

Recollections:
The 1930's and 1940's

Del Flint

This book was written as part of *Lifescapes*, a senior life writing program sponsored by the Washoe County Library System, the University of Nevada, Reno, and the Nevada Humanities Committee.

Copyright © 2007 by Del Flint

Sparks Library Press
1125 12th Street
Sparks, NV 89431
www.lifescapesmemoirs.net

Contents

Recollections in the Thirties and Forties

Contents.....	iii
---------------	-----

Education

High School Years.....	1
College Days.....	7
Geology as a Major.....	16
The American Girl Mine.....	23
Graduate School.....	26
Master's Thesis.....	32

Working for the United States Geological Survey

Summer Job.....	36
Chromite on the Stillwater.....	37
West Coast Chromite.....	44
Foreign Geology.....	47
Camaguey.....	55

The Army Years

Basic Training.....	66
Officer Training.....	70
Japan.....	77
Okinawa.....	87
Winding Down: Ryukyus Reconnaissance.....	103
Thailand.....	107
Return to the U.S.G.S.....	111

Recollections in the Thirties and Forties

Education

High School Years

In the nineteen thirties many California school districts, including Pasadena's, split the high school years (grades 9-12) between junior high school and junior college. My high school years were split evenly between McKinley Junior High School and Pasadena Junior College. When I say "high school," I usually refer to my two years on the junior college campus, my last two years of high school.

The Long Beach Earthquake of 1933 destroyed most of Long Beach Polytechnic High School, but there was no loss of life, because school was out at the time. Nonetheless, the lesson was clear; public buildings, especially school buildings, must be made earthquake resistant. Schools all over Southern California were checked for earthquake resistance and if found wanting, were immediately closed and ultimately torn down and rebuilt to strict specifications.

Pasadena Junior College was found to have several unsafe buildings, which were immediately condemned and evacuated. To take the place of the condemned classrooms, a small village of tents was erected on a paved section of the campus. My high school instruction was largely in those tents. We punned that we were getting an "intents" education. Some of the classes which required equipment, such as the sciences and home economics, were housed in rooms built inside the gymnasiums. I believe that the women's gym was completely filled with classrooms, but I can't be sure because I was never inside the building. The men's gym was a large building which included two gym floors. The locker rooms were under the bleachers for the football stadium. One of the floors was completely inside; the other floor was used for basketball and was flanked on two sides with bleachers. Those two sides were open, but under the gymnasium roof. Between the two floors was a long room for the storage of equipment that ran the full length of the floors. The storage room walls were cut on both sides by large doors designed to allow movable bleachers and heavy gym equipment to be moved out and put away. The outside floor was used by both men's and women's gym classes; the inside floor was completely filled with classrooms. The classrooms could be reached by a hallway that bisected the space and had classrooms on each side. Class rooms on the storage wall side could

also be reached through the doors in that wall, if the doors in both sides of the storage space were open.

My physics class was held in the room at the end of the hall which could be reached either through the hall or the open doors from the outside floor. The doors were always open because they offered the easiest access to that room. With both doors open, a student sitting in the back row of the class could look out through the open doors and see what was being done on the basketball floor, outside. Our physics class was held at the same time as a women's dance class. As a result, there was a certain amount of competition for seats in the back row, especially for the end seat, next to the open door. If the class got boring, as it often did, and one was sitting there, one could always find entertainment by looking at the girls. I must admit that even though the class might be interesting, certain girls and certain dances might have been more interesting to me.

My physics teacher was Mr. Peebles. He was a mild-mannered, slender man, of medium height, who sported a small, neatly-trimmed moustache. He appeared to be a "Casper Milquetoast" type, but his rather prissy appearance was belied by the man. He had played end on the Coe College (Iowa) football team at the time that the forward pass was introduced to the game. I think that at the time he played against Notre Dame, Knute Rockne was playing for the Irish. He had stayed in shape in the intervening years. One Easter Vacation (now called Spring Break) Mr. Peebles took a group of his male students on a camping trip to Santa Cruz Island. Santa Cruz is the largest of the Channel Islands off the coast of Southern California. It lies about twenty miles west of the city of Ventura, California. There was a cattle ranch on the island which otherwise was uninhabited. Mr. Peebles had obtained permission from the owners of the ranch for us to camp at a spring on the south coast, far from the ranching operations. In fact, we never saw a cow or a person other than those of our group.

A group of about 20 of us took a bus from Pasadena to San Pedro, the port for Los Angeles, late on a Friday afternoon. In San Pedro, we boarded a small fishing boat that had been chartered for the trip, which was scheduled to take all night. It was a surreal experience. Once clear of Point Ferman and into the open Pacific, our little craft encountered waves that seemed to us to be gigantic as we looked up to the crests from the depths of the troughs. Our course quartered across the great swells rolling down from the Gulf of Alaska. Our little boat would labor its way up the slope of the oncoming wave and then with a stomach-wrenching movement, slide off the back slope. The resulting pitching, rolling movement had most of our party emptying their guts over the rail. My pal, Ray Shuster, wasn't in my physics class so he wasn't eligible to make the trip, but his mother made a large, delicious Cornish pasty for me to eat on the boat trip. For some reason, I didn't get sick and I thoroughly

enjoyed that pasty. I don't think that I made any brownie points with my sea-sick friends as I sat in the pale moonlight looking into their wan, gray-green faces, eating and savoring my pasty while most of them were draped over the rail, feeding the fishes.

Early the next morning we landed in a small bay on the south coast of Santa Cruz Island. We established camp in a small, grassy meadow by a nice spring. Once we were ashore and our food and gear landed, the boat left, to return in a week. We had a great time. We hiked through the hills exploring the area around our camp, climbed the cliffs, swam in the protected waters of our cove, did a little fishing, cooked our own meals, and just enjoyed our isolation. The return boat trip was made in daylight and the sea was like a lake, so everyone had a pleasant voyage. The whole thing was a wonderful introduction to camping.

The next summer, Ray, Olof and I spent a week camping at Carpentaria, just south of Santa Barbara. This was a public camp ground with cooking, bathing and toilet facilities and was close to a grocery store and meat market. We borrowed a tent and camping and cooking gear, took a few staples from home, and Ray's older brother, John, drove us to Carpentaria. We took turns buying the day's food and cooking the meals. Olof, whose parents were cook and butler to a wealthy couple, introduced me to my first double-thick lamb chops, cooked rare. I don't think that I had ever tasted anything quite so delicious. At home, we seldom had lamb, it was too expensive, and the few times we had lamb chops, they were thinly cut loin chops and were well done; our meat was always well-done. It was a new experience, and ever since that day on the beach, rare lamb chops have been a favorite of mine. Many years later, I looked forward to trips to Australia, because there, I could order lamb chops for breakfast.

The three of us had a great time, especially after we met Dorothy, a friendly, outgoing girl our age who was camping with her parents in a nearby tent. The four of us went swimming, played volleyball on the beach, played cards in the tent in the evening and we boys generally showed off in front of her. We were pretty ingenuous kids and Dorothy was a godsend, a nice friendly girl who was at ease around boys. Dorothy lived in Glendale, a city only a few miles from our homes in Pasadena. After returning home, we kept up our friendship all that summer, riding our bikes to visit her and her parents. Dorothy became a good friend of mine. I dated her off and on for several years, and now, seventy years later, we still exchange Christmas cards.

My high school friends, most of whom I had known at McKinley, were good students and constituted the largest block in the student honor society and pretty much ran that organization. Our honor society was the local branch of the California Scholarship Federation, a statewide organization which held regional meetings. As we ran our local, we got to

attend a regional session that was held at Alhambra High, in the nearby city of Alhambra. After attending some sessions, which I don't remember at all, we had dinner in the cafeteria and were invited to a concert given by the student orchestra. The orchestra played Grainger's "In a Country Garden" and we sat in our front row seats, sucking lemons, trying to make the reed players salivate too much to play their instruments. I don't think we succeeded.

I have had the privilege of attending school with some very bright kids; one of them was Lacy Sumlin, whom I knew in junior high school. I will never forget how impressed I was when Lacy showed up in plane geometry class with an original proof for the Pythagorean Theorem. The teacher had never seen the proof before, so she sent it off to the American Mathematical Society. They replied that it wasn't a new proof but it was a rare proof that they received every few years.

The Southern California branch of the American Chemical Society used to hold an annual Chem Team Tournament for high schools. Teams from all over the area represented their schools in the competition. The size of the team was dependent on the number of students taking elementary chemistry in the school. We had a five-man team, one of the larger teams in the tourney. My year, the test was given at U.C.L.A., which had just moved to their Westwood campus from a campus in downtown L.A. Our team didn't win but we did place second. Lacy Sumlin was fifth overall and high man on our team. I placed fifteenth overall and in the middle of our team. The first place was taken by the two-man team from Eagle Rock High, a perennial winner which also often had the individual winner. The individual winner got a four-year scholarship to the college of his or her choice. Later I knew one of the winners at Caltech.

I took Latin as my foreign language for the first two years of high school but I switched to German for my junior and senior years. I am glad that I took the Latin, as it has aided me in learning other languages and in understanding English grammar. I never was very good at Latin though, and I am glad that I changed. My knowledge of German, gained in high school, was enough to satisfy the language requirement for graduation from Caltech. Many years later, my rudimentary knowledge of Latin helped me learn Spanish when I worked in Latin America.

My German class was taught by Frau Giddings. She was a fine teacher, even though she was an apologist for Hitler (Remember that this was several years before the outbreak of W. W. II.). Frau Giddings believed in training the ears as well as the eyes, so she had us taking dictation in German and writing it in the cursive script. She also thought that we should learn German songs and poetry. I still remember the words of several of the songs and can quote a few poems. At Christmas time we had a great time, singing German carols. Frau Giddings never would allow us to sing "Silent Night"; she couldn't stand to hear us mangle a

song that was sacred to her. For “Stille Nacht,” she brought a Madam Schumann-Heinck recording and played it on a portable phonograph.

I was young in my class and was physically and socially behind my classmates. I can remember going to three parties and two dances during my high school years. Although I was interested in girls, they weren’t interested in me, and I had a social inferiority complex. Meeting Dorothy at Carpentaria helped me to feel less uneasy around girls, but I didn’t really get along with girls till college.



Del Flint, High School Graduate. Circa 1935.

My graduation from high school was held in the Rose Bowl as part of a mass graduation for Pasadena High School, John Muir High School, and Pasadena Junior College. The high school graduates received diplomas and the junior college graduates received an Associate of Arts degree. The Associate of Arts was a degree invented for junior colleges. I don’t know how many of us took part in the ceremonies, but there must have been close to 800. Of course, we processed into our seats to the strains of “Pomp and Circumstance.”

One aspect of my youth that I haven’t really touched on is growing up during the Great Depression of the early ‘30s and its effects on me. The depression was ushered in by the stock market crash of ‘29. The country was riding a stock market boom in the late twenties; people in all walks of life were getting rich. In the mad rush to riches, people became gamblers not investors, and bought additional stocks on margin, using the stocks they held as collateral to guarantee payment for the stocks bought on margin. When the market crashed, all of the paper profits disappeared, as did the original investments. Overnight people lost

everything. The papers carried stories of ruined brokers and business men leaping out of skyscraper windows. My Aunt Frances in Minneapolis went from rich to broke; she didn't leap out of any window, but she had to start from scratch to accumulate a nest egg for retirement. The stock market was anathema to our family; it was considered a dirty word, comparable to "corner crap game."

My father was employed all through the Depression so we suffered no dire poverty. We were not well-to-do by any means, but were not poor. That was not true for some of my friends. Mike Donovan's father lost his job and couldn't find another. In desperation, he got a gold pan and went panning gold in the mountains above Pasadena, in an attempt to scratch out enough to put bread on the table. Mr. Konowski, who lived across the street with his seven children, co-owned the largest furniture store in town. He had the misfortune to expand his store from a relatively large one floor establishment on Fair Oaks Avenue, in the old part of town, to a five story building on Colorado Boulevard in a more upscale area. He completed the move just before the crash. During the depths of the Depression people were not buying furniture, and he and his partner were wiped out. Eventually, he got a run-down gas station on the corner and was able to eke out a living. All over town these things happened. All over the country these things happened. My cousin Clifford lost his job in the Santa Fe shops in San Bernardino and went to topping trees in order to feed his family and was killed when a whipping stub disemboweled him. My sister's father-in-law, who had twenty-year seniority as a machinist in the Santa Fe shops, was lucky that his seniority got him a job as a janitor in those shops. My cousin in Iowa was working eight hours a day, five days a week for 30 dollars a month in order to get some cash, and farming his own farm after work and on weekends to feed his family.

I was young, too young to really appreciate all that was going on, but I could feel the desperation of the times. Is it any wonder that my generation grew up valuing, almost worshipping, stability and frugality? It wasn't a worship of money or material things; it was an all-powerful desire to ensure food, housing, and an education for ourselves and our families. As children we were taught that going into debt was almost a mortal sin. We grew up with the credos, "Waste not, want not" and "If you can't afford it, you don't want it." It is evident to this day in a compulsion to clean my plate when eating and an aversion to unnecessary expenditures. In other words, I tend to be tight. In Scotland they would say that I have deep pockets and short arms.

College Days

The California Institute of Technology (Caltech) is located in Pasadena, California, my hometown. I grew up respecting its reputation in engineering and science and hoped to go there after junior college. However, when I was a senior in high school, Caltech scheduled an entrance exam at my school and I jumped at the opportunity and took it. (Caltech gave its own entrance exam in those days. Now it uses the Princeton national exam.) When I did well on the exam, I proposed to my parents that if I could enter Caltech as a freshman, I would pay half of my tuition for the first two years if they would pay the other half. They had already agreed that I could go to Caltech after junior college. At that time Caltech's tuition was \$300 a year and I had a little more than that in the bank. I would live at home as Caltech was easily reached by bus or bicycle. I argued that my sisters had gone to tuition-free state universities but had to live at school and their expenses for room and board made up for the cost of my tuition. For whatever reasons, my folks accepted my proposition and I entered Caltech as a freshman.

When I entered college, I entered a whole new world, academically, socially, and athletically. Few professors cared if you did, or did not do your homework. The education was there; you were paying for it and it was up to you to learn. You had to be self-motivated, no one was standing over you with a whip. You were on your own. Many tests were "open book" and even if they weren't, you could take your test paper out of the hall to a quieter place if the hall got noisy. Some tests were home exams; you took them home to complete. The one thing not allowed, was copying. You had to do your own work. All students were on the honor system, which was administered by an all student court. The student court was probably stricter than a professorial court would have been because the cheaters were in the same classes as the court members, competing with them for grades. The one court I sat on, expelled a student who copied and put the student who allowed his paper to be copied on probation

I did well on the entrance exam and was put in Section B, the lower of two honor sections. I had always done well academically without working very hard, but I had always had instructors who insisted on homework. When I got to college I no longer had that prod and didn't have enough self-motivation to do all the homework that was assigned in calculus. Disaster! I almost flunked the course. I fell out of Section B and more importantly, I never really mastered calculus, and calculus is basic to both science and engineering.

Although I lived at home, my social life was largely at school. Caltech did not have fraternities, either on or off the campus. Each residence house acted as a social club for its residents, taking the place of a fraternity. Dances, interhouse athletic teams and special social events were

arranged through the houses. Throop Club was the organization for non-resident students. It held dances, fielded interhouse teams and sponsored dinners and other events, just as the student houses did. Throop Club was housed in an old building that had served as a student center before the student houses were built. It was located on the north side of the tree-lined path that connected the instructional/administrative part of the campus with the Atheneum, the faculty club. It was a square, brown, shingle-sided building that contained a small library, toilet facilities and a large room suitable for a ballroom which was furnished with some lounge furniture and a grand piano. A wide porch ran along the south side of the building where the nonresidents ate lunch and watched the faculty and notable guests, such as Albert Einstein, as they walked to the Atheneum for lunch. I joined Throop Club and spent most of my spare time during school hours there. If I was on campus at night, after dinner I would probably be taking part in a bull session with friends in one of the student houses. When I shifted my major to Geology, we undergraduates were given an office in the geology building, and I spent many hours after dinner studying there.

I never went out for sports in junior high or high school but I decided to go out for football at Caltech. I weighed about 140 pounds when I was a freshman and had absolutely no experience; you can imagine how good I was. Fortunately, anybody could go out for a team and there was a “no cut” policy. Football had an honorable history at Caltech, but at the time I entered, a poor present. The coach was Fox Stanton, a real old timer, a contemporary of Walter Camp and Amos Alonzo Stagg. The three had coached together with the Army in World War I. When college football was played by students as an adjunct to a college education and not an excuse for one, Caltech held its own, even with big universities, such as Stanford. A few years before I entered college, Carnegie Tech, a national powerhouse at the time, wanted to schedule a home-and-home game with Caltech. (The offer was refused because it would have taken too much time from academics.) Stanton coached with one assistant, a graduate student who had played for Caltech in its palmy days. Another graduate student coached the freshmen. The players were regular students who had to fit in athletics with schoolwork and the schoolwork came first. Of course, there were no athletic scholarships. The rules at the time did not allow play calling from the coaches on the sideline. A substitute entering the game might carry instructions, but he could not talk until a play had been run. Play calling was strictly in the hands of the quarterback. When I entered college, football had a place for normal-sized people, even in the line. For example, Notre Dame was noted for its “watch fob” guards, light men who made up in quickness for their lack of weight. All players played both offence and defense, and a player could enter the game only once in a quarter. A player who started a quarter could leave and return, but only once in that quarter. This made conditioning very important, but weight

rooms and off-season conditioning were unknown. Probably there were players who instituted personal programs, but most players got laboring jobs in the off-season so they could make some money while keeping in shape.

Caltech teams were light and smart, running lots of different plays from many different sets. They didn't have the weight and strength to push their opponents around so they had to rely on misdirection and quickness. The year I entered Caltech, the varsity team was light but very fast. My freshman team was very light and not very fast. I think the heaviest man on the line weighed about 180 pounds and we had three backs that ran around 130 pounds. None were particularly fast. I made a numeral playing in the line at about 140, and had absolutely no prior experience. The type of season we had can be epitomized by an essay turned in for an English class by Rozansky, a rangy Russian kid who played at tackle. In his essay, he described the opening plays of the game: "We kicked off to start the game and they ran the kick back to their 40 yard line. On the next play, they bucked the ball over for a touchdown." We won very few games, but we had fun.

I entered Caltech all starry-eyed about science; I was going to be a nuclear physicist. My experience with calculus destroyed that ambition early in the first term. I then decided that I should study to be a civil engineer. It didn't have an immediate effect on my classes because everybody took the same subjects for the first year. Caltech insisted that all students, both engineers and scientists, get a good foundation in science and the humanities. We studied chemistry, physics and math, but we also studied history, English literature and composition, and a foreign language (only scientific German, French or Spanish). In addition, humanities electives were available any time you could work them into your schedule. After the freshman year you made a decision whether you would study Science or Engineering.

No music classes were offered, but the school had a program of Sunday afternoon classical music in one of the libraries. The music was on records and a faculty member introduced the pieces. This was, in essence, a music appreciation class with no credit. The school also had a small band; I don't know, but while the band was rehearsed on a regular schedule with a faculty band leader, I think it also was without credit. Each year there were three special assemblies, one of which featured a string quartet in a program of chamber music which I found most enjoyable. The others were talks by famous scientists or other public figures.

Every freshman was invited to dinner with Dr. Millikan, Nobel Laureate and President of Caltech, held in Dr. Millikan's home. We were entertained in groups of twenty or so, and had the opportunity to socialize with several other professors and their wives in addition to the

Millikans. The professors changed with the different groups but they all mingled with the students and tried to make the new students feel at ease. I met Linus Pauling (a wonderful character who later became a two-time Nobel Laureate) and Eric Temple Bell (a mathematician and an early science-fiction writer).

There was a comprehensive test given to every sophomore after the second quarter, covering basic physics. There may also have been a comprehensive test given in chemistry, I don't remember. The physics test was so bad it blanked out every thing else. We, the students, heard that the test questions were put together by graduate students who included questions from their graduate comprehensives. Whether that was the case or not, the test was horrendous. I came away from the test wondering if there would be a short refresher courser for those of us who had flunked, or if they would just drop us out of school. There was a story, which I think was true, about a freshman physics course taught by the noted astrophysicist, Fritz Zwicky. Caltech believed that students should be exposed to great minds, so even Nobel prizewinners were expected to teach underclassmen. Fritz was a Swiss, reared in the European tradition; he was new at Tech and had a section of freshmen to teach, and he flunked the whole section. Caltech prided itself on being selective in its admissions and didn't relish the idea that a whole section should be flunked, so they asked Fritz to explain. His answer was "What is all de fuss about, dey vas only freshmen." Remembering that story did little to settle my apprehension. The test results, when they came out, did nothing to make me feel better, I got 39 out of 100 and was sure that I had failed. Fortunately, the test was meant to tax even the best students and was graded on the curve and my 39% correct got me a B grade in physics.

Sophomore chemistry included one term of qualitative analysis. We were issued unknown solutions that were prepared by the Bureau of Standards and we were required to determine both the components and their amounts. When an unknown was completed, we submitted our results and our workbook, including all the laboratory data and our computations, to the professor who quizzed us on the reasons for the procedures we had used, gave us a grade and a new unknown. If we messed up the experiment and lost part of our unknown, we were issued another, but with the penalty of one grade; an A would be cut down to a B, a B to a C, etc. Therefore, when a classmate was approaching the end of his determination and pulled the residue he was washing through the filter paper and lost it; it was a tragedy for him. He had worked through most of his sample and now faced the necessity of doing it all over again and then suffering the penalty. However, he knew that only four or five different unknowns were issued in a class of about twenty students, so three or four other students had the same unknown as he. He had completed enough of his determinations that he could check with the

other students and find who else had the same unknown. He therefore, took the results of the other students with the same unknown, averaged them and took them as his results. He then had to work back through the various procedures to obtain the data to put in his work book as the experimental data that justified the results, He turned the book with his computations and results in to the professor, The next day, Dr. Swift, the prof, called him in to his office and complimented him on his work book and results. Then he added "I'm not going to ask you how you got these results and I'm not going to penalize you, but here is a new unknown for you to run. I'm sure you understand the procedures and your computations check but I want you to know that no single analysis will check the Bureau of Standards right on the nose; They average several analyses in establishing the composition of the unknowns they send out."

My social life at college was centered on Throop Club, which occupied the old student lounge on the campus. The lounge had seen better times but had the makings of a fine facility, so we decided to rehabilitate the building. We refurbished the knotty pine of the interior and it looked fine in a homey sort of way. The floor was a sound hardwood floor that had not been cared for, so we undertook the job of refinishing it. We rented a floor-sanding machine and proceeded to strip the floor of the accumulations of several decades, using coarse sandpaper. We then polished the cleaned wood with fine sandpaper, using the machine. We then had the problem of finishing the surface. Epoxy varnishes had not yet been invented, and we wanted something that would preserve the wood and serve as a base for wax, as this was to be a dance floor. Some misbegotten soul said we should put on a coat of raw linseed oil and we took his advice. We carefully applied the oil to the whole floor and sat back to wait for the floor to dry so we could wax it. We waited several days, and finally waxed the whole thing. Our beautiful floor took on the characteristics of the human equivalent of flypaper. Instead of a slick slippery surface we had a tacky, sticky mess that seized and held the sole of a shoe. A shoe could not be made to slide on that surface. It was absolutely impossible to dance on. Back to the drawing board! We had to strip the wax and linseed oil off, but how? That problem we solved with elbow grease not brains; we simply spent the next week or so, on our hands and knees scrubbing off the mess with fine steel wool dipped in alcohol. We were going to school all this time, working on the floor when we had time off classes, mostly at lunch time. When the floor was clean, we simply waxed it and got the best dance floor on campus.

Caltech was not coeducational in the thirties, but that does not mean that we lacked feminine association. Pasadena Junior College is just a few blocks away and there were mixers at some of the coed colleges to which we were invited. My principal way of meeting members of the opposite sex was through mutual friends and relatives. For the first time in my life, I had a social life. Nobody had much money (that is, nobody in

my circle of friends had much money), so that social life was limited to college activities and other low-cost affairs. One type of the low-cost doings were dances at the Pasadena Municipal Auditorium. A number of wives of Caltech professors banded together to bring the big bands of the time to the ballroom of the municipal auditorium, to play for dances that were open to the public at very reasonable rates. These dances had a strict dress code; coats and ties were mandatory. Nobody was allowed on the dance floor without proper attire. The ladies wanted to maintain civility at the dances and at the same time teach proper decorum. If an otherwise presentable couple showed up at the door out of uniform, the sponsors had coats and ties to loan, so the couple could get in. We had the opportunity to dance to all of the big-name, big bands of the day.

The wives of world-famous scientists were sophisticated ladies, ladies that had a lot of smarts, who could talk to young men and communicate. The head of the group that arranged for the municipal auditorium dances gave us incoming students an introductory talk on the social opportunities and responsibilities that would be available to us as Caltech students. It was a practical talk, not at all goody-goody. Prohibition had recently been repealed, and I remember her advice on drinking, "If you are going to drink, and you probably will, I would recommend that you drink brandy rather than whisky. It is easy to make bad whisky but it is hard to make bad brandy. If you stick to brandy you will suffer much less from hangovers." I noted the advice, but never followed it.

Thomas Hunt Morgan, the Nobel laureate in Biology, never pulled his punches when speaking to students, or maybe he just enjoyed shocking them. He was the faculty advisor for Throop Club my freshman year and in that capacity attended some club functions as an honored guest. I remember one dinner when Doctor Morgan was sitting at the head table and turned to the club president and in a matter-of-fact way, asked him what contraceptive method he used. As a sixteen-year-old, I was shocked, but also amused.

As a freshman I thought that I should try basketball in addition to football. It was a disaster. My lack of experience and minimal athletic ability were too obvious on the basketball court. I finished out the season, mostly on the bench, and didn't go out again. I kept trying for the football team. As a sophomore I was a second team end and got some playing time. One incident that year illustrates the position of sports in Caltech's value system. We had a preseason scrimmage with U.C.L.A. and the first-string end didn't come out; he was studying for a test. The coach didn't blink an eye, I got a chance to play, and nothing was said to the first-string end. It was expected behavior. Loyola University of Los Angeles was trying to become a football power, but they still scheduled a game with us because Tom Loeb, Loyola's coach, felt indebted to Fox

Stanton for past favors. The game was played in Gilmore Stadium, a brand-new venue in Los Angeles. We were outclassed, but putting up a good fight, when I got a chance to play. After a couple of series of downs I made the mistake of tackling their fullback in their backfield. In the ensuing pileup I was entangled with a number of players on both sides and could feel my left knee being slowly bent to the side. I finished my stint in the game with a very sore knee. The next day, my knee told me that it was sorely hurt and the doctor told me I was through for the year. Now in my eighties, my left knee is again giving me trouble. I think that my active career with lots of walking kept my joints in shape but the deterioration of my muscles with age let the old problems rise again.

When I was a freshman, Caltech had a very fine debate team that was rated nationally, so I tried for the debate team as a sophomore. I got a partner, another novice, and we studied the question of the year, but we didn't appreciate how much work would be involved and didn't prepare ourselves sufficiently. We went to one tournament, and didn't do well; it was our first and last tournament. The tournament was held at the College of the Pacific in Stockton, California, so we drove up and spent the night. The first evening in Stockton we went downtown to see what the town was like. As we wandered around we happened into the red light district, at least there was one establishment. The brothel was upstairs, up a stairwell papered in a repulsive, gaudy wallpaper that drew our attention. As we were discussing the wallpaper, and what we thought of it, a patrol car pulled up and one of Stockton's "Finest" came up to us, "What are you kids doing here? We know, all you college kids are alike. You've no business here. Get out of here! Now!" Protesting that we were just looking, we got. This was just before Christmas and we were amused when later that evening we drove by the women's dorm and saw that the girl who lived over the door had, in the spirit of the season, put a red light in her window.

By my sophomore year, I had decided that I didn't look forward to a professional life bent over a drawing board, and that I should pursue some career other than Civil Engineering. Very fortunately for me, we were all forced to take introductory courses in a number of sciences and I was introduced to Geology. I found my vocation! I loved the outdoors, I liked the three-dimensional problems. I was intrigued by the beauty of crystals and the challenges of mineralogy. I was fascinated by petrology and the formation of igneous rocks. The tectonic forces that deformed the earth's surface and the structures they formed; land forms; erosion and the deposition of sediments; all contributed to my thrill at finding my vocation. I enjoyed geology then and I enjoyed it all my working life. I looked forward to going to work. To add even more to the allure, Geology gave me the opportunity to travel and work in places all over the world and to experience many different cultures. I would advise everyone: if you don't enjoy what you are doing, don't hesitate to change; find something

you enjoy doing. If you have to become unemployed, you might as well be unemployed at a job you enjoy.

When I changed my major to Geology, I had to make up a term of chemistry which had not been a requirement for a major in Engineering. This I did in the summer term after my sophomore term. Because I had to attend summer school, I couldn't work, and if I didn't work I couldn't make money to take care of my personal expenses for my junior year. Things looked bleak for my social life. My older sister, Frances, who had completed a Master's in history, had just taken a job in Indio High School, in Indio, California. Out of the blue, she gave me \$10 a month for my junior year so I could have a social life. It came as a complete surprise to me, especially since we had fought like cats and dogs while she was living at home. I will forever be in her debt for her generosity. Today, \$10 doesn't seem like much, but I can assure you that it was a princely gift to me in 1938.

One of the nice surprises that came with attending Caltech was the opportunity to work parking cars at the Rose Bowl for the New Year's Day football game. The Rose Bowl was unique in that parking was free in the immediate surroundings of the stadium. In order to park the thousands of cars in a pattern that would allow them to get out after the game, it was necessary to leave corridors between the blocks of parked vehicles. We, the students, would route the cars into the proper slots to fill the blocks systematically, and maintain the lanes necessary to provide access and egress. We were responsible for maintaining the system, but we had no authority to enforce our directions to the motorists. If there was a state trooper nearby, he would back us up but usually there wasn't one in the vicinity. Fortunately most of the motorists realized the necessity of our work and obeyed our directions. There were always a few that would try to bribe us to let them park in a closer spot in one of the lanes or in a block that was not yet being filled. Usually, those people would follow directions when they were unsuccessful with the attempted bribery but there were always a few that realized that we couldn't do anything to make them park properly. These would park in inappropriate places, leave their cars and tell us where they thought we should go. This, of course, irritated us so we asked a trooper what we could do about it. His directions were terse and to the point; he said "Open the hood, take out the distributor rotor, and throw it away." Though tempted, we never did. For working, we were paid two silver dollars and allowed to see the game. Seeing the game was the reason we worked, but we didn't turn down the two dollars. We hated to see the University of California represent the West Coast; they used their own students; denying us the chance to see the game.

