

Dedication

We are grateful for this opportunity to continue sharing the joys and adventures of GSA members and friends. The GSA Foundation would like to recognize Donna Russell's vision for creating this series to capture stories to share with current and past colleagues, and the next generation of geoscientists.

Geoff Feiss President, GSA Foundation



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Choosing Geology

Shortly after commencing school at the age of five in 1932 in a one-room, one-teacher schoolhouse my mother was running, I began to hear about college. I don't recall this. Many years later my Aunt Esther claimed it was so. Myself, my younger brother, and my sister certainly were urged by the time we were in high school to attend and graduate from a university.

My mother had begun college at Missouri State College in Springfield, Missouri, at age 14. There she completed about three years. Then she married, and I was born.

Some 27 years later in 1950 my mother graduated from the University of Wyoming, completing a major in English with minors in Latin and History. From her transcript I see that she earned an A at Wyoming in Victorian Literature, 1832-1900, certainly a stellar achievement after some 22 years had elapsed since last being a student.

That I should go to and graduate from a university was a major goal of my mother and it became mine, starting that first year at my mother's school near West Bridger Creek, Hot Springs County, Wyoming.

My path to college encountered an early obstacle during the first grade. My teacher, whose name is not mentioned here, decided that I should not



be passed on to the second grade. Looking at my class record I see that there were signs in support of her position not to pass me on: a grade of D in application, a C in each of deportment, reading, and spelling. I missed 24 out of 180 days of first grade. I was tardy eight times.

Nevertheless my mother insisted that I be promoted to the second grade. She advanced on

the principal, eventually prevailing. In the second grade my application apparently improved and mostly I earned a C. My reading continued to limp along. I missed 14 days of school. From the second grade on I



continued in successive grades, never again encountering a teacher who believed that it was best for me to return the following year.

Spending long and wonderful days on my father's and later my Uncle Raymond's cattle ranches in Wyoming gave me a love for and an appreciation of the outdoor life. My brother, however, was always the superior horseman and I never thought that I would or could become a rancher. That was out of the question from my lack of aptitude for it and for economic reasons.

On the ranch when I was seven or eight, my grandmother took me for long walks. On them we were serenaded by chirping crickets at sundown along a tributary to West Bridger Creek. We shepherded the horses as they milled about for a drink. We picked up pebbles, mostly, fine-grained quartz and chunks of tuff. Grandma marveled at each discovery and she had something to say about every one.

\$3.50 a week on my first route and \$5.00 a week on my second one. I briefly became a cub reporter on the Northern Wyoming Daily News, writing several essays and reporting on the Big Horn Basin basketball tournament in Cody, Wyoming. One week I won enough money picking football winners in a newspaper contest to buy a 22-caliber rifle. I leaned to run a transit and alidade surveying sugar beet fields for Holly Sugar Company. One summer I worked for a geophysical company, lugging recording instruments through sagebrush badlands, searching for structures that might contain oil. Later on, I surveyed for the U. S. Soil Conservation Service.

My senior year in high school I met a life-changing teacher, R. L. Brown. He was a strange and remarkable man, with qualities I had not

encountered previously. A former mining engineer, he recently had worked at a mine in Alaska.

During that last high school year I took three courses from Mr. Brown: physics, biology, and general science, which was an introduction to geology. He was a superb teacher: animated, intelligent, and supportive of our attempts to be part of what was going on in his lectures and laboratory exercises. I was especially drawn to the geology course and to field trips

that we took to localities on both sides of the Big Horn River. Adjoining the river was the Willwood Formation, variegated claystone and sandstone of Eocene age with lenticular conglomerate. Alluvial deposits mantled the Willwood. Many years later at Princeton University I learned that F. B. Van Houten, one of two major professors on my thesis committee, had studied and described the Willwood and still remembered it fondly.



Just when I began to tell anyone about geology and to talk about it, I do not remember. I still have the copy of Outlines of Physical Geology, second edition, by Longwell, Knopf, and Flint that my folks gave me for Christmas in 1944. It contains pictures of concretions from Havre, Montana, an eruption at Kilauea, and photos of Lone Star Geyser and Old Faithful in Yellowstone, which we saw for the fist time when I was in grade school. I carried the book everywhere, once leaving it in the locker room at Shoshoni, Wyoming, when we played basketball there.

On a field trip with Mr. Brown, I found a concretion in alluvial rocks west of the Big Horn River that looked like a human skull. I sent it to Professor H. D. Thomas, state geologist for Wyoming. He sent me a kind letter telling me what he thought it was (a concretion) and why he believed it wasn't a skull. Years later when I became a student at Wyoming he gave it back to me and I still have it.

Mr. Brown let me use a spare room (really a closet) in high school and

to turn it into a mineralogy lab. With several bottles of acid, a Bunsen burner and other minor equipment, I began to identify a few minerals. That was a giant step for me. Soon thereafter, I started to collect rocks for what was to be a collection for the school. The reception to them was modest and a year later the principal had them thrown out. My brother refused to be a part of that.

In the fall of 1945, I was sent to Swarthmore College near Philadelphia by the U. S. Navy. Two years later I became a geology student at the University of Wyoming, earning the B. S. in 1950. At the end of the summer quarter, my mother graduated from Wyoming. We were the first graduates in our family.

- Dane Picard

How I Became a Geologist

When I was five years old, I sold quartz pebbles collected near my home in southern New Jersey. I would paint them bright colors, and sell them to the neighbors. Little ones cost a penny; big ones cost a nickel; two-tone rocks were a dime. I also loved maps. From about the age of eight, I was the official navigator on family vacations. Fortunately, my parents did not object to my planning routes that passed near quarries and mine dumps. My father bought me my

first rock hammer when I was twelve. By
then, he was probably tired of my ruining his
claw hammers. I did not know that maps
had anything to do with rocks until I took
a geology course at the Colorado School of
Mines between my junior and senior years of
high school, courtesy of the National Science
Foundation.

- Robert S. Kamilli

An Early Assignment

An early assignment when I began working for the North Dakota Geological Survey in 1962 was to examine the fresh excavations for the ICBM sites then being installed in the eastern part of the state, a legacy of the cold war, now removed. I traveled to all 150 missile sites, as they were constructed, and to another 15 launch-control sites, to examine the freshly exposed geology at each excavation.

I gained a remarkable insight into the glacial stratigraphy of eastern North Dakota by visiting those 165 excavations. I saw buried layers of glacial lake sediment–beds of silt and sand, standing on end, contorted and twisted into the positions they had been shoved by glaciers 13,000 years earlier; boulder pavements embedded in old, buried soil zones; blocks of shale that had been broken and mutilated by the ice; and an array of other geologic phenomena, all freshly excavated and ready for my



inspection. From my perspective as a geologist, the installation of the missile sites was North Dakota's most important role in the Cold War.

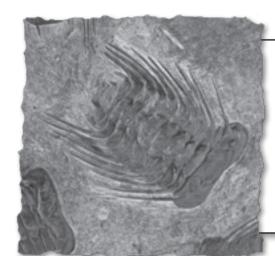
I also experienced one of the absurdities of the Cold War mentality that pervaded our society in the 1960s. No one was authorized to tell me where the sites were. That information was classified, and I had no map showing their locations. So, every Monday, I'd stop at the Air Force Base and check in with the Corps of Engineers construction

office. The Corps geologist would tell me the approximate locations of the sites being excavated that week. He couldn't tell me the exact locations so he'd say "one a few miles south of Langdon, one near Hoople, etc." I'd then drive to the general area and, with a little hunting and some local enquiry, eventually arrive at the site, explain my purpose to whoever was there and

spend a few hours examining and photographing the excavations: fresh, vertical walls, 30 feet high in the missile excavations, 50 or 55 feet high in the control sites. Since each excavation had four walls, I was able to see the geology, stunningly presented, in three dimensions. When I was finished with a site, I plotted its exact location on my map. So much for security regulations. It occurred to me that the Soviet Embassy certainly had maps showing the locations of all the missile sites, but I wasn't bold enough to ask for one.

One day, while visiting with a construction superintendent (not a government employee), I mentioned my minor frustration at having to drive around hunting for each site. He was amazed! He said that maps showing the locations of all the sites were posted in every service station. After all, the construction workers had to know where to report for work each day. He couldn't give me a map (against security regulations), but he did happen to lose one at my feet while we were visiting. I felt foolish, but relieved at saving several hundred miles of driving for the remainder of the job.

- John Bluemle



An early geology memory I have is collecting Devonian fossils with my brother when I was 13 years old. We were written up in the local newspaper and our collection was displayed in the Wyckoff, N.J. Library. WOW!!!
- Arthur P. Schultz.

 $8 \oplus \text{GeoTales V}$ GeoTales V $\oplus 9$

A Hollis Hedberg – Harry Hess Story

In April 1986, I was sitting in a small restaurant in Monteria, Colombia, having breakfast with Hollis Hedberg. I had met Hollis for the first time the day before but, of course, I was very familiar with his body of work. We were in Colombia as consultants to Chevron which was beginning an extensive exploration campaign in northwest Colombia.

Hollis had been invited because of his knowledge of petroleum source rocks found in northern South America, a question remaining to be answered for northwest Colombia. I was there because I had mapped the same area Chevron was beginning to study while working for Mobil Oil in the 50s.

Our first breakfast together was interesting. Hollis told me whenever he was working in South America he always ordered the same breakfast. First bistec a caballo – that's one egg sunny side up served on top of a small steak. At the end of the meal he always ordered papaya con dos semillas – a slice of papaya served with two, tiny, black seeds. He said starting his day with this meal was why he had such a long productive life and he was still very spry at 83 climbing up and down the outcrops. For the next week I



joined Hollis in that morning ritual and now, whenever possible, I finish breakfast by eating a slice of papaya con dos semillas. I'm not sure it has made much of a difference but I can use all the help I can get. Those of you who work or travel in the tropics may want to keep that breakfast in mind. Our conversation turned to discuss a mutual friend, Harry Hess, who once had been Hollis' neighbor at

Princeton. During the Apollo Program, Harry was the chairman of the National Academy of Sciences' Space Science Board that provided advice and recommendations to NASA. I told Hollis the story of the last time I was with Harry.

After Apollo-11's successful mission Harry convened a meeting of the Board on August 25, 1969, at Woods Hole. Perhaps some who read this



story attended meetings at the lovely house on the hill with wide porches on all sides and a view of the harbor. It was a favorite Academy summer meeting place.

Harry was concerned that congress and the public were already tired of supporting Apollo missions. NASA's budgets had steadily declined after FY 1965, four years before the Apollo-11 flight. Harry wanted to take advantage of the Apollo-11 success and all the publicity to be sure the scientific community would not join the congressional chorus already trying to terminate Apollo and would actively support further lunar exploration.

Harry invited me to attend to describe the experiments and exploration program that we planned for the remaining Apollo missions. Each of the six scheduled flights would be scientifically more ambitious than the last. For the final three, you may remember, there was a small two-man vehicle in the payload that would greatly improve the astronauts ability to study their landing sites. Over 50 experiments had been built or were in the process of being built specifically designed to take advantage of the Moon's unique environment and conditions where they would be deployed. More than 400 scientists had been selected to study the data and analyze the returned samples.

At the coffee-break the first morning, Harry said he wasn't feeling well and went to lay down. He complained of chest pains so we immediately drove him to a nearby doctor's office where he died. The Board chairmanship was passed to Bill Rubey who had been appointed in 1968 as the Director of the newly established Lunar Science Institute funded by my office. All the attendees agreed to continue the meeting and soon after the Academy issued a report strongly supporting the remaining missions.

- Donald Beattie

A Chair from the Dump

In 1966 with a master's degree in hand, I begin working for Phelps Dodge Corporation, which is referred to as "PD." PD's Western Office is located at the edge of Douglas, Arizona, where the firm's facilities consist of a copper smelter and office buildings next to the smelter's slag dumps. The offices are a 19th Century brick building with some adjoining sheds and a carriage house from the days of horse drawn wagons. The building's second floor is PD's geologic department. The offices occupy large highceiling rooms with well-worn floors and plaster walls, colored a yellowish patina from decades of dense cigar and cigarette smoke, which forms a dense gray haze throughout the office. The office décor is an eclectic mix of very old abused furniture.

The PD office "complex" is surrounded, on all sides, by some rather unpleasant neighbors. These include the smelter and slag pile, the town's municipal dump, the town's open sewage ponds, and a junkyard. Depending upon wind direction, you breathe either choking-sulfurladen smelter smoke, raw sewage, or the rotten smell of the dump. On a good day, an east wind brings the pleasant smell of oil and old discarded machinery.

On my first day, the chief geologist decides my office is in the library with Dr. Robert Stewart, an older geologist and another new employee. The library is an octagonal-shaped room with a ten-foot ceiling and walls lined with empty bookshelves, except for the exterior wall that has a window. Large sections of plaster have fallen off this exterior wall, leaving patches of red bricks. Mortar has fallen from between some bricks; thus both outside air and occasionally water enters the room. The library contains PD's entire technical library, consisting of four old mining books. The newest book was written in 1907, which I recall because that is the year my father was born. These four books soon become part of a daily office ritual. The chief geologist enters the library every morning at 7:30 AM. He does not speak to us, but takes one of the four books off the shelf and opens it. The chosen book always opens to the exact page he pretends to read for about 30 seconds. He then closes the book, puts it back on the shelf, and leaves the library. Bob then says, "We can start work now, we have been clocked in."

On that first day, I wore a suit and tie, not knowing that field clothes are standard office attire. The chief geologist escorts me to my new office in the library. There I observe the library's furniture consists of two gray metal war-surplus desks, and one chair. I ask, "Where is my chair?" "Go down to the carriage house and you will find an old man named Julio. Tell Julio you need a chair." I find Julio sitting at an old wooden desk, in the carriage house's dirty musty horse barn. After introducing myself, I ask, "Julio, I was told to see you about getting a chair for my desk." "I don't have any chairs, we will have to walk around and see if we can find one." Together, Julio and I search all the buildings for nearly an hour, but no spare chair can be found. Finally Julio says, "I do not know what to do. Yesterday, I take some trash to the dump and I see an old chair over there. Maybe you should walk over to the dump and look for that chair." So there I am, a recent college graduate on the first day at work; walking down a dirt road to the town's dump, to find an office chair (you can't make stuff like this up, you had to live it). Douglas has the typical municipal dump of the pre-environmental

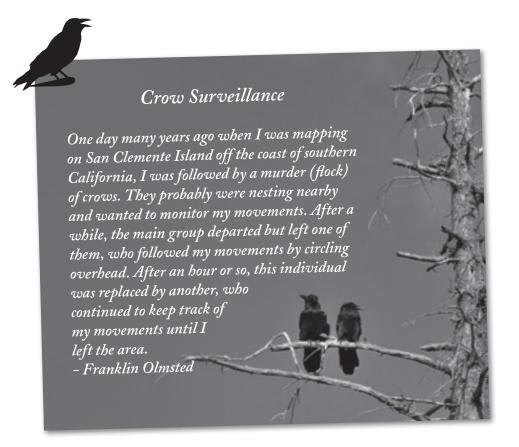
movement era. Decades of garbage, refuse, and toxic substances are piled into a high mound over a vast open area. Nothing is buried or covered with dirt; everything is just thrown there year after year. Over the decades, a dump ecosystem evolves. A large population of flies, maggots, cockroaches, seagulls, mice, rats, and other vermin call the dump home. In my dusty suit and once shiny new shoes, I gingerly climb over piles of trash and slimy, stinking, vermincovered garbage. Eventually, I see "The Chair". It was once someone's kitchen chair, a very

old tall straight-backed wooden chair. The chair originally had a cane bottom, but that was replaced by a piece of nailed-on plywood. At one point, some tension wire was added to hold the legs quasi-rigid. The chair's last coat of paint was "battleship gray"; so its style and color will match PD's elegant office décor. I pick up an old rag to wipe slime, grime, and vermin off the chair, before carrying it back to the office. For my entire employment at PD, that chair from the dump, with its subtle pungent odor, will be "my" office chair. When I left PD, the chair, which was technically my property, is left behind. I knew PD never threw anything away and would give it a good home with decades more use. It would not surprise me

in the least to enter a PD office today and still see that chair in use by PD's

- Eugene V. Ciancanelli

newest geologist.



