life in the aircraft industry through interactions with a group of British engineers who had been laid off from a Canadian aircraft manufacturer and unwillingly migrated to Marietta to find any kind of work they could – a very common phenomenon in the aircraft industry, which I had up to that point been totally unaware of and which gave me some insight into what had happened to my father at the end of WWII when thousands of people working in the defense industry were put onto the street virtually (and literally) overnight.

**BITS AND PIECES** – As a way of providing a little insight into what MIT was all about in the late 1950s, this section is a collection of odd incidents that occurred during the time I was there and which have pretty much stuck with me over the almost 60 years since that time ...

The first time I took a sectional quiz in Freshman chemistry, I thought I had done OK, but when the instructor handed the test back I found I had made a -18 on the quiz, something I didn't think was even possible! It turned out he was trying to issue a wake-up call that the actual class-wide quizzes would be very difficult, and the message sunk in – I actually ended up with a B in the course, much to my relief.

A similar incident happened in my Junior year in a Quantum Physics class, where I made 100% on the first quiz and in a burst of over-confidence made about 20% on the second quiz – another wake-up call!

As I progressed to my Junior year, I found that the math classes required much less time than some of the others and I tended to put off keeping up with the work until a quiz was imminent. One day I walked blithely into a math class, only to be handed a pop quiz for which I was totally unprepared. The classroom had two doors, so in the commotion I was able to quickly walk to the back of the room and slip out the other door without doing or handing in the quiz (I may not have been the only one!). With a potential zero on the quiz looming on the horizon, it took a bit of fast talking to get out of that one (the instructors – all TA's and often of foreign extraction – probably were used to hearing a lot of fast talking, not all of which they could understand!).

The Humanities classes could be long and somewhat beside the point as far as getting a technical education, and since the tests were purely by sections I began collecting little vignettes of what any given teacher would say in class in order to casually repeat them back on the written tests so the instructor would know I had been paying attention to his lectures. One I particularly remember is, “He is an agnostic as a dog is an agnostic, having never thought about the matter ...” one which the instructor did in fact appreciate hearing back, writing “Good attention in class!” on the paper. Another humanities instructor (maybe my first) handed back my first paper with the

comment “Terribly overwritten – do over again!” – a real ego-buster, but undoubtedly deserved!

Labs were an odd business and were usually totally out of sync with the classroom material, a real surprise at a school like MIT. My favorite physics lab was – *How to Measure the Speed of Light With a Clock and a Meter Stick!* – nothing to do with the course material, but fascinating anyway. Labs always required having a lab partner, one of the few times I had close contact with folks who lived in the dorms – something that made me realize that a lot of the MIT folk were truly different – sort of like your typical genius type in high school – not entirely in sync with the rest of the world.

The Electrical Engineering course labs could be downright dangerous back in the days of vacuum tubes, where circuits ran at several hundred volts. One lab instructor I remember always kept one hand in his pocket when checking out students’ setups so as to avoid accidentally getting zapped by being caught in a mis-wired circuit, something that was more likely to happen if he were using both hands. As technology was rapidly progressing to transistors at that time, we were handed out sets of hurriedly mimeographed notes describing transistor circuitry (no Xerox machines back then!)

One of the senior professors was a old-timer by the name of Ernst Guillemin who specialized in something called “linear network analysis/synthesis” and was a real tiger of the old school (always dressed dapperly in a full suit and vest). His favorite type of quiz problem would be to ask the student to synthesize a circuit which fulfilled a given number of what appeared to be rather complex pre-defined conditions, with the answer often being nothing more than a 1-ohm resistor – probably the simplest possible circuit element other a bare piece of wire.

My first EE class instructor was a young PhD by the name of Dudley Buck, who had gained a well-deserved modicum of fame at a young age by inventing a super-cooled switch called the “cryotron.” He was a very engaging younger professor, very much on his way up in the academic world. One morning he didn’t show up for class, and an administrator came in to say that he had come down with pneumonia and would be out for several class sessions. About a week later, the department head came into the classroom again to sadly announce that Professor Buck had died the previous night. It was a complete shock – one I have never forgotten, as he was one of the most likable of people -- with a young family (even a Boy Scout leader!) and a great future in academia ahead of him. It made one wonder what it was all about ...