Caltech students have long had the reputation for perpetrating practical jokes, sometimes very complicated practical jokes. The most famous of

the public jokes occurred long after my time during the halftime show of a New Years Day Rose Bowl game. I was watching the game on television and the announcer came on to introduce the card stunts, "Now the Washington card section will spell out Huskies", and the cards spelled out Caltech! That was the end of the card stunts for the day.

Most of the practical jokes were neither as complicated nor as public; they were "in house." Most of the more spectacular jokes depended on the ability of Caltech students to pick locks. Almost all of the students who lived in the student houses could pick every lock in the house. This ability made possible the practical joke called "stacking a room." The classic stacking consisted of removing the furniture from a room while the occupant was absent and introducing something unusual in its place. Usually this would be done over a weekend but some jokes required more time, like a short vacation. While I was a student, a man returned after a weekend away and found that two Ford Model A frames had been brought into his room and welded together in a cross. Another fellow returned to a room filled to the transom with crumpled paper. One luckless biology student opened his door to a room filled with thousands of *Drosophila melanogaster* (Mediterranean fruit flies). Perhaps the finest example of stacking a room occurred the year before I entered the school; it was a legend by the time I got there. There was some construction being done on the campus when a student went home for Easter. Returning after the short break, he noticed that somebody's furniture had been arranged in the patio, as though it were a bedroom. Entering the hall to his room, he heard a motor running and the sound increased as he approached his room. When he opened the door he found a cement-mixer with its motor running, instead of his furniture.

Sometimes the jokes were cruel to classmates. It wasn't rare for a student to fall asleep in the back of the classroom. It usually was due to lack of sleep the previous night, due to late studying or a late date, but it also could be due to a droning speaker, or to a combination of causes. When this happened, his classmates would file out at the end of the period, as quietly as possible to avoid wakening the sleeper. As they left they would apprise the incoming students of the situation, and they in turn, would take their places as quietly as they could. Imagine the embarrassment of the sleeper when he awakened in the middle of the next period, in the midst of people he didn't know and a strange professor lecturing.

The students met their equals when they tried their pranks on the Filipino houseboys who tended the dormitories. The students in one of the houses, tried the old trick of balancing a cup of water on a partially open door so it would spill onto anyone who opened the door. The students set it up on the door to a toilet stall. The houseboy who got doused, simply poured water on the toilet paper. The word got around very quickly and the houseboys were off limits to pranks

'Buck' Rogers was a halfback on the football team and a member of Throop Club with an unusual background; he had spent several years in Siberia as a boy. While in Siberia he had picked up a smattering of Russian, which suggested a prank to several of us. Throop Club was having a big dance in one of the large Los Angeles hotels and Buck wasn't going as he didn't have a date, so we set him up to go as a Russian count, the guest of our Faculty advisor. Our advisor that year was Dr. L. Winchester Jones, a Professor of History and a real nice fellow. Dr. Jones had done something in Washington during and after World War II. We took Buck to the Pasadena Community Playhouse where they greyed his hair, put a rather large fake scar on his cheek and generally made him look old enough to have been in Washington during WW II. Dr. Jones took Buck to the dance as his guest, introducing him as a member of a Russian purchasing commission who was stranded in the U.S. by the Bolshevik Revolution. Buck really looked the part. It worked like a charm. Buck thought the whole thing would fail when, as he entered the hotel, he was greeted by a singer singing "Oh tche tchornya" in Russian. Buck mustered his limited Russian and put together a couple of sentences. Approaching the singer with trepidation, he spewed forth his prepared phrases as fast as he could speak fearing that he wouldn't be able to handle the ensuing conversation. To the relief of all us in on the masquerade, the singer replied, "I'm sorry, I don't speak Russian. I memorized the song. I am Magyar."

A little later, Whitey, a first string end on the football team, thought he recognized Buck's profile. He approached Buck from the rear, slapped him on the back and said, "What do you think you're pulling, Buck?" Buck coolly turned, looked Whitey up and down and turned to Dr. Jones and asked, "What is this?" Full-face, the make-up job was more convincing, and Whitey was not so sure of himself. His discomfort was completed as Dr. Jones explained to the 'count', "It must be an undergraduate dare or some such thing. Don't let it bother you, I don't think any real disrespect is meant." Whitey wilted and slunk away.

Geology As A Major

I think that some special aspects of Geology as a major should be explained, as well as introducing some of my professors and their graduate student assistants. First, there was a special relationship in the department. Our professors were not distant from us under-graduates; they treated us as friends. Sometimes they even took part in our games. The graduate student assistants treated us as equals. Actually, we sometimes took classes together, competing on an equal footing. We regularly played touch football and softball; undergrads versus grads. We

had a camaraderie that carried over and included playing pranks on each other.

Dr. Horace Fraser was the Professor of Economic Geology; the course I wished to follow. He was a gruff Canadian who had a doctorate from Harvard and a lot of experience in pre-Cambrian geology. He also taught elementary Mineralogy. Dr. Fraser got me a summer job in the American Girl Mine, which will be discussed later. During World War II, Dr. Fraser left Caltech for a job in Washington. Paul Henshaw was the graduate assistant for Mineralogy. He astounded us under-grads with his ability to accurately estimate the specific gravity of a mineral specimen by hefting it in his hand. He could hold his hands behind his back and still estimate the specific gravity, thus showing that he wasn't identifying the mineral and knowing its specific gravity. After getting his doctorate, Paul went with Homestake Mining Company, where he eventually became Vice President, Chief Geologist.

Dr. Ian Campbell taught Petrology, the study of rocks. He was a no-nonsense fellow with a sunny open disposition who was popular with all the students. When he retired from Caltech he became the State Mineralogist for California. Dick Jahns was the graduate assistant for petrology. He had done his undergraduate work at Caltech; gone to Northwestern for his Master's, as many Caltech students did, and had returned to Caltech for his Ph.D. He had a spectacular undergraduate career, both academically and athletically. He wasn't a big man, maybe 5'10" tall and weighed perhaps 140 pounds. Nevertheless, he had captained the baseball team and starred in basketball. He hadn't felt large enough to play football, so he hadn't gone out for that sport. I think that, in retrospect, he regretted not playing football as an undergrad. In many ways, Dick was still an undergraduate; he was always ready for a prank. It was Dick who started the dropping of water-filled balloons on late-working students as they left the geology building after studying late into the night. He was impartial; he water-bombed both undergrads and grads. His activities started a more widespread conflict that was taken up by both grads and undergrads and a water war ensued. It was a guerilla war. The bomber would station himself on a roof, or in a window, over a door or an open window and lob his missile onto his prey. The fact that some of the people who received the water bomb got apoplectic didn't diminish the bomber's pleasure very much. Nobody succeeded in drenching Dick, though many of us lay in wait for hours with our missiles at hand in a futile attempt to ambush him. After earning his PhD, Dick entered academe and wound up a professor at Stanford.

Dr. Chester Stock was the professor of Vertebrate Paleontology. He was one of those people whose love of their subject was so obvious and whose lectures so interesting that every one enjoyed his classes. His doctoral thesis was the first work done on the famous Pleistocene fossil

assemblage from the La Brea tar pits in Los Angeles. He studied and named the animals that had been caught and preserved in the sticky tar. The assemblage was rich in carnivores, featuring saber-toothed tigers (*Smilodon californicus*), the great lion (*Felis atrox*), the dire wolf and many smaller, less famous species. Among the herbivores, the woolly mammoth stood out. During the Pleistocene, the tar pits were a low-lying swampy area with pools of water hiding the sticky tar. Animals came to take a drink and found themselves fatally mired. The carnivores were lured into the trapping tar by the bait of animals already stuck in the gooey stuff. They came to feast; ate and got trapped in the same stuff as their prey. Stock did all the work on the La Brea tar pits as a student of Dr. Merriam at Berkley. Although Stock did all the work and writing, Merriam inserted his name as senior author on the publication, which became world famous. Because of this shabby treatment, Dr. Stock would never co-author a paper with a student. He felt that he had been robbed of the credit that he had earned, and he never wanted to be such a robber. As he put it, "If the student's work is worth publishing, it should bear his name alone. If I have to work on a student's paper, it shouldn't be published." We all got to visit the display of La Brea animals in the Los Angeles Municipal Museum, which adjoins the tar pits, with Dr. Stock, who described the various specimens. He took delight in pointing out the skeleton of the buzzard, which he had named *Teratonis merriami*, the only revenge open to him.

Structural Geology was taught by the department chairman, Dr. Buwalda, "Bu" as we called him (never to his face), was something of a legend in the department. As an undergraduate at Berkley he had been the light-heavyweight champion of what is now the Pac 10, but you would never think it of the dignified, soft-speaking professor and department head. One summer, several years before my years at Caltech, "Bu" led a field trip to the John Doe region of eastern Oregon. In one of the small towns, he and the students went to the village store to replenish their supplies and a local cowboy started making unflattering remarks about the "dudes." "Bu" was a very mild-mannered man and paid no attention to the personal remarks as long they were general in nature. However, when the cowboy started on "Bu" personally, and called him a son-of-a-bitch, "Bu" turned and hit him, once. The punch knocked the cowboy off his feet, backwards out the door. The fellow was not interested in pursuing the matter any further. "Bu" coolly turned back to the storekeeper and continued his purchases.

Dr. Buwalda delivered his lectures in a droning monotone which exerted an overpowering soporific effect on me. The period was right after lunch and between my postprandial lethargy and the monotonous drone, I regularly nodded off. I sat in the middle of the front row hoping that by being directly under his scrutiny I could avoid going soundly asleep. I never made that fatal mistake, but I couldn't help nodding off and

catching myself. We students thought that Dr. Buwalda graded subjectively, pretty much by what he thought of you, so I was worried about what kind of a grade I would get. Either we were wrong, or my dozing was unnoticed; I got a good grade.

We were introduced to geologic mapping in the San Gabriel Mountains, along the northern flank of the Los Angeles Basin, under the watchful eyes of Dick (Grass) Hopper, who was getting a PhD. I have said that the Geology Department had an especial camaraderie and I believe it was due in a large part to the fact that we worked together in the field. We not only worked together we lived together on field trips. The teacher-student relationship didn't hold on the field trips. There, we all were together being instructed by whoever knew the most about the area or the problem. If a graduate student had worked in the area, he would do the talking; if the professor knew the area, he would do the talking. Also, we all camped together and that tends to break down barriers. Short field trips might be taken over a weekend; longer trips might be undertaken over a break.

One spring break we took a long field trip to the Grand Canyon and intermediate points. The previous year Caltech had led a National Geographic-sponsored expedition that traversed the length of the canyon, retracing the trip Powell, made in 1859. I think that it was the first trip since Powell's to run all the rapids and go the whole length of the canyon. Dr John Maxson, who led the boat trip, took us down the Bright Angel Trail to the bottom of the canyon, explaining the geology as we went. The geology is classic and the exposures are continuous. We had a great time, and being young and in great shape, romped down and up with no problem. I remember that we spent the night in Phantom Ranch, the tourist hotel in the canyon bottom. It was a great break from camping out and eating our own cooking. We ate in the dining room and slept in beds; to us it was the lap of luxury. Temperatures at Phantom Ranch were almost tropical; temperatures up on the canyon's rim, one mile higher, were cold and wintry. The night after our night of luxury, we were back on the rim, eating our camp cooking and sleeping in sleeping bags in the snow.

That night we had an incident that illustrated the adage, "Every good deed earns its own punishment." It was very cold and there were heated cabins that could be rented at a reasonable rate, but most of us undergrads didn't have enough cash to afford even the reasonable rate. By banding together three of the undergrads felt they could swing the deal and they rented a cabin. The cabin had room for a fourth so they invited John Griffiths, one of the impecunious majority, to share the cabin. They had forgotten that Griff snored, but they were reminded of the fact in the middle of the night when two of the original three had to

leave the warm cabin to get away from the stentorian snores of Griff; he made so much noise that they couldn't sleep.

The night after we left the Grand Canyon, we camped in the desert about four miles from the town of Cameron, Arizona. After dinner we were at loose ends, so a group of us walked in to Cameron, just to fill the time. The next day we came through Las Vegas, and we, of course, cased the town. At that time Las Vegas was a railroad division point, and not much else. As I remember, there was the railroad station, a small hotel, a cafe and a brothel. We found it amusing that that night our leader took us fifteen miles out of town to camp in the Cold Springs Range. We felt that he wanted to be sure that we didn't walk back into town that night.

When geologists are on a field trip, the first thing they pick up on leaving the car is their geology pick, that short handled pick with one end of the head pointed and the other end a normal hammer head. This habit can lead to humorous situations. The Caltech geologists were on a field trip in Estes Park, Colorado, driving on a country road with five men in the car, and their driving didn't meet with the approval of a hot-headed local. He thought that the students didn't yield the road to him rapidly enough. In a fit of road rage he shot past the students and cut off their car. When the students stopped and got out, they automatically picked up their picks. The bellicose local was already halfway to the students' car, with mayhem on his mind, when he saw five young men get out, each idly swinging a geology pick. He suddenly remembered an appointment elsewhere. He turned, ran back to his car, jumped in and sped away.

The possibility of using a geology pick as a weapon can give one a false sense of security, as I found out one night. We had been out on a date and we were saying good night in front of her house, sitting in my old Model B Ford roadster when we saw a man go up to the window of a house across the street and look in. He stood looking in through a crack between the window shade and the frame, and I said "a peeping Tom," and decided to be a hero. I used the car to go into the field and carried my pick on the ledge behind the seat, close to hand. So taking my geology pick in hand, I ran across the street to apprehend the dastard and be a hero to my lady fair. On my way across the street, reality set in. "What are you going to do with this guy if you catch him?" I asked myself. Fortunately, he cut and ran into a driveway that led into a pitch-dark backyard, with me in hot pursuit. "What will you do if he turns on you? You couldn't hit a man with a geology pick's pointed end. It could kill him. If you hit him on the head with the hammer end you would punch a hole right through his skull. If you didn't hit him on the head, you might not stop him. What if he is waiting here in the shadows with a knife?" All of these thoughts came too late as I was chasing the "peeping Tom" into the pitch-black yard. I heaved a sigh of heartfelt relief when I heard him scrambling over the back fence.

We had a summer field camp between my junior and senior years. We established our camp in a field in Bishop, California and worked mapping geology in the Inyo Mountains to the east. About half of us worked north of Montgomery Pass and half to the south. We did our field mapping on U.S.G.S. topographic maps, as aerial photographs were not yet available. We had to identify our location on the map by interpreting the contours and recognize our spot on the topography. Before the days of trimetregon mapping, which is done in a laboratory using projections of overlapping aerial photographs, all the fine details on the map were drawn in the field on a plane-table by the topographer. The plane-table mapper, using an alidade, would accurately locate prominent points in the terrain and sketch the contours between the points. The large scale features were accurately located but the details could vary considerable. Overall the maps were quite good but in some places it could be very difficult to correlate the map and the topography. The legend on the map listed the name of the topographer. In our case it was a Mr. Jenkins, who was one of the best topographers on the Survey. One time when we were frustrated and could not locate ourselves on the map, we referred to him as Boozer Jenkins and put forth the idea that he had done his mapping while sitting in a bar in Bishop. We really didn't think that that was the case, but it made us feel better to blame somebody other than ourselves. He was referred to as Boozer for the rest of the summer.

One Sunday we undertook the climb of Mount Whitney, the tallest peak in the conterminous United States. We got about halfway up the peak, following a good trail, when it began to snow. There was a cabin where we were, in which we took shelter. It was late June and the weather had been hot where we were working so we weren't dressed for snow. When we realized that this was going to be a pretty good snowstorm, we decided that discretion was the better part of valor and gave up the climb.

I had spent two summers at Lake Tahoe and had extolled its beauty to my campmates, so a bunch of us decided to take off for the Fourth of July, which came on a weekend, and visit the lake. We left camp on Friday afternoon and reached Reno that evening. Being healthy young males who had read about western cattle towns but had never experienced one, we had to see what Reno's famous, or should I say infamous, red-light district, "The Stockade," looked like. It was a one-story structure in the middle of town. It was in the early evening and already dark when we got there. I think it was located at about Lake Street on the north bank of the Truckee River. I never saw the place in the daylight and I am not sure of its location. The Stockade was built in the shape of the letter "U", with cribs along both legs of the "U" and a dancehall across the base. The open top of the "U" was closed by a wall which was breached by a gate with a police box. The cribs were cubicles with a door and a window. A sign in the window with the girl's name identified the girl who worked there. The girls either sat in the window or

stood in the doorway, seeking trade, displaying the goods, as it were. If engaged, the girl would close the window and pull down the window shade. We walked along, a gaggle of callow youths, exploring a strange new land. We walked down the line of cribs, stopping to talk to some of the working girls. As soon as we stopped, the girl would invite us in but would end the conversation upon receiving our stock answer, "I don't have any money." We stopped, and talked to a small, dark haired brunette who was attired in a rather diaphanous black bra and panties as she stood in the doorway of a crib that sported a sign identifying her as Frenchie. Her reaction to our "I don't have any money" was quite different; she proposed a version of pay now - play later. "Dat ees too bad. When you get some monee, geeve eet to mee. Den, when you feel like f__ing ..." We found the proposition amusing and the possible complications intriguing, but we didn't pursue the matter further. We continued with our exploration and decided to check out the dancehall at the end of the building. We entered at one end of the hall, which was empty of customers but had a small group of ladies-of-the-evening clustered around a piano at the far end. When we stuck our noses into the hall, we attracted the attention of the members of the group. Immediately the piano struck up a honky-tonk tune, and one of the girls uttered a shriek which was echoed by the others, and the whole covey came running toward us. We turned and fled.

We drove out of town on US 40, and slept that night a few hundred feet off the highway, a mile or two out of town. I think that our sleeping place was about where Mogul is now. We went on to Lake Tahoe Saturday, where we camped in a government campground on the west side of the lake near Tahoe City. Everyone was duly impressed by the beauty of the area and we returned to Bishop on Sunday with no stop in Reno.

When we finished the field work and closed camp to return to Pasadena, I was what you might call financially challenged; I was almost completely broke! I filled the gas tank of my Model B Ford and had enough money left to buy a cup of coffee in Lancaster on the way home. It was especially interesting because the lights on the car decided that they should play games. From Lancaster on, about 80 miles that seemed like 200, I drove through the early morning darkness with lights that would work and then for no apparent reason would flicker and dim, or even go out completely, only to flicker on again. I got home early in the morning, none the worse for my experience, but emotionally spent. The next week I changed out all the wiring in my car.

We had to write a report on the results of the summer's work. I wrote up the work in essay form, not having enough sense to investigate and see what forms were used in writing geologic reports. My grade did not fill me with glee. It did satisfy the requirement, though, and I like to think it taught me something.

The United States Geological Survey (usually referred to as the Survey) was, and still is, one of the best places for a geologist to work. It was the aspiration of many geology students, including me, to land a job with that organization. Survey positions are Civil Service jobs that require either passing a competitive examination or, more commonly now, special certification. In the thirties, passing the competitive exam was about the only way a young geologist could land a job with the Survey. Therefore, when I was a senior in college and the Survey announced a competitive exam, I and some of my classmates and many of the graduate students took it. I came away from the examination feeling good about it. I thought that I had done pretty well. Alas, I didn't know enough about the subjects covered to realize how little I knew. I was crushed to find that I had not passed! I had already accepted a teaching assistantship at Northwestern University, but now there would be no summer job with the Survey.

I made the rounds of the oil companies, seeking work as a geologist. Absolutely no success. Worse, they had no summer jobs for a geologist but they had lots of jobs for engineers. "Can you go back and get some engineering? We can give you a job in engineering." The rejections, and the general lack of hope, left me feeling mighty low. Then Dr. Frazer told me that he could get me a job for the summer at the American Girl gold mine. I jumped at the chance. The job was low-paying but I wanted the experience.

Before I could go to work for the summer, I had to graduate. The graduation ceremonies were held outside, on the lawn near the Atheneum. I am sure there was a speaker who gave us a rousing sendoff, but I can't remember who it was or what he said. My only memories of graduation are of the academic procession which opened the ceremonies. I didn't realize that some universities had brightly colored robes and fancy hats until I saw that procession. Among the brightly colored robes, the one that stood out was the magenta-colored robe worn by the Archbishop of Los Angeles, who gave the Invocation. I guess that in the race to develop distinctive beautiful raiment, the Church had a head start on the schools.

The American Girl Mine

Graduation behind me, I took off for the American Girl mine. The mine is located in the Sonora Desert in the southeast corner of California, near both Arizona and Mexico. The nearest towns are Yuma, Arizona and Algodones, Baja California, Norte; the latter being a very small town. The camp and mill were several gray buildings clustered around a headframe that stood over an inclined shaft that gave access to the underground workings. Among the buildings were several bunk houses, a boarding house, an office building, and a mill. I was assigned

to the boarding house, where I had a small room. The building was cooled by a swamp cooler and was always pleasantly cool, no matter the outside temperature. The boarding house was run by a very efficient lady who set a good table and kept an immaculate establishment. She also was a stickler for propriety, as I soon found out. We were in the desert, it was hot as Hades outside and I came to dinner in a short sleeved shirt and walking shorts. The proprietress icily announced to me that I should never come to her table in shorts, if I expected to eat, effective immediately! I changed my clothes.

Water for the mine and camp came from a source several miles away, across the desert. The pipe was laid on the surface of the ground without a cover of any kind, exposed to the direct rays of the sun. Under the desert sun, metal soon becomes too hot to pick up and water carried in an exposed metal pipe soon approaches the boiling point; much too hot for bathing. Miners coming off shift could not use the water as it came from the pipe. The problem was solved simply and efficiently in the bunk house. Night time temperatures on the desert get unpleasantly cool and the water in the exposed pipe cools off by morning, so the early morning water was stored in the hot water-heater tank, by-passing the heating coils. Then when the miners came for a shower they blended hot water from the cold water tap with cool water from the hot water tap and had a pleasant shower. There was no luxuriating in the shower; if you wasted the cool water nobody else would be able to shower till the next morning.

When I started, they put me to work as an assistant mine geologist but it soon became obvious that I not only couldn't cut it as a mine geologist, I didn't even know what one did. Rather than firing me, they put me to work in the mine as a mucker/trammer. The American Girl was a marginal operation and didn't have modern equipment. Ore shot down by the miners was loaded into $\frac{3}{4}$ yard tram cars by "Mexican mucking machines" (a shovel and two arms). The tram cars were then pushed down the drift by the mucker, now acting as a trammer, to a turn plate, where the trammer turned the car ninety degrees. He then pushed the car down a short crosscut and dumped the ore in an ore pocket. From the ore pocket the ore was loaded into the skip which hauled it to the surface. A turn plate is a steel plate with tracks leading onto the plate from two directions but not across it. A tram car is pushed onto the plate from one side and skidded around ninety degrees to leave the plate in the new direction. All the pushing and skidding is done by the trammer. The arrangement allows tram cars to make a sharp turn where space doesn't allow a curve

The only place one could relax with the other miners was the skip landing, and the only time one could do that, was lunch time. All of the equipment and supplies came down the skip and were off-loaded for distribution to where ever it was needed. Some of the most needed

supplies were fuses, blasting caps and dynamite since they were necessary for ore production and were consumed when used. While it wasn't good safety practice, the dynamite was stored in a lidded box which had a rack above it on which were hung fuses that had been cut to length and had detonators clamped on, ready for use. When we gathered for lunch, the old timers sat on the dynamite box while the rest of us sat anywhere we could. The landing was well lit with electric lights and also was somewhat cooler, due to the constant air flow up the incline. We looked forward to lunch and the accompanying bull session. The American Girl didn't have electric head lamps; we had carbide lamps which we refilled with carbide and water at lunch break. Carbide lamps burn acetylene, produced in the lamp by dripping water on calcium carbide and the flame is in the open. The landing and the drifts were lighted by electricity. One day when we were all lounging around, preparatory to going back to work, somebody brushed his lamp against the fuses and lit at least one fuse. These fuses had blasting caps and might well detonate the dynamite if one fell in the wrong place. When someone hollered "FIRE" and we saw and heard the burning fuse, there was complete pandemonium. Bodies were flying everywhere as we sought safety. I took off up the inclined shaft. If there was going to be an explosion, I did not want it to be between me and the outside. Others ran to get around a corner, or preferably two or three corners. While most of us panicked, somebody with a knife and a cool head simply cut the fuse between the fire and the blasting cap.

I worked with a young Mexican man who showed me the ropes. We were mucking ore at a drift face where the ventilation was not yet installed and the air was dead, hot and humid. It was so humid that the perspiration that evaporated from our bodies condensed on the back (ceiling in a mine) and dripped back on us. My co-worker showed me how to crack the compressed air line just a bit, just enough to give us a little cooling air but not enough to drain the pressure and affect the operation of equipment elsewhere in the mine. I was working with him when I started tramming and he loaned me gloves until I could buy some for myself. He gave me a lesson, or rather he gave me the occasion to realize how fortunate I was to have parents that could, and would, sacrifice to furnish me a good education. I was moaning and groaning about how my hands hurt and that I had an infection in my back and how the whole situation was so bad. He shut me up and shamed me by simply stating, "You hurt now and feel sorry for yourself; think of me. You will leave here and go back to school. I have nothing to look forward to, just more of the same."

The infection in my back developed into an abscess that required trips to a doctor in Yuma. Soon it was costing me more than I was making, so I decided to quit and return to Pasadena.

Fortunately I was able to get a job with Ray Gerhart's father for the rest of the summer. I was a "gofer" and general assistant on several construction jobs. One of the jobs involved putting floors in the High Voltage Laboratory at Caltech. The lab had offices up one side but basically was a great empty box. It was built to house experiments with artificial lightning and problems with high voltage transmission lines. The experiments that required the large space had been completed and now they wanted to put two floors in, breaking up the great room. To support the floors, steel I-beams were installed, bridging the width of the building at two levels, 20 and 40 feet above the concrete floor. The beams were about 6 inches wide on the top and bottom webs and perhaps 16 inches high. Until we got the floors in we had to work on the 6-inch-wide tops of the I-beams. As I have mentioned elsewhere, I am acrophobic; I'm scared stiff of heights. Needless to say I did not look forward to going out on a 6-inch wide beam with nothing but 20 feet of air between me and a concrete floor. At first, I tried straddling the beam and walking on the lower web. That method satisfied my acrophobia, but it played hell with getting anything done. After making several trips in that very awkward position I was frustrated; I couldn't get anything accomplished. Finally frustration conquered fear and I walked out on the six inch beams. At first I was tentative, but soon I wasn't thinking about anything but the work in hand and I was walking on the beams as easily as though they were sidewalks. The lack of fear lasted throughout the job, on both floor levels. Unfortunately my acrophobia was not cured, it was only in remission and it returned in full force when that job was finished.

Graduate School

In the late 1930s and early 1940s there was a regular traffic between the geology departments of Caltech and Northwestern University. Many grads from Caltech opted to go to Northwestern for a Master's Degree as the first step towards higher degrees. Some returned to Caltech for their Ph.D.s (Dick Jahns, for instance); others continued at Northwestern or went elsewhere. I was continuing a tradition when I accepted a teaching assistantship at Northwestern, I got a teaching assistantship instead of a scholarship, because my grades weren't high enough to qualify for a scholarship. A scholarship required a grade point average of an A-, or better, so my B+ didn't cut it. I of course, with typical Caltech hubris, felt that my grades from Caltech were better than higher letter grades from anywhere else. At any rate, I had a teaching assistantship, which meant that I would teach either quiz or laboratory sections for a stipend of \$400 a year and I would have to pay half tuition of \$200 a year. I was happy to get the deal, though I was able to accept only because I was 20 and could still get passes on the railroad and I was allowed to sleep in a professor's attic room and cook in his basement for a few dollars a month.

My primary reason for going to Northwestern was to study under Charles Behre, the professor of Economic Geology. Dr. Behre was a soft spoken "Southern Gentleman," a great teacher and a good friend. He had worked extensively in the lead-zinc deposits of the Mississippi Valley and was considered the expert on those deposits. He was universally respected; in fact, after I graduated from Northwestern, he went to New York to teach at Columbia. Charles treated us grad students as friends and equals and he knew that we were living on a shoestring. In my second year at Northwestern he caught pneumonia and was sent by his doctors to Arizona to recuperate. He and his wife had just completed building a new home in Winnetka, Illinois, a town a few miles north of Evanston, where Northwestern is located. He approached me and my roommate and asked us as a personal favor, to house-sit his new home while he and his wife were in Arizona. He added that we should use his car and charge the gas on his account at the gas station and to buy our groceries at his grocery store and use his credit to pay for them. He also instructed us to use the house and car as though they were our own. We needed the car to get back and forth to school but we didn't charge the gas, nor did we charge our food; we did use the food in the refrigerator and drank up the open bottle of wine in his wine cellar.

Dr. Jack Stark taught Structural Geology and Volcanology. Jack was an amazing man. He was orphaned as a baby and was raised by two maiden aunts, who did so under considerable financial stress. Because he recognized their sacrifices, he felt responsible for the two ladies' welfare after he finished high school. Therefore, as soon as he finished high school, he went to work. He got a job as an auditor and soon worked up to being a traveling auditor, going around a circuit of plants checking on the books. He hated the job but he felt that he had to keep working, to support his aunts. When they died, Jack felt liberated; he immediately quit the number crunching and, at the suggestion of a friend, went back to school, entering the University of Chicago as a freshman at age 35. At Chicago, Jack was exposed to geology and became enamored of it and decided that he had found his vocation. In talking of this time in his life, Jack said, "I never dreamed that I could work at something that I enjoyed doing and get paid for it." He got his Ph D, from Chicago and went into academe. In 1939, when I entered N.U. he was recently back from the Society Islands, where he had spent his sabbatical mapping the geology of Moorea and Borabora. We didn't know until later that he left a daughter there with her mother. We learned of the girl when he brought her to the U.S. and introduced her to his friends. She was a lovely girl and I heard that she married a naval officer.

Jack had the habit of illustrating the borders of his letters with sketches, often in color. The illustrations featured happy dancing devils that Jack drew with a few stokes of his pen. I saved some examples of his letters,

but have lost them over the years. Though the sketched devils were simply drawn, I have never been able to reproduce one.

Dr. Arthur Howland taught Petrology. Art was a young professor who had received his Ph.D. from Princeton. He wrote his thesis on the Stillwater Complex in Montana, where he worked with another Princeton student, Joe Peoples, of whom more will be said later. The summer before I went to N.U., Art and Bob Garrels had worked for the Canadian Geological Survey, mapping in Newfoundland.

Dr. Ed Dapples taught Sedimentation and Sedimentary Geology. Ed was about the same age as Art, but was much more outgoing and ebullient. Ed took us on field trips to the coal mines and to the recently developed oil fields in Southern Illinois. The oil fields had no use for the natural gas that was being produced with the oil, so they disposed of it by burning it in flares. During the period of maximum development it was possible to read a newspaper anywhere in the field at any hour of the night by the light of the flares.