An "Electrifying Experience"

During the late summer of 1949, "Doc" (Raymond C. Gutschick) decided we needed a little break from his studies of the Miss. Redwall Fm. in the Western Grand Canyon (see Geo Tales 4 for a just-prior experience). Doc had learned of a site near Crystal Pass in the Goodsprings Mountains

of Southeastern Nevada which was reputed to be an excellent source of large, well-formed Orthoclase crystals—many being Carlsbad Twins and the like. Thus, we traveled from our foray in the Peach Springs, AZ, area over into the mountains, guessing our way to the alleged site.

Ultimately, we: Doc, Vince Anthony and I, coaxed the old Ford wagon Overland up into a shallow saddle between two little peaks. We soon found the ground littered with good crystals—often good twins. We were so busy on our hands and knees that we neglected to notice a small, very black cloud sneak over our heads! Shortly, a very loud flash/bang put us flat on our faces! I raised up to see Vince rolling around, yowling and clutching his head—crying, "I'm hit! I'm hit!"Doc seemed OK. At about



the same moment we realized that a nearby stunted Joshua Tree was smoking and appeared about to blossom into flames.

When we had more or less gathered our wits, we decided that the lightening bolt had induced a current in the leather-covered metal headband in Vince's "Frank Buck"-style hat, and wherever the brass rivets touched his head, he got shocked. We quickly decided we were pretty lucky and might as well get out of there.

At that point we examined the smoldering Joshua Tree and the small "crater" next to it. Vince proclaimed, "The Lord has given us a sign! It's time to leave!"—and we did.

- Ray T. Throckmorton

A Blizzard to Remember

After I left Chile, South America, and my adventures with Franchesca and the High Andes (GeoTales IV), I accepted a job with the Arctic Institute of North America (AINA). AINA, acting for the United States National Science Foundation (NSF) was assembling a team of geoscientists for field explorations in Antarctica. Following survival training in the States, my team and I were flown via MATS to Hawaii, Canton Island, and New Zealand. From New Zealand we were transferred to the U.S.S. Arneb troop transport ship, then headed through the ice fields of the Southern Ocean, to Antarctica. We "beached" on the sea ice of McMurdo Sound and were

taken by amphibious Weasel to the United States Naval Air Facility (NAF) McMurdo, then by Sno-Cat to New Zealand's Scott Base on the lower slopes of the active volcano, Mt. Erebus. Rising stately into the cold blue sky, the massive mountain scowled down upon us, and the tiny Kiwi base. Young and still foolish - I resolved I'd climb that mountain. It was a chance to show my mettle. Two weeks after my arrival, one cold and sunny day, I headed - solo - up the ice cold slopes. Strong



and energetic during the first hour of my climb, I grew confident. I would be the master, not the mountain! I trekked the snowfields, sometimes deep, sometimes sealed in crusty firn. They were at first, smooth sailing, revealing little of the risks of inattention. They concealed, you see, crevasses! And then it happened! Upended, and without my cramp-ons, I was brought rudely to my senses. I stepped through a snowbridge that hid a deep crevasse. A brief fall of seven feet was sufficient to make clear my folly. First, I should not have gone alone. Second, I should have heeded

the Kiwi's warnings. Now wedged between blue ice and a stone hard place, I was stuck. I took a deep breath, and surveyed my surroundings. Not

much to see but ice, I decided to squirm a little. A squirm here and a wiggle there, and I inched my way upward. Skylight shown again, as I clamored to the surface. No surprise, a twisted back, an irritated muscle, I stumbled down to the base. Mt. Erebus, it seemed, had won. A quick check at NAF, and the Navy doctor ordered me to bed. Sick bay, he said, was called for - and traction! I couldn't believe it. Unsure of my injuries, he decided to send me back to New Zealand as soon as possible. The six-months of winter darkness were descending. Only one ship was left to make the journey, the icebreaker Eastwind. The



last icebreaker of the season, it would depart in two weeks. That meant of course two weeks of bed and traction. My adventurous folly was about to take its toll.

The day came, Eastwind was about to depart. Winter's night had set in. It was quiet, frigid cold, and dark. Unbelievably dark! The doctor ordered one of those wire contoured body-fitting stretchers - you know the ones built to prevent your escape - and put me in it. Straps over my shoulders, straps around my chest, straps over my legs, and I was packaged for evacuation. A tracked Weasel rode me down to the water's edge. There appeared an LCM (Landing Craft - Man), its front door open, waiting for me. Up the ramp I was scurried, the ramp door closed, the LCM (open to the sky) headed toward the waiting ship. A pitch black night hung overhead. A lacy snow began to fall as stars blinked distantly among the flakes. The icebreaker came into view above the edges of the LCM. Alongside the ship, the LCM bumped as the swells rolled in. The challenge now was how to get me up onto the ship. The icebreaker's crew peered



from the rail, down into the waiting LCM, where there I lay immovable, strapped and secure in my comfy and unpleasant circumstance. I heard a squeak. Then saw a hook. The crew was lowering a hook and cable from an overhanging boom, tethered to a winch on Eastwind's deck. I was to be hooked and hoisted into the Antarctic night. The snow intensified. The hook came down. The LCM crew attached it to my stretcher. Amid rusty squeaks the cable tightened. Slowly, up I went, swinging in the growing snowfall of the polar night. The wind increased, the snow, now more like flakes of ice, blew sideways as the winch squeaked on. It cranked, wretched and ground complainingly. Then came a metallic thud. The winch had stopped! And bumped. "The winch is stuck," I heard a crewman say. "Can't get it going." "It's just too old." Then from below, "but what about Jack?" "He's swinging in the wind." The Eastwind's crewmen scrambled. The winch was stuck, it hadn't been greased for a decade. The snow now blew into a blizzard. My wire cage swung like a pendulum. It swung to and fro as the blizzard blustered now more wildly. Hanging on precariously and obediently, I strained my head to see down to the sea. Snowflakes multiplied, the storm enlarged itself, my cable stretched and

slanted farther from the ship, away from the outstretched arms of the urgent crew.

A half hour passed as I sought for some way, should I need it, to be free. No luck, the medics had done their job, secured me to my wire bed immovably. I could hardly breathe. Then the LCM crew spoke: "The wind's comin' up, the blizzard's blowin' harder. Can't stay here much longer." There went a shiver up my spine. I was lost, I could no longer see the Eastwind in the snowy gale, the ship shrouded now in waves of white, nature insisting on its supremacy. The LCM's engine stepped up a notch, it grew louder from below. "We gotta head back to the beach - or we're in trouble." The swells in McMurdo Sound grew higher, and intensified, the LCM now bobbing on the growing waves. "We gotta go." They did. The LCM's engine roared, and it headed for the beach - Jack swinging in the gale, above the cold dark sea. The winch was stuck. My life now ended, I peered pleadingly to the sky for "just one more chance, I'm sorry for my folly." The wind abated, just a smidgen. A window in the white appeared, the Eastwind's crew, heads bobbing, straining, peering at me from the deck. Spotting me again, they swung into action. Swarming 'round the winch, sledge hammers, crowbars, tools and pounding all were brought to bear. The winch screeched in pain - and then - began to roll. They got it working! Jerkily, I went up, the rusty winch all the time complaining. I was caught by some kind of prehensile hook, and swung and hoisted to the deck as the LCM beached back on land. The Eastwind's soldiers of the sea had saved me. I remembered my wartime buddies of the past. Good men, our military. I breathed a sigh as, within minutes, they placed me gently in my sick bay bunk. The Eastwind headed into the Southern Ocean as I slept the night away. I'll never forget swinging in a polar night, snow drifting to my brow, some settling on the sea, a sea waiting - I prayed - not for me. I returned to Antarctica in the Austral spring to join my team for a four month journey inland, to explore the deep unknown. The Victoria Land Traverse (GeoTales V, page 81), though daily challenged by the unexplored interior, became a scientific success, one of the Antarctic's epic explorations.

- John G. (Jack) Weihaupt

18 ⊕ GeoTales V ⊕ 19

A University of Texas (Austin) Field Story

I had several favorite professors at U.T. Austin—Steve Clabaugh, Ed Jonas, Ronald K. DeFord, etc. but my favorite story concerns "Rocky" DeFord.

Summer 1957, Northern Rim Rock country, Sierra Vieja, Trans-Pecos, Texas:

My field partner, Dan Bridges, and I lost our jeep (Dan's jeep, actually) in a flash flood in the Arroyo Dieciocho near our adobe hut at the 96 Camp. Blue skies, no clouds, HOT... you know. When we got to the arroyo, there was some fast-moving, but very shallow water coming down from the hills to the west. We sat there trying to decide whether to try crossing. As it was Dan's jeep, his decision, to go ahead, carried.

We got a few feet and the motor died. The water was really rising really fast, and the jeep began to move downstream. Panic! I jumped back to the side of the arroyo with my shotgun, and our aerial photographs. We hooked a long chain to the jeep bumper and around a large cat claw bush on the side of the arroyo.

Very quickly, the jeep turned over, swept downstream, and was covered up to about a foot of its top by sand and gravel. There was still no rain where we were. For those who have been in this region, this is close to nowhere. However, inexplicably, not long afterward, several vehicles approached! Professor Bill Muehlberger and the Marathon Summer Field camp crew! All in pressed khaki pants,



cameras ready, having a really good time (the bastards).

The crew helped us dig out and turn the jeep up right (thanks, guys), with the help of Jose Valdez, the Foreman of the 96 Ranch, and his horse. (It was weeks before a mechanic in tiny Valentine got all the sand out of the motor and other parts of the vehicle.)

The Marathon crew left. Not too long later, along came Ronald K. DeFord, in his jeep by himself. Not knowing what had happened, and seeing the devastation, his first words were "Are the aerial photographs OK?"

Years later, at some Geology meeting, we hit him up about his comment. "We could have been killed, you know, and you just asked about the photographs!" He said, "Of course I was worried, but I could see you were both alive, so I got on to the more relevant question."

Although he almost flunked me out a couple of times, I loved RKD. Addendum: As many of you know, Dan Bridges lost his life October 2009, while mapping in Chihuahua, Mexico. We miss him.

- Julius Dasch

Squatter's Rights

Back in the late 60s I was checking some property locations for the Bureau of Land Management and trying to find a section corner in the brushy footbills a few miles east of San Diego, California. I had zeroed in on the probable location of the corner in a large and very dense clump of brush several feet tall and was working my way into it to find and verify the corner when I heard an ominous rattle... a rattlesnake, and from the sound, obviously large and very disturbed ... and not about to vacate the site. After circling and carefully inspecting the

area from all angles and being unable to locate the 'homesteader', I decided to rely on topography and local landmarks to verify the location. After all, the rattler had "squatter's rights".

- Tom foomis

Follow that Canoe

Tall but soft-spoken, almost taciturn, Cliff Stockwell (1897-1987) was the most distinguished Precambrian geologist in Canada for much of the 20th century. His maps were accurate and insightful, and he worked from the Cordillera to the Appalachians and in every tectonic province of the Canadian Shield, at a time when air travel was a rarity. Raised on the Prairies (Estevan, Saskatchewan), he made his name first in mineralogy but spent most of his career at the Geological Survey of Canada in Ottawa. A contemporary of his once told me that arguing geology with Stockwell was like fighting a balloon: apply pressure and it deforms; release the pressure and it returns to its original shape.

Stockwell mapped the east arm of Great Slave Lake, Northwest Territories, in the summers of 1929-31. The main part of the lake is shallow and rests on flat-lying Devonian carbonates; the east arm forms a chain of fjord-like channels and bays extending 160 miles/250 km into the



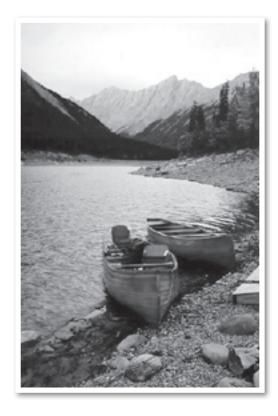
Great Slave Lake

interior of the Precambrian Shield. The east arm exists because the Laurentide Ice Sheet drained preferentially down the axis of a great canoe-shaped synclinorium composed of soft, nearly unmetamorphosed, Paleoproterozoic sedimentary rocks. Christie Bay, the largest in the east arm, has the third deepest

column of freshwater in the world, after Baikal and Victoria. A recent study of bottom sediments indicates that it was a lake beneath the ice-sheet in late glacial times. Unlike the main lake, which is turbid from Slave River inflow, the waters of the east arm are clear and cold. The main entrance channels are cleared of winter ice in mid-June, but pack-ice clogs the narrow outflow from McLeod Bay well into July.

In 1929, Stockwell used two 'freighter' canoes in mapping the east arm with three student assistants. At the start of the season, they paddled

northward, heavily-laden, from the railhead at Waterways, Alberta, down the Athabasca River into the lake of the same name. From there they continued north down the Slave River into Great Slave Lake, a combined distance of 370 miles/600 km. They arrived, hardened for a summer on the big lake, just as the ice cleared the main channels into the east arm. Two and half months later, with the weather turning, Stockwell sent two students and one canoe. carrying most of the gear and rock samples, back upstream to Waterways. With the remaining canoe, he and the third student



began mapping the thousands of low-lying islands and whale-back rocks that choke the entrance to the east arm. A canoe must be lightly-laden for this work in order to ride the swells generated in the 50-60 miles/80-100 km of open water to the west and northwest.

In early September, Stockwell and his companion lingered longer than anticipated on one of these islands. I think I know the one: a rare perfect exposure of the great unconformity between the Archean basement and the sedimentary succession occurs on the west side of a potato-shaped islet, about 1.5 miles/2.5 km from where they would have beached their canoe in its lee. They spent over an hour at the unconformity, unconcerned or unaware that the wind had freshened and changed direction. When they at last returned to their canoe it was gone—along with their tent, rain gear, sleeping bags, dry goods, fishing tackle and rifle. The nearest settlement was 25 miles/40 km to the south, 25 miles of mostly open water. Caribou cross the lake after freeze-up, but by then it would be late

November and the temperature would reach forty below. By the time they were seriously overdue in Fort McMurray, air search and rescue would be thwarted by short daylight hours. If they were to be rescued, they would have to rescue themselves.

Few of the trees that grow on the island are taller than a boy, but the shoreline is dotted with driftwood up to a foot/30 cm in diameter, which originates on the heavily-forested west side of the lake. Their canoe was completely out of sight, but Stockwell immediately told his friend to take off his belt and shirt. With two belts and a pair of shirts, they tied three logs of driftwood together to make a raft and pushed off into the 45°F/7°C water. All evening and well into the night they floated, increasingly cold and hungry. Sometime in the darkness they grounded. Stumbling painfully ashore, they lay down together for warmth and tried to sleep.

At dawn, they found they had landed on a gravel beach on another island, smaller than the one they had left. Their log raft was still there, and at the other end of the same beach was their canoe.

After the shouts and laughter died down, and the tears were dry, they wordlessly imagined what might have been, had Stockwell not insisted they take to the water immediately, before the wind changed direction again.

In 1932, Cliff Stockwell led his most audacious expedition. Paddling northward from Yellowknife on Great Slave Lake and mapping the geology as he went, he reached the headwaters of the Coppermine River, which flows into the Arctic Ocean. Circling well to the east, he crossed the major 'greenstone' belts of the central Slave craton (known since 1991 to be dotted with diamond-bearing kimberlites), before returning to Great Slave Lake via McLeod Bay. The circuit was 1000 miles/1600 km in length, on top of the 740 miles/1200 km round-trip from Waterways. This reconnaissance led to the recognition of the Archean Slave craton, and the Paleoproterozoic orogenic belt to the west, which Stockwell named the Wopmay subprovince, after the legendary Canadian bush pilot, W.O.P. 'Wop' May.

- Paul F. Hoffman

Why I Decided to Learn Spanish

When I was doing the early fieldwork in Peru for my dissertation, I did not know much Spanish. One day the mine foreman said to me (approximately) "Vamos a explosionar temprano hoy día, así que asegúrese de salir de la mina antes del mediodía." ("We are going to blast early today, so be sure to

leave the mine by noon.") I just smiled and said something like "Buenos días" and went on my way. I was alone in a stope when I felt the blast through the rock, then the

sound of the dynamite exploding, then the air blast. Big rocks started falling around me out of the back of the stope. I was OK, but decided

that maybe I had better leave. It was about a 200 meter ladder climb and then a 500 meter walk to leave the mine. When I exited the mine, the mine managers were waiting for me. They were both very mad and very relieved to see me. That was the day I decided to learn Spanish. I took many crazy chances in this little mine, which would never have passed an MSHA inspection, but I was young and immortal back then.