Like all Techies I came across the title of “Proctor” early on. A Proctor was simply a grad student who could earn a little extra money by sitting in on quizzes (where there would normally be several hundred students in attendance) and making sure no one was cheating or behaving in an abnormal manner. The job could be made somewhat challenging by the fact that various students would have stayed up all night before the quiz studying, and invariably a few of them would fall asleep in the course of the test period – alternately scribbling down a few lines, then dozing off. It could be hard to tell if they were peeking at a concealed set of notes or just momentarily passed out!

During my junior year I was assigned to a gym class by mistake and ended up with a free period after pointing out that I was already fulfilling the PE requirement by playing on the lacrosse team. I signed up for a French class during the free period just for kicks, but after a week was called to my advisor’s office and told that I was exceeding the prescribed class load. I offered to take the class without credit, but was turned down – reminding me of the fact that the same thing had happened to me back in high school. I found it hard to believe this could happen at MIT just

as easily as it could happen in Atlanta, Georgia, but found it wisest not to relay this bit of insight to my adviser – on whose good graces I depended.

In my senior year I encountered my first computer – an IBM 704, which was a huge vacuum-tube machine occupying a large room surrounded by cooling equipment to keep the beast from burning down the building. The machine was state-of-the-art, using the latest punch-card equipment -- punch cards being the means by which programs and data were input to the beast. Although higher-level languages such as FORTRAN and COBOL were slowly coming into use, we were required to do our programming in basic “machine language” – an artificial obstacle to interacting efficiently with the machine at that point in time. One of the attractions in taking the programming course was that we had to give our coding sheets to a punch-card operator to enter onto IBM cards – and a couple of the punch-card operators were rather cute young things! Unfortunately, after getting to know them a bit, it turned out they had the same nasal New England accents as the rest of the Boston lovelies, causing those of us who were not New England natives to simply commandeer one of the card-punch entry machines on the sly and do our own data entry!

One of the requirements to graduate with a bachelor’s degree in EE was to write a thesis during one’s senior year. Because writing a thesis to obtain a BS was not something one normally does in college and because it was never explicitly stated, I had mistakenly presumed this was an option and didn’t take the necessary steps to obtain a thesis adviser and choose an appropriate topic. Halfway through the first semester of my senior year, I was again called in to my advisor’s office and asked if I had formulated a path toward the preparation of my thesis, at which I was forced to admit I hadn’t realized it was a formal requirement! I ended up having to do some fast stepping to find an appropriate adviser and have him assign me a thesis topic, but in the end things worked out. My thesis was a fairly ordinary one – simply researching a means to implement a multi-phase generator for a type of switching diode called a “tunnel diode.” The basic method was simply to do a “literature search” by contacting people in various research institutes to advise me on how to do it – a rather pedestrian way to write a “thesis” but one which I was forced into by my ignorance of the requirements for graduating! One of the oddities of studying at MIT was the fact that one could become so absorbed by the day-to-day class work that unexpected requirements of this nature could end up being simply overlooked. Oh, well, at least my drafting skills enabled me to put together a very professional looking document which impressed the thesis committee, who typically had to tear their hair slugging their way through rather poorly prepared material (even if the actual technical work was superior!).

And so went my four years at “The Institute” – known to its students by its cheering ode – the MIT Beaver call, the lines of which run ...

Cosine, secant, tangent, sine,  
Three point one four one five nine!  
Integral, radical, mu, dv  
Slipstick, sliderule, MIT!

**LOOKING BACK** – After I finished my last exams in late May of 1960 I basically left MIT forever, returning to Boston for short visits only a handful of times in the course of the next 60 years. My parents did come to Boston for my graduation, although I had told them I wasn't planning on attending the actual graduation (just as I didn't attend my high school graduation through a feeling of disconnectedness with the surroundings where I had only recently arrived). Graduations have always seemed somewhat of an afterthought to me, with the overwhelming feeling being one of relief rather than of celebration. Similarly, I knew I would soon be entering the world of the military as I sought to free myself of that particular obligation in order to commence my own version of how I felt life should be lived. I did enjoy my parents' visit, however, and we drove up through New Hampshire and Maine to visit places they had never been before. Afterwards they flew back to Atlanta while I tried to sort out the details of how best to enter the military in a way that would maximize my chances of getting into the Army Language School in Monterey, California.