Ed had worked in the coal fields when he was fresh out of school and had done well until the mine workers started to be unionized. The union organizers were a mob equipped with pick-handles and chains and were moving in on the non-union mines and taking them over by force, in a series of almost military actions. When it became the turn of mine at which Ed worked, the management enlisted the aid of the Governor who sent the National Guard. When the advancing mob of pick-handle armed organizers were approaching the mine across a wide open field, the National Guard fired several bursts of machine-gun fire across the field in front of the mob, which broke and ran. The next day Ed quit his job and went back to school; he wanted no part of a game that was that rough.

Paleontology was taught by Dr. Ball, an invertebrate paleontologist. I never had much to do with Dr. Ball as I had no reason to study under him. He was an older man in a young department who was nearing retirement; he was very pleasant but was sort of in the background.

Geography was included with Geology in the department. Dr. Hudson was the geographer. He had just joined the department, replacing Dr. Haas who had retired. There were only three geography grad students to about fifteen geology grads, and we geology students looked down on the three, considering them to be pseudo-scientists. It was an example of the majority looking down on the minority, plus a case of hubris on the part of the members of the majority.

Dr. Haas and his wife lived in a large, old, gray, wooden house on Hinman Ave, about ½ block from the campus. They had built a bathroom in their attic and subdivided the remaining space into small rooms which they rented to impecunious graduate students for very low rentals. The location was ideal for students that had to walk to school and had little in

the way of disposable income. I was fortunate to get a room in the "Haashold." Actually I shared a room with Pete Krimmel, a graduate of Pennsylvania State, who like me was just entering graduate study. Two chemists working on their Ph.D.s lived in the largest room in the attic. Another geologist and a geographer had the other two rooms. I mentioned the fact that financial need was a requisite for getting a room in the "Haashold"; it certainly held for the chemists. One of them had bed linens made from old flour sacks. He had known no others until he left home, and then lacked funds to buy sheets and pillow cases as long as he still had usable flour sacks. Dr. and Mrs. Haas lived on the first and second floors, though they shared the second floor with Marshall Harris and his wife, who had a small apartment on the second floor. Marshall was a geographer from Oklahoma, who also was starting graduate study.

Pete and I slept in the attic room but we cooked and ate our meals in the basement where we had the use of a two-burner gas stove and a few cooking and eating utensils. Our refrigerator was the window ledge, which was really cold throughout the winter. When the weather warmed, our refrigerator just wasn't quite as cold, and we left for the summer before our window ledge became too warm. The living arrangement worked out very well for us; it allowed us to stretch our meager funds and get by without begging funds from our parents. The first year Pete and I lived on \$2.00 a week for food. The second year inflation hit; our food bill increased to \$2.50 a week. Our diet was a bit circumscribed; we ate a lot of chicken and noodle soup for lunch and pork hearts for supper. I don't remember what we did for vegetables, but whatever it was, we thrived. I can't remember having a single sick day in the two years I spent in Evanston. We were very financially challenged but I enjoyed a social life. Of course, there were times that I took the girl to the Student Union, bought her a Coke and watched her drink it because I didn't have another dime.

At first, Pete and I shared the cooking arrangements in the basement with the geographer who lived with us in the attic, but he couldn't stand our low-cash diet. He soon ate elsewhere. He was a shy, bland, blond Canadian who never enjoyed his situation in the U.S. He was unassertive in a bunch of highly competitive, very assertive young men and women. I think that he was completely snowed by every new and unfamiliar experience. He lived with us for a couple months and then threw in the sponge and returned to Canada. I said he was bland. He was so bland that the only distinctive thing about him that I remember, was that he would pour honey over peanut butter and eat it with a spoon

Helen Dowling was the only girl in our group of graduate students. She lived in Denver and had her undergraduate degree from Colorado College. Women were relatively rare in geology at that time and Helen was the first girl I had shared a classroom with since high school. Don't get me wrong,

there were some outstanding women working as geologists but they were rare, and they had to be outstanding to be there. Helen held her own with us and went on to Chicago for her Ph.D. I think that the only time she bumped into discrimination while at Northwestern was when she was denied entrance to an underground mine on a field trip. In denying entrance the mine management said their miners believed that it was very unlucky to have a woman in the mine and would walk out if one entered.

The graduate students helped at registration, before we knew the professors or each other. Our job was to get the students who were registering for Elementary Geology (Geo-I) into the proper sections, and to balance out the numbers in each section. Geo-I was widely, and I believe truly, perceived as the easiest way to satisfy the science requirement which every student had to meet for graduation. I was told that the science requirement could be avoided by taking Ancient Greek; strangely, few students availed themselves of that loophole. This meant that registration was hectic; hundreds of undergraduate students trying to find and enroll in the section with the easiest teacher and the graduate students just trying to find their own ways through the paper blitz. In the middle of the maelstrom, a student came up to Mal Bennett (an incoming grad) who was registering and said, "Give me any professor but Dr. Ball, I hear he's awfully hard." Mal drew himself up and said, "I am Dr. Ball". The poor student blushed and fled. Actually Dr. Ball didn't teach Geo-I that year and as we later found out, he was probably the softest touch, the easiest grader in the department.

When school started I met Robert Minard Garrels. Bob was the smartest man that I ever knew well. He definitely was not behind the door when brains and talents were handed out. He was a skilled pianist (his music teacher wanted him to go to a conservatory instead of college). He was widely read, covering every field of knowledge that I knew of, including poetry. He was a very competent athlete with terrific reactions but was cut from the University of Michigan freshman squad before the first practice because they had too many men on full rides who would concentrate on basketball. He was a quick learner who retained what he learned and at the same time an original thinker who put his knowledge to use. After getting his Ph.D. he taught Economic Geology at Harvard for several years and shifted his interest to Oceanography. Bob taught at several schools and ended up at the University of South Florida. In both sciences he made seminal contributions as well as training many students who in turn advanced their science. Cancer terminated his career early. While in Northwestern I was encouraged by Bob and I admired him as a role model

Most of the teaching assistants taught lab sections: map reading, rock identification, some mineral identification, etc. I was lucky and got to

teach quiz sections where we reviewed the lectures and the text and where I gave short tests to check on the progress. I enjoyed the interaction with the students, who were only a few years younger than I. One of my classes started at seven thirty in the morning and I sometimes would run late, and miss breakfast in order to get to the class on time. I would come into the class and warn the students to watch out and not give me any trouble as I was hungry and would be really mean. It was a running joke until one morning several of the students got together; one brought an orange, one brought a banana, one brought a big piece of home-made coffee cake and another brought a mug of hot coffee. They presented me with breakfast announcing that they feared a hungry instructor.

My supply of free passes on the railroad, which I got through my father's working for the Pacific Electric Railroad, ended when I turned 21 in December, 1939, in my first year of graduate study. The next summer, I was faced with the problem of getting back home as cheaply as possible, as I had very little cash and was looking forward to the necessity of paying the expenses of field work for my thesis. My problem was solved when I saw a notice on a bulletin board, asking for someone to help drive a new car to Salt Lake City. A student who lived in Salt Lake City, was driving a new car from Evanston to Salt Lake City for a friend and wanted two more drivers to share the driving. He felt that three drivers could drive twenty four hours a day by rotating through the driver's seat. I jumped at the opportunity as it would be easy and cheap to take a bus the rest of the way home.

I got only 4 hours of sleep the night before we left, as a myriad of unexpected little problems demanded my attention. We left Evanston in the afternoon and drove all night. I had no problems until I was well into my first driving shift in the dark, when my lack of sleep caught up with me. I began to feel that I had sand under my eyelids, grating on my eyeballs. My fellow drivers were sleeping and I felt that I had to finish my shift, so I drove on. It was most uncomfortable. When I finished my shift, I was able to get some sleep and the sand left my eyes. We drove all the next day and night reaching Salt Lake City early the next morning. We drove directly to the home of our leader, where his mother fed us and put me to bed. I slept around the clock, not awaking till the next morning. Refreshed by the long sleep, it was a simple matter to catch a bus to Pasadena and home.

Caltech has an honor system which is rigidly adhered to, so when I got to Northwestern I was unprepared for cheating during exams. I very probably missed a lot of it as I didn't really look for it. Nevertheless, some cheating is so egregious that it can't be missed. One such case occurred during a test administered by another graduate assistant during my second year and is so unusual that I have to include it. Northwestern

students, like most students at the time, took tests with bluebooks. Bluebooks consisted of several pages of lined white paper stapled in a blue cover. At the start of the test the students were instructed to turn the book over and write their name on the upper left corner of the cover. The body of the bluebook was used for the test. Some of the students, who were more verbose, filled the lined pages and continued their answers on the back, blue cover. In this case, a man filled his lined white paper and turned over his book and continued his answer after his name, writing a paragraph on the blue cover. His neighbor, who was copying his answer, was very busy trying to copy the whole of the answer before time ran out. In his haste he was copying word for word. This is not a wise thing to do because even a tired grader will recognize a word-for-word copy. This cheater made sure that his plagiarism was noted; he copied his neighbor's name, right along with the answer.

Master's Thesis

A thesis was required for a Master's degree, and I chose to map the geology of a mining district in the Inyo Mountains of California. The project was suggested by Dr. Fraser, one of my professors at Caltech. I corresponded with the owner of the Keystone Mine in the Beveridge Mining District and arranged to use his mine as a base camp while I mapped the geology of the District. The mine owner was an old prospector who held the property by doing the necessary labor each year. He lived in Lone Pine, a small town in Owens Valley almost due west of his mine in the Inyo Mountains which form the west side of the valley. He was completely familiar with the district and its history. He not only permitted me to use his mine as a base camp; he would come with me. He arranged for a horse for himself to ride to the mine and two pack mules for our supplies; he had pack-saddles, panniers, and all the other gear. We bought the necessary supplies, loaded them in the panniers and were ready to go. When it came time to load the mules, I got a lesson in "Mule Loading I". I put the packsaddle on the mule, pulled the cinch tight, hung the panniers and lashed the load down with a diamond hitch. My host who had shown me the diamond hitch, now pointed out that the packsaddles were not cinched sufficiently tightly and would shift. He then took the cinch of a mule, kned the mule in the stomach and the mule expelled air with a loud whoosh. When the mule exhaled, the old boy hauled on the cinch and tightened it perhaps 2 inches. He explained to me that mules are smart animals and that after they have been loaded a few times they try to keep the cinches loose by sucking in air which expands their girth until after the cinches have been drawn tight. When the mule expels the air, the formerly tight bands are no longer tight and unless tightened will allow the load to shift. The Draconian method of

assault with the knee allows the cinch to be drawn tight. I understand that this also applies to horses.

We left my guide's house, crossed the valley, past the Lone Pine station of the spur railroad line from Mohave and took the trail that led eastward into a box canyon and on into the mountain range. Our target, the mine, lies at an elevation of about 8,200 feet above sea level, in a valley on the eastern slope of the range. We left Owens Valley, elevation 3,700 feet above sea level, and climbed to the crest at an elevation of more than 9,000 feet, before dropping to the mine. At the time, this region was remote; we didn't see another human being from the time we left until we returned. In the past, the area saw a lot of activity but produced very little gold. The Keynote Mine (later renamed the Keystone Mine) is the only mine in the area that produced any gold, and it didn't produce much. The remains of Mexican arrastras can be found as well as complete mine setups. An arrastra is simply a basin made of uncemented rocks with a central post which acts as a pivot for a pole to which a heavy, hard rock is attached by a chain. A mule is hitched to the end of the pole and is driven around the basin, dragging the rock. Ore put in the basin is pulverized by impact with, and grinding by, the dragged rock. When the ore is pretty well ground, mercury is added which amalgamates the gold and collects in spaces between the rocks in the floor of the basin. After the run, the arrastra is shoveled clean and the amalgam scraped out of the cracks. It then is a simple matter to heat the amalgam and get pure gold.

With the exception of the Keystone Mine, all the developments were planned as scams to do a minimum of work while separating suckers from a maximum amount of their money. One mine set-up featured an aerial tram that connected a mill that never milled a ton of ore with a mine across the valley that never produced a ton of ore. The stock salesmen would describe a working mine in the Inyo Mountains, even show pictures of the tram and mine. He would allege that this mine occurred in an old area, known and worked by the Mexicans. He then would allow the sucker to buy some shares for himself and a few friends. My guide told me that doctors were the most common suckers, followed by prostitutes

The Inyos are a typical basin-and range, fault block range with the western edge uplifted higher than the eastern. The streams east of the crest drain much larger areas than do those west of the crest and therefore have larger and longer valleys. None of the valleys are large; they are better described as narrow, steep-walled canyons which dissect an east-sloping upland. In the higher reaches, the uplands support a sparse forest of stunted trees which fades into desert at lower elevations. In the area that I was mapping, at least one of the east-flowing streams had running water in the stream bed all summer, a rarity in the desert

ranges. I knew the water was there because I could hear it. I never saw the water because the canyon bottom was filled with very large rounded boulders and no soil. The water flowed on the surface of the underlying bedrock, under and around the loosely piled boulders. Fortunately, I had a canteen and didn't rely on the stream for a drink because there was no way I could reach the tantalizing water as it gurgled, unseen and out of reach.

The Keystone Mine made an admirable base camp. We had housing, cots, good water from a well and an adit at the mine, which held steady at a temperature of 40 degrees, and served as a walk-in refrigerator. I spent a month mapping in the Inyos, and enjoyed every minute of it.

There were a number of mountain sheep in the area and it was amazing seeing them move on the steep rocky terrain. One day I was working my way across a very steep outcrop and I came face to face with a female sheep. She looked at me. I looked at her. She dropped her head as though she was considering butting me. I looked around and saw that I couldn't dodge on the slope so I shifted my geology pick, figuring I could hit her between the eyes if she charged. She looked at me again, turned and took off in a series of great bounds, straight down the precipitous slope. I watched her go and heaved a sigh of relief. I am still amazed that an animal could negotiate that descent.

My guide shot a mountain sheep, butchered it and hung the carcass in the cool tunnel for our consumption. Actually I think we would have run out of food before I finished the mapping if he hadn't supplemented our larder. The meat was the best tasting game that I have ever eaten, and in the cool air of the tunnel it stayed fresh. The dry air in the tunnel produced a thin rind of dried meat that was like jerky but it too was edible. We ate the whole carcass; nothing was wasted

All of my experiences with the native wildlife were not potentially dangerous. One day I was resting after eating my lunch when I noticed a beautiful little fox daintily picking his way down the ridge that I was sitting on. I wasn't making any noise and I didn't make any quick movements as the fox approached, carefully picking each step before putting down his foot. His progress apparently took all of his attention, as he came to about four feet from me before he realized that I was there. When he saw me he turned and scampered away. The incident made my day. Another day I was eating my lunch and heard an eagle screaming. I looked up and there was a golden eagle flying in great circles, calling as it flew. As I watched, a second golden eagle joined the first and there were two eagles circling and screaming. Soon a third eagle joined in the circle and all three flew together for a while before they all flew off. It's amazing how a simple thing like eagles on high can lift one's spirits and make one feel good.

The U.S. Geological Survey announced another Civil Service competitive examination for geologists during my second year of graduate school and I, and many other grad students, took it. I had been doing well in my studies and I went into the exam room with great optimism. I left the examination room convinced that I would be lucky if I passed, and that if I passed it would be with a low score. My pride was badly shaken. I had considered myself as one of the better students; actually, in my hubris, I felt I was the best of those seeking a master's degree. I felt that if a bunch of others came out ahead of me I would lose my image of a promising young geology student. I didn't know what I would, or could, do if the others passed and I didn't. I was sure that I wouldn't be able to hold up my head in the department if that happened. It all added up to the fact that I was worried sick and awaited the notification of the results with great trepidation. When several other students received word that they had passed with good grades, I didn't feel any better. The notifications dribbled in; Bob Garrels passed with a very good grade, which everyone expected, and two more passed, solidly. I was a nervous wreck as everyone else got their results and mine still weren't in. I was almost sure that I had failed. Finally, the envelope came and I was afraid to open it. Ultimately I could not put it off any longer; I had to face the music. I opened the letter and found, to my surprise, that I had the highest grade of all the Northwesterners that took the exam. Later I learned that Bob and I were among the top ten in the nationwide test. Much later, somebody told me that I was number one, though I never confirmed that. It is ironic that I failed the test when I thought I did well and did well when I thought I had failed.

Working for the United States Geological Survey

Summer Job

As a result of the test, I was offered, and took, a summer job with the Survey, working in the Judith Mountains in central Montana. I finished my class work and left for Lewistown, Montana before the graduation ceremonies. Before I left, Dr. Behre told me that he was leaving Northwestern to take a professorship at Columbia. He also told me that I had a scholarship at Columbia, if I wanted it. I left, planning to attend Columbia in the fall. Oh, I might add that as a starting Junior Geologist, I would earn \$2,000 per year and because I was starting my employment in Lewistown I would never be able to claim travel expenses for work while staying in that city.

I reported to Eddie Goddard. Almost nobody on the Survey used the fact that they had a Ph.D., though most had one. Eddie did; from Michigan. It was considered ostentatious to flaunt your degree, and any such activity was derided. One who did, was John Reed, the head of the Alaskan Branch. He had his secretary answer his phone with, "Doctor Reed's office". When Tommy Hinrichs called and got the prescribed answer, he replied, "Oh, Hell! Public Health! I wanted John Reed," and hung up. Reed's effort also was memorialized in one of the all time hit-songs from the Pick and Hammer show, the annual show put on to poke fun at people and practices of the Survey. The song was "Call me Doctor," sung to the tune of "Pretty Baby." The words that I remember are, "Everybody loves a Doctor, that's why I'm in love with me. Call me Doctor. Call me Doctor. I feel ever so important since I got my Ph.D. Call me Doctor, that's me."

I worked that summer assisting Eddie in the Judiths, working out of Lewistown. We were mapping on aerial photographs; the geology would be transferred to topographic maps later in the office in Washington, D.C. While we were mapping the geology there was a field party of the U.S.G.S. Topographic Branch working in the area preparing the topographic map. This was to be the last U.S.G.S. topographic map for which the contours were actually drawn in the field. For this map, the topographers would trace the stream patterns on aerial photographs and transfer the traced streams to the plane-table sheet, sketching the streams in, in light blue pencil. Then, in the field, they would select forks and bends in the streams and any other readily identifiable points on the terrain and survey them, determining the location and elevation. Then, using the surveyed points as controls, they would adjust the blue stream patterns, tweaking them to agree with the survey. With the streams and ridges accurately located, it was simple to draw the contours while looking at

the terrain. U.S.G.S. topographic maps after 1941 have been drawn in the office, using stereoscopic projections.

That summer I stayed in a rented room in Lewistown and ate my meals in a small local restaurant. My landlady was a true pioneer. She had come, as a child, to Fort Benton, Montana when it was still a working fort, a bastion against the Indians. She, as a young wife, had spent winters alone with her children in a sod house on the prairie in order to hold the homestead while her husband taught school in town to earn money and support the family. It is an ironic commentary on the times that the waitress in the cafe where I ate, had to leave home and go out on her own in order to go to high school, because her old-country father didn't believe in education for females. She was working in the cafe to send her younger sister to high school and planned to go back for more education herself when her sister graduated. This was in a state that sent a woman (Ms. Rankin) to the House of Representatives. Ms. Rankin had the dubious distinction of casting the only dissenting vote against the declaration of war following Pearl Harbor. I registered to vote in Montana just so I could vote against her for re-election.

Chromite On The Stillwater

When the field season was over and it was time to go back to school I was asked if I would like to work through the winter on the Stillwater Complex in south-central Montana. I liked the idea of earning money, so I decided to defer going to Columbia and to work for a while and save some money before returning for more graduate study. I spent that winter living in a cabin in the Stillwater River Valley about a half mile from where the road ended at the Beartooth Ranch, a dude ranch. I got my mail at the metropolis of Nye, a single gas pump outside an ancient, small cabin which housed the post office, grocery store, a telephone and living quarters of the owners. The nearest real town was Columbus, Montana, a small town on U.S. 90, about 30 miles west of Billings.

The cabin I was living in belonged to Bill Mouat, an old timer who owned many of the chromite claims that we were diamond drilling. He and his wife lived in a new house they had built alongside the old cabin. The cabin had running water piped in from a small spring between the two buildings but had no other indoor plumbing or other amenity. A covered box set in the spring served as a refrigerator. The large room in the cabin was heated by a cast iron stove that burned coal and was lighted by kerosene lamps. In common with many old cabins in the west, it was papered with newspapers, to cut down on drafts. Some of the newspapers on the walls had reports on developments on the fighting fronts of World War I. The house was shared with the U.S. Bureau of Mines, who were

also working on the project. Their personnel usually commuted from Columbus, where they stayed in a hotel.

Early in my stay on the Stillwater, I found that there were many conflicting claims and that each party complained that their opponents were claim jumpers and crooks of one kind or another. Bill Mouat claimed all the ground you could see, for 360 degrees around wherever you happened to be when you questioned him. A Mr. Mclean (I'm not sure of this name; I didn't work much with him and probably have forgotten his real name) said Bill was a crook and had jumped his claims where their properties abutted. Bill just called McLean an old crook who was trying to cheat him out of his claims. McLean also tended to expand his holdings in the telling. When Joe Peoples and Art Howland did their theses under Dr. Sampson, they projected the chromitite layers far beyond the outcrops, into areas where chromitite was previously unknown and unexpected. They apprised Bill of their findings including the projections of the chromitite layers. No one was interested in chromite at that time and nothing was staked. Several years later, when chromite became a strategic mineral, Dr Sampson staked some claims, based on the projections. Bill claimed all the area and overstaked all of the new claims. Fortunately, I had nothing to do with adjudicating the conflicting claims. I did get a wry kick out of the names Bill gave to three adjoining claims in the area; in order they were Priceton, Skunk, Sampson.

Many of the old timers were interesting characters, not necessarily good role models, but interesting. Bill was such a character. I was told that during the boom in oil exploration along the front of the Rocky Mountains, Bill was whipped on the main street of the hamlet of Limestone, Montana by a disgruntled investor. The investor had joined others in footing the costs of drilling an exploratory oil well getting in return a share of the oil well. The fact that the well turned out to be a dry hole wasn't the reason the investor was unhappy; he saw red because he found out that Bill had sold 150 % of the well, insuring that he made money when the well failed. Actually Bill was lucky; he would probably have gone to prison if the well had made money. Bill wasn't a bad sort, but you couldn't believe a word he said. I was working in the office one day when I overheard a discussion outside the window; Bill was talking to two vice presidents of the Anaconda Copper Company. The A.C.M. was developing the chromite mines for the federal government and these two were checking on the progress. They were discussing the Monte Alto Tunnel, an old tunnel that had been driven into an alluvial fan on the west side of the Stillwater Valley, close to where the A.C.M. were building the mill. One said to Mouat, "Bill, what's this bullshit you've been telling us about the Monte Alto Tunnel cutting debris from the chromitite layers that assayed 10% chromium? We sampled the tunnel carefully from end to end, and found only traces." Bill answered, "I don't understand it. We

must have assayed for something else. That's it! We were assaying for platinum." There was no answer.

This was my first experience of many that led me to become a skeptic. It convinced me to never believe the statements of mine owners until I had a chance to check them.

It gets very cold in winter in Montana and living in the cabin allowed me to enjoy every bone chilling moment of it. At night, I would bank the stove, turn off the lamp and jump into bed wearing long woolen underwear. I found out my first night, that I had to sleep in my long johns or I would be too cold to sleep by early morning. It didn't make any difference how many blankets I had; without my long johns hugging my body and legs, I would get cold. In the morning, the alarm clock would awaken me, I would jump out of bed, open the draft on the cast iron stove, shake down the coals that I had banked the night before, add some coal and jump right back into bed. In a minute or two, that coal stove would be cherry red and almost throbbing as it poured out heat. In fifteen or twenty minutes the room would be warm enough for me to get up. The first time I spent a sub-zero night in the cabin I found that all of the inks that I was using froze solid. The stoppers were all up out of the bottles, lifted out by the freezing, expanding ink. At the same time, the droppers, which were attached to the stoppers and used to load ink into pens, were frozen solidly into the mass of frozen ink in the bottle. When the freezing ink pushed the stoppers up and out, the droppers, which were already solidly frozen in, parted company with the stoppers. The rest of the winter, I had to improvise when I wanted to load a pen with ink. The cold forced me to live in my underwear all the time I was in the cabin, so I probably got a little rank after a couple of weeks. Under the frigid conditions, there was no way I was going to bathe in a wash tub like my ancestors had, so there was no way for me to bathe, short of Columbus. As a result I would go to Columbus every two weeks to take a bath, and change underwear, whether I needed it or not.

I said it got cold. How does a month of sub-zero weather, two weeks of which never topped 20 degrees below zero, sound? Actually, I enjoyed the winter, as long as I was warm. The dry cold didn't bother me as long as I wore all-wool clothing. I will admit that when the temperature fell to 40 below I spent as little time as possible outside. It is interesting that when I flew home for Christmas and arrived in Southern California on a dank, damp, overcast day, I felt cold, even in my all-wool attire.

I was driving back from Columbus to the Stillwater when I heard the radio announcement of the attack on Pearl Harbor. I made up my mind to volunteer, but thought that first I should talk it over with my parents. When I did, I was surprised by my father's reaction. He, who had volunteered for the Spanish-American War, told me not to do it. He based his advice on the fact that in the army, one does not choose his superior

officers. “If you get an able officer you will be lucky, and even able officers make mistakes. If you get a poor officer, he will make lots of mistakes. Mistake or not, you will have to obey, even though you may realize it is a mistake and it might cause your death. I had good officers but some of the outfits which fought alongside us didn’t and suffered needless losses.” I had never heard my father discuss the war and was surprised by his feelings.

I returned to Montana and the job and put off volunteering. The experience of the Dupont Explosives representative, a graduate of M.I.T. and an experienced, expert blasting engineer, encouraged me to delay. He wanted to volunteer, thinking that there would place for an expert in blasting with the Corps of Engineers. He went to the Army Recruiting office in Los Angeles and was in the process of being enlisted when the recruiting officer asked how much mathematics he had studied. He answered “I’ve had through linear equations, Fourier Series, and theory of numbers.” The recruiter then asked, “Have you had Trigonometry?”

When the engineer heard that he answered, “Hell yes! I had that in high school.”

“Good” said the recruiter, “You can have a job with the Coast Artillery, at Fort MacArthur.” (Fort MacArthur is the old fort guarding Los Angeles harbor with large caliber, World War I big guns). When my friend heard that he exploded, and left the office. As he said, “If the country can’t put me in a position in the armed forces where I can use my expertise, the country can better use my expertise in the production of strategic minerals.”

I was still mulling over volunteering or not, when I took a ‘Learn to ski week’ in Sun Valley, Idaho. The resort was experiencing a slow season, due to the war, and offered a very attractive price for an all-expenses tour. We slept in a dormitory, but enjoyed all the attractions of the resort. While I was in Sun Valley, the U. S. Army Mountain Troops were filming a training film and I regularly ate dinner with some of them. They assured me that I could volunteer and qualify for that new, all-volunteer organization. That convinced me. I returned to Montana and mailed in an application for the Mountain Troops and was accepted for the newly formed Tenth Mountain Division. I then went to the recruiting office to sign up for the army in the aforementioned division. I was told that to enter the army I would have to resign my job in the Survey, wait six months, and then volunteer. This was due to the fact that I was working on supplying strategic minerals for the war effort. This stopped me. If I went from the Survey directly into the Army, I would have a job when I returned. If I resigned from the Survey, there would be no job awaiting me and I would be competing with all the recent graduates for any positions that became open. I opted to keep my job.

I worked through the winter on the Stillwater and was joined the next summer by a large number of geologists that included Bob Garrels and two other geologists from Northwestern. The chief of the whole project was Joe Peoples. Joe worked with Art Howland when they both were graduate students at Princeton, doing their Ph.D. theses on the Stillwater Complex, the body which includes the chromite layers that were the subjects of our work. The Stillwater Complex is a layered intrusive body, outcrops of which stretch from the Benbow Mine on the east, west-northwestward for about 30 miles, through the Stillwater and West Stillwater Valleys over the Boulder Plateau to Boulder Creek on the west. The chromite occurs in layers near the base of the ultramafic sequence which is the basal sequence of the complex. There are a number of chromitite (chromite rich rock) layers, some of which are consistent along the extent of the complex.

We worked in teams, mapping the geology of each outcrop of chromitite in detail. We tied in any other outcrops in the areas around and between those occurrences, to produce a geologic map. In our mapping, we first carefully established local baselines which we used to control the detailed geologic mapping. In the detailed mapping we used an alidade and plane table to locate points of interest. An alidade is a telescope mounted on a straightedge with its line of sight fixed parallel to the straightedge. The mounting is equipped to allow the scope to move in a vertical plane and to measure vertical angles. The telescope is fitted with three horizontal crosshairs and a vertical cross hair. The horizontal cross hairs are placed to subtend a known angle and the vertical cross hair allows the straightedge to be aligned to the target. The alidade is used on a plane-table which is mounted on a tripod and leveled. The map is mounted on the plane-table and the starting point on the map is located over the starting point on the ground. The geologist finds a point of interest, describes it in his notebook and holds a range rod vertically over the point of interest, as a target for the plane-table operator. A range rod is simply a long ruler, laid out in easily read units. The plane-table operator sticks a pin in the starting point on the map and, using the pin to keep the straightedge on the starting point, aligns the vertical cross hair on the range rod and draws a line along the straightedge. He then reads the vertical angle and the length between the horizontal cross hairs. Reference to tables, which solve the trigonometry, yields the distance and the difference in elevation between the starting point and the target. The distance is measured off from the pin and you're ready for the next point. I worked with Fred Cater, a superb plane-table mapper. When we had to carry a line through the woods and close the loop back to a control point, Fred didn't just hit the flagged pole that marked the point; he split the pole with the cross hair. Later, when we had a series of local maps, each prepared by a plane-table survey controlled by a local base line; we ran geodetic-quality surveys to tie down the exact locations of all the local

baselines and obtain an accurate map of the geology of the whole Stillwater Complex.