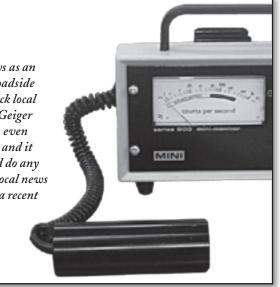
- Robert J. Kamilli

German

Nuclear Fallout

It was in early 1953 early in my days as an AEC geologist. I had stopped at a roadside outcrop near Las Vegas, NM, to check local background radioactivity with my Geiger counter. The needle quickly pegged, even on the top scale!! Obviously broken and it would have to be fixed before I could do any fieldwork...then I recalled hearing local news reports of radioactive releases from a recent nuclear test and the light dawned.

- Tom foomis



Ewing, Sloss and the Sigsbee Knolls

Two giants of earth science were Maurice Ewing, once a president of the Seismological Society of America, and Larry Sloss, once a president of the Geological Society of America. Happily, I knew them both. At Northwestern University in 1949-51, I had taken two courses taught by Sloss, and in 1951, I began a geophysics program at Columbia under Ewing and his associates.

In 1959 or so, my Columbia PhD nearly finished, I attended a geology lecture one day at Northwestern. Sloss sat down beside me to talk about Glomar Challenger, the first vessel ever outfitted for rotary drilling in deep water, due shortly to sail from Beaumont on its first cruise. Ewing would be chief scientist. His first declared objective was to verify his notion that the Sigsbee Knolls, a cluster of gentle hills on the Sigsbee abyssal plain,



were actually the surface expression of salt domes. At the time, these features were just bumps on a patch of otherwise very flat, very deep, ocean bottom, seen for the first time only a few years earlier via the echo sounder on a Vema cruise in the Gulf of Mexico.

Always outgoing, Larry's first question was approximately: "Doesn't

Ewing know that there's no salt in deep water?" Indeed, sedimentary salt was known then only from continental platforms and shallow shelves. But Larry's encyclopedic knowledge of continental stratigraphy went blank in deep water, while Ewing, trained only as a physicist, took sonograms as solid physical evidence. My reply was approximately, "I am sure Ewing is serious, and we'll find out shortly if he's right." I said that of Ewing on more than one occasion. Bruce Heezen and I both believed Ewing was correct on this one.

After drilling a test hole in shallow water, the second Glomar

Challenger core was drilled a short distance into one of the Sigsbee Knolls in 12,000 feet of water. Up came a mud core smelling of gas and tasting of salt. The drill had not penetrated massive salt, but samples sent to an oil company geochemistry lab were said to be of the stuff typically found around shallow salt domes. Today, huge salt deposits are known in deep water in many parts of the world.

I think this incident over 50 years ago was typical of the long, sometimes divisive, struggle to extend geologic knowledge from the carefully studied continents into the unknown ocean depths. Geology began as a science of land only. The certainty that there is also a lot of geology in deep water depended on learning a lot about it - involving a lot of physical science, technology and heavy equipment, as well as geologic experience. Science then was not so interdisciplinary; professional tensions often arose between those trained in different compartments of knowledge. The seemingly outrageous notions expressed by experts in unfamiliar fields could make the process trying at times.

- Jim Dorman



Lake Lucerne

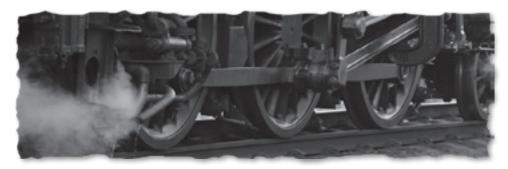
GSA Memories

Going by boat on Lake Lucerne (Switzerland) with explanation from Prof. Trumpy on Alpine nappes. - Peter Neumann Mahlkau

In the Late 1950s

In the late 1950s I was employed by the Missouri Geological Survey and assigned to do a geologic mapping project in west central Missouri. I stayed at a small motel at Clinton, Missouri, run by an elderly man and wife team. The room was comfortable except for the pillow, therefore I brought my pillow from home. Late one afternoon as I was checking in and carrying my suitcase and pillow, the old couple were sitting on the front porch and were somewhat puzzled about my pillow. "What do you do?" she inquired. Being tired from a long drive and not wanting to get into a lengthy discussion, I answered "I am a mapper." She turned to the old man and said "Isn't that nice he is a napper."

Also, we geologists sometimes stayed at an old hotel at Clinton, Missouri, that was 6 feet from a railroad track. At night we could hear the whistle from an oncoming train. The sound became louder and louder until it seemed that we were in the middle of the track. At last, the train would go swooshing by and the old hotel would rattle and shake. Several trains passed every night. One morning a salesman bleary eyed from lack of sleep approached the front desk and inquired, "What time does this hotel get to St. Louis?"



Also, in the 1950s, television sets were a rarity in most homes but they were becoming popular in hotel lobbies and salons. The local gentry would gather around the television set in the lobby of the hotel where I was staying. One morning I had time to spare and decided to watch some TV. I spied and empty chair in a prime spot in front of the set. When I was about to sit down one of the locals said, "I wouldn't sit there. Burt sits there and he has weak kidneys."

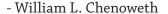
- Richard J. Gentile

Public Relations

In 1954, I was a geologist on a U.S. Atomic Energy Commission uranium exploration drilling project in northeastern Arizona on the Navajo Indian Reservation. The drilling camp consisted of 10 trailers, 2 office buildings, a shower house and an outhouse. We worked 11 days straight and got 3 days off. Every other Thursday afternoon we would lock up the trailers, buildings and the nozzle of the bulk gasoline tank and head for town.

Returning one Sunday evening we discovered a large, rusty TEXACO sign next to the gasoline tank. The next day the project engineer measured

the amount the amount of gas in the tank using a calibrated rod lowered into the tank. He discovered at least 20 gallons missing. Apparently our Navajo neighbors had put the sign there for the gas and using a long piece of hose had siphoned gas using the measuring hole on the top of the tank. The camp decided to write off the missing gas as "public relations".







Working in the southern California Coast Ranges, Clarence Hall and I had lunch under an oak tree with Ben Page and Tom Dibblee. Brash young (at the time) Ernst, I asked Tom if it was true he travels light in the Mojave Desert and ate cabbages that fell off produce trucks. He replied "Of course – would only go to waste otherwise."

- W. Gary Ernst



Lunacy – Discarding a Piece of the Moon

Early in my career, I happened to be in the right place at a unique time in history. Michael Duke, my supervisor at the U.S. Geological Survey, was one of the principal investigators on the Apollo 11 returned lunar samples. NASA provided us with a sample of the lunar regolith that literally would pass through the eye of a needle. In this case size didn't matter; we had a piece of the moon!

I was assigned to work on the ubiquitous micrometer-sized glass beads that occurred in spheres, oblates, and dumbbell shapes in a blaze of different colors. We were cognizant of the enormous value of this historic sample and we were determined not to lose a single grain. We put a huge glass vat in a fume hood in our clean lab and placed in it everything that came in contact with our lunar sample from glassine weighing paper to glass microscope slides, beakers and Petri dishes, tweezers and tungsten probes, etc. on the chance that a stray lunar grain may be adhering to it. Everything was doused in Freon (this was the dark ages of environmental ignorance) which would eventually be filtered, thus recovering every fugitive particle.

The vat was soon full of various and sundry laboratory items when I calculated that our minuscule sample contained at least two billion glass beads. As the beads constituted no more than about ten percent of the total particles, our little piece of the moon

harbored more than 20 billion grains! I showed my calculations to Mike who checked and double checked them and then promptly ordered the vat to be emptied; the effort to salvage a few dozen microscopic lunar particles being excessive. And so, without a second thought, we watched a part of the moon – a small part indeed – go down the drain.

- Robert B. Finkelman

The Re-attached Thumb and Forefinger

In 1977, I was up on the rig floor while we were tripping the bit. I witnessed an accident where a roughneck cut-off his thumb and forefinger while stabbing the pipe. Blood squirted about 10 feet into the air and they wrapped a dirty, oily rag around his hand. He was in great pain and losing blood, so they rushed him to a nearby hospital in Weatherford, Texas. Times had changed and several of the crew went with him to the hospital, so they shut down the drilling operations.



In about 30 minutes, I received a call stating they had left his thumb and forefinger in his glove at the rig. I was the only person in the dog house, so they asked if I could find them. A pile of dirty gloves were present in a corner near the accident. I had to feel each glove carefully until I found the solid one with the thumb and forefinger. I called the hospital and they rushed out with a container to obtain the thumb and forefinger, which were still inside the glove. I wrapped the glove in an oily rag and rushed out to give it to the hospital employee. He hurried back to the hospital and they operated on the roughneck's hand. The doctors reattached the thumb and forefinger successfully, and today he has complete usage of his hand.

- Billy Caldwell

Professor Baylor Brooks

Professor Baylor Brooks was a one-of-a-kind educator, mentor to many, and effective campus politician. Known affectionately as "Skip" he was always there for his students, and the number he recruited/guided into geology is all but legend. Skip was more interested in touching the future than grinding out research papers.

His principal claim to research fame was co-published in 1954 with Dr. Ellis Roberts, for the Annual Geological Society of America Meeting in Los Angeles, California. This student research project, published as Map



Professor Baylor Brooks

Sheet 23 in California Division of Mines Bulletin 170, was a compilation of mapping by field geology classes in the Jacumba 15' topographic quadrangle, eastern San Diego County, California. It embodied his passion for taking students into the field where the rocks are -- and then "hooking" them on geology. The snare was not subtle -- it included weekend camping trips to the nearby Peninsular Ranges and Colorado Desert, exploring abandoned gold mines, learning the dos and don'ts of

mapping, sampling, and proper note taking. The hook was easily set when, after a day of "playing geologist" in the field, we would settle into camp for a garlic bread and spaghetti with meatballs dinner, washed down with a couple of brew-skis! All this and more was topped off with geo-educational stories and a smattering of ghost tales around a crackling campfire.

Skip's career at San Diego State University started in 1931, and charged full steam ahead until his retirement in 1966. Under his leadership the department grew from a one-person program offering physical and historical geology, to a department with a dozen faculty. The Bachelors

and Masters of Science program attracted annual visits by recruiters from several major oil companies. Skip's goal was to offer a solid basic geological curriculum that included classroom instruction, field experience, and laboratory work -- culminating in a Senior Thesis Project of original work that would add at least one new piece of information that would benefit science.

In the classroom, Skip dressed for and played the role of a classic British educator -- á la his post-graduate experiences at Oxford University, England. His classic dapper wardrobe included a 3-piece brown tweed suit, white shirt and tie, short hair, manicured mustache, horned-rim glasses, and an ever-present pipe. As beginning geology students, we were kept on our toes with pop quizzes -- known to all as the infamous "walkietalkies." While strolling around the classroom, he would ask about a dozen seemingly random questions. Because the pace was rapid, the challenge was to remember the question and record the answer before he could move on to the next.

Skip passed away in 2000 at age 94. A teacher's teacher, he will long be remembered by untold numbers of students he helped train and send into the world -- to work for a living, to do the research, and/or to continue touching the future by educating the next generation.

Thank you Skip. I owe my fun-filled and rewarding 40+ years career as a consulting engineering geologist and part-time instructor, to a chance conversation we had in your office one warm spring day in 1960.

- William J. Elliott



GSA Memories

The Grizzly Bear and our cooling pot of overcooked macaroni!

- Aureal T. Cross

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GeoTales V
GeoTales V

Dinosaur Tracks

One fine day in 1956 I was riding a mule down the Quebrada (Canyon) Chacarilla in Northern Chile. I was very tired, hungry, and thirsty. We had been on what was supposed to be a one day trip up the quebrada to get a first idea of the structure and strata of the area that we would be mapping. We had been so interested in making notes of rock types, dips, and strikes etc. that it became too late to make it back to camp before dark and we had no desire to be riding down those mountain trails in the dark of night. It was a difficult decision as we were not equipped to make a dry camp at approximately 13,000 feet above sea level. We had no tent, no sleeping bags, and very little food or water for us or for the mules. All we had to eat was some horse meat jerky, a few potatoes and some rock- hard bread. Have you ever tried to boil potatoes at 13,000 feet? At that altitude, water boils at about 180 degrees and the potatoes never really get cooked. It was not a good meal. The night was cold and all we had were our jackets and the saddle blankets. It was not a good night.

The next day as we reached an area several miles from camp, the mules apparently sensed that we were nearing water and fodder and they started to pick up their pace. I raised my head and glanced up at the south wall of the quebrada and was amazed to see a pattern that could only be some sort of tracks. Then I realized that those tracks were several hundred feet above the valley floor and were some distance away. They had to be large and could only be dinosaur tracks. I was going to call out to the other



geologists and then I realized that it was late and we had to get back to the truck and pack up and get down to the coast to return to Santiago. So I just filed the information away in my mind. By morning I began to think that maybe it had all been a figment of a mind that had been under some

stress and so I decided not to mention the tracks to anyone at the Instituto de Investigation Geologicas in Santiago, Chile, where I was working with other USGS geologists as a part of the US AID program.

Several months later I was back in the same canyon with three Chilean

geologists, our mule man, a cook, six mules, and a half dozen or so of sheep that were scheduled to be consumed during our proposed three week camp. We had spent a week studying the rocks trying to determine where we were in the geologic section. Some thirty miles north we had found abundant Jurassic fossils but here the formations did not seem to be the same. So the next morning I said "Let's find some dinosaur tracks today and maybe we can date the rocks with them." There were murmurs of surprise and maybe even a whispered "Gringo Loco" as they knew that tracks had



never been found in Chile. We mounted up and went to the east, up the quebrada. We rounded a rocky point and I called out, "There they are! Up on that dip slope!" There, clearly exposed, were the tracks of a three toed dinosaur that came down from the upper left to intersect with a trail of larger rounded tracks. There was a fairly large area of mixed foot marks and then the trail of the rounded prints continued off to the right and the three toed prints went off to the upper right. The Chilean geologists decided that maybe the gringo was not so loco after all. These were the first dinosaur tracks discovered in Chile and we also found others in the same general area. The tracks were later determined by Dr. Gregory Y. Fellows of Yale University to be Late Jurassic in age.

- Robert J. Dingman

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GeoTales V

The Piper Played On

Late on an overcast day in Trans-Pecos Texas many years ago, several other geologists and I were climbing a steep slope toward the summit of a mesa to examine the capping layer of volcanic rock. The wind was gusting and cold, the threatening clouds scudded by close overhead. Shortly after we began the climb under the darkening skies, drifting up from below and from a considerable distance where the vehicles were parked, came the haunting sound of bagpipes being played by one of our associates, a Scot who had brought his pipes along on the field trip.

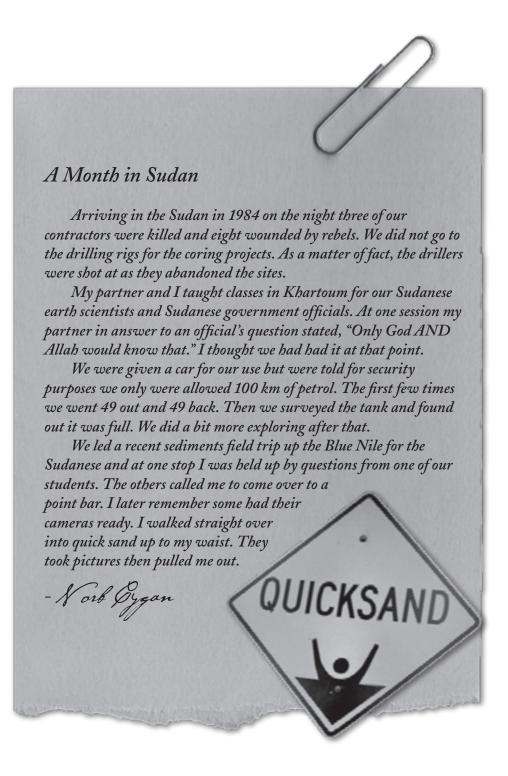


Rather than struggle up
the slope after an already
tiring day, he decided to
energize our group with some
spirited martial music. As we
labored up the slope, I gave
my imagination free reign
and and thought about how
it would have been to be a
rifleman in a guards regiment,
attacking a well-fortified
position on the summit, led
by an unarmed piper and flag
bearer.