Although I got on quite well with my fellow fraternity members, once I left MIT I never saw any of them again -- with the odd exception of only one person -- a guy named Howard Ziehm. Howie was two years behind me, which was odd in itself since there normally wasn't that much mixing between academic years. He was an army brat, whose dad was a Lieutenant Colonel in the Army -- in the Dental Corps! We both enjoyed sports, and if the weather was decent we would spend half an hour before dinner tossing the football around in the street outside the fraternity just to unwind a little after a long day of classes. Howie was far more athletic than I, his standing 6'2" to my 5'8" and his playing on the varsity basketball team (the Koch brothers of conservative political fame were teammates of his!), but we also enjoyed playing golf together on the occasional weekend when we had time to take in a round.



Howie had cultivated the skill of getting on a golf course for free by teeing off on the second hole about a half an hour before the clubhouse opened to paying customers -- who normally started on the first hole! We tried this on the Brookline Golf Course (a large, well-known facility in the nearby Boston suburb of Brookline where regional tournaments are frequently played). It worked well for several outings -- until a groundskeeper caught on and hauled us in as we approached the end of the ninth hole (where the course returns to the clubhouse before starting in on the "back nine"). We told him we had arrived early and intended to pay as we passed through the clubhouse. We thought he had bought into that until, as we walked into the clubhouse, he yelled loudly to the cashier in a nasal Boston accent that everyone could hear, "These bums are trying to play through without paying. Ring 'em up and throw 'em out!" We ended up having to pay \$10 each (a gargantuan sum -- over a day's wages back in the late 1950s), but were able to con the cashier into allowing us to play the back nine before leaving Brookline, never to return again (sob!). Howie was a math major, but struggled mightily to keep up with his studies. In addition to playing basketball, another distraction for him became the occasional trips he and another fraternity brother would occasionally take on Saturday evenings down to a part of Boston called Scollay Square, which was populated by a variety of entertainment venues, including a club featuring a performer with the professional name of Irma Teabody (also known as 'Irma the Body' although, interestingly enough, said to have been born with the name of Mary Goodneighbor!). Perhaps the juices were beginning to flow a little more freely in the less academically oriented parts of Howie's person, but, in any case, by the end of his junior year, things caught up with him, and he was forced to go onto probationary status at school. I saw him briefly at the end of 1961 while passing through Boston on my way overseas after having finished Army Language School in Monterey, but by then he had dropped out completely and was living in a dumpy little place off of Beacon Hill -- at that time a semi-trashy neighborhood, which later on morphed back into its former glory of being a very up-market residential neighborhood. He had learned to play the guitar to a certain extent and was hanging around second-tier Boston night spots earning a living in one way or another (I didn't ask!). It sounded kind of sketchy to me, but he seemed to be enjoying himself and had no thoughts of trying to get back into Tech. Later on he moved his activities to the Bay Area of Northern California, where he and a friend with a small stash opened a little folk-singing nightclub on San Pablo Avenue in the East Bay. Among his claims to fame during that period was the fact that he had fired Janis Joplin from a singing job because she kept getting drunk and falling off her motor-scooter, and as a result not showing up for her paid singing gigs at his club (this was all before she became a real star and started driving a Porsche!). Howie actually became quite well-known later on in a rather odd sort of way when he and a buddy got into producing second-tier porn movies (what he called "beaver" movies!). One of them actually turned into a mid-1960s cult classic -- a very seedy movie called "Flesh Gordon." After that I didn't see Howie for many decades until he turned up one weekend at our Skylonda digs -- looking much older, but doing quite well for himself. He and one of his "starlets" (a lass named Judy) had somehow stayed together over the years and bought a small "villa" with a swimming pool in the hills behind Malibu, where they were actually living quite comfortably while he was doing various kinds of writing. The place had burned down during one of the periodic Malibu fires, but they had managed to rebuild it into a very comfortable pad where we visited him briefly on a trip up the coast from Los Angeles.. I would hear from him occasionally, in particular after he decided to write the story of his life in the form of a very colorful "memoir." In the end it was hard to believe we had met at an MIT fraternity, but so it seemed was the way

it happened. Howie was actually the one who had put me on to the language school at Monterey, since his father, an Army lieutenant-colonel, had served there in the dental corps at Presidio of Monterey while Howie had been in high school! (One of the more practical skills Howie and his mate Judy taught Kathy and myself during our visit in Malibu was how to butter an ear of corn by taking it fresh out of the hot water and rolling it over the top of a quarter-pound stick of butter – a simple but very effective trick!) None of my other former fraternity brothers were nearly as colorful!