In our work we got to see, and live with, the fauna of the area. We worked for a week in one area under the supervision of a doe and her faun. When we moved the plane table, the two deer would move and settle down to watch us in our new location. Porcupines love anything salty and any leather objects that had absorbed sweat were targets for their teeth. Tying objects up in trees can protect goods from bears but it is no protection from the arboreal porcupines, as we found out when one of the spiny rodents gnawed holes in our alidade case. Bears are honest camp robbers; when they raided our camp, they left a payment in the form of a large pile of bear dung in the center of the camp. In the winter, a herd of mountain sheep would come down into the valley but we never saw them at other times of the year. Grouse, which were plentiful, had the habit of freezing under a bush until a person just passed and then exploding up and out almost from under ones feet. In taking off, they made such a loud sharp noise it was almost guaranteed to bring on heart failure. We never hunted, but after being startled almost out of his shoes several times, Fred decided to get something in return. He shot one in the head with a pistol. If he hadn't hit the bird in the head with the shot, I think the bullet would have bounced. That bird was so tough when we cooked it, that I don't think we could have cut the gravy with an axe, much less eat the bird. Although we didn't hunt, we did fish. Trout fishing on both the Stillwater and West Stillwater Rivers was excellent and we enjoyed some nice fish dinners.

In the course of our work I met a number of the people that lived and worked in the area along the front of the Beartooth Mountains. Many of them had interesting stories to tell and because hunting and fishing are important to them, their stories often had to do with hunting and poaching. I take a lenient view on poaching, if it is done by locals who depend on the poached meat or fish to supplement their diets.

One of the cowboys was hunting deer along Rosebud Creek and succeeded in shooting a 4- point buck. The deer dropped in its tracks. When the hunter approached the deer the first thing he did was to attach his deer tag to the deer's hind leg. The hunter had been working on a fence line and had a pair of pliers in his pocket but had forgotten to take his hunting knife. Faced with a dead deer and no knife, and wanting to bleed the animal, he tried to cut the deer's throat with the pliers. To his surprise, the deer jumped up and took off over the hill, leaving a trail of blood as it ran. The hunter was following the spoor, expecting the animal to drop at any time, when he heard a shot from the other side of the hill in front of him. As he breasted the crest of the hill, he saw another hunter bending over a dead deer -- his deer. "Hey!", he shouted, "That's my deer!" "The Hell it is! It came running over the hill and I shot it," was

the rejoinder.” “Look at its hind leg. It’s got my tag on it.” “My God! You can have it. Any man that can tag a running deer deserves it.”

One of the least popular men in the area was a game warden, I’ll call him Snyder, though that’s not his name. Snyder was universally disliked. It wasn’t that he did his job; it was the way he did his job. Two old timers were cooking out-of-season venison for Sunday dinner, when Snyder drove up to their cabin. The air inside the cabin was redolent with the mouth-watering aroma of the cooking steaks and there was no way it could be cleared or masked. When the cook saw the approaching game warden, he turned to his partner, gave him the cooking fork and told him, “Here, you take over the cooking and act absolutely unconcerned, and for God’s sake don’t admit anything. I’ll take care of this.” He then went out the backdoor and into the cooler. The cooler was a shed with gunny sacks sewn together for walls which were kept damp. Hanging in the cooler was a freshly killed deer carcass from which the steaks had been cut. This was cut down, thrown in the corner and covered with gunny sacks. The old timers had recently lost a young colt, and that body was nearby. It didn’t take him long to hack a quarter off the colt, hang up the quarter, cut some pieces off it, and throw them where they wouldn’t be noticed. He then returned to the cabin. Snyder invited himself to dinner, which he enjoyed, and then turned to his hosts and said, “That was a great venison dinner and now I’m going to have to arrest you. Where’s the deer? I’ll need it for evidence”. The cook said, “You’ve got it all wrong.” “Don’t try to lie to me. I know deer meat when I eat it. Where’s the deer?” “You’ve got it wrong, but if you insist, it is out in the cooler.” Snyder went out to the cooler and returned almost immediately in a rage. “What do you sons-of-bitches mean, feeding me horse meat!” he screamed as he stormed out of the cabin and drove away.

The dislike of Snyder wasn’t limited to adults. One beautiful summer day on the Stillwater River a teenaged boy was fishing for trout when Snyder drove up. The boy was wearing waders and was fishing with expensive gear which would be confiscated if he was fishing illegally. He was on the opposite bank when the game warden called to him, “Come over here and show me your fishing license.” The boy answered, “If you want to see my license, come over here. I’m trying for a big one and don’t want to scare him.” Snyder was wearing street clothes and the river was about waist deep and perhaps fifty feet wide where they were, so Snyder went downstream to a place where he could easily cross. When he came back upstream to where the boy was fishing the boy was on the other side. Snyder again called to the boy, ordering him to come over and show his license and received the same answer as he had received before. Snyder now was sure that he had an arrest if he could get directly across the stream. He also knew that if he went back to the crossing the dance could go on indefinitely. Thoroughly angry, he jumped into the water and waded across, getting thoroughly drenched in so doing. Now he faced the

boy and demanded, "Okay, you've had your fun, SHOW ME YOUR LICENSE." "Sure," said the boy as he produced his license.

In addition to the chromite in the Stillwater Complex, there were scattered small pods of high grade ore on the Beartooth Plateau, some miles south of the Stillwater Complex. Union Carbide was mining these in a number of small open pits. I went up to visit the workings on a July day in 1943 and found that the mine boss was Art Drescher, a geologist whom I knew when he was a graduate student and I was an undergrad at Caltech. Although it was a day in July, it was a bitterly cold day. Snow flakes drifted lazily in the slight breeze which nipped at our faces and any other exposed skin. I turned to Art and asked him, "When do you get summer up here on the plateau?" He replied, "I don't really know. I've only been here two years." It was a small exaggeration, but it made his point. Years later, my wife and I, on our honeymoon in mid-July, drove through 8-foot snow banks on our way across the Beartooth Plateau going to Yellowstone National Park.

West Coast Chromite

There are two regions on the west coast where pods of chromite were being mined during World War II: one was in the Coast Range in Southwestern Oregon and Northwestern California, the other was in the foothills of the Sierra Nevada in Central California. In both areas the individual deposits were small but the grades were high. In the late fall of 1943, I was moved to Grant's Pass, Oregon, to work in the Josephine River area. It was late in the season, but we wanted to look at several more deposits before the snows made the region impossible for fieldwork. It is interesting that the geologist that worked out of Grant's Pass the previous winter feared that winter in the small town would be exceedingly boring for a single man. Faced with the prospect of several months of tedium, he took heroic measures to circumvent the problem. He made a list of all the marriageable young ladies in the town and graded each one as to compatibility. He then proposed to the girl that he had rated highest and married her. I don't know if he would have worked downward through the list if he had been turned down, as that didn't become necessary.

At the time, Grant's Pass was the center of a booming timber industry. It was a common sight to see large trucks bringing in the great logs of Douglas Fir, many more than six-feet in diameter. A single one of the larger logs would make a load. Three of the smaller logs (perhaps four feet in diameter), would be hauled in a load. The logs would be lashed down with heavy chains, pulled as tightly as possible. The trucks moved right along reaching speeds in excess of forty-miles an hour on the open highway. At such a speed, a sudden stop would be deadly. The momentum of the logs would cause them to shift forward, shearing the

cab from the chassis and crushing the driver. I saw one demolished truck, and afterwards never felt safe when I met loaded trucks on the highway.

Fall was scrolling down into winter when I drove out of Grants Pass into the forested Josephine River country, to visit one more property in the area west of town. It had been raining and the unpaved, narrow road had many mud holes, most of which were small and presented an annoyance but were not a serious impediment. One, however, was long and deep. I got through it going in, helped by the fact that it sloped gently down in the direction I was driving, but I noted that it might give me problems when I returned. I reached the cabin of the property owner with no problems and met the owner. He was an interesting man, living a solitary life with few trips out. Although I was looking at his chromite prospect, he depended on his placer gold claim for cash to purchase necessities. He had rigged up what he called his "automatic shooter" to aid in working his claim. It was a small weir or dam which had a gate that was opened by a lever that was connected to a bucket which filled with the water which overflowed the dam when the dam was full. The weight of the water-filled bucket activated the lever which opened the gate, releasing the dammed up water. The release of the pent up water sent a surge of water down the creek moving all but the largest rocks. The large rocks he moved with a crowbar. He was recovering the gold nuggets that were exposed in the stream bed. Evidently he recovered enough gold to buy his necessities. He was another local who lived in large part off the land; he netted trout, which he kept in brine, and he ate deer meat and trout all year round.

It was a cold, overcast afternoon with a threat of snow in the air when I left the cabin to drive back to Grants Pass. Everything went well as I sailed through the minor mud puddles and approached the long, deep, mud hole that I had noted on the way in. I looked around to see if there was an alternate way that would bypass the stretch of road that I feared. The left hand bank sloped away and offered little hope as a bypass. The right hand bank was slightly higher than the road, relatively even and was only thinly covered with low brush. It looked passable and I opted to try it. The snow that had threatened was falling by the time I pulled off the road and essayed to pass the vehicle trap. I got about halfway past the muddy obstruction, when my rear driving wheels, sank into mud, hub-deep into mud. I got out and with shovel and jack dug out and lifted the car enough to pile brush under the rear wheels. The brush furnished enough traction to allow the car to pull forward – unfortunately only forward enough to run off the brush and sink into the mud again. I had no option but to continue with more of the same. It now was snowing in earnest and getting dark. I worked as long as I could by daylight and then continued working by the light of a flashlight. I didn't realize how cold my hands had become until I tried to change the batteries and the loose

parts slipped from my numb fingers and fell into the slop. Without the light I couldn't find the parts and without the light I couldn't work, so I called it a day and crawled into my sleeping bag and went to sleep in the car. Early the next morning I was awakened by the sound of an approaching truck. It was a Forest Service work gang that was coming out of the woods, leaving for the winter. It was their last run for the year. The truck navigated through the muddy hole with no trouble and then pulled me out of the mud and back onto the road. For the rest of the way out, I tagged along, close to that truck, until we got back to the paved highway.

I was in Grants Pass through Christmas and was then sent to Auburn, California, turning my vehicle in to the government garage in Sacramento and going on to Auburn by train. I set out from Grants Pass early one morning driving down the highway to Redding and then on to Sacramento. Somewhere in the 350 mile drive, my brakes gave out. I think it was south of Redding, but I don't remember exactly where. Like an idiot, I didn't stop and find a garage and get them repaired; I decided I would get to Sacramento and let the people there mess with the repairs. The open highway wasn't bad. Traffic was light and I could control my speed by downshifting, as long as I didn't have to make a complete stop. Things went well. I drove carefully, watching the road well ahead and slowing in advance of any problems. That was fine on the open road; the problems arose when I arrived in Sacramento and I had to contend with city conditions. By driving slowly and braking with the emergency brake when I had to stop completely I got to the garage without an accident I found it very hairy, driving inside the garage, where the ramps, small parking spaces and generally constricted conditions complicated things. I lucked out and was able to leave the car to be repaired by the custodians there, and I caught the train.

I joined a group of geologists that were working in the foothills of the Sierra. I was there about a month and was called back to Washington. The Survey geologists had a going-away party for me in the apartment of one of the fellows that had been in Auburn for several months. We timed the party to end about an hour after the scheduled time for the eastbound train, as all the trains ran late. Travel was difficult in the war years. Troop movements and priority freight had precedence and schedules didn't mean much. This didn't worry us as we partied; we could hear the trains as they labored up through the foothills to Auburn and get to the station in plenty of time to catch the train. The grade of the railroad at the station in Auburn sloped several degrees to the west; fine for west-bound traffic, as the trains could benefit from the westward slope and start from a dead stop, but the westward slope was too much for eastbound trains; they couldn't start against the slope. In order to avoid the problem at the station, there was an alternate track which skirted the town and allowed the trains to stop on a nearly level stretch of

track outside the city. This produced a situation where it was a mile longer to go from Sacramento to Reno, Nevada than to go from Reno to Sacramento. The stop for the eastbound trains did not have a depot; it was simply a graveled area along the track with several electric lights and not even a signal. This wasn't much of a problem, because stops were only made when there was a ticketed passenger to pick up. As we expected, our party was in full swing at the scheduled hour for the eastbound train; we didn't hear a train until several hours later. When we heard the train, we all grabbed my bags and headed out to the graveled area where I would be picked up. It was chilly and the area was deserted, except for us. As we huddled together along the track we could clearly hear the approaching train and I made my goodbyes to my friends. The sounds didn't seem to indicate any slowing down of the train; quite the opposite, it sounded as though it was picking up speed as it hit the level section of track. To my consternation it WAS picking up speed, and it passed us as I waved futilely at the accelerating engine and the Pullman cars. I felt neglected and frustrated as the train disappeared into the night. Nothing to do about it but to return to the apartment and phone the railroad office in Sacramento. When we got through to the dispatcher, we learned that the train wasn't my train; it was the train that was scheduled to have gone that morning; my train hadn't left Sacramento yet. By the time I finally got on the train, we were tired of partying.

Washington D.C.

I had worked for the U.S.G.S. for several years before I got to the head office in Washington D.C. I left the west by train on the transcontinental trip; air travel was just coming in and we were only authorized to travel by train. The train travel allowed me to see a slice across the U. S. in winter. I had never been east of Chicago and looked forward to seeing new things and places. Snow covered the terrain for the whole trip. In the mountain west, trees and crags festooned by snow and scattered buildings projected through the snow cover. As we crossed the high plains, the ground leveled off and an icing of pristine white accentuated the general flatness of the region. The white blanket was broken only by the works of man. Smoke, curling up out of the chimneys of the farm houses and the buildings of the small towns we passed through added to the allure of the mainly rural environment. This landscape gradually changed as the train roared eastward. The white of the all enveloping snow took on a dingy gray and the landscape lost the post-card prettiness of the west. The tint on the snow deepened rapidly as our route turned south at Pittsburg and proceeded up the Monongahela Valley. As we sped through the bustling industrial area, I grew more and more depressed at the black snow and grungy mills and factories. I was asking myself, "Why am I going into this mess? Why don't I just turn

around and go back to the clean air and attractive environment of the West?" I felt that way, but I continued on to Washington and my job.

When I first arrived in Washington there was shortage of apartments and rooms in the city due to the influx of wartime workers. Because of the scarcity of housing, the city asked residents with spare rooms to list them with the city and to rent them to newcomers. To make the rooms available to people coming into the city, they established a rental office in the central station. I availed myself of this help and was able to get a room in a large apartment building in the middle of the city. A middle-aged lady was the tenant, and I believe that I was the first roomer that she took in. The apartment building had seen better times and was slowly sinking into the encroaching ghetto, but was not yet in it. The lady was very nice and was obviously nervous to have me as a house mate. She fluttered around as she showed me my room and emphasized that all of the bedding and linens were freshly back from the laundry. Freshly washed or not, that night I awoke to feel something biting my leg. I sleepily reached down and, on the first try, squashed something. The next morning I checked and found one bedbug, a little the worse for being flattened between my fingers. A small blood spot showed that he had enjoyed a last meal before his summary execution. I tore the bed down and checked it thoroughly and could find no more unwelcome critters and never again, during my short stay, was I bitten. My land lady really fluttered around for a while after that episode.

A few days after I moved into my room, Bob Garrels came to town to work with the Beach Erosion Board; they prepared reports for the army on the problems to be met on Pacific island beaches that were being considered for landings. They also forecast the conditions to be expected during the actual landings. Bob had an apartment rented and his furniture was promised for the next day, which was Sunday. I suggested he bunk with me and that we go together to receive and position the furniture. He agreed and Sunday morning found us in his empty apartment, awaiting the arrival of his goods. We didn't think to bring any food but did bring a good-sized jug of red wine. As the day wore on and the promised furniture didn't arrive, we broke the tedium by sampling the wine. We broke the tedium rather often in the course of the afternoon. It was hot and the tedium didn't stay broken very long, so about the time that we realized that the furniture wasn't going to be delivered that day; we ran out of wine. We hadn't eaten all day and had consumed a goodly amount of tedium breaker, so we went back to my room, planning to go out to eat. About the time we got back, everything caught up with me. I suddenly developed a tremendous crush on the commode and rushed to embrace it. I pillowed my head against its cool curves and spent the rest of the afternoon transferring the red wine into its capacious bosom. We never did eat. The next day, I went to work and Bob got his furniture and

moved in. Ever since, I have tried to take along some food when tedium is likely to become a problem

I didn't live in the apartment long; I moved in with my sister, Dorothy. Jerry, her husband, had been drafted and assigned to the Quartermaster Corps. He was sent to the headquarters of the corps in Ft. Lee, Virginia, as an enlisted man. Dorothy and their daughter, moved to Petersburg to be with Jerry. He proved very valuable to the Quartermaster Corps and they wanted to keep him in the job, but there was some rule that enlisted men could stay in the U.S. for a limited time only, and then must be sent overseas. I thought that they should have commissioned him but for some reason they couldn't; maybe the same rule applied to officers. The only way the Quartermaster Corps could keep Jerry was to marshal him out of the service and hire him as a civilian, so that was what they did. As a civilian, he was assigned to the Pentagon and he moved his family from Petersburg, Virginia to Arlington, a suburb of Washington. I imposed on them, and moved in with them.

In Washington, I, a neophyte not yet dry behind my ears, was received by world-famous geologists and treated as an equal, which I definitely was not. Most of the U.S.G.S. geologists were not particularly affluent and five or six regularly ate paper-bag lunches in an office near mine. I was accepted by them and regularly ate lunch with them. By listening and keeping my mouth shut (something my wife doubts; she claims that keeping my mouth shut is something I am constitutionally unable to do), I learned a lot about the Survey and geologists. I think that the old-time geologists, the geologists that founded the science in the U.S. and the group that was going out as I was coming in, were more idiosyncratic and thus more interesting personalities than the present crop of geologists. Their idiosyncrasies varied a lot in kind and in intensity but they all added to the interest of the person.

Charley Hunt had completed his course work and his thesis for the degree of Ph.D. at Yale, but refused to defend his thesis before a review board. He felt, probably correctly, that he knew more about the subject than anyone that would sit on his board and he flat out would not justify his work to a board that knew less about it than he. He didn't get the degree. Years later when Charley was world renowned, it was said that Yale offered him the degree and he turned it down.

I first met Francis Wells in Grant's Pass, Oregon when he headed the work of the Survey in the Pacific Northwest, and I was sent there. "Francois", as he was affectionately known, was a middle-aged bachelor with courtly manners. His face was somewhat disfigured by a congenital deformation that pulled down one side of his mouth. I think it may have been the reason he was a bachelor, but it didn't bother anyone who knew him. He lived in the Arts Club in downtown Washington, and he owned a dairy farm in suburban Maryland. Francois was a wonderful friend if he

liked you, but was an implacable enemy if he had cause to dislike you. Roger was a candidate for a Ph.D. at the University of Minnesota, who worked as a student assistant for Francois one summer in the Olympic Mountains of Washington. In the course of the summer he convinced Francois that he was a lazy, selfish individual. Francois, who had received his doctorate at Minnesota, made a trip to Minneapolis and told them, among other things, that if Roger got a doctor's degree from Minnesota, he, Francois, would send back his degree. I never heard more about Roger, but I don't think he got a degree. Francois liked me and was a good friend to Fran and me during my years on the Survey.

Professor Esper S. Larsen, the famous petrology teacher at Harvard, was working with the Survey during the war, as was his son E.S Larsen, Jr. All the younger geologists, and some of the older, referred to the father as 'Big Sig' and the son as 'Ep'. Ep was a paraplegic, the victim of an accidental shot by his brother, who died young. I had nothing to do with "Big Sig" but had a lot to do with "Ep", the son, and had many friends who had been students of the father. Dr. Larsen was the stereotypical absent-minded professor and the stories about him were many. One of my friends who was a student of his, remembered a lecture during which the lecture notes were knocked off the lectern and were all mixed up. Larsen gathered up the notes and proceeded to use them in the mixed order in which they were picked up. It didn't faze the lecturer but made for jumbled notes for the students. The funniest story was about the time Mrs. Larsen was going to some function in the evening and left their sons with her husband to feed and put to bed. She left him with the admonition, "Be sure and get the boys to bed by nine o'clock." When she got home that night she asked if he had had any problems. "No real problems," he replied as he pointed to the bed where three boys slept "but I had a little trouble getting the boy in the middle to settle down." They only had two sons! The boy in the middle was the son of their neighbor!

Dr. Larsen had the ability to consider a problem and arrive at a simple way to solve it. The solution might be very unusual but it would do the job. An example of this was an incident in the field. Larsen was heading a field party which included Dave Griggs as an assistant; although he knew Dave well, he kept addressing him using the name of his assistant of the previous year. Dave decided to do something about it and one evening he approached his boss, "Doctor Larsen, I'll bet you a milkshake that you can't call me Dave for one whole day". "That will be no problem. The bet's on for tomorrow", was the rejoinder. Big Sig won the bet. He simply called everybody Dave for the entire day.

Some of the professional feuds were legendary. Bailey Willis, a professor at Stanford, had a memorable feud with Andy Lawson, a professor at Berkeley. Willis was a feisty, little gamecock, taking on a larger, bearded

old goat, and the two would go at it hammer and tongs at professional meetings. Lawson deserved the goat comparison for additional reasons than physical appearance; he was a legendary sexual character. While attending a Geological Society of America convention in Toronto he married the daughter of a Canadian geologist who was many decades younger. Everything went well until he drove back to the U.S. and was stopped at the border. Seeing the bearded older man with the much younger lady, the Border Patrol detained him, suspecting violation of the Mann Act. (The Mann Act is the federal law against white slavery.) Years later, when I was working in Tokyo, we heard that Andy Lawson had just fathered a child, whose half-brother was in his sixties. Of course, we geologists in the Chief Engineer's office of SCAP, told all the engineers that this was only to be expected of geologists.

Another famous feud was that between Benjamin Miller of Rutgers and Anna Jonas Stose of the Survey. Theirs was a professional disagreement, over the existence of the Martic Thrust, and if it existed, where it was located. It all boiled over at the afore-mentioned GSA convention in Toronto. Miller had given his paper and Anna was giving hers. The green signal light warned her that her time for presentation was nearly up and she should bring it to a close; she kept on speaking. She also disregarded the red light that notified her that her time was up and she should quit speaking. Finally the Chair politely interrupted her and asked her to quit speaking. Her answer was, "I will not shut up!" and she didn't.

Anna Jonas was one of three famous female geologists that were classmates at Bryn Mawr. The other two were Eleanor Bliss and Julia Gardner. Anna was a structural geologist on the Survey who married George Stose, also of the Survey. Eleanor, the daughter of General Bliss, did postdoctoral studies in Germany and returned to the U.S. to introduce the study of microscopic structures as indicators of regional forces. She married Adolf Knopf of Yale. Julia Gardner never married and was known everywhere as 'Miss Julia', a paleontologist for the Survey. The three were very different from each other. Anna was a steel-jawed, rawboned, tough individual. Eleanor was a scholarly, rather quiet person. Miss Julia was a small, white-haired, typical "Southern Lady" -- quiet, but with a will of iron and very sweet while being absolutely inflexible, a hand of steel in a velvet glove. There was a story in the Survey about Anna Jonas that may be apocryphal, but it should be true. She was head of a field party with two young, male, student assistants who resented having to answer to a woman. The two thought they would shock their boss. This was in the years between World Wars I and II and women were supposed to be more easily shocked than they are now. The field party was sitting around the campfire at supper and one of the young men said, "After this field season I'm going home to attend my parents' wedding." The other added, "I think you'll enjoy it. My sister and I had a

great time at my parents’.” They then sat back to see the reaction. Anna laconically said, “Will one of you bastards pass the salt?”

The old-timers didn’t lack self confidence. Dr. Bateman, Professor of Economic Geology at Yale was an outstanding example. Dr. Bateman was a very well known expert in the geology of mineral deposits and he knew it, and didn’t mind telling the world and his students. One day he was talking about a famous ore deposit that he had consulted on, and said, “As there were many millions of dollars involved in this decision, money was no problem and it was necessary to call in the best geologist available, so, I told them what they should do,” and he gave his students his findings. Of course, he may have been correct in his self-evaluation. Joe Peoples, one of my mentors, reminded me, “Never underestimate a man who overestimates himself.”

William Drum Johnston, ‘Bill’, had made a name for himself studying the Mother Lode in California, and when I got to Washington he was in charge of all foreign work of the Survey. He was an avuncular man, heavy-set but not fat, who wore half glasses with thin horn rims. When speaking to you, he would tilt his head forward and peer at you over those glasses; he always reminded me of Benjamin Franklin. He was a friend of many of the Diplomatic Corps, but was especially friendly with the Saudi prince who was the Ambassador of Saudi Arabia. They both had children and the two families often socialized. One evening, just before Halloween, the Saudis were visiting the Johnstons and the Johnston kids were playing with their Arabian counterparts in the playroom while the older folks were in the parlor. The kids were playing with costumes and masks and dressed up the Saudi boy with a pig mask and brought him out to show him off. Bill almost died! The pig is an unclean animal to a Moslem, and Bill was afraid it might insult the ambassador, especially, because, the Saudis are devout Wahabis (a very strict sect of Sunni Mohammedans) and take their religion very seriously. Fortunately, the prince was amused and there were no international repercussions.

Foreign Geology

Bill Johnston, as the head of the Foreign Geology Branch, pulled men out of the other branches for the foreign jobs as needed. The men in the field were accredited by the State Department and enjoyed diplomatic status. The Survey was starting a program studying the chromite deposits in Camaguey, Cuba, and I was tapped for the job. Phil Guild, who had done a doctoral dissertation at Johns Hopkins University on Cuban chromite and was living in Santiago de Cuba, keeping up with the development of the chrome mines in Oriente Province, would be my local boss. There also was another U.S.G.S. geologist in Santiago, Johnny

Strassic, who was working on manganese deposits, another strategic mineral. I was given a quick class in Spanish at the Army language school in the Pentagon, and dispatched to Cuba.

On my way, I met “Bill” Simonds, a Survey geologist, and his wife in Miami and we went on to Havana together. The Simonds’ had lived in Panama, and he was coming to Cuba to work on manganese with Johnny Strassic. On our first night in Cuba we went out together to get a late supper. We went to a café that had been recommended, had a drink before dinner, and ordered. Mrs. Simonds ordered chicken salad; I forget what we ordered. When we were all eating, she encountered a very large, very dead cockroach molded into her salad. I was aghast. She calmly pushed the roach aside and finished her salad; saying, “I’ve seen worse on my plate in Panama.” I admired her sangfroid, but I couldn’t have finished that salad.

The next day we flew on to Santiago de Cuba, the capital of Oriente Province. We flew in a Ford Trimotor. The Ford, as the name indicated, had three radial engines, was sheathed with corrugated aluminum, and had windows we could lower and lean out of. The plane flew low so we could see and be seen by people on the ground. It made for a friendly trip; we waved to people on the ground and were waved at in return. In Santiago, I met Phil Guild and his wife Terry, and Johnny Strassic. Phil was a tall, handsome, black-haired young man. Terry was a cute brunette. They made a very attractive couple. Johnny was a small young man that had a very high forehead; he was going bald. He invited me to share his apartment when I got to Santiago. It was an invitation that I was happy to accept. Johnny was born and grew up in Alaska, where he lived an outdoor life, featuring hunting and fishing. His last posting had been to India where he was able to do a lot of hunting, including shooting a leopard. I heard a lot about India from him and developed a desire to visit the place. I also met Jesus de Albear and his wife, Elsa. Jesus was a geologist with the Cuban Government who was attached to our group from the Survey. Jesus was the son of Francisco de Albear, the most famous engineer in Cuban history; there is a statue of him in Havana. Jesus was to work with me in Camaguey Province.

Jesus Albear was about 5 feet 8 inches in height, dark haired, dark mustached, wore horn-rimmed glasses, and was a little older than I. He was a pleasure to work with, and helped me greatly in getting acclimated in Cuba. Coming from a famous family, he knew most everybody of note and filled me in on the people and situations I encountered. Jesus also knew paleontology; he recognized the various formations by their foraminifera and kept us straight when we were mapping in the Tertiary limestones. He was a very business-like man but enjoyed joking, and like most Cubans, could enjoy life. When he was going into high school (Instituto de Segunda Ensenanza), the political situation in Cuba was

unstable, and high school students in Cuba, as in most Spanish-speaking countries, were usually in the forefront of the fight. Francisco de Albear wanted to keep Jesus away from the dangers inherent in the Cuban situation, so he sent him to Barcelona, where he would be removed from the temptations of getting involved in political demonstrations. The move turned out to be counterproductive. Jesus said that when he was in Barcelona, the students were really swept up in the kinds of activities he was supposed to be avoiding, while the situation in Havana simmered down and posed no problems. In Barcelona, Jesus moved in international society, though he never flaunted that fact. I heard about it when Haile Selassie, the Emperor of Ethiopia, was having difficulties, and Jesus said that the family was not black, which had come as a surprise to him. It then, under questioning, came out that Jesus had been a guest at the debut of Haile Selassie's daughter in Lake Como, Switzerland. That was the only reference he made to his European social life and he didn't elaborate on it.

Phil took me out to visit the chromite area in Northeastern Cuba on an introductory trip to acquaint me with the deposits. We stayed in the village of Punta Gorda, a small primitive village on the northeastern coast of Cuba, about 30 miles west of the town of Baracoa. Punta Gorda was the port from which the chromite was being shipped to the U.S. Chromite was mined from several large deposits in the nearby mountains, trucked to Punta Gorda and dumped onto barges to be taken out and loaded on ships. The ships, with relatively deep drafts, could not approach the shore so they would anchor in the lagoon inside the reef and take their loads from the barges. In peacetime, lumber was shipped from Punta Gorda, but chromite displaced wood in wartime. Mr. Wetmore operated the sawmill that furnished the lumber to be shipped, but now was operating a small chrome mine while the timbering was shut down. Mr. and Mrs. Wetmore were living in Santiago at this time but had lived in Punta Gorda while developing the sawmill.

The Wetmores were an interesting and very nice couple. He had been kicking around in Central America when he heard that Theodore Roosevelt was taking the Rough Riders to fight Spain in Cuba. The idea of the Rough Riders intrigued him so he made his way to Cuba and joined them in time to take part in the battle of San Juan Hill. After the end of the war he stayed on in Oriente, the eastern province of Cuba. In addition to setting up and operating the sawmill, he also set up an import-export business in Santiago. I never heard how the Wetmores met, as she came from a socially prominent family in Philadelphia. Although she might have been expected to lead a sheltered life, she opted to move to Punta Gorda and actively labored alongside her husband in developing the timber business. In the early days, when finances were tight, she had preserved and canned fruit to sell to the ships that came for lumber. Years later, when Fran and I came to Santiago, the Wetmores were

fixtures in Santiago society and she was the doyenne of the foreign colony. There will be more about them later in these memoirs

Camaguey

After meeting the people that I would be working with and seeing the Oriente mines, Jesus and I went to Camaguey, the capital city of the province of the same name. The city was originally called Puerto Principe and was located on the Bahia de Nipe on the north coast of the island. The location, on the coast, was subject to attacks by English pirates, so it was moved forty miles inland. Even at its inland location, it was sacked by Henry Morgan. When I went there, Camaguey was a small, sleepy, colonial city very much like the other Spanish colonial cities throughout the Americas. There was a central plaza flanked by the cathedral and government buildings, an almost modern hotel on the main street, and an old, rundown hotel across the street from the railroad station. In town the houses were built flush to the sidewalk with an internal patio and perhaps one (rarely two) windows with heavy shutters and grills, opening onto the street. All the buildings were made of brick or stone covered with plaster which had been painted or tinted at some time in its existence. There was no space between the buildings; they presented a united front that seemed to imprison the streets into which the thick walls radiated the heat of the tropical sun. Storefronts and restaurants featured heavy metal shutters which were rolled down when the businesses closed. There were trees and plantings in some of the plazas but elsewhere in town there was little vegetation to be seen from the streets.