It came to me in a moment of clarity and insight, how the stirring notes of the bagpipes during countless attacks over the centuries, must have energized and encouraged the Scots, reminding them in an instant of the long and colorful history of their countrymen persevering and pressing an attack in the face of a determined enemy.

I was grateful that upon reaching the crest of the mesa we found only an interesting layer of long-cold volcanic rock rather than a fanatic enemy bent on our destruction. It was a memorable and exhilarating experience. As we retreated down the slope "victorious" and without even one "casualty", the piper played on.

- James R. Underwood



Hotels and Serenos

In the mid 60s I toured Spanish uranium deposits with geologists and engineers from several countries, led by Antonio Arribas of the Junta de Energia Nuclear. All, especially Tony, were so dedicated to the task that time passed unnoticed. We were in the Ebro Basin changing villages every night or two

Our inattention to lodging wasn't disadvantageous off the tourist track, but was unexpectedly overwhelming when we arrived late in Zaragoza. As habitually, the caravan pulled up in front of the best hotel. Dirty and tired, we followed Tony into the lobby. No rooms were available.



Not disturbed, we piled back into the camionetta and jeep, and proceeded to the next-best hotel, with the same experience. What to do but go to the next, and the next. We seemed to miss rooms by just minutes. Zaragoza has various hotels, and we followed Tony down through the quality sequence. Well after dark, we were all standing on a street corner, discouraged, waiting for Tony to do something. Some of us suggested sleeping in the vehicles, or camping out. Tony was obviously distressed.

Suddenly, Tony's eyes lit up. He said an explosive "Ah Ha!", stepped into the street, and clapped his hands loudly. Shortly came a loud "Ya vengo!" A man in a long cape with a large bunch of keys on his belt appeared out of the dark. It was the Sereno of that neighborhood. Now relaxed and confident Tony said: "Necesitamos

seis camas" (we need six beds), counting on his

fingers. The sereno pondered for a moment, then said "Si.", and led us to a series of private homes where each was assigned

a room or bed. All was well.

I recalled a visit with the Arribas family in Madrid when Tony's wife, Mercedes, performed a similar action to get into the Arribas apartment. She explained that serenos are traditional neighborhood watchmen that carry keys to all the houses and were constantly aware of situations and whereabouts of families. Later I was charmed by Baron Davillier's account (Viaje Por Espana [1862], 1957, Ediciones Castilla, S.A., Madrid.) of colorfully dressed Catalonian serenos, residual from the middle ages, that not

only guarded sleeping residents, but also

announced the hour, weather, current events,

and serenaded melodiously on serene nights—hence their name.

Next day we returned to our work determined to arrive back in Zaragoza in time for better accommodations. But our geological instincts prevailed and by coincidence, or preordination, we repeated almost exactly the performance of the night before. Only the Argentinian remained smilingly calm; he had made a reservation in the home of the night before. - John W. Gabelman



The Russians Are Coming

During the summer of 1968 after an NSF post-doc at the University of Oslo's Geologisk Museum I joined a group from the museum traveling to the 1968 International Geological Congress in Prague. I booked in at



Alexander Dubček

the Hotel Merkur where many American delegates were staying. Prague was a beautiful but grimy, crumbling baroque city after twenty years of Communist rule. The recent liberalization introduced by the Dubček regime during the "Prague Spring" was raising hopes for better days.

On August 20th, I registered and attended several technical sessions. Around the city young people sat on the railing of the bridge over the Charles River, strumming guitars

and singing. Sidewalk cafés were doing a booming business. An outdoor puppet show poked fun at the Communists.

Things changed abruptly that night, with noises of heavy trucks in the streets. We awoke to find a Soviet tank in the street below with its cannon aimed directly at our window. Military vehicles filled with heavily armed Soviet soldiers rumbled along the street. During the night Soviet troops had marched into Czechoslovakia.

All public transportation ceased, and we walked to the Technical University where the congress was meeting. Vehicles full of Soviet soldiers passed groups of young Czechs carrying national colors and beginning protest marches. A Soviet tank skidded up against the façade of the cathedral. President Svoboda was under house arrest in Hradčany Palace. (His name means "freedom!") At the university the congress organizers decided to close the congress. It would be an insult to the Czechs to continue business as usual in spite of the invasion.

We joined the crowds protesting the invasion. A soldier grabbed Bob Scholten's camera and ripped out the film. Greg Davis, Dan Weill and other former graduate school pals from Berkeley and I avoided a suspicious-looking man who was listening too intently to our conversations with Czechs. He was an obvious undercover informer.

Soviet Academician Vladimir
Stepanovich Sobolev, his son
Nikolay, and Corresponding
Member of the Academy
Luchitskiy whom I had met on a
recent trip to the Soviet Union
invited us to drink vodka with
them at their hotel. They were as
much surprised and offended by

the invasion as we were. Scarcely had we toasted friendship than tracer bullets split the sky outside our window. Luchitskiy quickly said, "Get Down! We know how to deal with this!"

Jim Gilluly appointed me "captain" of the American group at the Hotel Merkur to organize our departure. However, I soon accepted the invitation of my

Scandinavian colleagues to join them on their bus since the Americans seemed completely disorganized. CIA representatives had accidently set fire to the U.S. embassy while trying to dispose of their secret documents! I quickly appointed someone else to "lead" the American group at the Hotel Merkur as I left Prague on the Scandinavian bus.

Following back roads to the West German border we drank a toast to the Czechs from the bottle of vodka that the Sobolevs had given me. From Frankfurt I sent the message Sobolev had asked me to transmit to their families: "Kol'ya and I doing fine. Look forward to seeing you soon, Love, Vovo." Here was I, a young Syracuse University associate professor, having to send a cryptic proxy message from Germany to the family of one of the august members of the Soviet Academy of Sciences! I also sent a card to John Prucha, my chairman at Syracuse who expected me back to teach classes saying, "Having a fine time. Hope to be able to see you in a few days."

- Bill Romey

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Tidal Wave

Five thousand casualties! Severe damage to buildings, highways, and bridges! A volcano in eruption! Landslides! Damaged ports! Areas sunk under the sea! A tidal wave that originated in Chile causes death and destruction in Hilo, Hawaii, and in Japan! The earthquake that occurred in Chile on May 22, 1960 was one of the most violent of the twentieth century. Its magnitude reached 8.5 on the Richter Scale.

I visited the large island of Chiloe as a result of that terrible seismic movement. We were geologists of the Geological Investigations Institute of Chile, sent to determine the urban geology of the areas to be reconstructed. To make accurate geologic maps of the city it was necessary to examine the rocks, sediments, and soil with the greatest possible detail, and to obtain information from the inhabitants about what had happened during this tragedy. A citizen reported to me that he and many of his neighbors, upon feeling the land begin to quiver and shake under their feet, ran to the nearest hill. They were there looking at the still, calm, sea and something terrifying occurred! Some fifty minutes after the earthquake the first surge of the tidal wave advanced toward the interior of the Bay of Ancud. This wave reached the lowermost part of the



doors of the houses located closest to the sea. It was something like an extraordinary high tide. Meanwhile the fishermen left shore, rowing in their boats toward the center of the bay. They must have thought, "In the sea it does not shake and quiver as it does on the land". The familiarity and the confidence in their fishing boats that they had developed from the time that they were children, made them feel more secure on the water than on the land. But something horrifying happened! The water withdrew from the bay exposing the dark, muddy bottom of the bay that had never been seen before, not even during the lowest tide. At the entry to the bay a wall of water formed that appeared to remain in place, neither advancing nor retreating. Water and rocks moved without ceasing producing a noise clearly audible to the inhabitants clustered on the nearby hilltop. The wall of water seemed something like a line of race horses in the starting gates, nervous and excited, moments before departing like arrows on the course. It was then that the fishermen understood what was going to happen and within a very few minutes! They left their stranded boats and tried to run to shore, but they mired in the saturated mud of the bay bottom. They seemed like flies trapped in those glued papers of yesteryear. It was horrid! The fishermen disappeared when as a wave some seven meters high moved rapidly from the entrance to the most protected parts of the bay. The tidal surge moved houses from their foundations, destroyed streets and buried forever those neighbors who had refused to abandon their homes and property.

September 1960, we were working in the streets, wet as they usually are in Ancud. The sky was dark grey, There was almost no color in the walls, just the reflection of flooded water. No, over there is something white. We will see what it is. Tactile sense? Hand lens? I believe that it is? No, it seems to be? It doesn't feel gritty between the teeth. What can it be?

A boy of about twelve had been watching us for some time and we asked him if he knew what the material was that formed the small white mountain? I do not know if he had his tongue in his cheek but he did seem to be mocking us as he replied, "That is guano, No?"

- Carlos Galli O.

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TIME and Weathering in the Libyan Desert

The mysterious disappearance of the WW II B-24 Liberator Lady Be Good on April 5, 1943, while returning at night from a bombing raid over Naples was solved when she was identified on a sand plain deep in the Libyan Desert in 1959 by an oil company exploration crew. With a strong tail wind and thinking they were on course, the Lady's crew overflew their base near the coast, continuing until they ran out of fuel. The crew including the pilot, bailed out, and Lady Be Good, gradually losing altitude, eventually landed with very little damage as the engines ran out of fuel; the crew never saw the airplane again. In 1960, search parties eventually located the desiccated remains of all but one of them.



On an expedition to study two circular structures in the eastern Libyan Desert that later proved to be impact structures, Oasis Oil Co. hydrogeologist Ed Fisk and I came across an old camp site of one or more of the groups engaged in the search for the Lady's crew. Weapons-carrier chassis, abandoned motors, transmissions, and fuel drums littered the former camp site, indicating that the search crews had operated there for several weeks to months.



One other bit of dramatic testimony to the harsh, dry conditions in that area of the Libyan Desert was provided by the October 31, 1960, issue of TIME, lying on the

desert floor at the camp site. The cover photograph, bright and clear and only slightly wrinkled owing to desiccation, was of Richard M. Nixon when he and John F. Kennedy were candidates for the presidency. We found the magazine on May 22, 1970, almost 10 years after

it had been cast aside as the search and recovery team abandoned the site and a year after Nixon became the 37th President of the United States.

TIME was preserved in a remarkable, near-pristine state despite prolonged exposure to desert weathering conditions and processes, not surprising perhaps since some localities in the region report no rainfall for extended periods, even as much as 20 years!

- James R. Underwood



GSA Memories

While at the Indiana University
Field Station, (Montana; summer of
1963) coming down off a limestone
ridge and stepping on a coiled rattle
snake, with its coiled "friend" nearby.
Both struck out—but both missed.
- Kennard B. Bork

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The Preacher's Broken Arm

In 1957, I was working as a Geologist on a mud logging unit in Tom Green County near San Angelo, Texas. About 3:00 AM one morning, the driller called me on the rig phone. He said they were tripping the bit and broke one of the men's arms. It had been crushed between two stands of drill pipe. They needed to get back in the hole, so they could take him to the hospital. The driller wanted to know if I could help them get back to drilling. I told him yes, even though it was my first time to roughneck.

The injured man was lying down in the dog house groaning, in great pain and his arm was turning purple and swelling. We worked feverishly to get the pipe and bit back in the hole. It was dangerous work, handling and stabbing each section of the pipe strings and chain throwing and tightening each connection. We made it in the hole in record time and then they took the roughneck (preacher) to the hospital with his broken arm.

The injured man was a preacher in a small nearby Baptist church and worked morning shift to pay his bills. The church found out about the incident and his willingness to do this job to help support his family. They then raised his salary, so he wouldn't have to roughneck on the side.

- Billy Caldwell

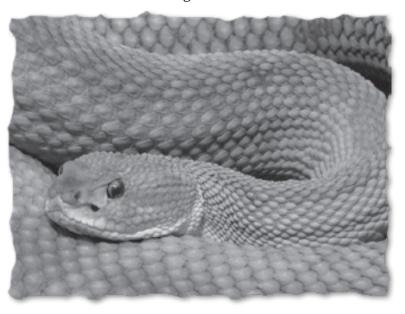
GSA Memories

In Summer 1960, Harry Hess (1963 GSA President) sent Bill MacDonald, Martand Joshi, and me to Haiti to reconnoiter potential field thesis areas. After several harrowing weeks of fording and getting stuck in streams and mud holes, having our Jeep's clutch sabotaged twice, and being chased by machetes, Hess pulled us out and sent us exploring elsewhere.

- Eldridge M. Moores

Chased by a Rattlesnake

The funniest rattlesnake incident, that I ever witnessed, occurred at a drilling rig in the 1960s. I am working with a driller and two helpers on a truck-mounted core-drill in southern Arizona. The driller is a Texan, who wears cowboy boots and Levis. On this project, the crew is only working a day shift and the rig is shut down and deserted at night. During the night, a rattlesnake crawled under the rig.



Arriving in the morning, the rig is started up producing noise and banging metal, which certainly stirred up the rattler. As the driller is walking along the rig's side, the rattler strikes and hits his leg, just where the leather boot protects it. The rattler's fangs became stuck in the Levi denim. As soon as the snake struck, the driller began to run around the rig with the rattler caught on his pant leg. The driller is running and screaming, while the rattler is wiggling back and forth with his tail buzzing. As the driller begins a second circuit around the rig, he is shouting, "Get this thing off me!" The helpers are laughing and one helper shouts, "Run faster Roy, he's a gaining on you!" Eventually, the snake shook loose and was dispatched with a shovel. Neither geologists nor drillers were environmentalists in those wonderfully simple times.

- Eugene V. Ciancanelli

Some Memories of Bygone Days of Field Geology

Most geologists know fellow geologists who are 'characters', at least in the eyes of the beholder, many of whom have sterling qualities as well. One of those was my friend and mentor, the late Dr. George Swingle, whose doctorate from the University of Wisconsin was in economic geology. However his great interest was always in the structural geology of the Appalachians in Tennessee. He was Professor of Geology at the University of Tennessee at Knoxville for many years, and while there trained many geologists in structural and economic geology.

In the early 1950s while a graduate student at UT, I was very fortunate to have George teach me field mapping in the Valley and Ridge as I worked under him for the Tenn. Division of Geology for two summers—even a 'handsome' stipend of twelve hundred dollars a year as a graduate assistantship didn't take a family of three very far then.

George was a dedicated field geologist in the Appalachians, and, over the years, taught a large number of students who, if I might use the expression, idolized him then, and now his memory—I'm one of them. George's own training had been formidable, he had been taught geologic field mapping by the master himself, Dr. Phil King, and in that most geologically complicated of geologic regions, the Valley and Ridge and the Blue Ridge provinces in eastern Tennessee. As a person George was quiet and reserved, and when spoken to would answer almost inaudibly, but always to the point; he seldom raised his voice, and had a dry wit that was often served with a little twinkle in his eye that could be interpreted as you pleased. He seldom spoke, unless he knew you well, but when he did it was worth listening too. What's more, if you were a friend, he would tell you stories about his many experiences while field mapping in the western edge of the Blue Ridge and the Valley and Ridge. There are still his students who get together under his aegis led by one of his former students, Dr. Robert (Bob) Hatcher, a well-known authority on Appalachian structure a la George Swingle, and who occupies a chair on the faculty at the University of Tennessee in Knoxville. As I wrote above, he was a unique character in his own droll way, and, as you might expect, I have several stories about George.

k * * *

Being an 'old' fighter pilot (WWII) I had a healthy respect (and still do) for fuel levels, especially when I was in the 'boon-docks' far from a gas pump, so I was particularly aware of the fuel gauge in our field car, an old, beat-up, State, pickup truck used in our mapping area at the base of Cumberland Plateau escarpment, miles from nowhere. That was especially

true when the gas gauge rocked on empty for a

while. Somewhere in that process, after 'biting my tongue' as long as I could stand it, I would mention to George that we might need gas. Seemingly unconcerned about such mundane things he would answer laconically in a 'Wel-l-l-l' that seemed to drag on, and end in a "Don't worry about that". Obviously undaunted, far from human habitation on the western edge of the sparsely settled Ridge and Valley,

George would proceed to drive on for another

twenty or more miles. My agonized thoughts were about how many miles I would have to walk to where we could borrow enough fuel to get back to a gas pump (then, in rural Tennessee, most gas pumps in the hill country were on a dirt road in front of a country store). Finally, when the gauge had been resting on empty for the Lord knows how long, George would stop at the gas pump at a rural store. Then I couldn't believe my eyes when he put more than seventeen gallons in a 17 gallon tank. George never seemed concerned, but then we never had to walk, so he must have known something that I didn't. Later, after the fill up, we would stop for a cold beer at a local honky-tonk, order a cold beer in a tall glass bottle, and, in short order, he would finish his beer before I could get more than one good swallow out of mine. Then, after another cold beer, I would get up the cheek to comment on the gas—his comment, always was, "Well! Don't worry about that, have another beer."