Camaguey was proud of its past and the part that large terra cotta storage jars called “tinajones” had played in its history. The tinajones stand about four feet tall and had the classical jar shape, narrow at the bottom, enlarging upward to a maximum width about three and a half feet up where they narrowed to a fairly wide mouth. In the early colonial days they were used for storing water. I always thought of them as being ideal for smuggling the forty thieves into Ali Baba’s house. Now they are used as ornaments and as symbols of Camaguey.

When I went to Camaguey it was still clinging to the old Spanish customs, especially as they pertained to sex and boy-girl relationships. Ever Wednesday evening, the city would bring out chairs and distribute them along the inside edge of the sidewalk that rimmed the plaza. At twilight, the young people of both sexes would gather on the plaza; the girls would be accompanied by chaperons, “duenas” who ensconced themselves in the chairs. The young folks would start walking around the plaza, the girls walking clockwise and the boys counterclockwise. As they passed each other, they would exchange greetings and see all the perambulating members of the other sex. If a couple wished to talk

together, the boy would turn and join his girl friend in her walk. In the meantime the duenas would gossip and keep up with what was happening in the town. Although they gossiped, they kept an eagle eye out to be sure that their charges kept passing by. If the girl didn't show on schedule the duenas would swing into action to find the girl and forestall any hanky-panky

The honor of girls was thought to be very fragile. I was visiting a young lady in her home, in the presence of her mother and sisters. The girl had a very nice voice which she was showing off for my edification. She had just finished "Catalina O", a real tearjerker of a song, which brought tears to the eyes of the singer, when all hell broke loose. The whole neighborhood was in an uproar. I asked what caused the furor and was told that a girl in the neighborhood was caught alone in her house with a boy. The police were called and the boy would probably be forced to marry the girl. They evidently felt that no girl could say, "No." If the opportunity for sex was there, it was treated as having occurred.

The Camaguey Tennis Club had a very nice ballroom and bar and the only tennis courts in town. The club offered memberships to unmarried women only; associate memberships were offered to unmarried men of good family. It was unabashedly a marriage bureau for the members. They had some sort of membership for alumni, because many of the dances were attended by older, married couples. The club offered a place for young people of good family to gather and socialize and to play tennis, cards, etc. As a young, socially acceptable, unmarried male, I was given an associate membership and greatly enjoyed the facilities. It was at the Christmas dance at the Tennis Club that I met Fulgencio Batista, the President, (read that Dictator) of Cuba. Batista made an unannounced visit; with his bodyguard; he just walked in with no introduction. Nonetheless, when he walked in, he dominated the assemblage. The force of his personality was so great that I, and most of the people there, knew that a Man had just entered.

One evening at the tennis club, things were very dull. There very few people in attendance, and those there, were boring. It was an unpleasant rainy evening outside and there was no reason to expect any changes in the situation. Raul and I were talking about things and deploring everything. It was just a rotten evening. Raul, the son of a well known doctor in town, was between an acquaintance and a friend of mine, whom I knew only through the tennis club. We were discussing possible courses of action when Raul remembered something, "I've got a couple of marijuana cigarettes. Let's go somewhere and smoke them." I was familiar with all the pros and cons about marijuana and that it was supposedly non-addictive, and I toyed with the idea of trying it. "Come on, it's not as good as coco, but it isn't bad," added Raul. "Wait a minute," I interposed. "Do you mean cocaine?" "Yes! That's it. It's a lot

better than marijuana.” “You start with marijuana and work up to cocaine?” “Yes. It’s a lot better.” I thanked him for his kind offer but I remembered an appointment elsewhere and had to turn it down. That was the extent of my exposure to marijuana; the only time I was really tempted.

When I came to Camaguey, I took a room in the Camaguey Hotel. It was originally the cuartel (the barracks) for the army. It was a single-story building that covered a city block on the main street, a few blocks north of the Plaza Principal. There was a more modern hotel, nearer the plaza, the Grand Hotel, but it lacked the ambience of the old, converted cavalry barracks. The building was in the form of the number 8; two courtyards side by side. The entrance and the public rooms were in the crossbar of the 8. The rooms all opened onto the courtyards which were rimmed with covered arcades. Among the plantings in the courtyards were several small trees, or tall shrubs, with creamy white, orchid-sized flowers that flooded the whole area with a sweet aroma. I was told that they were Ylang-ylang trees from Malaya. Some people didn’t enjoy the aroma but I liked it. To me, the aroma symbolized the romantic East Indies of Carveth Wells’s writings and Gauguin’s paintings. Today, the sweet fragrance of the Ylang-ylang tree doesn’t bring me thoughts of the East Indian tropics; it brings me memories of the Camaguey Hotel.

I had the southwest corner room, with windows on two sides. The windows were covered with fixed slatted shutters. Though the shutters were fixed in the window, the inclination of the slats could be changed to vary the amount of light entering and to close against a driving rain. There were no screens, so insects were free to enter; as were the geckos that dined on the insects. The beds were equipped with mosquito-bars to protect a sleeper from the biting critters, but in the rest of the room it was open season and you were the quarry. I enjoyed living in the Camaguey Hotel, but when I got sick it was impersonal and lonely. I wasn’t feeling very chipper, in fact, I felt downright lousy so I decided to go the doctor. I drove to the doctor’s office at about 2 o’clock of a sizzling hot day, and to my consternation I found out that my right front tire was flat. At the hottest part of the day, I had to change a tire. The street was a veritable oven, getting the reflected light and heat from the light colored walls on all sides. I got the tire changed and was surprised at how weak I was as I entered the doctor’s office. When he told me my temperature was 104, the weakness was explained and I realized how sick I was. After getting some medication (probably some kind of shot as Cuban doctors were enamored of shots at the time) I returned to the hotel and to bed. Once I was in bed, I had nothing to do but watch a couple of geckoes chase flies on the ceiling. I didn’t eat anything that night nor the next day which I spent in bed. By the next night, I had lost interest in watching geckoes and was feeling lonesome and sorry for myself. When I recovered, my self-pity disappeared and I felt a little ashamed of myself.

Some social affairs were held at the Camaguey Hotel. One such occasion was a formal dance; the men wearing white, starched guayaberas, the women in long dresses. As the evening wore on, the facilities in the men's room stopped up, and the urinals over-flowed, spilling out onto the floor and running out across the arcade into the central plantings. The men continued to use the urinals and the women delicately lifted their skirts when they had to cross the flood.

The province of Camaguey's economy depended on agriculture, principally sugar and cattle, but the area also had a history of mining. In colonial times, Camaguey had produced a little gold, but not a lot. More recently, Bethlehem Steel had mined lateritic iron ore to be smelted directly to steel. When specialty steels were developed, the lateritic ores could no longer be used, they contained highly variable amounts of nickel and chromium which could not be removed economically. As the amounts of the various alloying metals had to be accurately controlled to meet the specifications of the specialty steels, the variability of the lateritic ores made them unsatisfactory feedstocks. Bethlehem Steel Co. was still active in Camaguey, though now they were mining chromite from a number of pods exposed in the savannas to the east of the city. Jesus and I were to prepare a geologic map of that chromite producing area.

On a typical day, Jesus and I left town early in the morning after a breakfast of bread, "café con leche" and orange juice. The café con leche was a glass of hot milk to which a shot of very strong, very sweet coffee was added. The milk was boiled, so it was safe to drink, but without the coffee to hide the flavor of the boiled milk, it would not have been palatable to me. Leaving early in the day got us into the field before the dew was off the ground, and the rutted dirt roads through the sugar-cane fields were extremely slippery. As a result, we often slipped into the deep ruts and high-centered, coming to a stop as we had no traction. We could have, with a lot of work, gotten ourselves out of the messes but it seldom was necessary. The campesinos who would be going out to work, driving large, two-wheeled wagons, "carretas" drawn by two or four big oxen, would come to our rescue. During the work day the carretas would haul cut sugar cane from the fields to the railroad where the cane would be picked up by a train and hauled to the "central," the mill, where it would be crushed to extract the sugar as juice. When the drovers saw us stuck in the mud, they would unhitch a pair of oxen and pull us out of the muddy rut with no trouble. All of the oxen were named, and the drovers would call them by name as they encouraged the oxen to pull. I was interested in the names used for the powerful beasts. Perhaps the most common name was Mariposa (butterfly) but Abogado (lawyer) and Juez (judge) were almost as common. We never got stuck in the evening, when we wouldn't have had help, because the ground would have dried out enough that we didn't slip sideways into the ruts.

In our mapping, we had to cross the properties of many different owners and lessors, and we tried to identify ourselves to each owner whose property we entered. All of them were hospitable and helped us in any way they could. Sometimes my poor command of Spanish resulted in humorous situations. One evening I stopped at the home of a rural family to tell them what I was doing on their farm. The owners insisted that I have coffee with them and we talked over the coffee. The man in the family asked me, "Esta usted casada?" (Are you married?), and I, thinking he had asked, "Esta usted cansada?" (Are you tired?), answered, "Un poco" (A little). The puzzled campesino then asked, "Es posible?" (Is it possible?)

When I was mapping in the cane fields that contributed cane to Central Senado, I would often stay in the small, primitive hotel at the central and hop on a cane train to get to distant points of the property. After working all day, I would catch the train back to the central. It might be wise for me to explain the operations of a sugar central before continuing. The central was a mill which ground, pressed and extracted the sugar from cane from a large area of cane fields controlled by the central. The actual growing and harvesting of the cane was done by "colonos" (lessors, sometimes owners, of large tracts of land that sold cane to the central.) The large tracts, called "colonias", were linked to the central by railroads which picked up sugar cane that had been cut by hand and hauled by carreta to railroad sidings where cranes, "gruas", had loaded it onto cane cars that were positioned on the siding. By knowing the railroad schedule, I was able to reach some areas that otherwise were difficult of access. I got to know one of the colonos quite well because his house was a stop on the cane line and I would catch my ride at his house. This particular colono was a grizzled old Spaniard who had come to Cuba as a penniless young man and, through hard work, become a colono. The old boy was a real character. The first time I met him, I introduced myself and was invited in to have coffee while awaiting the train. While we were enjoying a little cup of very strong, sweet coffee, something came up that required some money. He went over to a hole in the floor, reached in and fished out a cigar box. He opened the lid and pulled out a thick roll of bills held together by a rubber band. He stripped off the rubber band, peeled off a U.S. twenty dollar note, put the rubber band back around the roll, returned the roll to the cigar box and the cigar box to its place beneath the floor. That roll wasn't ones and fives; it must have contained several thousand dollars, money which he kept on hand. I guess that he didn't trust banks.

On another occasion, we were shooting the breeze while drinking coffee and he invited me to a birthday fiesta for his son, to be held at his colonia. In describing the festivities that I would enjoy and wanting to make the invitation even more alluring, he said, "You really should come. After one night with a mulatica (a mulatto girl) you will never leave

Cuba.” I was young and single and I have to admit that I found the invitation very interesting. A little later I met the old boy’s son and suddenly the invitation lost all its allure. The son was sporting a white woolly mass that obscured his right eye, the so-called cotton eye that is one of the symptoms of optical gonorrhoea. It didn’t seem to bother the father in the slightest, but it made an indelible impression on me.

Bethlehem Steel Company was operating several mines in the area and maintained an office and a shop at Chromo, a very small community about seven miles east of Camaguey, on the road to Nuevitas. The principal Cuban office of Bethlehem was in Mayari, on the Bahia de Nipe, in Oriente. Locally there were two Norteamericanos: Mr. Kolwey the mining engineer boss, and a Texan driller, Tex, whose real name I can’t remember. The driller came to Camaguey to drill exploratory holes with a truck-mounted rig and he stayed as a sort of jack-of-all mechanical trades in addition to drilling. We drove out the Nuevitas road almost every day on our way to work, and would often stop in at Chromo to touch base and pick up information on happenings in the area, and more importantly, any developments in the Bethlehem mines. I got to know him pretty well. Bethlehem had been mining in the Camaguey area for many years and some mines that had initially been open pits had reached depths such that they had been converted to underground operations. The underground mines were developed to exploit sloping tabular deposits which had been mined as open pits until it was economically unfeasible to strip the overburden to allow further development. The ore bodies, however, continued on down the dip, and it was economically feasible to extend the workings if the overlying rock didn’t have to be removed. Hence the change to underground mines. They consisted of a sloping shaft driven from the floor of the open pit, down along the footwall of the ore to the lower end of the ore body. The shaft was equipped with tracks over which supplies moved into the mine and ore moved out. The actual mining was done from a series of levels, tunnels driven horizontally in the ore to the extremities of the ore-body. The mines made water, so a sump was excavated at the foot of the sloping shaft and a pump installed to dewater the mine.

One afternoon I stopped at Chromo and met Tex, who was heading out. He told me that Bethlehem had lost an underground mine to water and would I like to go with him to check on developments. I jumped at the opportunity to see something new and we all went to the mine. At the mine, the miners told us that they were working on the lowest level when water erupted from the base of the working face with great pressure and soon drove them away. When they realized that the mine was flooding, they took the pump out of the sump and mounted it on the skip where it could continue to pump even as it was lifted to safety. We went to the adit and walked down the shaft. As we entered the shaft, we were greeted by a deep throbbing sound that we felt as much as we heard. It throbbed

as though the mine was breathing. The pump was on the skip and was being lifted slowly so as to remain just above the rising water level while continuing to pump, as the miners retreated upwards. The water level continued to rise as the mine was making water faster than the pump could lift it to the surface. All the time the whole mine throbbed. The ominous beat got into our minds and gave us a feeling of impotence. A feeling of being helpless in the face of an impersonal, primordial force that was driving us out of the workings. We left the mine with the pump working and still being withdrawn up the shaft and the mine throbbing with implacable menace.

The next day, when I returned to the mine, the pump was making headway, the water level was going down and the throbbing beat was silent. The mine was soon dewatered and we eagerly went down to the lower level to see where the water came from. We found that one of the exploratory drill holes, a drill hole about four inches in diameter, had been intersected by the tunnel, and all the water had entered through the drill hole. The mine workings hadn't actually intersected the hole; they just got close to the drill hole and the water pressure in the hole was sufficient to break through into the tunnel. We didn't realize what had happened because the breakthrough occurred from the floor not from the face. I had never realized the intense pressure of 300 to 400 feet of water, and what damage it could do. It also brought home to me the need to cement off drill holes when they were abandoned.

After a couple months at the Camaguey Hotel I joined the F.B.I man who was attached to the consulate and the British Vice Consul and rented a cottage that belonged to the telephone company. The F.B.I. man went back to Havana after a month, leaving me and the Brit in the house. The cottage was a typical bungalow, made of wood, and suffered the depredations of termites. They had weakened the floors in the bathroom so much that we had to watch our step to keep from putting our feet through the weak place. We had a charcoal stove to cook on that had two iron fire boxes about 8 inches square, set into the stove top. Charcoal was burned in these to give us cooking places. One of the fire boxes was encircled with copper tubing to heat water for bathing. The building had screens, so we didn't need mosquito bars. It was a pleasant place to live, much nicer than the hotel.

Maxwell Dupree, the British Vice Consul, was an interesting housemate. His father was a doctor who had attended medical school with Somerset Maugham and had practiced in Devonshire. Max and his sister grew up at Chagford, an estate on the moors, where they enjoyed the lives of country gentry, riding across the wild, open country, hunting and enjoying nature. They both went to Cambridge, where his sister distinguished herself getting a "Firsts" in classics and Max played tennis for Clare College. Max evidently was pretty good, as he played one year at

Wimbledon. He lost his first match; it was against Baron von Cramm, the German star of the Thirties. When World War II began, his sister disappeared into the code breaking group, where she worked throughout the war. She really did disappear; when she joined that highly secret group she dropped from sight. All communications were sent to an APO. Max had no idea where she was and seldom heard from her. Max, who was fluent in French, volunteered for espionage in occupied France, but was turned down because he suffered from diabetes, which he had from childhood. The diabetes also made him unsuitable for military duty. So he entered the diplomatic field, knowing that he would have no future in that field after the war. He was sent to the British Embassy in Havana where he worked for a while and then was dispatched to Camaguey to act as Vice Consul.

In Camaguey, his duties were to administer financial aid to the impoverished British subjects in the province. The economic boom in the Twenties is known as the "Dance of the Millions" in Cuba. In those years the sugar industry was flying high, and they recruited labor from all over the Caribbean. People from all the British Islands, but especially Jamaica, left their homelands and flocked to Cuba to get rich. In leaving, they bragged to their neighbors about getting rich, evidently rubbing it in. When the bubble burst, they were left high and dry. By Cuban law, foreigners had to be the first fired and the last hired, so all of the immigrant laborers were out of work with little or no chance of ever getting steady employment. The Jamaicans felt that they couldn't go back to Jamaica poorer than when they left, and they had Cuban children, so many stayed on as a permanently unemployed group. These were the people that Max primarily worked with. There was another group of expat British on the north coast that grew oranges, but Max's contact with them was more social, as they didn't seem to have economic problems.

All of the Jamaicans' problems were not economic; some were personal matters, and I do mean personal. Max brought a dramatic flair and a vivid imagination to those problems. One man came to Max's office and detailed his troubles. "I have a wife in Jamaica but I have no way of being with her and I have a cockubine (sic) here in Cuba. Last week I had a fight with her and she put a curse on me and I went cold from the waist down. I want you to make her remove the curse and let me be a man again." Max sat back in his chair and fixed his gray eyes on the man and said, "I hereby lift the curse from you. It will no longer affect you. You can tell your friend that if she attempts to renew the curse, I shall invoke on her the curse of the British Empire and she will no longer satisfy men and she will die friendless, all alone and her body will lie, unburied, on the side of the road to be eaten by dogs and vultures." The man heaved a sigh of relief, thanked Max and left. He never came back, so the threat evidently worked.

Max and I employed a woman who cleaned the house, did the laundry, and cooked. When we started we had Crazy Ella, a Jamaican. Crazy Ella was always very sure of herself and had an explanation for everything she did that somehow always shifted any blame to you. Max came in one afternoon with a chicken that was a gift from one of the British orange growers on the north coast. The bird was from the grower's flock and was healthy and fat, unlike the scrawny chickens that one purchased in the market. Of course, the bird was also alive. The live bird was turned over to Ella, to be consumed that night for dinner. Dinner time came and Ella brought out some beautiful fried chicken. It had been some time since we had had chicken and the aroma of the chicken frying had been stimulating my appetite. The crisp batter that coated the meat gave promise of what was to come and I took my first bite with great expectations. My mouth was flooded with bitterness! Really intense bitterness. Bitterness that gagged. As I was sputtering and spitting I looked across the table and saw Max dining, enjoying each bite. I had never tasted anything like it before but when I saw a green mass in the bite I ejected. I knew that I had tasted gall. Ella saw my reaction and asked what had happened. I told her that she had left the gall in the chicken. She answered "I've been cooking for twenty years and I've never left the gall in a chicken" Max interjected, "That's enough, Ella. Mr. Flint didn't imagine it". She turned to go back to the kitchen and snorted, "Imagination!" I started to explode, but then saw the humor of the situation and dissolved in laughter.

One firebox in the stove contained a coil of copper tubing which heated water which was piped to a tank which was connected to the shower. The only way we could get a hot shower was to have a fire in the special firebox for some time before we took the shower. Ella was always cooking something, so we asked her to use the water heating firebox if she was cooking on only one. I was the person who worked out under the tropic sun all day and came home tired and sweaty, in need of a hot shower, and I was the one who explained to Ella why it was important to me that the proper fire box was used. The water heating fire box was located behind the other firebox and I guess it was a little less convenient to use. At any rate Ella never used the water heater. One day I came home after a hard day in the field, looking forward to a hot shower, to find only the front fire in use. I made Ella light up the rear cooking place and had to wait until after dinner before enough water was heated for me to bathe. I chewed Ella out and again explained that I wanted a hot bath when I came in, rather than after dinner. Then I asked why she couldn't follow simple orders. She mumbled something and then told me that hot baths are bad for people. She left our employ shortly thereafter.

Paul was the acting U.S. Consul in Camaguey. He and his wife had come to Cuba many years prior to my time, as Episcopalian educational missionaries. They built a small church and a school with living quarters

above and had made their life in Camaguey. His appointment as Consul was an honor and he represented U.S. citizens on the rare occasions when problems arose. He was widely respected. I wanted to improve my Spanish and asked him to tutor me. He agreed, and I would go to his home above the school a couple of times a week for lessons. Later, I would go to his house simply to talk. I was very impressed with his furniture and wall paneling, which were made of dense, almost purple mahogany. Paul told me that wood like that was no longer available. All of the wood in his home, the school down stairs, the church paneling and the pews came from a single log that had been recovered from the swamps along the south coast where they had lain, sunk in the muck, aging for countless years. When the log was found, he had heard about it and was able to buy it entire and cut it into lumber for his church. After finishing the church, there was enough left to panel his home and the school and make his personal furniture.

Late in my first stay in Cuba, there was a presidential election to replace Batista. Batista, who was a great admirer of Abraham Lincoln, promised the people of Cuba an honest election. Jaime Benitez, the police chief in his cabinet, decided to go against Batista's promise and rig the election. When Batista heard of this, he called a meeting of his cabinet and told them, "I have promised an honest election and Jaime has decided to fix the election. Are you with Jaime or with me?" Benitez left Cuba the next day. The election was held; it was honest, and Grau San Martin, a doctor, was elected. I have been told that he was honest but his family was avaricious. Succeeding presidents and their cabinet members were exceedingly grasping. The Minister of Education in the Saladrigas government landed in Miami with six duffel bags filled with U.S. currency. When asked where it came from, he said it came from the Cuban treasury. When asked how he got it out, he said in a suitcase. The customs man on duty, whom I knew, called his superior and asked what he should do. His superior asked if it was all U.S. money and then said he would have to pass it. "We can't deny entry to our own money." This could not happen now, as laws have been passed to control transfers of money. It may surprise you that a government official could raid the national treasury with impunity, but it was almost expected in Cuba. I know of one case where several millions of Cuban Pesos were authorized to build a highway along the north coast of Camaguey Province. The funds were spent but the road was never built. All the money was stolen before any work could be done. This didn't faze the politicians; each year thereafter, there were funds authorized to maintain the road that was never built. Those funds went the same way as the originals had.

Jesus and I were winding up the field work when I was called back to Washington to be drafted into the Army. Early in the war, the German U-boats had wreaked havoc with sea transport and our planners wanted to insure supplies of strategic minerals, that is, minerals necessary to the

war effort. As the war wore on, the Allies gained control of the sea lanes and it was possible once again to import the needed ores, removing the need to find alternate sources of supply. I came back to Washington and was immediately drafted. Phil Guild took our work and wrote it up. It was printed as U.S.G.S. Bulletin 954--B: Geology and Chromite Deposits of the Camaguey District Camaguey Province, Cuba.

THE ARMY YEARS

Basic Training

I had been in Washington a short time when I received my “Greetings” from the draft board, which told me to report to Fort Myers, in Virginia across the Potomac from Washington, next to the Pentagon. When I arrived in Fort Myers, I was ushered into a room with about twelve other men who were also there for induction. We were lined up and an army officer advised us that if we wanted to be inducted we should take one step forward. He then added that if any one of us declined induction we would immediately be arrested. Strangely enough, every one of us stepped forward. After a perfunctory ceremony, we were given train tickets and told to take the afternoon train to Fort Meade, in nearby Maryland. In the meantime we had about five hours of free time, to spend as we pleased. I was also told that I was in charge of the detail; an honor that I did not appreciate. I was theoretically in charge of twelve men that I had never seen before and that were scattering all over the Washington area. It didn’t make me feel any better when I heard one of the men saying that he had gotten married last night but was sure he wouldn’t be taken and had partied all night and hadn’t consummated the marriage. The reason he felt so sure he wouldn’t be accepted was that he had syphilis. At Fort Myers, he was informed that the army would treat him for the disease. Although I worried that some one of the group would miss the train and I would be held responsible, fortunately every one made it.

When we arrived in Fort Meade, we joined a large group of inductees from all over the area. We were assigned to various units and entered training. Actually we entered testing. We took a battery of tests to determine our capabilities. I don’t remember much about the tests. I had always tested well and figured that it really didn’t make any difference, anyway. The one thing about the tests that I do remember was a test in which two series of sounds had to be listened to and classified as “different” or “the same.” Every group of two series sounded the same to me, just a meaningless noise. I later saw on my records that, based on my failure on that test, I should under no circumstances be given signal training. We were checked for eyesight, peripheral vision, reaction time, etc. I was, and still am, nearsighted. So, they issued me glasses which I didn’t use, as my myopia was not yet bad enough to bother me in everyday life, and I figured that glasses in the army would be more trouble than my near-sightedness would be.

We had to strip down to the skin for our physical exam so there were lines of naked men snaking around the examination room. I think the first test in any army physical is for venereal disease. This was typical; we gave blood for the Wasserman Test and urine for the gonorrhea test. In addition, it seemed that we were shot with every vaccine known to man and some unknown. As the line wound around the room there was a lot of wisecracking and talk about the shots we would be getting and the equipment used in injecting them. "Wait until they hit you with the hooked needle." "That needle they use is the size of a small tube and looks like a fire hose." "It wouldn't be bad if the needle wasn't so dull." Because of the worry engendered, or just because that was the way they reacted, a couple of the inductees fainted when the needle went in.

When all the tests had been completed and the results evaluated, we recruits were assigned to the branches of service that we were best suited for. I was sent to the Field Artillery Training Center in Fort Bragg, North Carolina. There, I was assigned to a training platoon housed in a typical barracks, a dormitory with two rows of beds on a central aisle and a lavatory across one end of the building. The lavatory had a row of toilets in one room and a row of showers in another. There were neither toilet nor shower stalls, just a single room for each. Each barracks was overseen by a couple of cadre noncoms, who herded us around and drilled us as well as seeing that we kept our quarters clean and orderly. It was our sergeant who told us that we were in the building that had housed Hargrove, a trainee who had authored a humorous book on army training. The book "See Here Private Hargrove" had wide readership and was well known. The sergeant told us that Hargrove had been a deadbeat, but a smart one. I guess that he was something like Beetle Bailey of the comic strips. One of Hargrove's tricks typifies the man they described. The camp was having an inspection by the general and Hargrove, as usual, was Latrine Orderly; he was responsible for the cleanliness of the room and the row of toilets. In the army, when an officer enters a room full of GIs, the first to see him calls the room to attention. This was a general officer doing the inspecting who was known for his punctiliousness. Most if not all, general officers are demanding of recognition and ceremony, so when one is known for demanding all the ceremonies and panoply of his office, he really is demanding, and this one was. When the inspecting officer, the general, entered the lavatory, Hargrove called loudly, "TENS HUT" and the whole row of toilet seats stood up, as Hargrove pulled on the cords he had attached to them.

General Ben Lear was the general in charge of the Army in the Southeastern U.S. which put the FARTC at Fort Bragg under his command. He was known in the army, at least to the enlisted men in the army, as Yoohoo Lear. He gained the name when it came to his attention that a resting group of GIs shouted "Yoohoo" at a passing pretty girl. He put the GIs through a long forced march as punishment. Throughout the

camp he was known as a real stickler for the respect due him as a general. I didn't think that he could be as bad as he was painted, until word came that General Lear would be inspecting Fort Bragg and they had us not only make our quarters spotless; they had us sweep the streets just before he was due to arrive to pick up any pine needles that might have fallen.

I think that basic training in all branches of the Army has a core of activities that are the same. You are taught to handle basic weapons: to clean them, handle them safely, and to shoot them. You are taught close order drill. You are exercised hard, to get you in trim for combat. They read you the Articles of War and impress on you the importance of obeying orders. They attempt to instill in you a sense of belonging to your unit. In addition they expose you to most of the weapons that are special to your branch of service and teach you how to use the equipment that you will be using. Competition in sports was one of the ways that was used to get you thinking as belonging to a unit. Another competition was close order drill; your platoon was judged against the other training platoons. The cadre members in each barracks tried hard to have the best group and would schedule extra drill if their platoon didn't win. I remember one of the ploys we were taught. In drilling, it is common after completing a maneuver, to halt and dress your lines. On the command, "Dress right. DRESS!" the man on the right end of the each line looks straight ahead and everyone else looks to the right and adjusts his position to straighten out the line. This is used in training, and used a lot until the marchers get the drill down. It also is always used in competition. We were taught that in competition, we should look right but not move an inch. We might be a little out of line but we should give the impression of perfection. I don't know if it was due to that ploy or not, but we won close order drill, regularly.

There were some really odd people in the platoon I was in. There was a mama's boy that was so spoiled I couldn't believe it. He was fat, in terrible physical condition and unable to meet any kind of problem. On the rifle range he was a hazard. I think the range officer had to show him which end of the rifle was pointed down the range. When we were firing for record, I had the misfortune to have him in the position on my left. After completing the round the targets were pulled back and read. My target had twice as many shot holes as any other and my neighbor's target was pristine. He had shot at my target. Then the range officer wanted to distribute the accurate holes and the shots that had been sprayed all over the place between the two of us. I squawked. I claimed all of the good shots. I pointed out that any body inept enough to shoot at the wrong target could not be expected to be accurate, and it was unfair for me to be penalized for his bad shooting. I didn't win the argument, though I still think I should have.

One of our standing jokes was based on the procedure at the firing range. When the platoon was all in the butts at the range, the range officer would check for safety before allowing the shooting to begin, "Ready on the right?" Upon getting assurance from the sergeant on the right, he would continue, "Ready on the left?" After getting assurance, he would proceed to announce that all was ready and the firing would begin, "Ready on the firing -- Who fired that shot?", as somebody with an itchy finger anticipated the clearance and jumped the gun. It happened so often that it became a standing joke.