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George, Gill Boyd, another graduate student, and I were mapping the contact between the distinctive Devonian/Mississippian Chattanooga Shale and the white porcelainous cherts of the Mississippian Ft. Payne Chert just below the Cumberland Escarpment. It was an easy contact to map and George would assign each of us a short segment of the contact to map during the day, and then he would check it and put it together that night.

It was early on a cloudless morning, the mists were still dissipating, and dew was heavy on the plant leaves. George put Gill out first, then me, in our respective segments of the Chattanooga Shale/Ft. Payne Chert contact. When George put me out he warned me that there was a big bull and cows in the nearby pastures and that the bull had run him out of the field some time ago and then went on to his map area. I couldn't see any cattle in the pasture, which was surrounded by woods, so I forgot it, took out my neatly folded 1:24,000 topographic field map and pencils and headed to the outcrop.

My segment included woods that had been cut over and, locally, dense thickets of Sumac had grown up. Even so the contact between the two





formations was easy to follow as outcrops were fairly common. I began mapping, marking outcrops on the map with hard, sharply pointed, colored pencils as I struggled through the wet Sumac. As I walked along the contact, I drew it in either as a solid, dashed or dotted line on my field map, depending on the control, with a sharply pointed No. 4 pencil, and where possible measuring dip and strike with my Brunton compass. The Chattanooga Shale provided me with an easy surface to take dip and strike readings for my map. I might add that George was very finicky regarding maps and field techniques—he wasn't above telling how when once Dr. Phillip King was checking his field mapping near Cleveland, TN, that he, George, found that he had forgotten his pencils. He said that Phil King didn't offer the use of his own pencils, but suggested that George could cut a branch off a tree, sharpen it, and mark his map with it well enough to decipher it that night—George said it was a long day, but he never forgot his pencils again.

Initially, the contact led me across some low hills into a sparsely timbered area. I worked my way into the woods and then into a rank growth of young Sumac just higher than my head; the day was bright and warming up and the Sumac was dripping wet with dew. The contact went right through the Sumac thicket and there was nothing to do but push the stems aside as gently as I could in order to map the contact without getting me and my maps too wet, my eyes alternately on the ground and the wet

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Salted Holes

Sumac ahead. I had advanced some ten to fifteen yards into the Sumac when I began to get a strong feeling that something was watching me. So I gently parted the sumac fronds, and lo and behold there was a wet muzzle and two great moist and dilated nostrils right in front of me. A second look showed two great blood shot eyes and great curved horns—they didn't really look like they belonged to a cow, but I wanted to make sure before I tried an awkward retreat, my only out. So I leaned very carefully to one side in order to look closely along the flanks of the animal. My worst fears were confirmed: two great, seemingly cantaloupe sized balls in a bag, swung beneath his rear end—A BULL. And I was face to face with him.

Trying not to panic and in a cold sweat I pondered my predicament. As luck would have it he showed no tendency to move, but just stood there, malevolently staring me in the eyes. My only out was to move backwards, very carefully, which I did, sneaking, very fast, under a nearby barbed-wire fence—I would complete mapping that area another day.

- Ernest E. Russell



GSA Memories

Raiding the Harding Pegmatite at dusk as a spinoff from a Penrose Conference field trip with Dick Jahns.

- Reinhard A. Wobus

I was in northeast Wyoming with one of the AEC Jeep-mounted probe units when orders came to drive to a location in the Shirley Basin area where I would be met and provided with a map showing location of four drill holes to be probed. After probing the holes and taking samples of any cuttings at the hole collars, I was to return to the office with the logs and samples. At the office I learned the background of the rush probe job. This was at the time the US ceased guaranteeing a market for new uranium discoveries; probing the holes with a small hand operated field unit a week before had indicated several feet of high readings indicating an extensive area of definitely minable uranium.



When the logs from the mobile unit were interpreted it was found that during the week between the two probing the thickness of the radioactive layer remained the same but was several feet deeper in each hole and the radioactivity was only half as intense. I checked the logs and calculations, no errors found. On a hunch, I checked my isotope tables and found that iridium, Ir-192 had a half life of seven days...BINGO. The collar samples were sealed and taken to the AEC lab at Grand Junction, CO and word soon came back that it was believed that the holes indeed had been salted with...Ir-192!

- Tom Loomis

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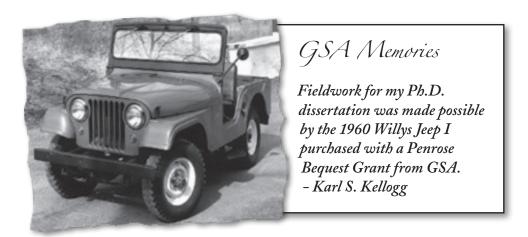
Stones and Rocks

Some of the more prominent rock stars from around the world I have seen and visited are the Blarney Stone in County Cork Ireland, a lower Carboniferous biomicrite, and the Wailing Wall in Jerusalem, a white, coarsely crystalline, thick-bedded limestone that occurs in the Judean Hills on the West Bank in Israel.



The Stone of Scone is the rock placed under the throne where the kings of Scotland were crowned, and the Scots know it as the Stone of Destiny, a block of yellowish sandstone of uncertain origin. Then there is Plymouth Rock, a chunk of Dedham Granodiorite, that according to legend is located where John Alden of the Plymouth Colony first stepped on American soil in 1620. And, of course Ayers Rock in central Australia is a famous enormous monolith of Cambrian coarse-grained arkose.

- Dan Merriam



Whose Fault Is It?

When I returned from the South Pacific after WWII, I was delayed in San Francisco awaiting Army rail transport home. During those few days at Christmas time, I was graciously entertained by a friend of the family who taught Italian at the University of California, Berkeley. When this elegant, elderly professor learned that I was headed back to the University to complete my work in geology, he became very interested in my studies. He assured me that he knew nothing of geology; however, he hoped that I, as a geologist, might explain something that had puzzled him for a long time. His question was this: "Why are all of the earthquakes in California blamed on Saint Andreas?"

- R. David Matthews



The Day 1 Aged 30 Years

Years ago several of us at San Jose State University traded off teaching a six-week summer field geology course in the rugged Inyo Mountains in the desert of eastern California. We generally camped in tents at Santa Rita Flat about fifteen miles up Mazourka Canyon from the small town of Independence. The camp with 20+students was always run by a single faculty member who generally had a couple of graduate field assistants and a cook. Many memorable events took place over the years, but one stands out above all others.

It happened on the third day of the camp and the first day students were to begin their field mapping. That day my plan was to drive two field parties of three each down the canyon to their assigned field areas. I dropped off the first party part way down the canyon and suggested to the second party that I let them off on the Betty Jumbo Mine road that extended from Mazourka Canyon up to a mine of that name high on the mountain slope. The students, however, insisted I let them off at the mouth of the canyon so they could climb up to the Betty Jumbo Mine where I could pick them up at the end of the day. Their reasoning was that as the day got hotter they would be climbing to higher, thus cooler elevations. I couldn't dissuade them so I let them off and then went to look at outcrops I wanted to see.

Later in the day I drove up the Betty Jumbo road past a flat where an old compressor had been abandoned and up a series of steep switchbacks to the relatively flat road cut into the cliff leading to the Betty Jumbo Mine. I noticed that dark rain clouds were developing over the Sierra Nevada to the west when I came across a very large boulder near the middle of the road. I drove up to it and ascertained that I might be able to pass it just above the cliff extending hundreds of feet down toward the valley. I backed up and drove up as close to the outside of the boulder as I could and got out. I could see I would have just barely enough room to pass. Unfortunately a short distance along the road I came across another similarly positioned boulder. I was able to pass it, also on the outside, only to come up to a landslide just in front of the mine that completely blocked the road.



I walked around the slide, but didn't see my students whom I figured by now must be farther down the road. Then to my horror, I found there was no place to turn around. I had to back around both boulders sweating blood all the time. Finally I found a place to turn around just above the hairpin turns.

From there I saw the students half way down to the compressor. I was so relieved I carelessly backed up and turned around. Then I heard the sound of air escaping from a rear tire. I stepped on the gas and stopped for the student yelling, "in quick, we have a flat and we've got to get to the flat at the compressor so we can change it."

When we got to the compressor, which took only a couple of minutes, we got out the jack. But there was no jack handle. So we put the jack under the rear axle and with geology hammers started digging under the tire just as the rain started to fall. Eventually we got the tire changed and got back to camp to eat leftovers.

I swear, I was so totally bummed out that if I'd been anywhere near a phone I'd have called my department to send out a replacement. I would have told them I'd had it, I was quitting.

- Calvin Stevens

In the Footsteps of the Master

As a newly minted faculty member in geology at the University of Wisconsin in 1964, the opportunity to join Bob Dott in co-teaching our traditional summer "field mapping" course was one I could not refuse, and, of course, it was a welcome source of summer salary for a green faculty member in those early, otherwise unsalaried summers in my startup years. As a veteran of the "west coast style" of summer field courses from my formative years at UCR and UCLA, I found the fit with Wisconsin's course nearly perfect. Almost I say, as there are far too many anecdotes to temper my assertion.



The fact that I was, at best, only a few years older than most students was sobering. That put me but one step ahead of these students, but now I was a "driver" not a "passenger" on the life-long trip of learning. Our eight-week course consisted of a two week field excursion through parts of Colorado, Wyoming, and Montana learning the regional geology and stratigraphy and setting our eventual mapping area in context of what was known at the time about the tectonic evolution of the western US. This was followed by six weeks in the Bridger Range near Bozeman to map the geology of the area. I only now appreciate it, but Bob, in his effort to engage the expertise of this new, and very green professor, would

step to an outcrop, deliver a lengthy "no notes" sermon on the local and regional geology complete with chalkboard, maps, and handouts, drawing on his extensive experience with the sedimentary side of geology and consummate knowledge of regional geology and natural history of the American west.

Then, as even I was taking notes, Bob would turn to me and say, "and now I'll turn it over to Dr. Bowser for some comments". "Baptism of fire" describes it well, and I somehow managed to pull a few pearls from the corners of my oxygen-starved brain, evidently enough to satisfy Bob and the students if only for the moment. Soon I got used to his "shared" teaching methods. Needless to say my evenings were then split between consoling my wife and 18 month old daughter that camping wasn't too difficult, and that only a few more weeks remained, and pouring over the slim library of reference material with me so that I would be prepared for the next day's "and now I'll turn it over to Dr. Bowser". A strong background in igneous petrology and sedimentary evaporites gave me some edge over Bob at appropriate moments, and we walked away from the experience enriched by our joint efforts.

Fortunately Bob's wife, Nancy, and young family also joined us on the trip. With her extensive experience of field travel with Bob, and especially with children, she was most helpful tutoring my young family on adjusting to the camping life. It forcefully brought home the reality that our day-to-day work in the field was not the same for our dedicated spouses and unwitting children.

- Carl Bowser



GSA Memories

Sitting around the campfire with William Wiltary and our Paleontology class talking, served a gourmet casserole.

- John V. Brahana

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The Bug

Long ago, Clark Burchfiel and I worked together for a decade, mapping parts of the Mesozoic foreland fold-and-thrust belt in southeastern California. Neither of us will ever forget a July 3rd night in the summer of 1963, when we were camped on the lower slopes of Clark Mountain near the Nevada border. It had been a typically long, hot, tiring field day and a good night's sleep was our only objective as night fell. It was not to happen...

It was still too warm to crawl into sleeping bags, so both of us lay on top of them before falling asleep. Early the next morning when it was still very dark I was awakened by Clark's frantic voice.

"Greg, wake up! You've got to help me! Greg, WAKE UP!"

The intensity of his words meant something serious was happening and I was immediately wide-awake. I turned my flashlight on and directed its beam at him. He was sitting upright on his sleeping bag, one hand to the side of this head.

"What's the matter Clark? What's happening?"

His desperate response was surprising — to say the least.

"I'VE GOT A BUG IN MY EAR! It's flapping around inside my ear and it's driving me crazy! You've GOT to get it out!"

Despite the somewhat humorous imagery his words conveyed to me, it was obvious that my friend was in real and serious distress. But, how could I get a bug out of his ear when it was apparently deep enough that its removal wouldn't be possible without proper instruments? Even if I had had them, I couldn't possibly use them in the dead of night to extract a tiny bug. And then, I had an idea. If I couldn't get the bug out, I could — at the least — kill it!

I got up and walked to our field kitchen area. There it was, the solution to Clark's problem. Taking the bottle I had located easily, I returned to Clark.

"Lay on your side, bug ear up," I told him.

"What's the Mazola oil for?" he asked.

"I'm going to pour it in your ear. It'll immobilize the bug and eventually kill it. It won't be able to breathe. Now, give me your ear."

He was clearly unconvinced of the wisdom of my planned emergency treatment, but the wing-flapping bug inside his ear was his immediate concern, not an oily ear.



I believe I can still recall the soft "glug ... glug" sound of the thick Mazola oil as I poured it slowly into his upturned ear.

"Can you still feel the bug?" I asked when I had finished pouring?

"No. Great! It's not moving around anymore. Thank heavens."

"You're sure?"

"Yes, thanks. I think you've killed it."

"Good," I said, anxious to get back to sleep. He and I returned to our sleeping bags to complete our night's rest. I quickly dozed off. I don't recall how much time had elapsed when I once again heard Clark's distraught voice. It was still quite dark.

"Greg, wake up! WAKE UP!"

Rather groggily, I answered. "What's the matter?"

Cow Pies

His voice, only a little less frantic than earlier that night, was still unmistakably anguished. "I'VE GOT A DEAD BUG IN MY EAR! You've got to get it out!"

"Clark," I said calmly, "there's nothing more I can do. When it gets light we can drive into Las Vegas to an emergency hospital and someone there can take the bug out. So, please, go back to sleep. Your ear will be fine." Given my obvious lack of action, he agreed reluctantly with my plan.

Later that 4th of July morning, in the emergency ward of a Vegas hospital, the bug was indeed removed, but not easily as Clark was to tell me. He met me in the waiting room after the procedure, holding his hand against his ear. His face was devoid of color and his grim expression told me that his treatment had not gone well. I still remember his words. "That was the most painful experience I've ever had." he explained. "I don't think the doctor was a doctor! Maybe he was a holiday substitute. He probed my ear for about 30 minutes getting pieces of the bug one at a time, but by the time he had finished my ear was bleeding and I was worrying about permanent damage."

Doctor or not, the bug and its Mazola coating were gone.

We both slept well that evening.

- Gregory A. Davis

An Unexpected Pitfall

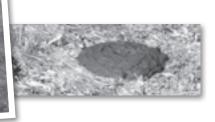
It was the winter of 1960 after a heavy drifting snowfall and I was traveling a dirt road in the uranium area at the edge of the Black Hills north of Edgemont, SD. The road was barely discernible under the snow cover and suddenly the Jeep station wagon went nose-down into an 8-ft deep snow-filled prospect pit which had been bulldozed in the road since my last trip through the area. Luckily the Jeep had a winch and there was a nearby tree as an anchor so we were able to extricate the Jeep undamaged and drive it home.

— Tom Roomis

In the 1960s, I am supervising a copper exploration-drilling project in southern Arizona. The drilling rods are sticking in the hole and mud additives to correct this problem are not immediately available. The driller knows how to solve this problem. The drilling project is in cattle range country. Carrying 5 gallon buckets, the driller, his helper, and I now wander about picking up dried cow pies (manure). As I'm walking along gathering up the cow pies, I'm thinking, "I went to college for nine years to get this job". The cow pies are dumped into the drilling mud tank, which turns the drilling mud into an aromatic greenish-brown slime that lubricants the hole. Two hours later, I'm washing slimy-greenish-brown stinking cow manure off the drill core. Then I get to hold each aromatic core sample up to my face and examine it with a hand lens to determine the mineralization and hydrothermal alteration. The reformatted drilling mud sticks to everything, leaving greenish-brown stains on the field book, the log sheets, and me. As a young geologist, I will

quickly learn those romantic tales of a geologist's life are fantasy. Such stories no more reflect the life of a working geologist than does a cowboy movie depict a cowboy's life. Geology may be a profession, but sometimes it can be a crappy way to make a living.