The weirdest fellow that I met in the army was in my platoon at Fort Bragg; he suffered from narcolepsy. At first, I thought that he was bucking for a Section Eight (unfit for army service because of mental problems), as that would get him out of the army. After living with him a while I realized that he really was narcoleptic, or he was a consummate actor. Any time he sat down he went to sleep. I watched him light a cigarette when there was nobody else watching him; he went to sleep before he finished the cigarette. He awoke when the cigarette burned down to his fingers and burned his skin. Even then he only halfway awoke and went back to sleep as the cigarette dropped from his fingers. He dropped off to sleep at the firing range. He dropped off to sleep in the classroom. He dropped off to sleep in the mess hall. The only time he didn't go to sleep was when we were marching. I am not sure, but I think he got the Section Eight; at any rate he left our platoon.

One of the highlights of our basic training was an exhibition of a coordinated attack, featuring a paratroop drop and an artillery barrage. It was a spectacular show. Unfortunately, there was a breeze, and a number of the parachutists were injured in landing. All of the school troops were veterans of the European Theater who had fought long enough to be rotated home or had been wounded and sent home. They didn't take kindly to being ordered into a hazardous action for show.

I mentioned that I was issued glasses to correct my myopia and that I decided not to use them because I felt they would be a problem in action. When we had to fire our rifles for record, the lack of glasses was no problem until we moved to the 500-yard range. At 500 yards, the target was a square blur of white; I couldn't see the printed target at all. I had to shoot the course and I wanted to qualify as high as possible. I had to do something, so I aimed at what I took as the center of the blur. It worked like a charm and I qualified as a sharpshooter. Shooting is fun and I had a good time on the firing range. I did fine until we had to run the combat courses where the targets jumped up and down. This more closely approximates combat conditions where you have to snap-shoot active targets. I didn't do so well there, but it was still fun.

Officer Training

After completing the basic training, a number of us were sent to officers training at Fort Sill, Oklahoma. I think the number being sent to O.C.S. (Officer Candidate School) was higher than usual because many of us were older, having been deferred for some reason. Anyway, there were quite a few of us from my class at Ft. Bragg that met again at Ft. Sill. Other branches of service besides Field Artillery were represented in the class. In the four-man tent that I was assigned to, Larry was from the Air Force (in those days the Air Force was part of the Army, not a separate service), Barney was from the Infantry, and there were two of us from the Field Artillery. Larry had an interesting history. He had trained as a tail gunner on a B-52 bomber, but when his crew and their B-52 was sent to Europe, Larry was sick in the hospital with pneumonia, and couldn't go with them. It was a fortunate sickness for Larry; his B-52 was shot down on its first mission and all hands were killed. Larry was a sad-eyed Jewish boy whose soulful eyes seemingly were irresistible to the ladies. We all were jealous of him.

O.C.S. was more interesting than basic; we had to use our heads more. In addition to the arms training we were given some training in command. One aspect of the latter was commanding our platoon in close order drill. In addition to marching the platoon to meals, we also had periods where we practiced ordering the platoon through intricate maneuvers. In these classes we often were maneuvered into a mess and then told to straighten things out. One day, one of us, an Italian watchmaker from New Jersey, was given command of the platoon that had been put in some strange position and told to bring it into parade position. The candidate couldn't think of any set of commands that would bring order out of the situation but he rose to the occasion; he shouted, "Platoon, fall out and fall in on me!" It worked, and the tac-officer was impressed with his coolness and quick thinking.

In O.C.S. we started our specialized training to be field artillery officers, how to work with big guns. We were introduced to 105mm. howitzers, from the ground up. Our howitzers were grouped in batteries of 4 guns which commonly were fired as a unit, after the target was located. There was a small gun crew under a non-com, which set up the gun and brought it into battery (aligned it parallel to the rest of the guns in the battery). The crew then aimed the gun, by turning the declination from the common base line to determine the direction, and setting the inclination to determine the distance. Other members of the crew loaded the gun and it was ready for firing. We had to rotate through all the positions in the gun crew, so we could fill any one of them and we could instruct others to do the same. As officers we would have to check how the guns were served, how they were brought into battery and how they

were aimed. Concurrently to learning the grunt work, we were studying the geometry of aiming the guns.

While the actual aiming was done by the gun crew, the determining of where to aim was done by an observer, who watched the explosions of ranging rounds and made corrections to bring the explosions onto the target. I should explain that a single gun was used to determine the direction and distance to the target (ranging rounds) before all 4 guns would fire for effect. The observer could be located at or near the battery, or on the front lines. In the latter case he was a forward observer. When the observer was located at the battery, the problem of aiming was simpler because his line of sight was very close to the line of flight of the projectile. It was like sighting down the barrel of a rifle. The problem becomes more difficult as the angle increases between the observers line-of-sight and the gun's projectile's line-of-flight. We called the problems "Little A" problems for small angles, and "Large A" problems for large angles. In both cases the observer could give directions directly to the gun crews. When the forward observer (FO) was in a forward position, the problem demanded the help of a fire control group that could convert the observer's sensings into orders. The forward observer estimated the location of the target in relation to a known position (a road junction, a building, a river bend, etc.) and advised the fire control the nature of the target and its location. Fire control converted the location, given in yards, to orders and advised the FO that a round was on the way. The FO watched for the exploding round and estimated how far right or left and long or short of the target it was and passed the corrections back to fire control who again converted the sensings to orders and sent another round. This was continued till the FO called, "Fire for effect!" and the full battery would shoot. After that the FO would estimate the damage and whether or not to send additional shots at the same target.

Artillery ammunition is expensive so we had to have some way of learning to shoot without shooting. We used a smoke-table. A smoke-table is a three dimensional model of terrain; a relief map of an area with trees, houses and roads, set in hills and valleys, all depicted in scale. The smoke-tables were maybe 25-feet by 25-feet in area and were made of a painted, porous fabric that permitted the passage of smoke. Under the relief map was a system that allowed a little smoke-pot to be moved to a position under any point on the table. As the student observer gave his orders, people under the table moved the little pot to the required location and pressed a control to emit a puff of smoke. The puff of smoke rising through the model gave a very creditable illusion of an exploding shell. The whole arrangement was relatively cheap and easy to build and operate. I am sure that, now, smoke-tables have been superseded by some electronic devise that costs a years pay of a large company's CEO to build, and an electronic expert to operate. Upon further consideration, probably any present day school kid can operate it. Upon still further

consideration, the present day weapons controls are probably so different from those of WW II that none of the above would apply.

The commanding general of the Fort Sill area made an inspection one day. We were told that we should continue what we were doing and act as though he wasn't there. Of course, we knew when he came into our smoke-table session but didn't realize that when he left, he left a major in the back of the room to check on things as they actually were, rather than as they were presented to a general.

We graduated from the smoke-table to the range, from the illusion to the real. We practiced Little A, Large A and forward observer problems. In each type of problem, we went through all the ranging but when firing for effect, we usually only fired one gun. One shell gave enough effect to be graded, and was much cheaper than four. One day however, for some reason I can't remember, our class was split into two sections: one section went to a forward position as observers, one section served the guns and on this occasion the guns were a battery of four. I was in the section that went forward. There was a low ridge between us and the battery. We were on the fore slope of the ridge, overlooking the impact area, and the guns were several thousand yards behind the back slope. There had been several problems worked out with no unusual happenings when the order went out, "Fire for effect!" It was followed by a very loud explosion behind us, on the back side of the ridge. I never saw a man move faster than our tac-officer moved to get to the phone and call range control. I think that range control could have heard him without the phone. "Who the hell is on this range besides us? THE NAVY! Tell them to get the hell off!" However, it wasn't the navy that had screwed up. It was the other section of our class. One of the guns was fired 100 units off, in inclination. The problem was apparent when the tac-officer looked at the guns which were side by side, and the difference in elevation just jumped out. I am sure that the tac safety officer couldn't sit down for a week after the chewing out he got, and he deserved every bite.

I loved the range shooting. I was always pretty good at geometric thinking, and aiming cannons was right down my alley. I got through to the last day before I blew a problem. We were allowed to pick our own targets on our last day on the range and I picked a target that was in a clearing in dense woods. We were allowed only two ranging shots for our last target and then had to either fire for effect or give up. I fired my first ranging shot and saw absolutely nothing in the way of smoke. I guessed which way I was off, and fired again. Again, I saw nothing! I had no alternative but to guess again and fire for effect. Once more, I saw nothing. I still had to estimate effectiveness of the shot, which I did using the time honored phrase, "Near miss. Enemy demoralized."

A division of infantry might include three battalions of 105 mm howitzers, one with each regiment, but it also might have one battalion of 155 mm

rifles attached to headquarters. Because we might be assigned to the larger guns we were given a very short course in handling them. Howitzers are guns with comparatively short barrels and are used for short range work usually in close support of troops. Rifles are guns with longer barrels and have longer ranges. Mortars are very short barreled guns without rifling, used to lob shells over short distances. The caliber of the gun, that is, the diameter of the bore, is given in millimeters. Thus a 155 mm rifle would be a long barreled gun with a bore a little larger than 6 inches. The 105 mm. howitzers were made to be mobile, easy to set up and take down, and easy to tow to a new location. The larger guns required larger towing equipment and required more time to set up. They also required separate powder and projectiles. Now, I think most guns are self propelled, and the larger, longer ranged guns, have been superseded by aircraft and rockets.

In addition to learning how to serve the big guns we also were taught to shoot machine guns, sub-machine guns, hand guns, mortars and rifle grenades. There were two types of 45 caliber sub-machine guns. One type was the Thompson sub-machine gun, called "Tommy" guns by the army and "Typewriters" by mobsters in crime stories. The other type was a simplified all metal sub-machine gun that we called "grease guns" because they were all metal and looked like the grease guns used by mechanics to fill grease fittings. These were not equipped with safeties. More of this later.

As we approached graduation, we were given a short introduction to military courtesy; how to conduct yourself as an officer. Finally we were commissioned as Second Lieutenants and sent out into the world.

When we received our travel orders I went to the bank to close out my account. I had a check outstanding and wanted to be sure that I left enough money in the account to cover the amount of the check. I asked the bank official I was dealing with, whether there would be any bank charges on the relatively small amount required to pay off the outstanding check, and was assured that there would be none; that I should leave in only the amount of the check. That I did. Imagine my chagrin when I received word from the payee that my check had bounced for insufficient funds. I immediately sent a money order to pay the debt and a letter to the bank recounting my experience and accusing them of victimizing service personnel by setting up a system that would lure service men into situations where small amounts would be left in accounts, to be nibbled away by service charges. I received a letter from the bank that regretted the happenings and said that they would freeze the remaining funds, but they didn't offer to repay the charge, and I was still mad.

Our group was sent to Fort Ord in Monterrey, California, by way of San Francisco. I found that there was a wide spread lack of knowledge in the

eastern U.S. of the climate of San Francisco. I tried to tell my co-graduates that it was always cool in San Francisco and that they should wear, or at least have handy, some warm clothing. They laughed at me and said we were going to California, which was warm, as everybody knew, and they all wore khakis. We arrived in San Francisco on VJ-day, and found the city celebrating with all stops pulled. It was almost a riot. I was not in the mood to maul women, even though most of the women seemed happy to be mauled, and I sought refuge in an officers club. I found many of my classmates already in the club. It wasn't that they shared my qualms; they were cold.

We got to Fort Ord the next day and I was assigned to a pack battery, a unit of artillery to accompany mountain troops. We had small cannons that could be knocked down in pieces that a mule could carry. The heaviest piece was the barrel which I had a heck of a time raising high enough to get on the mule's back. Fortunately, the assignment was a temporary thing, something to keep us busy until we shipped out for the Orient. I was in Fort Ord a week or so, and then was sent to the Philippines in a casual company of officers. Our transport was the William P. Biddle, a freighter that had been converted to a troop ship. The conversion installed bunks in the hold and added sanitary facilities for the troops being transported. The bunks were stacked 5 deep in order to accommodate as many men as possible. I have always wondered what it would be like if the ship, when fully loaded, encountered rough weather. I can't really imagine the hell hole the holds would become when the occupants in the upper bunks got seasick, and their friends in the lower bunks were too sick to leave their bunks. We had better accommodations, at least we were not stacked one above another.

Our route took us south along the coast to San Pedro, the port for Los Angeles, where we picked up some troops, but not any where near a full load. From Los Angeles we went west across the Pacific. We avoided Hawai'i and passed close enough to Bikini Atoll to see the tops of more ships than we could count, but we didn't enter the atoll. We didn't have anything to do but lie around the deck, being careful to stay clear of the ship's Officer's Country, where we were not welcome. The Biddle's captain was a regular navy captain at Pearl Harbor and after the war, he was still a captain. His ship was no luxury liner for us officers, it must have been really unpleasant for the enlisted men. The crew ate first at mess and were allowed seconds of anything they wanted. The casual company of officers was next and the officers were given a helping of the meal. The enlisted men ate last and often some of them didn't even get a helping of the main dish because it ran out. The ship's P.X. allowed the members of the cargo to buy only items that the crew didn't like and wouldn't buy. When items disappeared from the enlisted men's kits, the captain merely said that some minor thievery was to be expected and refused to search the crew's quarters. We were fortunate to have good weather and calm

seas for the trip and were happy to disembark in Manila, after a short stop at Leyte.

We didn't spend much time in Manila before being trucked up to Base M at the southern end of the Lingayan Gulf. Base M was a large supply base for troops in northern Luzon and a jumping-off place for Japan. We were billeted in tents and had very little to do but lie around and drink warm beer. We had plenty of beer because one enterprising member of our group was able to swipe an official order form and forged an order for a truckload of beer to be delivered to a fictitious company. He then went to the trucking company on the base and made a deal. They would take the order to the supply dump, pick up the beer and deliver half to us and keep half for their trouble. We were all good friends, having known each other since O.C.S., so the entrepreneurs shared the beer with all. Probably the fact that there was more beer than one or two tents could drink played a large part in the sharing. We weren't able to get any ice, hence we drank warm beer.

While we were killing time in Base M, some of us hitchhiked back to Manila to break the boredom. The roads were filled with army and navy vehicles; some were still being operated by service personnel but most were being operated by civilians, evidently as private vehicles. We saw ducks (amphibious vehicles), six by sixes, jeeps and command cars, all in private hands. There actually were traffic jams as one approached Manila. I later learned that there was widespread thievery in Manila, and wonder how many cars, trucks, etc., were legally in civilian hands and how many were stolen.

One of my friends was stopped on the road to Manila by a Japanese soldier who wanted to surrender. The Japanese had been hiding in the hills for more than a month, afraid to surrender to a Filipino and seized the opportunity to turn himself in to the first American he saw. My friend didn't know what to do with the fellow but was able to turn him over to a passing MP.

We were waiting in Base M while a group of LSTs was being arranged to take us and a load of 105s, trucks (prime movers for the guns) and jeeps to Japan. After a week or so of tent life we were taken on board the LSTs, but we didn't set sail immediately for Japan. The skippers of the LSTs made us welcome and even designed some activities to amuse us. One of the most welcome activities they arranged for was swimming. They opened the bow doors and lowered the ramp to provide a platform from which we could enter and leave the water. We, of course, had no swim suits so all swimming was in the nude. The water was warm enough to encourage night swimming so the skippers rigged lights for swimming after dark. The lights illuminated the upper few feet of water as well as the ramp area. I lost all desire to swim after dark when I saw numerous sea snakes writhing among the swimmers, evidently enjoying the light.

We were told that the snakes were very venomous, but were not at all aggressive. No one was bitten but I wasn't anxious to prove or disprove the statement.

The crews of several of the LSTs rigged aquaplanes out of plywood and pulled them behind landing craft to add aquaplaning to our diversions. This made possible one of the funniest scenes I saw while in the army. The commander of the fleet of LSTs was skipper of one of the other ships and asked one of the aquaplaners to deliver a message to the skipper of the LST I was on. It was a beautiful tropical day and there were several aquaplanes zipping around in the still water of the bay. I was on the deck of the LST and as I looked at the aquaplaners as they frisked around the anchored LSTs, I saw one approaching the Jacobs ladder on the side of our ship. He was stark naked and standing stiffly upright in a stance suggesting attention, holding a roll of paper in his teeth while maintaining his position on the aquaplane. As the aquaplane passed the Jacobs ladder he stepped off the board and climbed the ladder. Still holding the message in his teeth he saluted the Quarter deck and maintaining a stiff military posture marched to the center line of the deck. At the center line he turned a military right angle and marched up to the skipper of our ship, he threw the skipper a sharp salute, took the message out from between his teeth, presented it formally to the skipper, threw another sharp salute, did an about face and retraced his steps, turning a right angle where he had turned before, and took a swan dive into the bay where he picked up the aquaplane that brought him. This was all done with a perfectly straight face. The whole thing was such a parody of the military procedures that we all, including our skipper, were in stitches.

The atmosphere on the LSTs was relaxed and friendly, a welcome change from the Biddle. We were welcomed by the LST's officers, shared their mess and often kept them company on their late night watches. We often played poker in the ward room using occupation currency, which looked more like soap wrappers than money. It is interesting that we also treated it like soap wrappers and played with it accordingly, not worrying if we lost. Perhaps the not worrying about losing was more because we were all young and single, but the aspect of the bills entered into it. I think that in the poker game I broke even, or made a little, but I am not sure. I do know that I couldn't have lost much because I am too tight to forget a big loss.

Our little fleet of LSTs encountered some pretty rough weather on the trip to Japan as we ran along the edge of a typhoon for several days and nights. This was the typhoon that did a lot of damage to Okinawa and piled a number of ships on the beaches there. I had no idea how flexible an LST is. We slept in bunks built into the side walls of the ship and could look along the walls as we lay in bed. When the ship was heading

directly into the weather the waves would cause a wave in the hull which sent ripples along the walls of the ship. Our deck load of trucks and guns clearly showed the flexure of the hull. It was like watching a sine wave passing along the ship. You could stand on the bridge at the stern and watch the waves travel towards you, the length of the ship. Some of the soldiers put cots on the deck behind the bridge so they could sleep in the open air and they experienced the deformation directly. The waves in the hull ran the length of the ship and exited with a sharp snap. The exiting-wave- produced –snaps were strong enough to flip the cots into the air and dump the occupants onto the deck. The ships, in addition to deforming, rolled badly in quartering seas but I don't remember anybody getting seasick.

Japan

We sailed into the port of Nagoya, on the main island of Honshu, As we entered the harbor, we saw a mine sweeper shooting machine guns at something floating in the water. A violent explosion which sent a column of water high into the air apprised us that the floating objects were mines. It was confirmed when a second mine was detonated. This was a more than a month after VJ-day and was a somewhat sobering reminder of what we would have faced in a combat landing on Japan

Our first impression of Japan was of concrete walls standing above rubble. The walls evidently were common walls between adjacent houses which were left when the houses were destroyed by fire. We later noted that there was little evidence of high explosive bomb damage outside the factory areas and little evidence of fire bombing within them. There appeared to be little destruction in the downtown areas where the large buildings were intact. We were told that this was according to plan; our airforce selectively bombed the city of Nagoya to do the most damage to the areas outside the downtown and to spare the downtown areas so we would have the use of the buildings there during the occupation.

We were temporarily billeted in a multistoried office building in the heart of Nagoya. The next morning we experienced a small cultural shock as we were performing our morning ablutions. There was a crowd of junior grade officers lined up at the urinals when a little Japanese lady came in to clean the place. She went down the line of urinating officers requesting each in turn to lift first one foot and then the other so she could mop the floor.

Our stay in town was short as we were moved to an airfield on the outskirts of town. There again we had reason to be thankful that we didn't have to invade the home islands. We found more than a hundred airplanes of all shapes and sizes lined up along the sides of the main runway facing the runway. They had been gathered to be used as

Kamikazis, suicide bombers. They would have been loaded with explosives and sent out to dive into ships of the invading fleet, sacrificing the pilots in so doing. The propellers had all been removed and placed on the ground in front of each plane. I guess it was a symbolic killing of that airplane.

During our short stay at the airfield we witnessed an unexpected incident of employee relations. The occupying forces hired a large crew of Japanese to work around the base. Members of the occupying army were expressly forbidden to touch any of the workers, which the workers soon realized and some of them decided that they really didn't have to work. The second day on the job, one of the workers came up to the American in charge and said that if he was appointed straw boss he could get the work done. His offer was accepted and the workers were lined up and told that they had a new boss. The new boss assigned the jobs for the day and sent them all to their assigned labors. After a short time he called them all together and lined up the work force. He then went down the line and selected a couple of the poorest workers and told them to take two steps forward. He then proceeded to slap the heck out of them and sent them all back to work. After a couple of hours, he repeated the whole procedure and slapped two other laggard workers. Apparently the workers got the message as they worked the rest of the time that I was at the airport without any repetition of the "reasoning" session.

We didn't stay at the airfield long before our group was broken up and the members assigned to artillery battalions in the 25th Infantry Division, the Tropic Lightning Division. Our patch was a bolt of yellow lightning on a red taro leaf outlined in yellow. My outfit was the 89th Field Artillery Battalion assigned to the 3rd Regimental Combat Team. Except for a stint of polishing the rust that had formed on the rails of the guns during the LST trip, I didn't see the guns again in Japan.

The 89th Field Artillery was billeted in half of a cantonment that housed a lumber mill in peace time. The other half of the area housed another army unit the name of which I can't remember. The buildings, in which we were quartered were typical Japanese houses of the time. They had rigid frames of thin timbers above wooden floors which were covered by straw mats (tatami). Thin paper covered walls, often made as sliding panels, were used to break up the area within the house. The outer walls might be panels of thin wood or paper covered panels. As you can imagine such houses were very prone to fires, and when ignited burned up completely in a few minutes. There was no central heating and no open flames to heat the rooms in cold weather. In a Japanese home there was a cut out section of floor in the center of the principal room, producing a pit into which they placed a covered, metal or porcelain charcoal burner. In cold weather, and they had lots of snowy days, the family could sit around the edges of the pit with their legs and feet down



Del - Nagoya, Japan 1946

in the pit and cover their knees with a comforter stretched out to cover the pit and keep the heat in. Needless to say, such a situation was not acceptable to the American soldiers. We introduced fuel oil fired drum heaters, one in each room, fueled by oil tanks on the outside. The drum heaters had smoke stacks of sheet metal tubing to vent the smoke out of the room. The smoke stacks would fill with soot if the heaters' burners were not adjusted properly. If that happened, the burners could backfire and blow the intake pipe loose to spew fuel oil into the room, causing a fire. Sometimes, in the dead of winter, the fuel in the intake lines would gel and clog the lines and interrupt the flow to the burner sufficient to extinguish the flame. This might produce a situation where the flow was intermittent, where it would stop and put out the fire and then pick up again and pool in the hot drum. The pooled fuel might then reignite in an explosion which could result in a catastrophic fire. To avoid any thing like this from happening, we enforced strict safety rules. During the

waking hours, one man in each room was responsible for seeing that the heaters were operating correctly and the officer of the day was responsible for checking every thing. During the night hours, the GIs wanted the heat kept up, so we had a fire marshal on duty all night who made regular rounds and immediately shut down any heaters that were smoking badly or which showed signs of improper burning. This may sound like a lot of trouble over nothing, but was absolutely necessary. During the winter I was in Nagoya there was a fire that destroyed the fire station and killed two GI firemen. The troops that were occupying the other half of the lumber mill were separated from our half by a fire break, which had been cut by us. They didn't maintain fire safety and their quarters were destroyed in a fire. As I stated above, the houses were tinder boxes, the time from the first sign of the fire to the last obvious flame was 15 minutes. Nobody was hurt in the fire which occurred in the daytime. It wasn't a complete disaster, as the affected troops took advantage of the fire to write off every thing they had lost for the last year.

There was a saying in the army that "Angels make poor soldiers; their halos interfere with using a rifle." I guess that means that you have to expect some deviations from accepted morality and make plans to mitigate the effects of such occurrences. There is one big complication for an army of a democracy in making and enforcing such plans, the politicians. Combine the politicians with the "do-gooders" that know what is best for everybody, and you have a force that can undo the best of pragmatic plans. The Army knows that many soldiers are going to have sex, no matter how you lecture them and point out the evils of sin. The Army also knows that the sex available to soldiers may bring with it various diseases, various nasty diseases which can, to a large extent, be avoided. The Army does not appreciate having an army of clapped up or syphilitic soldiers that can't fight or do a good job of occupying a region. To avoid most of the evils of catch-as-catch-can sex, most armies, including our army, take measures to ensure that the aftermath of the sex does not include diseases. This usually entails concentrating the availability of the sex into areas that can be policed and safety measures enforced. That was the case in the orient. Red light districts were recognized and everybody that entered those areas were forced to use a prophylactic before leaving. This "modus operandi" was used in the Philippines and Japan. There was no need to set up the areas, in most cases they already existed and the army just had to set up a "pro station" at the entrance. This system worked. The 89th Field Artillery Battalion was at full strength all through the Philippines and had only two cases of gonorrhoea. The same system was in effect in Japan when I joined the battalion and there were no cases. A minister visited Japan and was horrified by it all. He returned home and initiated a campaign to stop the army leading "all our good boys into sin." The campaign got some of the

more conservative churches involved and pressure was brought to bear on the politicians who forced the army to put all the red light districts off limits which, in turn, put an end to the “pro stations”. My artillery battalion was put on duty as MPs and we had to put guard posts at the four red light districts in Nagoya, prohibiting entry to GIs. With the closure of the supervised districts, the streetwalkers took over and there was no way they could be checked for health. The order to close the districts to GIs came in the dead of winter and our men were forced to stand guard in ten inch deep snow. That was very unpopular, but that isn't important. What is important, is, that with the closure of the supervised districts, the streetwalkers took over and there was no way that they could be checked for health and no way to enforce prophylaxes on the men's part. In the next month ten men in the half strength battalion came down with VD.

We were MPs covering all of the town and as such were responsible for enforcing speed limits and dress regulations, among other unwelcome duties. We operated with jeeps and soon found out that trucks could outrun us over bad roads, or maybe we just weren't as daring drivers as we could have been. Our shortcoming, as far as speed was concerned, was soon recognized by the members of the truck battalion that serviced the troops in Nagoya. The battalion quarters were located about a mile out of town, on a major highway with several good sized cross streets and the truck drivers soon turned the highway into a speedway. Our jeeps couldn't keep up with trucks and we couldn't get any cooperation from the officers of the battalion. When we chased a truck into the compound nobody knew any thing about which trucks had just come in. We solved the problem by stationing a jeep with a radio on each end of the speedway. The truckers complained, they felt we were taking an unfair advantage, but they slowed down

The commanding general of the division lived in the middle of town where he was awakened one night by some GIs that had had more to drink than they should have and were noisy. The next night, by the general's orders, we had lieutenants walking patrol on the streets around his quarters all night.

There were some interesting aspects to our roll as cops; one was the reception on our ultra short wave radios. One characteristic of the radio was that they accepted the strongest signal, cutting out any weaker signals. Another was that they operated basically as line-of-sight radios. My first experience with the bouncing radio beams came one night when I was out in my jeep and I got a stolen vehicle report that came in loud and clear, cutting out our base set. I didn't realize what was happening and wrote down the stolen vehicle's number thinking it was a local station. The report continued, giving details about the jeep and where it was stolen from, and it became clear that I was listening to Guam. We often

got Guam and several times we got Tientsin in China. So much for line-of-sight transmission. It appears that radio beams will bounce off the Heavyside layer and, given favorable conditions, can cover great distances and arrive strong enough to blank out the local stations. Apparently, favorable conditions occurred only late at night, as we never got distant calls during the daylight hours.

We worked with interpreters, Japanese that were really quite fluent in English. I got to know Ohara-san, the interpreter assigned to me. We worked together for several weeks and on several occasions he asked me how long the American troops would be in Japan. Eventually, I got a little tired of it, as it was clear that he wanted to see the last of us. The next time he asked the question I replied, "I hear that we will be going pretty soon. As I hear it, they will replace us with Russian troops." There was a hissing intake of breath from Ohara and then a plaintive, "Some Americans will stay won't they?" He never asked the question again.

One of my classmates in Basic Training and in OCS, was a lawyer who was assigned to the attorney general's staff in Kyoto. For some reason, he requested that I work with him on a couple of cases and that led to my being named a defense council for a GI in our battalion who was facing a court martial for taking one of a number of articles that had been confiscated from the Japanese. There was no question about his guilt. That was indisputable. I got him off by playing down the importance of the crime and painting it as the sort of thing that happened all the time. I got him off, and all the officers that sat on the court got reprimands from the general. I was removed as defense council which suited me because I didn't want the job in the first place. I didn't do the GI a real favor, as he got the idea he could get away with anything and wasn't worth a plugged nickel for the rest of his enlistment, most of which he spent in the stockade, for minor offences.

The Pacific Stars and Stripes was the newspaper published in Tokyo for the Armed Forces in the Orient, equivalent to the Stars and Stripes published in Europe. Many of the features of the European edition were carried, in addition to the news, and the paper was very popular. I eagerly awaited the Mauldin cartoons which were far and away the best cartoons that were spawned by the war. I think that I only read the rest of the paper after I saw the cartoon. One day I looked up the cartoon and stumbled on a report from Tokyo that the Engineer Corps needed geologists. Colonel Schenk, a paleontologist from Stanford University, was in charge of a geologic unit under the command of General Casey, Chief Engineer, AFPAC. Working with the Army unit were a number of USGS geologists from the Survey's Military Geology Unit that I knew. Since I didn't feel that guarding whore houses was a very productive use of my time, I wrote to Frank Whitmore, the senior USGS geologist in Tokyo, and suggested that if they really wanted geologists, they could get

me by instituting a transfer for me to the Corps of Engineers in Tokyo. I didn't think that I could make a request through the 25th Division for the transfer that would have a chance of success. Frank arranged the transfer and I went to Tokyo.

In Tokyo, I was quartered in the Marinuchi Building, a building taken over for junior-grade officers, that is, for officers below the rank of Major. As a second lieutenant, I shared a large dormitory on the third floor with about twenty other officers; it wasn't much for privacy. The mess hall was on the second floor with windows which faced the Russian billet which was the next building on the street. There was a small street between the buildings. The senior Russian officer had his quarters on the second floor of his building, directly across from our mess. As a senior officer, he shared his quarters with a tall, nice looking, buxom blonde who was evidently a stickler for fresh air. In the morning, when we junior-grade officers were having breakfast, she would come to the window and go through deep breathing exercises. As she exercised bare from the waist up, window seats in our mess were much in demand.

Relations with the Russians were not always warm; their officials frowned on the Russian soldiers having any contact with other allied soldiers or representatives of any kind. Max Elias, a USGS geologist who spoke fluent Russian, stopped outside the Russian billet and passed the time of day with a Russian enlisted man. Any conversation was impossible, as a Russian officer came running out and reprimanded the enlisted man, "You know it is forbidden to talk to an American!" Early in the occupation, any and all, troops of the Allied Powers were welcomed to the American PXes, (Post Exchanges) where they were allowed to buy whatever was available to the Americans. The Russians soon forbid their troops to patronize an American PX, saying that they were set up to mislead the Russians into believing that such wares were available to ordinary citizens in the USA. The denial to shop in the PXes didn't apply to diplomats and other Russian in the Occupation, and I was told that they loaded up on nylon stockings, shoes, and other items that were in short supply in Russia.

The race riots in Detroit occurred while I was in Tokyo and the news reels featured shots of the black Americans being manhandled by the police. I thought that the Soviets would make a lot of the situation and show the news reels widely in the Soviet Union but I was told that the pictures were banned because the Russian audiences noted that the downtrodden, mistreated blacks all wore good shoes and some drove away in cars.

The US armed forces tried to keep the troops amused by scheduling armed forces-wide competitions in various sports, at widely separated venues where there were concentrations of US troops. For example, a track meet was held in Shanghai for Army, Navy, and Air Corps

personnel. As part of the program, a boxing tournament was scheduled in Tokyo with all the occupying forces invited. It sounded like an interesting even, so I went. The elevated train station was across the street, and I got on the train with three Russians, a major and two lieutenants. The train was crowded and we found ourselves sitting together and soon we were talking - in English, of course. The major was quite fluent in English and the lieutenants were adequate. We were all going to the boxing matches and we decided to go together. We enjoyed the matches and agreed to meet the next day and see the finals. When the major heard that I was a geologist, he asked if I could get him some specimens of Japanese ore minerals for his son in Russia. I had seen a small box of minerals in a store on the Ginza, so I agreed to get them and have them for the next night. I waited for the three the next night, but they didn't show and I went by myself. I still had the box of Japanese minerals, which I felt duty bound to deliver. Two days later, I went to the Russian billet and asked to see the major. The atmosphere in the Russian billet was not warm or friendly, in fact it was downright cold. I was quite uncomfortable as I waited for the major to come down from his quarters. When the major arrived, he took the box, thanked me rather uneasily, told me that the two lieutenants had been sent back to Russia, turned, and fled back upstairs.

One of the things that I noted was a plethora of signs that the Japanese shopkeepers put up to appeal to our troops. A common sign that I saw many times said "WELCOME VICTORIOUS ADVANCING TROOPS," but there were many others, all slightly not idiomatic in the use of English. Connie Krauskopf, a geology prof from Stanford, who was working with the Army in Tokyo, made a collection of slides of signs in the Tokyo area. There were few foreign females in most of the occupied cities but there were many in Tokyo, so there were many signs there that were aimed toward women. Some from Connie's collection that I remember were: "LADIES HAVE FITS UPSTAIRS" for a dressmakers shop, "FUR COATS, WE USE OUR SKINS OR YOURS," for a furrier, and "FLESH MEATS" for a butcher shop. The most interesting sign of them all was a pitch for McArthur. At the time, President Truman was having difficulties with General McArthur and there was talk that the elderly general might return to the States and run for the presidency. The Japanese language has no "L" sound; they pronounce Ls as Rs. The sign read "MCARSUR, WE PRAY FOR YOUR ERECTION."

We were able to leave the office on Friday afternoon, jump on a train and go anywhere we wanted, as long as we were back in the office for Monday. There were two young second lieutenants in the Engineers Office that were railroad buffs, especially interested in steam locomotives and the operation of steam powered lines. I think they were working with the Japanese railroads. Anyway they had a good working, friendly relationship with the operating crews of many of the trains leaving Tokyo

for places in the mountains. One trip I made with them, they arranged with the engineer of the steam powered locomotive to warm our C-rations on the hot boiler, in return, they taught the engineer to blow the whistle so it sounded like an American whistle. Even without the lieutenants I was able to visit many of the hot springs in the mountains near Tokyo. We were able to get rooms in the tourist hotels, without payment, simply by asking. This made it possible for me to experience Japan by living with the people in unplanned situations. I guess I imposed on people but everywhere I went, the Japanese seemed to enjoy interacting with me and seeing how I reacted to their culture.

I had read about the Japanese love of the communal bathing in the mountain spas and determined to experience it for myself. Of course, I knew that it was nude bathing and keyed myself up to not let nudity bother me. As a result, on my first visit to a hot spring hotel, I determined to check out the pool. I stripped down and went to soak in the hot water. I had determined to brazen out my nudity, so I marched jauntily into the pool area, naked as a jaybird and just as cocky. I noticed an unfavorable reaction among the naked Japanese so I watched to see what I had done wrong. It soon became clear that there was a protocol to be followed. You entered the pool area with a wash cloth held over your pubic area and carrying a bar of soap. Along the pool's edge were a number of small wooden basins which you used to dip water out of the pool and use with the soap to cleanse yourself before entering the water. The area around the pool sloped away from the pool, so the dirty water flowed away from the pool and into drains. When you entered the hot water it usually was so hot that you couldn't believe you could stand it. But if you just stayed in the pool without a lot of movement you cooled a thin layer around you and soon found the heat pleasant. Armed with this knowledge, I felt confident that I could bathe without offending other bathers. On my next trip to the mountains, I put my knowledge to use. I entered the pool room in the height of fashion. My washrag was strategically placed, held in place by my left hand. I clutched a small bar of soap in my right hand and I was looking around to check the reactions of the other bathers and to locate a basin. Everything was going swimmingly. After looking up and seeing that I was decent, the Japanese turned back to whatever they had been doing and I was congratulating myself on how clever I was, when I stepped on a bar of slippery soap. My feet flew up in the air, my arms flailed, and I lit on my bare behind with a resounding SPLAT! As I was realizing what had happened I saw my washrag and bar of soap disappearing down a drain. I think every Japanese in and around the pool were laughing their heads off as I struggled to regain my composure. It is not anything I would recommend, but it was an effective way to break the ice; everybody there made me welcome and treated me as an equal.

I enjoyed the trips that I made into the mountains not only for the hot springs but also for the contacts I had with Japanese people that were not planned; contacts that were not staged to impress a representative of the Occupation. On one of my solo weekend trips I was staying in a hotel that was hosting a battery manufacturing company that was throwing a weekend party for its employees. I had soaked in the hot pool and was running around in the kimono that the hotel had furnished and I was invited to the party that the company was putting on. After a typical Japanese dinner the party began. All the men were seated on the floor in a line down one side of the room and the ladies were seated in a row on the opposite side of the room. It was a typical Japanese room with a floor covered with tatami (thick straw mats) and everybody was wearing the single toed socks that were standard indoor wear, no shoes. After an entertainer sang a couple songs and the female servitors had poured a couple rounds of saki for the men and tea for the ladies the party settled down to serious drinking. The men took turns pouring for the men. A man, I guess he was the senior man of the company, took a small teakettle filled with warm saki and got out in the center of the room and turned to the man on his right, bowed and filled the man's saki cup. The man drank it down and turned his cup upside down and then he filled the cup of the man in the center who swigged it down and signaled by turning his empty cup upside down. The fellow in the center refilled the empty cup of the man on his right and moved on to the next man. The whole procedure was repeated down the whole line. Each person drank two cups and the man in the center had to drink a single cup with each man. Saki cups are about thimble sized, so no great amount of saki is served in a single cup, this is important, as almost, if not all of the men present took a turn in the center. After I had taken my turn with the saki kettle I looked across the room and thought that the ladies should also get in the fun. I procured a kettle of hot tea and started across the room to serve the ladies. One of the men thought I was serving saki and told me "No, no, these are our wives." I may have been feeling my saki because I continued down the line using the same protocol as the men. There was a dumfounded group of women but I like to think they enjoyed the attention. Evidently the men didn't get put out by it, as they invited me to visit their factory when they returned the following day. I jumped at the chance and accepted the invitation.

The next day I joined their party and returned with them to the small town near Tokyo where their factory was located. I was shocked to see the factory. They were producing flashlight batteries completely by hand. The zinc for the cases was cut from a thin sheet of zinc and hand formed into a tube and soldered. A zinc base was cut from the same stock and soldered to the tube. The carbon electrode and the manganese oxide electrolyte were hand loaded into the tube and the cell was completed by sealing everything in place with sealing wax. They put me up in the

company guest house where I enjoyed a stag dinner, with only males present. The ladies ate after the men. After breakfast the next day I caught the train to Tokyo.

General Loper, the second in command to General Casey in the Engineer's office, was our direct link to the office. He was a smart capable man who was respected by all of the geologists in the office, most if not all, of our dealings with the army were through him. He was easily approachable and we often passed the time of day with him. One day I was talking to him, when to my consternation, a flea came out of the wrist of my uniform. That flea hopped happily up my arm and disappeared into my shirt front. The same flea, or a carbon copy, disported himself in and out of my shirt front and then jumped merrily back down my left arm. Needless to say, I was acutely embarrassed by it all and continued to talk to the general, ignoring the flea and praying that the general hadn't noticed it. He either didn't see the insect, or was too much of a gentleman to call my attention to it. I went back to the billet at lunch time, stripped down to the buff and dusted myself and my clothing with DDT. That was the only time that I can remember having a flea or fleas. I should add that I carried DDT with me for the rest of my stay in the Orient.

Okinawa

MMcClelland Dings, a geologist with the U.S.G.S., came to Tokyo to initiate a geologic mapping program, starting with the island of Okinawa., SI, a young U.S.G.S. geologist, and I, joined Mac and we went to Okinawa where we were soon joined by Warren Fuller and Raymond Saplis. Warren was a Major in the Air Corps, stationed at Kadena Air Field on Okinawa where he had been working in photo interpretation. He had been studying for a Master's degree in Geology at the University of New Mexico when Pearl Harbor was attacked and had volunteered for the Air Corps. Ray was a recent graduate in geology from Caltech and was serving as a Second Lieutenant in a transportation battalion in southern Okinawa. It is interesting that when we contacted Ray, he had just finished cooking a number of coconut cream pies for the battalion mess. He baked the pies on his own time simply because he liked to cook. Si was a graduate of the University of Pennsylvania, where he had lettered as an oarsman. He was notable in having 6 toes on one foot which made it difficult to get him footwear. Try explaining to an army supply sergeant that you need one shoe size-14 and the second shoe size-16. The solution of getting a pair of each size and discarding the unneeded shoes, immediately suggested that we were trying to black market a pair of shoes. We got the shoes but it took almost an act of congress.

Okinawa is a long, relatively narrow island, oriented approximately north-south. Southern Okinawa is a relatively low, open, terraced expanse, with flat lying limestone beds underlying the terraces and forming cliffs along the terrace edges. Northern Okinawa is mountainous terrain with rocky coasts rising sharply to a dissected interior. Flat land is found only in the neck of the Motobu Peninsula and in the bottoms of the stream valleys. At the time we worked on the island, northern Okinawa was off limits to all the occupying forces except those with business there. For most of the time we were there, that was us, a small rest-and-recreation camp and a radar station at the north end of the island.



Beached ships in Okinawa

When we got to Okinawa the place was alive with troops and the beaches were spotted with hulks, mementos of the hurricane that had given us the high seas on our way from the Philippines to Nagoya. Every flat space that was extensive enough sported an airfield. The Navy airfields and other installations were located around Buckner Bay on the eastern side of southern Okinawa. The Air Corps had air fields on all the other flat land, including the island of Ie Shima, off the tip of the Motobu Peninsula. Ie Shima has been described as the world's largest aircraft carrier. From a distance it has the silhouette of an aircraft carrier, a long flat expanse with a small peak off center, both lengthwise and crosswise, like the island on a carrier. It received a lot of publicity during the war as the place that Ernie Pyle, a famous reporter, was killed. After Ie Shima was taken, the Army established a large ammunition dump on the island. Naha, on the southern west coast, was the capital of the island and was

served by Naha Airfield which also housed fighter planes. The Army headquarters, RYCOM, (Ryukyus Command) were located on a ridge just south of Kadena Airfield in the central part of the island. Kadena was the base for bombers and photo-recon planes. I believe that the Navy was operating one field and the other fields had been decommissioned.



Ie Shima, from the Motobu Peninsula

We had been on Okinawa a short time, in which time we had reconnoitered the road system and made a few forays into the mountain country of northern Okinawa to get an idea of the conditions we would face, when a captain in the Intelligence Office regaled us with warnings of the dangers we would face from irredentist Japanese if we left the main roads. We had neither seen nor heard of any hints of such activities and as we were planning to map the whole island and as we felt sure that any Japanese hiding out in the boondocks would be anxious to avoid any attention and not bother us, we didn't take the warning seriously. I guess my face showed my disbelief of his statements, because the captain hastened to add, "You doubt it. Here's documentary proof. Here's a report I just wrote." Actually, months later, I bumped into one Japanese who was passing as an Okinawan. He was an ex-army officer who was acting as a practical doctor in a small village well off any road. He was helping the villagers so I did nothing to expose him.

Si and I took over a Quonset Hut in an encampment that had been abandoned by the Navy. The base had been erected on a spit of land at the mouth of Shioya Minato, a small bay on the west coast of northern

Okinawa, about halfway between the Motobu Peninsula and the north tip of the island. There was a small island in the mouth of the bay which, with the spit, gave a safe, albeit a somewhat shallow, anchorage. Commodore M.C. Perry, who opened Japan to the Western Countries, stopped in the Shioya Minato on his way to Edo in 1853. While he was refilling his water casks, he charted the bay and recommended in his log, that if he was unable to gain access to Japan proper, this bay could serve as an alternative port. I was told that the Navy based PT-boats in the bay in WW II. Our Quonset was one of two that were left when the Navy pulled out. Our hut was wired for electricity and had running water. The water came from a small spring on the hillside east of the camp and had sufficient head to give us an adequate supply of water at a good pressure. The water was not safe to drink but it gave us showers and washed our clothes. We only had to get an electric generator and a supply of potable water and we were in business. Our potable water problem was solved when we were able to obtain a small water tank on wheels which we refilled at the Army rest and recreation camp a few miles north of our camp. A generator was no problem, after all, we were attached to the Engineers. We were in business. Although we had our own camp we also had quarters at RYCOM where our party was headquartered. We made weekly trips to RYCOM for supplies and to check-in with the rest of our party. We soon found out that we couldn't operate our camp on the rations for two that we were furnished by the Army as we had to feed guests, from time to time, as well as the women who cooked our meals, washed our clothes and kept the place clean. The women also served as watch dogs, to protect our camp and equipment from pilferage as we were away all day and most weekends. We were able, however, to make some unofficial arrangements with the non-coms who ran the big refrigerators in the Navy supply depot, to augment our rations. They furnished us Navy supplies and we never lacked fresh meat, eggs, bread, canned goods, etc. We also had plenty of C- and K-rations for lunches in the field.

When we opened the camp we had an interpreter who spoke Spanish. I would talk to him in Spanish and he would pass on the instructions to the women. I wondered how and where he had learned Spanish, and asked him. I learned that, some years before the war, there was a shortage of labor in Peru and that he was one of the many Okinawans, who went to Peru to work, forming a small colony of foreign laborers, in much the same manner as the Jamaicans did in Cuba. Just as in Cuba, when the depression hit, the foreign laborers were no longer needed and they all were let go. Most of them were returned to Japan, my interpreter among them. Evidently, some stayed and did well, as a Senor Fujimura was elected President of Peru in the late nineteen hundreds. Working through the interpreter was a clumsy way of operating, we didn't have enough work to keep him busy and he was causing some problems, so we cut him off the payroll, after a week or two. We soon learned enough

Japanese to get by, and never looked back. It surprised us how rapidly we learned enough to converse with the Okinawans in what was probably very poor Japanese, but it was sufficient for our purposes. Having to speak a language, is the easiest and quickest way to learn a language, if you don't worry about proper grammar and honorifics. I was told that there are also two dialects of Okinawan, but we made no attempts to learn them. In fact, I don't think I ever heard more than a few words of either of them

After our initial period of getting organized, we settled down with three women servants who worked for us for the whole period we stayed in Shioya. They were a great crew. Fumiko was the youngest of the three. I never was good at estimating the age of Okinawan women, but I guess she was about twenty. She came from the village of Shioya, as did Yoniko. Yoniko had been sold to a geisha house in Naha when she was a child. It was a common practice on Okinawa for poor peasant families to sell their children, the girls to geisha houses and the boys to fishermen. They were not sold into a life of slavery, they were sort of indentured for a period of years, when they reached a certain age they returned to their native villages where they resumed life as though nothing had happened. I guess Yoniko was in her late twenties. Michiko, our third woman, came from a neighboring village and I was never able to estimate her age with any surety but I think she was about the same age as Yoniko. Michiko had spent some time in Tokyo, where she had been a groupie of the Takawarazka Theater group. I am not sure what her relationship was, but she proudly showed her metal capped bicuspid that identified her allegiance to that organization. The girls were very loyal and advised us about local customs and activities. They did more than just advise, they tried to take care of us. For instance, when we were invited to a party in the police station that was attended by the police chief and a number of the local big-wigs, they told us that we would be expected to get drunk and should be careful coming home. On Okinawa, and all through Japan and China, men's parties are designed to get everybody drunk, and I mean really drunk. When one of the participants passes out and falls over backwards on the straw mats, his wife and children haul the old boy out and get him home. Our girls expected that we would require help, so they showed up with the high school boys that studied in our hut to get us home. I don't know if they were disappointed when we staggered home under our own power.

After we could understand them, they would kid us about our idiosyncrasies. At the time I had the habit of expostulating "Son of a bitch" when something went wrong. If I was working on the generator and the wrench slipped and I barked my knuckles I would react with "Son of a bitch." If I stubbed my toe, I'd use the term. Any time I was surprised by a major or minor accident, I would grit out "son of a bitch" through my clenched teeth. Fumiko didn't know what it meant, but she knew it

wasn't a very nice expression, so she christened me "the son of a bitch honcho" to differentiate me from any other honcho (boss).

The Quonset hut was divided into two sections; our living quarters and the kitchen-dining area. The living half had two rooms cut out of the large area. One room was the bath room, complete with hot water, shower and commode; waste was discharged into the China Sea through a pipe that emptied well off shore. The other room served as my bed room, complete with bed. The remainder of the area was open, with a bed for the other geologist and room for spare beds as they were required. We had a table, chairs and some shelves to round out the furnishings. The other half of the hut had a small semi-enclosed cooking area, a dining area with a table and chairs, a refrigerator and a small pantry. It was a great setup and made an ideal place to live while working in northern Okinawa. The other Quonset was located about 150 feet south of our hut with open space in between. It was serving as a first aid room and adjunct to the school. The town had grown back to fill in most of the area of the spit but no buildings had been erected close to the two Quonsets; they stood alone between the road and the shore. The police station for most of northern Okinawa was located across the highway from our hut. I call it a highway because it was the only road that ran the length of Okinawa. It was a two lane, poorly paved road that followed the shoreline about ten feet above sea level.

When the Navy pulled out of the camp they left some equipment and supplies which were much appreciated. An Electrolux refrigerator was the largest and most appreciated item that was abandoned to us. This type of refrigerator cools with an Erickson cycle that cools with the heat from a kerosene burner and has no moving parts. The refrigerator was slow to recover its low temperature when its door was left open but maintained a temperature low enough to keep meat and eggs indefinitely, if care was taken to keep the door shut as much as possible. In college, I was taught the thermodynamic legerdemain of the process, but I've long since forgotten any thermodynamics that I may have learned and now, cooling with a heat source, is just another example of arcane technologic magic. In addition to some powdered foodstuff, cooking and eating utensils and furniture, the Navy left a carbine and a 45caliber automatic pistol with cases of ammunition for both. We welcomed the weapons and often, in the evening after work would practice firing at objects floating in the ocean at our door step, always checking to be sure there were no swimmers in the water.

Once we had the camp set up, we fell into a daily routine. We would get up, cook and eat breakfast, get either a K- or C-ration and go into the field. The women would get there about the time we left, and we would give them orders for the day, what should be done and what to cook for dinner. We had two vehicles, a jeep and a small truck, so we could go to

different places to start working. We worked independently, each in his own area, and got together in the field often enough to be sure we were mapping the same units for the same rocks. We would return in the late afternoon, shower and eat dinner. After dinner we would retire to our living area to read or write notes while the women were cleaning up and going home to the village. As the women left, a group of three or four high school kids would come into the dining area and study on the dinner table. We had the only electric lights in town and they asked for, and got, permission to study by the electric lights. They were nice kids and were no bother to us. We had to be careful about helping them in their study of English, though. One time, early on, one of the kids asked how some words were pronounced and we told him. The next day, the teacher flunked him in English because the kid didn't pronounce the words the way the teacher did.

I never took a weapon into the field; it would just have been a needless encumbrance, but Si took the 45 to shoot spiders. There were large spiders on Okinawa that spun webs across forest trails. The spiders had yellow and black striped bodies about the size of a man's thumb and sturdy black legs that gave the spider an overall size of 5 or 6 inches. They spun well-engineered webs across trails and other openings in the woods. The webs were strong; on several occasions when I blundered into a web while I was looking down, I had the hat removed from my head and suspended in the web. Usually I would see the spider in time to either duck under the web or use my geology pick to clear a way through. I will admit that it is a fearsome thing to look up and stare a huge spider in the face, but Si's reaction was a bit drastic. He filled his pistol with shells that shot very fine birdshot and blasted the spiders. One day he came in and reported that he wouldn't carry the 45 any more. That afternoon he was locating an outcrop on his map, looking down at his map board, when he heard a slithering sound like a snake might make (Okinawa has two poisonous snakes) so he whipped out his pistol and looked up to see one terrified native that didn't enjoy looking down the barrel of a 45 caliber automatic. Si then got the shakes at the thought of how close he had come to shooting an innocent person. Later, Si got heat stroke while he was mapping and collapsed into a flooded rice paddy. The natives pulled him out of the paddy and sat him down to recover. We thought it was too risky to keep him where he might have the same experience again; the next time there might not be anyone near to rescue him, so we sent him back to Tokyo to be assigned to some cooler clime.

As our program developed, there were changes in personnel, Mack Dings was replaced by Stearns MacNeil, a paleontologist, and Gil Corwin, a Harvard graduate, moved in with me, taking Si's place. Other specialists, including stratigraphers, an engineering geologist, and soil scientists worked with our group for varying periods of time. Most of them stayed at RYCOM but two soil scientists stayed with us for several months.

One evening, early in our stay in our Quonset, a jeep pulled up and an Army major who was with the Military Government stepped out. He had business in the area and asked if we could put him up for the night. We welcomed him and offered him a drink before dinner. While Si and the major enjoyed their drinks, I stepped into the other half of the building and told the women that there would be three for dinner and suggested the menu. When we moved into the building we found that we had inherited a restaurant-sized can of powdered, dehydrated, navy bean soup which we tried and liked. I included the soup in my suggested menu. When the soup was served, I realized that the tiny, whitish, comma-shaped objects in the soup were not the bean germs we thought they were, but were tiny grubs. Of course, they were dead and had been boiled but they were insect grubs. I said nothing as we enjoyed the soup and rationalized that they simply added protein to the soup. However, we tossed out the rest of the can. We didn't need the protein that badly. I recently got a kick out of reading a food column in the newspaper that extolled the taste of a powdered soup that still had tiny crescent-shaped pieces of bean germ in the finished product.

The best exposures of bed rock are in road cuts, rocky coasts and stream bottoms. We had few road cuts and had to map the interior so we worked primarily in the stream valleys. There is no shortage of water in northern Okinawa, and most of the valleys have flowing streams in their beds. The valleys also host large trees which are the homes of cicadas, which fill the air with their strident love songs. I was eating my lunch one day, sitting on a large rock next to a babbling stream, enjoying the bright sun shine and listening to the cicada's chorus when a bomber from Kadena Airfield flew overhead. Evidently, the roar of the big plane was taken as a challenge, because the cicadas raised the volume of their song and kept it up, as long as the plane's roar was audible. After that, I noticed that every time the cicadas heard a plane while they were scratching out their love song, they upped their volume. I still wonder if they thought the plane was a big cicada entering the competition for the local female cicadas.

The nearest native hospital to Shioya was located in Nago a large town on the south side of the base of the Motobu Peninsula. The natives had no means of transporting ill patients to the hospital, so, when an emergency arose, they would come to us and ask if we could take the patient to the hospital. We would rig a bed in the back of the truck and help out if the emergency seemed real. Since we were out all day, it was almost always at night when we received such requests, and we tended to insist on the hospital giving immediate attention to the patients that we brought in. This practice almost cost me a lot of trouble. Early in our stay, we were guests at a betrothal ceremony of a really beautiful girl who lived in a village on the bay a short distance east of Shioya. The girl was the niece of the chief of police for the area north of the Motobu Peninsula and some

relation to our Michiko. I gathered that while technically not married, the betrothed couple could enjoy all the benefits of marriage and that the actual marriage ceremony could come later, at some more auspicious time. I forgot all about it until, 8 or 9 months later Michiko came to me and said that the girl was very sick and the family was worried as she had been in labor for more than 24 hours and appeared unable to have the baby. They feared that either she or the baby, or both, might die; would I take her to the hospital in Nago? We rigged a bed and I picked up the laboring girl and drove her to the hospital. When we arrived in the hospital, I thought that they weren't paying any attention to the girl and I was worrying that she might have serious complications, so I started throwing my weight around. The ensuing stir got her the attention I thought she merited, so I left and drove back to Shioya. Beyond checking and being told that she had a son and that both mother and child were healthy I forgot all about it. Several months later a policeman from Nago pedaled a bicycle up to the police station in Shioya to find out who the American was who had had a child in the Nago hospital several months previously. It seems that when I was demanding attention for the laboring girl, some body asked what was all the fuss about. I knew a number of the nurses but one that didn't know me, said, "Oh it's an American whose girl friend is having a baby." The police chief, who was familiar with the case, explained the situation and the matter was all cleared up. At the time, the military government was gathering information on GIs fathering children and leaning on them to make them assume their responsibility and support their progeny. I can just see me, years later, trying to explain to my wife why the US Government was billing me for child support.

There was a small hospital in a village out near the end of the Motobu Peninsula that I used to stop in and check on what was going on. The hospital was a dirt floored Quonset hut with no sanitary measures that I could see but that didn't faze the doctor, or keep him from operating. When I say operating, I mean doing serious operations. At the time, I thought him a cut-happy hazard and would not take anybody to him. If an emergency arose, I would go a few miles farther to the hospital in Nago. Fortunately, I never had to face that problem. The first time I visited the hospital, I just stopped in to say hello and introduce myself and was dressed in dirty field clothes. The doctor was preparing to operate on a patient and I was invited in to witness the operation. The patient had some problem in his chest cavity and was lying on his back on the operating table. His clothes had been pulled back to expose his chest and he had been sedated. After swabbing the area with what looked like iodine, the doctor laid back a large flap of skin, laying bare several ribs. I began to feel a little woozy, I couldn't help but thinking of a meat cutter cutting up a carcass. When the doctor next took what looked like a pair of large wire-cutters and proceeded to cut through a rib, I had to sit

down and put my head down between my knees to keep from fainting. This sign of weakness amused the nurses but I think I would have to sit down if I witnessed it today. It wasn't the sight of the cutting that I couldn't take, it was the crunch when the doctor cut through the bone. The crunching sound, together with my mental picture of a butcher hacking up a human being was what almost made me faint.

We quit making mercy runs because we were being asked to take runs, when no emergency existed. One evening somebody from the little island at the mouth of Shioya Minato paddled over to our camp and asked us to take a sick woman to the hospital. We rigged up the bed in the truck and drove around the head of the bay and met the sick woman who had been loaded on a cart and hauled across the bridge that connected the island to the mainland. I took the woman to Nago and raised my regular fuss to get her taken care of. When she had been seen, I asked the doctor what was her ailment. He told me it was insomnia. We didn't consider insomnia critical, and I was discomfited to raise hell for somebody who was having trouble sleeping. We let it be known that we felt that we were being used and that henceforth, we would only transport critically ill patients.

Every morning the children of school age from the little island would cross to the mainland and walk down the highway to attend school in a village about a mile closer to Nago. They were a happy chattering bunch of kids as they walked to the lessons. Often, we would pass them as we drove to work in the morning or, more rarely, on the way home after work. As soon as the kids saw us coming, an older student, usually a girl, would line up the group along the side of the road and they would bow to us as we passed. We got to know the kids and sometimes would give them rides. This was strictly against the rules but we bent the rules as we knew there was nobody around to see us and the kids were endearing. Unfortunately, we had to learn the hard way that there were reasons for the ban. My hut mate at the time was driving a jeep on the west side of the island when school let out and a bunch of little kids clamored for a ride back to their home village. He was going there anyway and he knew the kids so he loaded up his jeep with an overflowing load of very young school children and drove to the village. We always admonished the students to stay on the vehicle until it came to a complete stop, but this time one little girl jumped off the jeep as it was slowing for a stop. When she landed, she lost her footing and fell back under the rear wheel of the jeep and was killed. We felt terrible about it and expressed our sympathy to her parents and took them a supply of food for the post-funeral meal (on the advise of our women). They recognized that it was an accident and apparently didn't hold us responsible. It did put an end to our giving rides.

One day, when I was the only geologist in camp, I had finished supper when the ground shook and a short time later we heard a resounding BOOM. The big, earthshaking explosion was followed by a rolling barrage of smaller explosions punctuated by larger explosions with earth shakers occasionally thrown in. The women who worked for us, came to me for some explanation. "Is it the Russians? Is it an attack? What is it?" I answered that it wasn't an attack but I that didn't know just what it was but that we would find out. I loaded the three women in the truck and drove off toward the sound. We went south to the Motobu Peninsula and turned west, following the sound. I was beginning to guess what was happening. When we got to the tip of the Motobu Peninsula, my guess was correct. The ammo dump on Ie Shima was on fire. Looking towards Ie Shima was like looking at a Fourth of July celebration in the south west corner of Hell. The whole island was going up in flames. It wasn't really flames it was explosions. The light and sounds of thousands of ammunition and bomb explosions lit the skies over Ie Shima and filled the air with the sounds of Armageddon. The ignition of larger bombs would punctuate the crackling roar with resounding explosions and flash above the background light. When the big bombs went off you could locate the explosion by its flash and we were close enough that the shaking of the ground would follow immediately. Often the explosion of one of the big fellows seemed to cause an answering explosion of another big one from another part of the dump. Every once in awhile, a supply of tracer shells would catch fire and spew tracer tracks over the conflagration, like the rocket tracks in a celebration of the Fourth back home. The dump burned for days and finally burned itself out.

When the dump had cooled enough to allow people to enter the area, the dirty, dangerous job of cleaning up began. Not only was it necessary to clean up all the detritus of the fire, it was necessary to clear the area of any live ammunition that remained. The hairy part of the task was picking up shells that may have been armed but not exploded. The job of cleaning up was given to a civilian company which picked up everything and dumped it in the deep sea. The cleanup was almost complete, and the ship containing the last load of dangerous trash was tied up at the dock, ready to take it out and dump it in the deep sea, when it blew up. Fortunately, there were no natives on the dock at the time. A few minutes earlier the dock was crowded by natives who were meeting the ferry from the mainland, but they had all gone back up to the village by the time the explosion occurred. I think that some of the ship's crew were not so lucky and were killed in the blast. The man in charge of the operation wasn't killed in the explosion. He killed himself, after the explosion.