- Eugene V. Ciancanelli



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A Day in the Life

My father, Julian W. Feiss, was a mining engineer (masters degree from the University of Arizona). In 1929, he went to Broken Hill as an exploration geologist with Northern Rhodesian Border Concessions along the Kafue River. He kept a daily diary of his year in Africa before the mines closed and he returned to the States – without a job!

Here is one day in the life...

- Geoff Feiss



August 19, 1929.

I left the camp early for a long traverse, in fact 20 miles in all, 10 out and 10 back from the west. Dick took a short route to the Lufumyama.

It was a terribly hot day. The tropical sun shone down with a driving heat enough in itself to kill if one is not protected from the blast. I had a crew of 10; we crossed the Sakarara and setting my prismatic compass for 270°, we headed due west. To the north the faint line of the Congo hills shimmered in the mirage of heat waves.

Hour after hour we continued west. At about six miles we entered thick bush, almost jungle. I took check bearings on the big kopje to the south before we entered the tangle. At the edge of a large ant heap I was raising my compass to my eye when there was a swish and I stood staring at death in the form of a black mamba just a foot or two off. I jumped back – the snake hesitated, didn't strike and was off in the bush. The boys killed it with long poles. I sat on a log, smoked by pipe to quiet my nerves and traversed on. It was the narrowest escape I've ever had. I nearly stepped on the rascal.



Just at noon, we arrived at the Funda base. I found some hematite gossan nearby with covellite stain. I suppose it will show copper. I was sitting under a thorn bush eating my lunch when something glided into the long grass nearby. I saw a long cat-like body, a long tail - that was enough; I reached for my rifle, aimed for the shoulder and fired. I thought it was a leopard. The animal dropped dead, shot through the heart. It turned out to be a jungle cat – a sort of lynx, rather a sneaky creature ordinarily and somewhat dangerous when wounded. He was gray and black striped somewhat in a tiger fashion. The skin however is quite furry. I would have liked to skin him but as we had a long trek back, there wasn't time.

About half way to the Sakarara, Jungupinga spied a big wart hog ahead. He was in long grass but I took the shot and wounded him badly in the hind quarters. The boar made for the trees and vanished down a big hole in the ground. James and I followed him up but I couldn't see the hole until I was right on top of it. James threw a handful of dirt down the hole -- there was a grunt, out came Mr. Boar. He rushed James who turned in time to get only a lacerated arm. Then he rushed at me. As I was only a few feet off, I couldn't get my rifle into line. I jumped just as he snapped at me, was knocked off my feet as I fired and the weight of 150 pounds of piggy sent me spinning into the bush with my rifle knocked out of my grasp. My shot missed

A Story of Game

and the boar was off. I decided to call it quits – I was supposed to be exploring, not hunting.

Well, it was not to be so. About 1/4 mile on, the old porker was on our path. He singled me out, did a grand end run in my direction and fell about 50 yards off in a final nose dive with one of my 9.3s through his heart. We cut him up and now have pig in camp for a while. He has 2 big semi-circular tusks that I'll send home.

Dick was in camp when I arrived. His nerves were a bit on edge. It seems that a lion decided to follow him all day. These lions are getting to be a pest.

-Julian Feiss



Summer of 1968 in a prospect pit a few miles west of Barstow, California ... climbed down a rickety ladder into the long-abandoned pit and was greeted by three young barn owls fluttering and hissing, then posing so I was able to get some stunning color photos of them.

- Tom Loomis

When I did the fieldwork for my Ph.D. thesis in the early 60s in the Coast Mountains of British Columbia, I had a permit from the provincial government to take game for food as needed. My thesis advisor, Arden Albee, was about to visit me in my field area, so my assistant and I hung a

deer to ripen in a timberline
tree, near where we would later
make camp.
When we hiked back in 10
days later, with thesis advisor
in tow, we saw a very happy

and fat grizzly waddle away from the deer's remains, which consisted of scattered bones and a very large pile of manure. We had no meat for our camp. So I asked my assistant to make our cook fire, and I went out to get some meat. I soon shot a deer but it was too late in the evening to drag it back to camp. I did what I normally did with freshly killed game: I extracted the liver for dinner and the heart for breakfast. We would return the next morning to bring in the meat.

The problem was that Arden did not like liver, even fresh young buck deer liver, a great delicacy. He went hungry until

the heart was served for breakfast. Maybe that is why he did not come to my retirement celebrations this last spring.

- Lincoln S. Hollister



Bush Country Reverie

Memories that last a lifetime don't happen often, but when they occurred on my very first exploration and mapping job, they indeed became special. In 1957, those remote areas in Northern Quebec which contained taconite iron formations were mostly accessible only by float planes, so I had to settle for infrequent resupply of beer, non-essential foodstuffs, and other luxuries I now take for granted. The positive element, however, was to teach a young graduate student all about solitude – and that gift has lasted me a lifetime.

The first task for the three young geologists hired to map that area was to assign a name to our austere tent cabin that would lend distinction to its occupants, all three of us having been educated in several of the



lower 48 states rich in Paleozoic strata. The door proudly displayed "Fubar Oil Company" and our Canadian undergraduate assistants mostly trained in shield metamorphics had to ask us what it meant! But a few weeks later when the camp manager's wife arrived for a weekend "business" visit, we

quickly told her it meant "Found Underground Beneath Any Rock."

Our camp manager boss wanted to ensure that his wife had an enjoyable visit while staying in her husband's private tent, and of course didn't have to explain that wifely visits over the course of a summer were few and far between. To help our boss provide as much comfort as he could in this rather primitive camping environment, I loaned him my canvas cot for the weekend and simply used caribou moss under my sleeping bag for padding. All seemed to be working well over the weekend and smiles were exchanged frequently. After the departure plane had left and business as usual returned, my boss rather sheepishly explained to me privately that a major seam tear had occurred on my cot. I took my cot, telling him I'd just sew it back together, trying not to notice his beet-red face. And once sewn

together again, that same cot held my 180 pounds for many more years.

But another memory from later in that same summer which probably overshadowed everything else was when I landed a 25-pound Northern Pike on a 3-pound test line – very close to a world record



at that time. For this part of that story-worthy summer, I have an actual picture to show it was "no bull!"

- James T. Neal

The International Post Office

Back in the 1960s when computers were new and everyone wanted to use them, the Kansas Geological Survey provided program source decks and data on punched cards as a service. Literally hundreds of these programs and data were distributed worldwide. One organization in Mexico had ordered a program and kept complaining they had not received it – it had been sent, and we had a record of the mailing. It turned out that the Mexican postal authorities had the box in customs and had determined that some of the cards, which were a filler in the box, were not punched and therefore new – the punched ones were old and ok, but the receiving institution would have to pay customs on the new unused cards! So much for international postal wisdom.

- Dan Merriam

Franklyn B. Van Houten, Sedimentologist

Franklyn Bosworth Van Houten (1914-2010), sedimentologist and one of the two chairmen of my dissertation committee at Princeton University, recently left us for red beds on Mars. Van lived through most of the 20th century; he made a strong start on the 21st century. Not long before he passed on, we talked on the telephone, and he asked about my research, my life and family, as he had done for almost half a century. He was always a friend.



Early in my first month at Princeton, Harry Hammond Hess (1906-1969), then chairman of the Department of Geosciences, suggested a thesis topic. It evolved into an effort to correlate normal and reversed paleomagnetic events in the Chugwater Formation (now a Group) of west-central Wyoming. Harry believed many geophysicists that were publishing on reversals of the earth's magnetic field didn't have a sound grasp of what they were doing.

Franklyn Van Houten soon

became my principal supervisor, joined later by Bob Hargraves (1928-2003), the first-rate petrologist from South Africa. Van furnished financial support for most of the field work through a National Science Foundation grant.

Born in New York City in 1914, Van majored in geology and biology at Rutgers University, graduating in 1936. Going on to graduate school at Princeton, he planned on focusing on vertebrate fossils with the late Glenn Jepson. However, during the course of his field work, his passions turned to the nonmarine depositional environments of the rocks containing the fossils. In 1941, he finished the Ph.D. For the remainder of his research

career, he essentially stayed with the vagaries of sedimentary rocks and their environments of deposition.

From 1942 to 1946, Van served in the U. S. Navy, mostly tracking German U-boats in the North Atlantic. After D-day, the Navy transferred him to several different bases in Europe. From these postings, he sent out research articles and managed to get his thesis published, one of the chapters appearing, for example, in the journal Science. He also advanced in the Navy to become a Lieutenant.

When I began graduate studies at Princeton (September 1960), I was assigned to Van, becoming his Assistant in Instruction for the beginning course in physical geology. We met at least once a week to go over what he wanted covered in the laboratory. On several afternoons during the semester we broke away from the importance of geological principles and played squash, a game that I had never played but thought that I could manage because of hours and years spent playing tennis. Van rebuffed that conceit quickly, on occasion enthusiastically ricocheting a ball off of my butt and into an unplayable corner of the court. A small trim man he was an excellent player, quick and fit.



During that first year at Princeton, Van introduced me to the Triassic/ Jurassic beds he was studying in the Newark Basin, especially outcrops along the Delaware River in New Jersey. At a very early stage of his research, he wondered if the layers were arranged in cycles, or could they be non-cyclic? Soon, however, he recognized cycles at both macro-and micro-scales; gray to red rocks repeated endlessly. In a heady vision, he finally suggested that the longer cycles represent Milankovic alternations, orbital variations of the Earth around the Sun, an astronomical explanation for glaciation proposed by Milutin Milankovitch (1879-1958). Van's hypothesis was confirmed many years later; the research is now considered a major advance in climate science. One of his earliest papers (1962) on these rocks, a prelude to the Milankovitch cycles, was about cyclic deposition and analcime in the Upper Triassic Lockatong Formation of west-central New Jersey and adjacent Pennsylvania.

When Van with his family first visited me in the field I was at a locality on the Wind River appropriately called Red Grade near Dubois, Wyoming. My field assistant, Lee R. High Jr. (1941-2004), who became a friend of 44 years, and I were measuring the stratigraphic section, studying the bedding and sedimentary structures, and drilling tiny cores (2 to 4 inches in length, an inch in diameter) for later determination of the magnetism. Around noon Van took off to the south toward the Wind River Range, gone for the rest of the day. He was satisfied that we knew what we were doing; that fall he told Harry Hess so.



Typical of his ability to reconstruct ancient environments and paleogeography, Van was able much later to match Triassic rocks in Morocco to Triassic strata in New Jersey. Until the Atlantic Ocean opened, the sequences had been neighbors. He also managed his own and other

geologist's studies of oolitic iron deposits around the world, "from the Colombian Andes to the Canadian Rockies, from the Alps and to the Pyrenees, and across northern Africa, Madagascar and Taiwan." At geological conferences the "oolitic-iron workers" tracked Van from room to room, seeking his help and counsel.

Van was a member of the Department of Geosciences at Princeton for 39 years (1946-1985). From 1940 to 1990, he published almost continuously. A final paper appeared in 1997 when he was 83. In 1991, he suffered a devastating stroke, thereafter the physical act of writing was difficult.

During spring 1963, I finished my thesis, defended it, and began desperately looking for work. I was married, the father of two daughters, almost 37 years old, and caretaker of two cats, one of which to my chagrin had recently torn a stocking from the ankle of a minerals-deposit professor. Oil company interviewers that year in Tulsa showed no interest in my résumé, looking out a wide window and fiddling with pencils as they talked to me. There were no teaching jobs. However, Van got a call from the chairman at the University of Nebraska, offering him a full professorship, which he would never have accepted, or any other teaching position. He recommended me to them. In a few days, on the basis of his recommendation, I was on my way to Lincoln, soon to become an Associate Professor.

Van was a serious man of good humor, a kind and thoughtful and generous man whose students loved him. He questioned dogma, challenged theories and he was a sedimentologist who made exceptional discoveries. Those he came into contact with he tried very hard to help if they sought his aid. He challenged me; he was always a great pleasure to be with. His imprint on many lives was forever. In 1986, he was awarded the W. H. Twenhofel Medal, the highest honor the Society of Economic Paleontologists and Mineralogists bestows.

I have drawn on the memorial by Lincoln Hollister and Tullis Onctott published in The Smilodon, newsletter of the Department of Geosciences, Princeton University. My Thanks.

- M. Dane Picard

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"Field Studies" in Northern Mississippi

The late summer of 1950, John Hageman, Nashville district corps of engineers' chief geologist, sent me – a new hire - to Iuka, Tishomingo County MS. I was to get acquainted with the geology of the yellow creek area, which would ultimately become the northern terminus of the Tennessee Tombigbee Waterway.

While roaming around the still economically-depressed area trying to get familiar with the geology using a yellowed copy of a 1935(!) Mississippi geological survey publication, I tried to find a pretty good-sized pond described as located (and shown in a picture) near the intersection of a couple dirt roads. I found the crossed roads but not the pond. Continuing my exploration more or less cross-country, I drove my government Ford through the woods, across pastures, around the edges of fields of stunted cotton, opened and closed gates until I came to a house which was clad in slabs of the brown/tan highland church sandstone (ms) - as was common practice in the area. There was no vehicle in sight!

An old man was sitting in the only chair on the porch. He was undoubtedly a little surprised to see me arrive driving across his pasture, but didn't show it. I got out of the car; he said, "howdy", and I did, too. Then he got up and said, "come sit awhile." It was really hot, but he had on a coat and hat, plus clean biboveralls and a white shirt buttoned to the neck. by now I had learned some southern manners, so I said, "thank you very much", and sat down in the rocker. He sat on the steps. I had learned that it would be an insult not to take the (only) chair, even though I was 25 and, I'd guess, he was over 65. He offered me a jelly glass full of cool water which I surely appreciated!

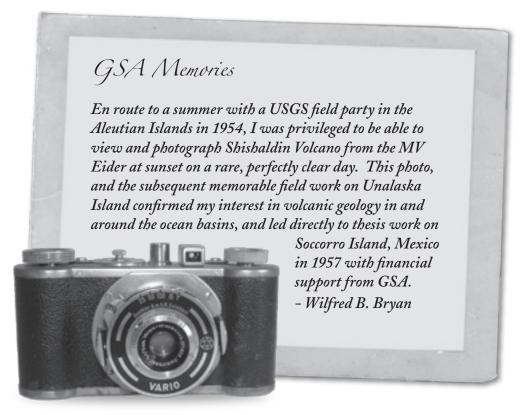


I explained what I was doing prowling across his land, but I could tell he already knew why I was in the area. Word regarding some new government money for the TTW project spread quickly! There had been talk about building the waterway for at least 75 years and the natives were generally tolerant, but figured it would never come to pass.

From his porch I was probably less than three miles as the crow flies from the alleged site of the pond I was hunting, but said I couldn't find it. I'm sure he thought I was really a dumb Yankee and said, rather sharply, "of course, it's there, I saw it a while back." I asked how long it was since he'd been over there and after some careful further thinking, he allowed it was probably 20-25 years ago! I thanked him and promised to have another look (the pond had, no doubt, been drained and turned to pasture many years ago).

When I got ready to leave, noting his go-to-town dress, I asked if he would like me to carry him along. Yes, he had a doctor's appointment and had expected to walk his track to the main road a mile or so away and hitch a ride. I took him to Belmont and the doctor's office. He was grateful and I never forgot him, especially as he was well-traveled and also kind to a Yankee stranger! He probably never saw the completed waterway.

- Ray T. Throckmorton



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Limestone Cowboy

In 1967, I was hired by Indiana University (in Bloomington) to develop a degree-granting Department of Geology at their extension campus in downtown Indianapolis (renamed in 1969 as part of Indiana University – Purdue University Indianapolis). We developed both a BS and a BA degree in Geology. Students in the BS program were required to take a summer field course, and that course was the one that IU ran in Montana.

In the fall of the late 1970s or the early 1980s, one of the students, Marcia Moyer, showed me a song--verse she had written that was based on the students' learning process at the summer field camp. The verse was



to be sung using the tune for Glenn Campbell's Rhinestone Cowboy, which was a very popular song at the time. I liked what she had done, and we discussed the matter further.

We agreed on several points. If done right, the song could be a unifying tool for a theme song for the department. The short version Marcia had done emphasized details from the summer field camp, and perhaps we should broaden the images in the song. We could sing the song at the up-coming annual Christmas party the Geology

Club sponsored, by making copies of the words and handing them out as a surprise at the party. I agreed to write some verses with a broader imagery. I also agreed to sing the song, if another student who played a guitar would accompany me, which came to pass.

The following words of the song, now called Limestone Cowboy, are the result of our collaboration. The song was featured at a number of the Department's Annual Christmas parties, as well as at several meetings of other geologist groups. The last performance was at the farewell dinner the Department arranged for me upon my stepping down as Chair of the Department in 1993.

- Arthur Mirsky

LIMESTONE COWBOY

Words by Arthur Mirsky and Marcia Moyer Sung to the Tune of Glenn Campbell's Rhinestone Cowboy

I've been walking these hills so long, prospecting as I go along,
I know every creek and outcrop along my way.
Where bonanzas the name of the game,
And good specimens are weathered by the snow and the rain.
There's been a lot of geologizing, on the road to my horizon,
And I wanna be where the geodes bigger than me.

Chorus

Like a Limestone Cowboy, collecting fossils and minerals everywhere I go, Like a Limestone Cowboy, getting fossils and minerals from people I don't even know, But will they make legends grow?

Well, I really don't mind the pain, and a find is worth the strain,
The work is hard and the strike is rare through a long day.
And I dream of the things I'll do,
With a 4-wheel drive and a lot of sample bags, too.
There's been a lot of geologizing, on the road to my horizon,
And I wanna be where the geodes bigger than me.

Chorus

Like a Limestone Cowboy, collecting fossils and minerals everywhere I go, Like a Limestone Cowboy, getting fossils and minerals from people I don't even know, But will they make legends grow?

I've been hitting these books so long, hearing the same old song,
I know every theory in these dingy books, the hard way,
Where geology's the name of the game,
And a job well done isn't done without any pain.
There's been a load of compromisin' on the maps I've been comprisin'
But I wanna be where the maps say I should be.

Chorus

Like a Limestone Cowboy, collecting fossils and minerals everywhere I go, Like a Limestone Cowboy, getting fossils and minerals from people I don't even know, But will they make legends grow?

Well, I really don't mind the rain, and a smile can hide the pain,
But you're down when you're walking the terrain, if you've gone the wrong way.

Still I dream of the rocks I can't see,

And the folds and faults that are hidden from me.

There'll be a load of compromisin' on the maps I've been comprisin',

But I wanna be where the maps say I should be.

Chorus

Like a Limestone Cowboy, collecting fossils and minerals everywhere I go, Like a Limestone Cowboy, getting fossils and minerals from people I don't even know, But will they make legends grow?

Just a Limestone Cowboy - yeah!

A Summer Vacation in the San Juan Mountains



Ouray, CO

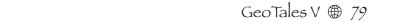
It was the summer of 1953 and I had a field assignment that was a geologist's dream... based in Ouray, CO, with a brand new Jeep station wagon loaded with equipment and orders to check the local mines, prospects and rock outcrops in the Ouray, Silverton, and Telluride areas for uranium mineralization. Three enjoyable months passed all too quickly

before early snow storms ended the field season. Extensive checking of over 100 mines, prospects and waste piles, and many field traverses with a Halross scintillometer yielded only a few minor traces of uranium minerals, but

nothing justifying further work. However, it left a young geologist and his wife, Joy, with fond memories that have lasted over 50 years...

A hair-raising trip down a steep mountain slope at the north edge of
Ouray as our Jeep station wagon (driven by my second field assistant)
accidentally left the road to roll and tumble end over end for several
hundred feet down the moderate slope before being stopped by a
sturdy mountain aspen ... at the edge of an even steeper drop-off of
several hundred yards!! A badly scared geologist and his field assistant
cautiously looked around then crawled out of the battered vehicle,
bruised and somewhat battered but otherwise unscathed by the wild
tumbling ride.

- Learning to beware of dry-rot in the old mine workings when I lightly tapped the 2x4 upright of a ladder with the tip of my rock hammer and it sank nearly an inch into the punky wood. The 1x4 inch steps broke like balsa wood when lightly tapped with the hammer.
- The birth of our son David at the San Juan Miner's Hospital where Joy was the only patient.
- Trading jeeps for a day at Telluride to get the use of the USGS crew's small army jeep for a trip to the top of Bridal Veil Falls where our station wagon had proved too wide and long for the upper part of the road. As we neared the area where our Jeep had been blocked, a rock in the roadway knocked off the pin on the assembly connecting the front wheels and we were left with no steering!! We managed to rescue the USGS Jeep by chaining it to the AEC Jeep station wagon and slowly easing down the switchback road.
- My introduction to the Ouray County Sheriff, "Bud" Scott, when my first field assistant had an epileptic seizure in the local cafe (and was transferred to non-field duties at GJOO).
- And finally, the confidence, patience, understanding, support and mentoring provided by Ward B. Meek and Jack Foran, my bosses at the distant Denver AEC office.
- Tom Loomis



Discovery of the Pacific/Anti-Pacific Hemispherical Symmetry in Global Tectonics

The early 1960s represent one of the most fascinating periods of exploration of our planet. Information regarding the geology of the oceanic lithosphere and the Earth's mantle was poor, at that time, and awaited exploration. Under the leadership of UNESCO international cooperation in Earth science research was promoted in the frame of special projects, such as the International Geophysical Year, I.G.Y., or the Upper Mantle Project, U.M.P. The world-wide installation of modern seismograph networks in the 1960s allowed a precise determination of the global pattern of seismicity,

marking the advent of the theory of plate tectonics. In the following years, new space techniques, such as VLBI, SLR and LLR, and the utilization of GPS, allowed an accurate determination of the Earth's gravitational field.

The influx of new observational data from all over the world stimulated the rise of new geodynamic hypotheses, the most

famous of them being the theory of plate tectonics. After some needful modifications, the theory is widely accepted today.

My special interest has ever been in late-Cenozoic tectonic deformation, active tectonics, recent crustal movements, and seismotectonics. In 1959

I was offered the post of a research geologist at the Institute of Geophysics of the ETH Zürich. For me a wonderful dream became true! The new job allowed a close contact with the latest data and results published in geophysical journals, and also with many colleagues specialized in geophysics.



So, in 1960-1962 I was involved in a fascinating innovative research toward a synthesis of recent and late-Cenozoic crustal movements on a global scale by use of geological, geomorphological and seismotectonic data, with emphasis given to the active strike-slip fault zones of the Eurasian and circum-Pacific orogenic belts. Relevant results regarding crustal movements were noted in a special volume of the Times Atlas of the World, which soon became my most precious book.

As a result of these investigations, the circum-Pacific and Eurasian orogenic belts were interpreted to represent a zone of intense crustal shearing and convergence located between two very large, expanding geotectonic units, the Pacific unit (centered in the central Pacific region; center P, at 170°W/0°N) and the Gondwana unit (centered in central Africa; center A, at 10°E/0°N). The same hemispherical symmetry or bipolarity is documented by the concurrent regular growth of the Pacific and African plates over the past 180 million years, and by the antipodal position of the two plates. The roughly concentric growth pattern demonstrates diverging movements of neighboring plates away from the Pacific and African plates, respectively, as they grew. This growth appears to reflect a regular, diverging flow pattern in the mantle upwelling beneath the two plates.

According to the geotectonic bipolarity model, introduced in 1969, a large-scale pattern of lithospheric divergence and convergence is produced by mantle convection, consisting of two torus-like convection cells, the Pacific cell and the African cell, with cylindrical upwellings

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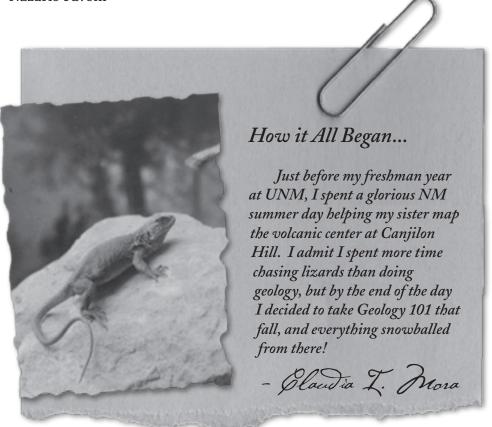
Impossible Tourney

below the Pacific plate (center P) and below the African plate (center A), and sheet-like downwellings in the meridional plane beween the two centers. This flow pattern, mathematically described as quadrupolar spherical convection, with axis of symmetry located in the equatorial plane represents a very stable configuration.

The residual geoid, proposed in 1980, as well a the seismic tomography model of the Earth's mantle published in 1996 express the same hemispherical symmetry and are in good agreement with the bipolarity model.

Strange to say, that during the past 50 years the geotectonic bipolarity model did not meet with approval from the part of the proponents of plate tectonics, although the model is not in contradiction with plate tectonics. So, let's look forward to the next 50 years!

-Nazario Pavoni



Once done with war, once done with my job as an exploration geologist in South America, I headed home to find the nation in recession. I stood in the unemployment line while sending letter after letter to anyone who might hire me until, one day, United Geophysical Corporation out of Pasadena caught me in their sights. They offered me a geophysical job, and took me on as a "doodlebugger." Although the job I felt was pretty shaky, I learned seismic, gravity and magnetic exploration pretty well. Then unexpectedly I got a call from the Geophysical and Polar Research Center of the University of Wisconsin. They, the Arctic Institute of North America and the United States National Science Foundation, were looking for geophysicists to go to Antarctica. It was part of the International Geophysical Year (IGY) and the successor United States Antarctic Research Program (USARP). Much in need of a secure income, still adventurous, and still youthfully naïve, it sounded great. I said yes. I joined a small team of scientist/mountaineers tasked with undertaking a risky but important journey, the Victoria Land Traverse (VLT), a deep penetration into then unknown East Antarctica. The mission was to explore Victoria Land, a 10,000 foot high ice plateau where no one else had gone before. An oversnow traverse of two-thousand kilometers, it had to be done within a four month window to avoid the killing Antarctic winter.

My team members (Frans Van der Hoeven – The Netherlands, Al Stuart - USA, Bill Smith - USA, Claude Lorius - France, Arnold Heine – New Zealand, Lou Roberts – USA, Al Taylor – USA, Tom Baldwin – USA, and Warren Jackman – USA) and I were flown to New Zealand, then sailed for Antarctica. Preparations for our journey were made at New Zealand's Scott Base on the northern edge of the Ross Ice Shelf. The journey was



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to begin in the Austral springtime, still some months away. By spring preparations were complete. Our three Tucker Sno-Cats, named Detector Cat, Seismo Cat, and Mess Cat, each towed a five-ton sled. Bound for the



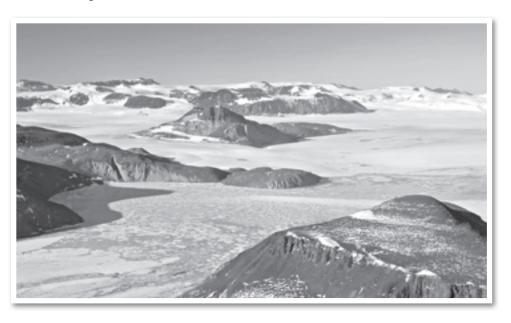
Skelton Glacier, the vehicle and sled loads included fifty-five gallon fuel drums, nitramon and seismogel explosives for crevasse detection and for our seismic work, frozen and dried food seemingly aplenty, a large selection of spare parts for the anticipated failures of the vehicles, scientific instruments

like seismograph, gravimeter and magnetometers, skis and mountain climbing gear. We were (we thought) quite ready!

The Victoria Land Traverse departed Scott Base in the spring, on October 16, 1959, and headed south. Our team of ten, destined to become eight before the trip was over, rumbled over the Ross Ice Shelf bound for the Skelton Glacier which was to be our highway to the sun, to the high East Antarctic Plateau. The trip across the ice shelf was good. The weather cooperated - until October 22nd when the wind and snow began to blow. The hard surface sastrugi worsened until we reached the foot of the Skelton Glacier on October 27th. There we found two supply caches, an Antarctic tradition of explorers on their return journeys, food left for adventurers who might follow. One of the caches had been left by Vivian Fuchs British TransAntarctic Expedition of 1955-1958, and the other by Albert Crary's traverse of 1959. Our Sno-Cat caravan set off up-glacier on the 28th, bound for the high plateau one-hundred and ten miles away, at the upper reaches of the glacier. Heavy crevassing soon greeted the team on the lower and mid-reaches of the glacier. Encumbered with their loads, the Sno-Cats and sleds broke through snow bridges repeatedly. The

vehicles or sleds sometimes lodged in deep and wide crevasses, threatening an end to the journey almost before it began. Strenuous efforts and strong ropes and timbers enabled the team, each time, to extricate the Sno-Cats and sleds, to carry on the journey. On November 7th we made it to the glacier's head, and there achieved the high plateau.

A day of repairs, retooling and other preparations was needed before heading into Victoria Land. There, katabatic winds blew constantly. The sastrugi therefore worsened. Sometimes four feet high, the icy mounds of snow were often impenetrable or, with determination, surmounted by the vehicles which took merciless poundings, as did the trailing five-ton sleds. No letup in the sastgrugi for the balance of the trip, breakdowns increased in number. Broken pontoons, broken tracks, broken fifth wheels, broken springs, frozen engines and broken engine parts occurred repeatedly. A breakdown, an equipment failure, happened every other day. But, we had planned ahead. On the five-ton sleds we had stored a treasure



of spare parts, though repair work in fifty degree below temperatures was demanding, progress was slow, but determined. And, over the entire traverse, exhausting hand-drilling for seismic soundings, gravity readings, weather condition recordings, elevation determinations, navigational

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positioning, and equally exhausting glaciologic pits were dug because, this also was a scientific expedition. Each day's travel netted some ten miles on the way to completing the more than two-thousand mile journey. Then, on Christmas Eve 1959, the traverse reached Station B-61, the inland station that had been achieved by a French traverse of the year before. Intended to be a deep penetration into Victoria Land, the French party was able to penetrate but three hundred miles or so from the Southern Ocean before



returning to their coastal base at Charcot. Having reached B-61, our team was elated. An evening of celebration, and precious bottles opened, we sat in snow drifts, well suited for imbibing. The team resumed the trek next day, on December 25th. The traverse turned and headed east, bound for the distant Ross Sea. There an icebreaker waited for us, its helicopter prepared to evacuate the team before the setting of the six month sun.

Still a long long way to go, and determined to complete the mission, the team remained strong, but the vehicles began to flounder.

Detector Cat, with a broken main frame, and its sled were abandoned, their good stuff moved to the sleds of the two surviving Sno-Cats and sleds. Team members from Detector Cat now slept in survival tents as the journey lengthened. Two thousand kilometers from the VLT's beginning, still bound for the Ross Sea, the traverse discovered a range of mountains. Pleased with our discovery, it nonetheless prevented the VLT from

reaching the Ross Sea, and our planned evacuation. No way now to make it to the coast, plans were being laid in Washington, and at NSF's base at NAF McMurdo to find a way to get us out before the setting of the sun. Still focused on our task, we thought little of the future.

Penetrating to the Rennick Glacier and amid the mountains, Al, Arnie, Claude and I resolved to climb the nearest mountain, Mount Welcome, discovered and named by the team. A long trek across the glacier, down into the windscoop, then up the mountain's walls, we were in our exhaustive glory. I collected rock samples near the peak, and later sent them to Ohio State for their Antarctic archives. Once the mountain was conquered, and with little strength remaining, we four made it down the cliffs, and headed in a grueling trek back to camp again. Once there, a radio message told us that the plans for our evacuation were unclear. The sun by now was setting. We couldn't make it to the sea, nor could the helicopter make it o'er the mountains. High sastrugi ruled out a ski-plane



landing. Plans, it seems, were being made to abandon the traverse and its team in the deep interior for the long dark winter. They would leave us stranded on the Rennick 'neath the gaze of newfound mountains. An airdrop of supplies for survival, a Jamesway insulated hut, and food to get us through the winter would be delivered by plane. Eight tired and trattered men would huddle in a ten by fifteen foot "igloo" for six months. Enthusiastic for our achievement, we found the plan, I must admit, a little bit discouraging.