Midway through the mapping program, our party was augmented by an influx of soil scientists, under the direction of Roy Simonson, who was succeeded by Ed Templin. Ed was an excellent bridge player, much better than I, but he didn't mind playing with me in the Saturday night

duplicate session at RYCOM. This weekly bridge game was set up, and mostly attended by, married Army couples, some of whom were fine, experienced duplicate players. The format matched the winners one week against the losers, at the next the next session. This meant the top winners of both north-south and east-west would play north-south against the losing couples the next time around. The top players seldom lost and they regularly played north-south while the better pairs among the lower ranked players would win one week and move up only to lose as a north-south and move down the next week. Ed and I were good enough to win when we were playing east-west but couldn't compete with the really good pairs. Winning in both groups was rewarded with bottles of liquor, so Ed and I regularly took home a bottle of some variety of alcoholic beverage. The kind of liquor depended on our winning position. Some times we got some rather exotic potables, which we tried and added to our stocks.

We were well ensconced in our hut when the Japanese New Year came up and Shioya celebrated with a three day festival. The first day of the celebration was a village-wide open house. All the men in town spent the day going from house to house, partaking of what ever goodie was offered. They moved as a pack, descending en-masse on each house in turn. We had been warned of what to expect and prepared for the occasion. Alcoholic beverages that were available to the Okinawans, were generally of lower proof than our bourbon or scotch, so we thought it wise to cut our whiskies with water so as to not plow our guests under. We had two new bottles of bourbon which we diluted to fill three bottles, a partial bottle of scotch that we diluted to fill the bottle, and a number of exotic liquors which were of lower proof and didn't require dilution. Having made our preparations we set back to await the horde. We didn't make the rounds; we didn't know what we might be expected to eat. Early in the morning, long before our hut was visited by all the villagers, the police chief showed up at our door, invited himself in and sat down with a bottle of Cointreau. We knew that he really liked the Cointreau and were happy to furnish it to him, but were a little surprised that he spent all morning sitting at our table sipping the liquor. He didn't leave until the bottle was empty.

Things got really hectic when the crowd arrived. We couldn't pour for every person and even if we tried, they wouldn't have patiently stood around waiting to be waited on. The potables were all arrayed in our kitchen area and our guests served themselves, each choosing his own drink. With our hut crowded with happy chattering guests, we lost track of things, not that it mattered. We had expected that the Okinawans wouldn't leave till all the bottles were empty, and they didn't. When everybody had gone and we were cleaning up the place, we were amused to find that among the empty liquor bottles were two vinegar bottles.

The second day of the new years celebration was devoted to public entertainments given in the space between the two Quonset huts. There were dances, songs and skits. The skits were traditional playlets that demonstrated some moral. The only one I remember is a story that, I am told, comes from China. A young couple is celebrating their son's birthday with a feast. They are doing everything they can think off to make the child happy. In the course of the day, the elderly grandmother is treated very badly on a number of occasions while they are spoiling the son. At the end of the day the couple asked their son if he had enjoyed the day. He answers that he is happy because he has learned so much. He now knows how old folks should be treated. They are past their prime and no longer have any importance and don't merit consideration. Now he knows how he should treat them, when they are old.

Since the entertainment was held in the open air, under a hot sun, liquid refreshments were served. The drink was fermented rice, not true saki, just a thin white beverage consisting of fermented rice powder in water. It was a powerful laxative and I spent the third day close to home and don't know what was done in the town.

Northern Okinawa has relatively little flat ground suitable for agriculture so what there is, is planted in something or is devoted to towns. Rice and sweet potatoes were the principle crops but tea, "daikon" (large white radishes) and some leafy vegetables were also grown. It was interesting that shipments of corn, furnished by the occupation forces, were accepted but resented. I was told, "You send us corn to eat, but you feed it to pigs." Needless to say, corn was not a common crop. I think that the agriculture practices hadn't changed over the last millennium. Rice was grown as it was in the time of Genghis Khan. After the crop was harvested, grass and leafy material was dug into the paddies as a green fertilizer, along with animal waste, if it was available. I don't remember seeing the holding tanks for night soil that are so common in Japan. Instead, the natives build their privies over their pig pens, giving the pigs first refusal of the human waste. In the paddy area, selected small paddies were planted with closely spaced seeds which were allowed to grow to seedlings perhaps 6 inches tall. The seedlings were then transplanted into the paddies which had been flooded. The individual seedlings were set out in rows about 8 inches apart, with the plants separated about the same distance. It is interesting that the spacing was controlled by a frame that was long enough to span the area between the mud walls that delineated the individual paddies. The frame was about 8 inches wide, the distance between the rows, and the long members were studded with brass nails spaced every 8 inches, the distance between the individual plants. In practice, men would squat on the dividing walls between the paddies and flop the frame over as each row was completed. The transplanting was done by women who were working bent over, in ankle deep mud, sticking a seedling opposite each nail head. The men

filled in their time smoking green tobacco cigars which they rolled as needed. When the rice was ripe, it was cut off at its base and collected in sheaves which were dried. The straw was saved and the heads were pounded with a large wooden maul to free the rice from the chaff. The rice then was separated from the chaff by winnowing in the wind.

Rice could only be grown where the fields could be flooded, sweet potatoes were grown in dryer areas. One day I was walking on a path between sweet potato patches when I noticed a spider web across the path. The web was beaded with the morning dew which had attracted my attention. I hate to think that I can be conditioned to react the same way to a stimulus. I don't like to become a creature of habit. I have mentioned the strong webs spun by the large spiders and that I had the habit of breaking the web with my geology pick before walking through the web. Well this time, I thought, "I'll just walk through this web, I'm becoming a creature of habit." Fortunately for me, habit was too strong and I swung my pick through the web before I walked through it. I was startled by a gun shot, and I realized that it wasn't a web at all. It was a fine twine that was attached to the trigger of a rifle rigged to shoot across the path, a dead set. If I had walked through the thread the shot would have shattered my lower leg. My first reaction was a flare of anger. I jumped off the path and crossed the potato patch to the gun, which I grabbed by the muzzle. I swung the gun up and looked for a rock to beat it on and break the damned gun. There wasn't a rock near by, and by then I was beginning cool down and act more rationally. The occupation forces had collected all guns and natives were not supposed to have any, and I was still angry as I took the gun to the head man of the nearby village. He was scared of what would happen to him for having an illegal weapon and apologized abjectly for setting the trap. He explained that wild pigs had been raiding the village's potato patches and the people were worried about what was being done to their food supply. By then, I had cooled down, and gave the gun back to the head man but cautioned him about setting gun traps that might shoot a person. I could understand the villager's concern for their crops and their need to protect their food supply.

Pigs and chickens were the principle animals grown, but sea food was the main source of protein. Fish, octopus, mollusks, and lobsters were the sea foods most commonly harvested from the ocean. Once a year the "iruka" (small whales) migrated past Okinawa. When the migrating whales passed, they swam near shore in great numbers and the natives went crazy in a killing frenzy. They went out in their canoes and slaughtered the whales till the water was red with whale blood, and they continued the slaughter as long as the whales were still present. When the pod had passed, a few hours, the canoeists towed the dead whales ashore, to be cut up and sold to the public. Everybody ate whale meat for

a while. I didn't. I was aghast at the wild killing, and didn't want any part of it.

Fishing was done primarily with nets but sometimes the nets used were rigged in the canoes, not in the water. When fishing for flying fish, the natives would go out at night and put up nets vertically along the length of the canoe. They then would light a fire and burn it brightly. The flying fish would be attracted by the light and jump over the boat only to be caught in the net. The flying fish, and any other fish that they wished to preserve were smoked and dried. Larger fish were filleted for drying and smoking. The resulting product looked like a piece of wood and was as hard as a block of wood. When using the dried fish the block was shaved with a sharp knife. I was shaving a smoked bonita one day and found that like a block of wood with termites the fish was cut by tunneling insects. It didn't help my appetite, but I continued eating the fish.



Poisoning fish, Keramo Retto

I was crossing the tidal zone of one of the small islands west of southern Okinawa at low tide when I came upon the locals fishing in the fringing reef. They had blocked off a tidal pool and were pounding some vegetation on the coral walls of the pool. The pounding was freeing the sap of the leaves which produced a milky haze in the water which was killing or at least stunning the fish. The knocked out fish sank to the bottom of the pool. The people couldn't see fish on the bottom because of the haze, so they were feeling for the fish with their feet and reaching down to pick up any that were found. I was standing on the reef looking down at the edge

of the pool when I saw a woozy moray eel in a crack. Moray eels are mean and nasty, with a mouth lined with razor sharp teeth which can produce a bad cut, so I called to one of the men, and pointed out the eel. He went mad. He picked up the drugged eel and started beating it on the reef. He beat that eel on the rough coral until it was a bloody pulp, and then continued to beat it until it was shapeless mass that he put in a basket after he added a few more swats against the rocks.

Eels are not the only dangerous denizens of the reefs. I was told about a woman who was collecting shellfish from the reef off Shioya at low tide. She was taking any small shellfish she found and putting them in the basket she had on her back. Unfortunately one of the cones she put in the basket was a very poisonous mollusk that bit her through a space in the woven reed basket. The bite was fatal. Great white sharks may also be encountered near shore. I watched two 5- or 6-foot sharks one day and didn't swim in the ocean again. One night I was called to the first aid station in the other Quonset to look at a lady who had stepped on a sculpin. (A sculpin is a fish with poison spines.) I had a little pump that I carried in my first aid kit to use in case of snake bite, to suck the venom from the bite, which I used on the woman's foot. I was able to suck out a plug of coagulated blood and serum about an inch long, and get most of the poison out of the wound. I don't know what would have resulted if I hadn't been there to treat the woman, but after sucking the poison out, the woman had no other problems with the wound.

We like to think that American soldiers are good men who always conduct themselves properly, unfortunately they are no different than people everywhere; they are mostly good but among them are some that are bad. A bad person makes a bad soldier and by bad I mean evil. While I was on Okinawa there was a man who was waiting trial for rape. He had broken into the women's quarters to rape any body he found. It was early in the morning of a work day and there wasn't any body there but an old Okinawan cleaning man; so he raped him. On the day of his trial before a military court, a young lieutenant was sent to the barracks to escort the man to the court. It so happened that the lieutenant's wife was in the hospital delivering their first child. When the lieutenant arrived at the barracks he was met by a fusillade of rifle fire which killed him instantly. The killer fled to one of the small islands off the east coast of southern Okinawa, where he hid in a native's house. Immediately a posse was formed to bring in the killer. The posse consisted of ten or twelve officers, no enlisted men were included. The posse cornered the man in the house he hid in and in the ensuing fire fight he was killed. I was told that he was killed by the same number of bullets as there were posse members involved. I am sure that there never was a chance that the man would be brought in alive.

I had several direct experiences with bad actors while I was working in northern Okinawa. I mentioned earlier that the school kids from the small island in the mouth of Shioya Minato would line up and bow to us when we drove past them on the road and that we got to know them. One afternoon as I was driving back to our hut, I was stopped by some of the parents of the school kids and asked to take their daughter to the hospital in Nago. The girl was walking home from school with the group of children, when a vehicle with two GIs stopped and one of the GIs tried to grab her. She, in trying to elude him, slipped and fell off the edge of the road onto the jagged rocks below. I went to our camp and put in an air mattress and some blankets in the back of the truck and drove the girl and her mother to the hospital. Unfortunately, the girl died. There was no way I could identify the GIs beyond reporting the incident to the M.P.s. For a while, I felt ashamed to be in the same army as those GIs.

Winding Down: Ryukyus Reconnaissance

We finished the mapping in Okinawa and turned our attention to other islands in the archipelago. We just wanted to make a quick reconnaissance, to see whether additional work was justified and to see if there were any deposits of economic minerals. One of the first islands I visited was Tori Shima, a small island in the North China Sea west of Okinawa that had been described as having deposits of sulfur. Tori Shima is composed of two volcanic cones, aligned in a NW-SE direction. The smaller, southeastern cone is extinct. The larger northern cone is very active. It has a central crater floored with volcanic ash and mud deposits that locally are cemented with native sulfur. In the center of the crater there was a large fumarole, a roaring column of sulfurous steam about 30-feet in diameter rising hundreds of feet in the air. The rising column of steam has a yellow tinge due to the contained sulfur and sulfur stains the crater walls. The Japanese had mined the sulfur-bearing ash that floored the crater, heated it in retorts to distill the sulfur from the ore, and collected the relatively pure sulfur. There was no source of fuel on the island so coal was imported from Iriomote to heat the retorts. The ash now free of sulfur then was returned to back-fill the workings. I didn't approach closer than about 30-feet of that roaring column of steam as the ash beds in the floor of the crater had little strength and I could imagine getting near the edge and having the ground give away under my feet. It would be a toss-up whether I would die of inhaling the gasses or from being cooked. Neither possibility intrigued me, so I kept my distance from the hazard. It was my first close-up experience with volcanism and I was impressed. I also had a lot of respect for the workers who had labored there.

Ray Saplis and I accompanied a group from the military government in Tokyo that visited Kita Daito Shima, an island in the Pacific Ocean about

200 miles east of Okinawa. There was a shortage of fertilizer in Japan and an “ad hoc” committee was formed to consider the problem. Evidently the Japanese language dictionary being used by their delegation lacked a word for fertilizer, because the meeting opened with a promise that the Japanese Government would do everything in their power to increase the supply of night soil. Kita Daito had produced phosphate fertilizer during the war and the Military Government had tried to revive the operation, unsuccessfully. We were checking to see if economic deposits remained. Kita Daito is a small D-shaped island measuring about 1 by 2 miles. It is an elevated atoll with a central depression surrounded by an unbroken wall of limestone. The walls rise in vertical cliffs from the sea. The local fishermen had built a skidway over which they could drag their boats to and from the ocean. There are no beaches and no bays or inlets. The isolation is so complete that the man who ran the prior attempt to revive the mine developed cabin fever, and before he was relieved amused himself by shooting geckos off the walls and ceiling of his quarters.



Access to Kita Daito Shima

The Ryukyu Islands are an island arc that runs from a point east of Taiwan northward to a point south of Kyushu, where it ends and a chain of active volcanic islands, the Tokara Gunto, links the Ryukyus with Kyushu and Japan proper. As part of the reconnaissance of potential ore deposits, I accompanied a Military Government group that touched most of the islands north of Okinawa and south of Japan. We saw no deposits that merited development but saw some interesting things. We traveled

in a 600 ton coastal steamer that would anchor off each island and we would go ashore in the ship's boat. The captain of our ship had been captain of a 10,000-ton ship at the beginning of World War II. It and three other ships were sunk under him. Each ship was smaller than his previous command, and at the end of hostilities he was down to commanding the 600 ton coastal steamer. He told us that being sunk by a submarine wasn't bad, what was bad, was being sunk by air attack.

We were anchored off Suwanose Shima for the night and we could hear the explosive eruptions of Aku San, the volcano that towered above the island. In daylight we could see puffs of smoke that accompanied the booming sounds and hung in the air as a cloud over the mountain top. As night fell and darkness cloaked the mountainside, we looked up at the peak and could see an angry red glow as the incandescent lava in the volcano's throat reflected off the cloud that capped the mountain. As the darkness deepened the glow became more distinct and we could see large masses of ejecta being hurled into the sky. There didn't appear to be any lava flows and nobody seemed to worry about the continuing volcanic activity. I wouldn't care to live on that island.

On the same trip we spent several days on Nakano Shima another volcanic island, in the Tokara Gunto. Nakano is larger than Suwanose and its volcanism is limited to fumarolic and hot spring activity. There is a hot spring at the village beach, in the tidal zone. The villagers had erected a bath house over the spring and all the villagers would take hot baths in the bathhouse. When the tide was out, the water was relatively low in salt, when the tide was high, the water was salty. The bathhouse was divided down the middle, one half for men, one half for women. Though nudity is no problem in Japan and the sexes often bathe together, this bathhouse had his and hers sides. One night we were invited to bathe with the men of the village and we joined them in the men's side. I happened to look at the dividing wall and was amused to see that each knothole in the wood of the wall had a female eyeball glued to it. These people had never seen a white man before and every body wondered if we were white all over.

Ray Saplis and I, took a reconnaissance trip with the Military Government to the islands south of Okinawa; Miyako, Ishigaki, Iriomote and Yonaguni. I never got to Yonaguni, as I was sick when they visited and Ray did the honors. Our primary interest was to evaluate the coal mines on Iriomote, which were being operated by a Japanese company on a very small scale and which the Military Government hoped to mechanize. We were amazed to find that the coal seams were 18 inches or less in thickness, and that included several inches near the base of very poor coal. The operators had a haulage tunnel about 4 feet high that extended several hundred feet along the seam, from both sides of which short extraction galleries were driven. The miners lay on their sides

to dig and extract the coal. We could see very little at this operation so I and a guide who claimed to know where coal was exposed in the interior took off on a hike that was supposed to take a day to see the coal and wind up at a village on the other side of the island. We ran into difficulty as soon as we got into the rainforest. The leafy canopy was complete. We could not establish where we were on the air photos that were our maps. So we continued on to see the outcrops of coal, except my guide didn't have a clue as to where they were and how to get there. We just kept walking, hoping to blunder onto some outcrops or come out on the other side of the island. As the day wore on it became obvious that we would achieve neither. We never saw an outcrop and we were up in the hills with no indication that we were anywhere near the other coast. Since we were going to have to spend the night in the jungle we were faced with the problem of food, or lack thereof. I had taken only one K ration and there were two of us. Fortunately I had taken a carbine with me as I didn't know what wildlife we might encounter and I was able to shoot one very small duck, the only duck we saw. My guide got the K ration and I stuck a branch through the duck and cooked it over our fire. We just lay on the ground and slept.

The next morning, we got an early start and pressed on to a valley that drained to the coast we sought. As we started down the valley, we met a bunch of men that were cutting timber to take to a small island off the coast. We bummed a ride down the stream in one of the canoes of the woodsmen and found to our delight that our goal, the village on the other coast was at the mouth of the stream we were on. Ray had come around the coast and was waiting in the village for me. We were scheduled to be picked up by the Military Government boat late that afternoon. The villagers gave us something to eat and offered us a hot bath, which we eagerly accepted. We had second thoughts for a moment when we saw the set up for bathing. It was a large cast iron pot built into a small wood stove that served to heat the water. The pot was large enough that a man could crouch down in it and only have his head above water. The pot was located on the side of the main road, actually a wide path that connected the village to the beach. The big pot was filled with water and a fire started to heat the water. The whole setup looked like a public feast with us being the main course. We knew that we were absolutely safe, but when we were in the pot and smoke rose from the fire, it amused us that we were in the position of countless cartoon characters being prepared for consumption. Of course, every man, woman and child from the village lined the path to see us bathe. They, like the villagers of Nakano Shima, had never seen a white person before and were interested to see if our paleness held all over.

Thailand

We were in the Orient and we thought that we should take some time off and see more of it than Japan and the Ryukyus, so Ray and I went to Thailand, which was known as Siam at that time. We flew from Tokyo to Bangkok by way of Shanghai, where we thought we would spend some time seeing the city. Unfortunately, we were restricted to the airport and saw nothing. Things were in a state of flux. Chiang Kai-shek and the Kuomintang were being driven out of mainland China and nobody knew when the communist troops of Mao Tse-tung would enter Shanghai. The U.S. had backed the Kuomintang government and now didn't want any incidents due to U.S. citizens being in China, so they kept passengers-in-transit on the airport grounds, where they couldn't get into trouble. Ray had been in Shanghai previously, having taken part in the Army's Asia Games track meet which was held in Shanghai. Ray had high jumped in college and competed in that event.

In Bangkok, we got rooms in the Ratanakosindr Hotel, a moderately priced hotel located on the southeast corner of Rajademnong Avenue and a small canal. The Ministry of War was on the other side of the canal, between the canal and the Phra Mane, the huge parade ground in the center of Bangkok. The Imperial Palace and the Temple of the Emerald Buddha stretched across the far, southern end of the Phra Mane. Rajademnong Avenue ended at a fountain in a miniscule park at the junction of the avenue and the road that encircled the parade ground, near its northern end. Directly across the avenue from our hotel were the headquarters station of the national radio system and a large restaurant, the Cathay Cabaret. The Cathay served good food and was patronized by foreign correspondents as well as Thais. At the time of our visit, the body of the recently deceased king was being held in a huge catafalque that had been built on the parade ground to hold the body until the royal astrologer determined an auspicious date for its incineration. We couldn't afford to stay at the internationally famous Imperial Hotel but our moderately priced hotel was fine. As an aftermath of the war, we had water to bathe for only a few hours a day, a minor annoyance that we could easily live with. Our hotel served the largest and best prawns I have ever eaten; one prawn, butterflied and breaded, filled a dinner plate. They served them for breakfast and we ate them for breakfast every day. We usually ate dinner in the Cathay restaurant, and lunch at a restaurant that some Thai geologists recommended.

The first thing we did after we got set up was to visit the Thai Geological Survey and introduce ourselves to the Thai geologists. They were a friendly bunch of fellows and recommended places to go and things to do. They also took us to their favorite restaurant and wrote down the names of the dishes, so we could order them for ourselves if we liked them. The food was excellent and later we ordered some of the dishes. The geologists

forgot to tell us that they had ordered the food to be prepared with less, much less, hot pepper than was customary. When we ordered the dishes we got them with the full amount of heat. I like Mexican food and can handle all but the hottest Mexican dishes but the Thai food brought tears to my eyes and fire to my mouth. It coated the inside of our mouths with a water repellent coat of fire that burned and kept burning. We tried water; it just bounced off the burning tissues and didn't do anything to allay the heat. It wasn't until we found that the excellent Thai beer could cool the clinging fire, that we could enjoy the food. It also enabled us to justify drinking a lot of beer.

Following the advice of the geologists, we arranged to get regular pedicabs and drivers. The Thai pedicabs were big tricycles with paired rear wheels. The passenger rode on a seat between the two rear wheels and the driver was in front on a bicycle seat. The propulsion was furnished by the driver; he pumped a bicycle style drive. We were a little sensitive about being big, able-bodied men being hauled around by the labor of a much smaller Thai man. We got over that feeling very soon. In Thailand these vehicles are called "samelos" (3-wheels). We traveled all over Bangkok with our samelos and got to know and trust our drivers.

We were awakened early our first Sunday morning in the Ratanakosindr Hotel by the clanking of tanks moving and the voices and noises of groups of men. They seemed to be moving into positions around the radio station and the Ministry of War. We got dressed and went up to the roof of the hotel to see if we couldn't get a better idea of what was going on. As dawn brightened the sky and daylight shed light on the situation, we could see what was happening. The tanks were around the radio station and not taking much of a part in the activities. The tanks never fired a round, at least we never heard one. The infantry were deployed along the far bank of the canal, where the depression offered protection. The troops were doing a lot of shooting across and down the Phra Mane but there didn't seem to be any return fire and there didn't seem to be any specific targets. It was just shooting for shootings sake. Since there didn't appear to be any incoming fire, I decided to go down and get closer to the action. Ray was a devout Roman Catholic (he later became a priest) and felt that he had to attend Mass and couldn't go with me; I would have to go by myself. I picked up my Leica and went down to where the troops were milling around. As I got near, they began to move out, some were crossing the open parade ground and some were moving along its edge, toward the Imperial Palace. I bumped into a squad of soldiers armed with Tommy guns who were friendly, so I accompanied them. They were so friendly they scared me out of a year's growth. They indicated that they wanted me to take their picture, which I was happy to do. They arranged themselves in a line, made fierce faces and pointed their Tommy guns at me, posing for the picture. I was dismayed to have twelve or fourteen 45-caliber machine pistols pointing at me. The yawning mouths of guns

seemed to be small cannons as I remembered that Tommy guns don't have safeties. If even one of the friendly soldiers happened to put a little bit of pressure on a trigger, I would be meat. I hastened to have them point the guns down, and took their picture. I think that I remembered incorrectly. Now, I think that Tommy guns have safeties; "grease guns" were the weapons with no safeties. However, what I think "now" has no importance to how I felt then. I was just as scared as if I had been right.



Tommy Gun Squad. Bangkok, 1949.

I walked with my new friends across the north end of the parade ground and started down the west side, toward the Palace. We reached a point a little south of the catafalque when I realized that the feel of things was changing. The carefree lark we had been enjoying seemed to have lost its carefreeness; things were getting serious. A small tank appeared and began to shoo the civilians, who were out on the street, like me, back into side streets and buildings. An officer appeared and took charge of the squad and suddenly I got the strong impression that I would be better off somewhere else, almost any where else. I thought that the time had come when I should get back to the hotel, so I headed back, taking the shortest course, angling across the Phra Mane. As I walked across the broad expanse of open ground I felt very conspicuously exposed in an unfriendly area. Nobody threatened me but I felt like a thumb nail waiting to be struck by a hammer. Though nobody threatened me, nobody was greeting me with a smile. I didn't feel any less threatened when I got into a surly bunch of Thai marines that seemed to growl as I passed. Finally one them stopped me and asked me where I was going.

At least that is what I think he asked. I pointed to the hotel and indicated that I was staying there. He grunted and waved me on. We read in the English language paper that the rebels were cornered in the Palace grounds and arrested. Two days later we read that friends of the rebels tried to free them and in the ensuing fight all of the prisoners were killed. It was strange that only the prisoners were killed and their bodies showed deep bruises and burns, evidence of torture.

We heard that the U.S. embassy was instructing all Americans to keep off the streets and stay in their quarters. We had no desire to waste our few days in Bangkok in our hotel, so we kept away from the Embassy. We didn't want to disobey an order. We went all over town in our samelos and didn't encounter, or even see, any disturbance.

I had read about durians in the writings of Carveth Wells about the East Indies. He touted durians as being the finest fruit of the tropics, if not the world. This fruit was supposed to have a wonderful flavor but its odor was so bad it turned off westerners and made it all but impossible for them to even take a bite. Once tasted however, its superb flavor would make it a favorite of the brave man that could surmount the odor. We wanted to try a durian but could not find it on the menu of a restaurant. Finally, on our last day in Bangkok, we asked our samelo drivers if they could buy us a ripe durian. They said it would be expensive but that they could get one. We gave them enough money to cover the purchase and told them to bring the durian and any excess money to us at the restaurant we were going to for lunch and we would give them any durian we didn't eat. When we told the people at the restaurant what we had done, they told us that we were crazy to give the drivers money and that we would never see them again. They did agree to prepare any durian we got. Our fellows came back with a large, green melon-shaped fruit that was covered with spikes, and some change. We surrendered the fruit to the restaurant to be prepared, with instructions to return any unused portion. We were rewarded with plates of white creamy fruit that resembled plates of ice cream or whipped cream. The aroma lived up to its billing; it was world class stink. We figuratively held our noses and essayed a large spoonful of the creamy, malodorous mass. It tasted like spoiled sour cream! We each felt that we should try another spoonful to see if it would taste better with repetition. It still tasted like spoiled sour cream! When I was very young, I liked sour milk and cream, but that was long before this time. I found it impossible to choke down any more of the "super fruit." Ray also found the taste repugnant. When we sent back the remainder of the prepared durian and asked for the unused portion, the restaurant offered to buy it from us. We thanked them and repeated that we had promised it to our samelo drivers. Their reaction showed that we had confirmed their earlier estimate of our sanity.

Return To The U.S.G.S.

When we closed up the Okinawa office, we were recalled to Tokyo where we worked in the office for a month or so. Both Ray and I had taken our release from the Army in the orient and continued to work as civilians attached to the army but actually were working for the U.S.G.S. After working in Tokyo we returned to Washington, D.C. to write up the various phases of our work. I flew back through Guam, Midway and Oahu, with a side trip to the Big Island, Hawaii. I was fortunate to meet the geologists at the Volcano Observatory, Gordon MacDonald and Ruy Finch. Gordon, a young geophysicist, showed me around the Mauna Loa area and Ruy, who was ready for retirement told of the early days of the observatory at Kilauea and showed movies of some of the eruptions. He told of the time they were working on the solid plug in the bottom of the crater of Kilauea, collecting data on the quiescent stages of the volcano. The plug, while solid, was a thin mass of cooled lava that moved up and down with the liquid lava in the vent beneath. The scientists were taking gas samples from fumarole vents in the plug, when they felt the plug settle a little and a fresh flow of liquid lava covered much of the floor, including the area between them and the ladders they had used to get down to the crater floor. The surface of the flowing lava cooled rapidly in contact with the air to form a leathery skin that would support a man's weight though the lava beneath the skin was still liquid. They knew this and they escaped across the fresh lava, ruining their boot soles and leaving foot prints in the lava. They were filming the work they were doing in the crater and coolly continued to film the escape, getting a record on film of the whole operation.

Back in Washington, Ray and I continued working in the Military Geology Branch, getting our work in a form that would be usable for the Armed Forces. We shared an apartment in Chevy Chase and drove in to the Department of the Interior building where the Survey was located. We drove in a car that I had purchased. It was a real "wool wagon"; a gray Studebaker convertible with red leather seats. When we first drove to work, we went to work early, so we had little trouble getting a parking place on the street. Later, I rated a parking spot in a garage, which was much nicer. In the garage there was little chance of being vandalized. A lady chemist, who worked for the Survey, parked her car on the street near her place of employment, alongside a low embankment. When she got off work she climbed into her car, started it and put it in gear. The engine raced but the car went nowhere! She tried reverse; the engine raced and she went nowhere! She got out of the car to see if she could find the trouble. She found it. Somebody had jacked up her car, stolen the two wheels that were alongside the low embankment, and left her car on blocks.

One day in early spring, we came into the office and saw two new faces. The faces belonged to two young ladies who were going to work with the Survey for the summer. They had sponsors with connections to the Survey who had arranged summer jobs for the girls, who had other jobs during the school year. Jean lived on Long Island where she had gone to school and now had a job in the geology department. Fran, the other girl had graduated from Mount Holyoke and now was working for my old friend and boss, Joe Peoples, at Wesleyan University in Middletown, Connecticut. The girls were attractive and we invited them to a picnic on Skyline Drive in the Great Smoky Mountains. I asked Jean and Ray asked Fran. We made quite an impression on the girls when we drove up in that gray convertible. We had promised a nice lunch of our own cooking, but we surprised them with fried chicken, salad, rolls, wine and pecan pie. I remembered Ray's pie making on Okinawa and let him do the pie. I think our culinary efforts made an even bigger impression than the car. It was a beautiful spring day and we all had a great time in the mountains. By the end of the day I realized that I wasn't romantically interested in Jean, but that I was interested in Fran. That is how I met Frances McCormick, the girl I married. Now 58 years, five children and ten grandchildren later, we are still married.