A Long, Cold Night

With more incentive now, we searched intensely for a ski plane landing zone. We searched near the mountains, out on the plateau and up the glacier for sastrugi-free terrain, at first without success. Then came the break we were praying for. A somewhat questionable, but we were convinced suitable, landing strip was found up-glacier on the Rennick on February 8th, five days short of the closing four month window. Now 2,400 kilometers from the start, we were ready to go home. An intrepid U.S. Navy air crew decided to give it a try. A ski-equipped VX-Six R4D, on a second day's attempt, landed! The question now was - could it take off again? Loading only ourselves and some treasured gear onto the plane, the remaining vehicles and sleds were abandoned with their remaining cargos. A cache that now rests beneath the snow, it is unlikely to be accessible to later adventurers. With a questionable and dangerous takeoff (the plan endured damage from the sastrugi) we headed to NAF McMurdo on Feb 10, 1960. The team had met its goals. The Victoria Land Traverse had discovered the vast 1600km x 400km Wilkes Subglacial Basin beneath the ice of East Antarctica, discovered the Wilkes Land Gravity Anomaly, an apparent meteorite crater beneath the continental ice sheet, discovered a region of dramatically chaotic ice near Station B-61 related to ice streams that we now know supply the Mertz and Ninnis Glaciers on the coast,

- John G. (Jack) Weihaupt

Earth's last continent - Antarctica.

* * * *

found the upper reaches of the Rennick Glacier, and discovered a range

of mountains, since named the USARP Mountain Range. The VLT was

a scientific success, and a historic and epic journey into the unknown of

Acknowledgement and Epilogue: I want to thank and commend the members of the Victoria Land Traverse team. Both as individuals and as a close knit group they were unflinching in their dedication. Tireless, unselfish and devoted during a truly strenuous, dangerous and uncertain journey, their performance was commendable, and their contributions historic.

I was a junior transfer student at Stanford on a Friday afternoon in the early spring of 1961 when I met Ben Page in the hall of the Geology Corner. Page was then the chairman of the geology department and was then, as always, exceptionally friendly and helpful to all students. Bob, he said, "Are you going on the departmental field trip?" "No," I said, "I don't have a car." "Well come with me." he said.

So I rushed back to the dorm, got my 1951 Montgomery Wards kapok sleeping bag and everything else I thought I needed, and joined two other graduate students, whose names I have forgotten, on a late night rush to Oroville, California.

I no longer remember whose idea

it was, but we decided to spend the night on a concrete walkway under the covered walkway of an elementary school somewhere in the foothills of the Sierra Nevada. Ben Page asked me, "Bob, are you sure you will be warm enough?" I told him I thought I would be OK. This was before I ever heard of insulated ground cover, or Dacron, or any of the other synthetic fibers now used to insulate even the cheapest sleeping bags.

I was too cold to sleep very much and when I got up, I was completely numb from the bottom of my ribs to the tips of my toes.

I recovered after breakfast at a nearby restaurant. That day we trailed after Robert Compton as he explained the complex metamorphism that he had discovered in his masterful study of the Bald Rock trondhjemite batholith near Bidwell Bar. Even though it snowed and rained all day and the temperature was always near freezing, Compton was oblivious to the cold and wore only jeans and a light blue cotton work shirt.

The next day the sun came out and we spent a glorious Sierra spring day observing and discussing the glaciation of incomparable Yosemite Valley.

I have spent many cold and miserable nights all over the West but never again one as cold as the one I spent on the concrete of a school near Oroville. Nor have I ever regretted my decision to be a geologist.

- Robert McWilliams

Running on Empty

In 1971, following a graduate seminar on Franciscan rocks supervised by Eldridge Moores at UC Davis, we decided to visit areas under study by UCD students and others, including John Suppe of Princeton and Darrel Cowan of Stanford. UCD students of the Franciscan rocks in those years included Jim Berkland, Curt Kramer, Terry Kato, Mike O'Day, and yours truly. We made arrangements, offered invitations, and John flew in from the east coast.



In the Diablo Range, we visited my research area around Ospital (Hospital) Creek and Darrel Cowan's at Garzas Creek. I drove the group in a carryall van. The winter runoff, heavier than usual, had cut foot deep channels in the gravel fill of Hospital Canyon. Normally, I crossed inches deep channels in my car by getting a running start and just blasting across. I hadn't been in the canyon since the rains, and my method didn't work so well. After an unexpectedly abrupt stop, we learned that the right side of the axle had been knocked back, so that to the right we could "turn on a dime", but to the left a 180° turn required the half-length of a football field. While this created some inconvenience, we continued on.

Later, in Darrel's area, we drove into an isolated region perhaps 20 or more miles beyond the end of the paved road. At road's end, I parked on a stream terrace, we crossed the fence, and we explored some excellent

mélange exposures. Back in the van, I asked if it was clear to backup and turn, and received the "all clear." I backed a short distance, heard a loud screeching sound, stopped and pulled forward a bit, smelled gas, and saw the gas needle moving towards empty. For fear of an explosion, I jumped out and simultaneously yelled the alarm to the others. Once out, we looked under the van to see a 9 cm long, 2 cm wide hole gushing gasoline. I tore off my T-shirt and we found a stick to jam — with the shirt — into the hole in an attempt to stop the gas flow. I had backed across an unseen, vertical blade of Franciscan chert. We hastily headed for pavement, but it was clear from the fuel gauge that we were not going to make it. Darrel directed us to a ranch a few miles away, where we borrowed a bar of soap for the hole and a can of gas. The gauge registered empty, so periodically stopping to pour a bit of gas in the carburetor and gas tank of the sputtering van, we limped out of the range into Gustine. It was Saturday, late afternoon. Garages were closing and we searched for one that might



help us immediately — prodded by the fact that John had a flight back to Princeton the next morning from the Sacramento Airport, more than 100 miles away. Finally, we found a garage that would remove the tank, fill it with water, and weld the hole, while we had a less than gourmet dinner. John made his flight, ending this adventure in the Devil's range.

- Loren A. Raymond

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Streaking Down the Grand Canyon

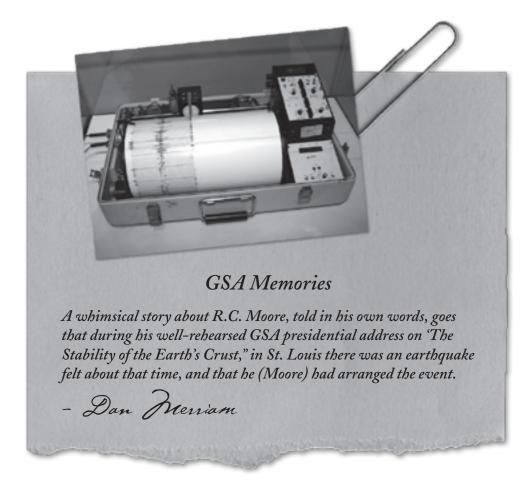
In the early 70s I was transferred from the NOAA Research Labs in Boulder, CO, to join the USGS at the Denver Federal Center. In 1975, as a paleomagnetist I joined one of Don Elston's famous oar-powered raft expeditions on a field collecting trip down the Grand Canyon. I had hiked down into the Canyon and joined the party at Phantom Ranch (passing many red-faced day-trippers on the trail). We were drilling at various sampling sites along the banks of the Colorado. At the time the rage on



campuses across the country was streaking. The week before, over 100 students had streaked on the campus of Northern Arizona University at nearby Flagstaff. I was drilling at one site along the river when I decided that I wanted to initiate the Grand Canyon into this fun, so off came the kit. After a while I heard in the distance the unenviable sound (to traditional oar boaters) of a big power raft belonging to one of the commercial river-running companies coming down the river. Funnily enough I realized that I wasn't hearing the usual Doppler drop-off in sound of the motor as it went by. I turned around and there was the big rig doing circles in the river, while twenty or so hooting tourists took photos of this naked wild man on the banks of the river. In those days I was Editor

of Geology, and when the GSA publications group got hold of one of the photos, they mocked up a cover for the magazine. However, management deemed it was too risqué even for those times. As a footnote, my wife and I were married the following year and we spent our honeymoon on another of Don Elston's Colorado river trips (on official business, of course) before hiking out at Artists Point. It was a bit of a surreal experience to have hiked up 12 miles of Tanner Trail and reach the parking lot, and then see tourists stopping in their air-conditioned cars, roll down the windows, take a photo, roll up the windows, and thereby "do" the Grand Canyon for the family album.

- Henry Spall

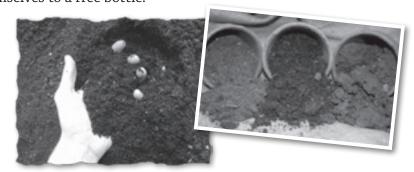


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Drinks @ Geomorphology

The 1976 GSA national meeting in Denver was memorable on two fronts. First, John Frye, the Executive Secretary at the time, had a meeting of the local committee. He asked me if I would be in charge of alcoholic beverages for the opening party at the Denver Museum of Natural History. I told him that I had the perfect student, one who knew all the beverage selections and prices in the region. So, Bud Burke and I filled a milk delivery wagon full with thousands of dollars of such beverages, and parked it in our driveway right under the bedroom window, so we did not get robbed. The next day we drove down to Denver and put on a party for some 4000 people, the most we have ever had at a party. We had one problem--as we delivered replacement beverages to the various stations throughout the museum, we had to ward off those partiers trying to help themselves to a free bottle.



The second front involved putting on a soil geomorphology field trip. Mike Machette had just finished his M.S. thesis on correlating the local alluvial sequence with Glen Scott's alluvial sequence, and he included the first quantitative soil data. He gathered a bunch of us to help out, including Peggy Guccione (showing off a class field project and with a newly born boy), Gergely Markos (doing some thesis work in the area), Rolf Kihl (of INSTAAR and the best laboratory technician west of the Mississippi) and Bud provided more quantitative soil data, and Pete added some sites from his soils and Quaternary stratigraphy courses. Alas, on the morning of the field trip it snowed. My students grabbed brooms, swept the outcrops, and we had a successful field trip. Our photographs show a long line of participants marching across the snowy prairie, in search of soils.

- Pete Birkeland

It had been a cold night in our field vehicle. We had not come prepared to spend the night, so despite the fact the weather was good in October we were unprepared for the cold. We parked on top of one of the river terraces so we had a view of front of the mountains, and if Dave appeared we should surely be able to see him. Neither Tony nor I got much sleep that night, being concerned about Dave's whereabouts and safety. As the sun came over the Sacramento Mountains to the east, we started the car and drove down the four-wheel drive road towards the main highway. It

was then we heard the helicopter. It was a small military chopper flying low from the south, generally along the main highway leading north from White Sands Military Headquarters. As we pulled out on to the main highway, the chopper made a large circle

and landed on the highway. Out climbed an Air Force officer in full dress uniform, ducking the chopper blades as he made his way toward our vehicle. As we stepped out of the car, the officer yelled, "Have you found him yet?" No, we had not found him.

It began the previous year, in 1972, when I received some funds to study the Precambrian rocks in southern New Mexico. Very little was known about these rocks at the time. I was going to focus on the granites, especially those exposed beneath the Cambrian-Ordovician unconformity in the San Andres Mountains between Socorro and Las Cruces, New Mexico. Because most of the study area was on the White Sands Missile Range, we had to obtain special permission to work in the area. Tony Budding, also on the faculty in the Geosciences Department at New Mexico Tech, was going to help with the field work and petrographic description of the rocks.

After what seemed to be an endless amount of paper work, the Missile Range finally approved our project, provided we had a government security officer with us at all times. We decided that we would spend one day a week during the fall and spring in the field, since these were the only times of the year it was not too hot or too cold. Each time we entered the Missile Range, we had to meet our military escort at Stallion Site, the northern entrance to the Missile Range. Our escort, Roberto, was a Spanish-American, and he came dressed in full uniform with nice shiny black boots. We intended to spend most of the day climbing over rocks and arroyos, something that didn't particularly appeal to Roberto. So we decided to make traverses along the front of the San Andres Mountains, mapping the Precambrian basement rocks. Roberto was very happy to let us off at one point in the morning and pick us up later in the day at a predetermined location at the end of our traverse. In fact, the government unknowingly provided us with a free field assistant!

During the latter part of the summer, we had a post-doctoral research fellow from Miami University join us in the field. He was going to collect granite samples for Rb-Sr radiometric dating to complement our field and geochemical studies. We shall call him Dave. Dave arrived in Socorro in late September in a beat-up jalopy with a large dog. He had had very little field experience, but assured us he could get along fine. So to cover more



territory in the field with the limited amount of time allotted to us by the Missile Range to complete the field work, we decided to break up and cover three traverses each field day, instead of one. This was no problem for Tony Budding and me, both of

whom had been doing field work in the Southwest deserts for many years. However, this was Dave's first encounter with the desert.

It was a warm, clear Friday in early October 1973, when the four of us pulled up to a large arroyo in the southern San Andres Mountains. I would take the first traverse, Tony the second, and Dave the third, each about 8 miles in length. Roberto would let each of us off at the start of our respective traverses, and then pick us each up at a specified time later

in the day. Each of us had our lunch and plenty of water for the day. I met Roberto about 4 PM at our pre-determined meeting place and then we moved on to pick Tony up at about 4:30. From there, we drove back out to the highway and then south to the dirt road that would lead us to the

arroyo in which we would meet Dave at 5 PM. We arrived a little early, and thus began to look at some of the rocks in the vicinity.

Come 5:30 and Dave had not yet appeared. Well, perhaps he had miscalculated how long it would take him, and he was running late. Roberto called

he was running late. Roberto called in the White Sands security office and indicated we were running late. He was

not really unhappy about this, since he would be paid overtime.

By 6 PM, Dave still had not showed and we were beginning to be concerned. Both Tony and I had White Sands call our wives and let them know we were running late. By 7 PM the sun had set and it was beginning to get dark. What should we do? Perhaps we should start looking for Dave, but our chances of finding him in the dark were small. We did wander back along his traverse for a ways, calling out his name. Nothing! Roberto now called his office indicating that Dave had not showed up, and soon after the Missile Range security office officially listed him as missing.

We were soon joined by a group of military police who began to search in the immediate area where we thought he should be. Surely, if one is lost, we would expect him to move to high ground and build a fire. The Missile Range had by now contacted the Las Cruces Search and Rescue team, and they were gathering their group together and heading for White Sands. It was after midnight when search and rescue arrived. They had first aid equipment, ropes, high-powered flashlights and numerous other items for emergency rescue. They lined up and began a major sweep along the mountain front where Dave was supposed to have traversed. Tony and I stayed at the vehicle with Roberto, who had now transferred to a military

jeep, and was carrying on radio conversations with the Headquarters. We could see the line of lights of the rescue team as they faded into the distance. Surely, they would find Dave.

It seems to me someone sent some sandwiches out from the Headquarters during the long night. In any case, the temperature dropped to close to freezing as it does in the desert in the fall. This gave us greater concern for Dave's safety since he did not even have a coat with him. It was very cold even in our field vehicle, and we still had a long night ahead. The vehicles that brought the search and rescue team left and moved north during the night, and that was the last we saw of the group. We heard later they had traversed the complete distance along which Dave should have come, yet found no evidence of his whereabouts.

Needless to say, we were both glad to see the sun come up over the Sacramento Mountains and begin to warm the vehicle. Where was Dave? Was he hurt? Did he fall someplace, was he unconscious? What should we do next? We then heard a small military aircraft flying close to the mountain front, looking in all the canyons.

After a short discussion, the military officer climbed back into his helicopter and took off. The helicopter started to search the arroyos and flew close to the mountain front, as if looking for Dave in the mountains. It was about then that we saw the military jeep rapidly approaching us from the south. It squealed to a halt near our vehicle and out climbed Roberto. It was obvious from the way Roberto was responding, that nothing so exciting as this had occurred at White Sands since he came on base. He ran over to us yelling, "They've found him. He showed up at the guard station 20 miles south of here." We spoke to Dave on the two-way radio. He had spent the night in the bottom of an arroyo, some distance from where anyone expected him to be. Curled up with his dog and a small fire, he was probably warmer than we were. The next morning, instead of heading to high ground where he could be seen, he continued down the arroyo to the main highway, where he was picked up by a patrol vehicle and taken to south gate. All is well that ends well. Nonetheless, I think we all learned a lesson from this experience.

- Kent C. Condie

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