AUTOBIOGRAPHY OF ROBERT EVAN SLOAN

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INTRODUCTION

At the time I write this (August 1995 to April 1996) I am a full Professor of Geology, at the University of Minnesota in Minneapolis, who has taught geology to some 18,000 students, trained some 3000 people to shoot, collected many hundreds of thousands of fossils, written some 90 professional papers, 4 books, 80 articles on narrow gauge railroad history and model railroading, and 10 pieces of teaching software. I have produced 13 Ph.D. students, most of whom are now professors themselves and 17 master's students who are professional geologists. I will teach at the drop of a hat, usually without notes, and usually by telling stories. I have never been bored since I learned to read. I have been married to the same very exciting woman for 42 years and have two daughters, two nieces and two nephews. I will not have any grandchildren, so I will be remembered only professionally, by my students and my nieces' and nephews' children. I have been very pleased with my choice of paleontology as a career, it isn't everyone who has gotten to do as an adult just what he wanted to do as a child.

I was blessed with high intelligence, a great memory, both verbal and visual, developed fully three-dimensional thinking, became a story teller of some renown, and so have had some success in my chosen career. While retyping my great grandfather Evan Wiggle's autobiography, I decided it was time to write my own. It is for several uses: some of it is for my family and the endless detail about new and valuable fossils may bore them, but it is also for my colleagues at the University of Minnesota to give a record of events that otherwise will disappear. The family stuff may bore them.

I have been interested in the evolution of mammals and have studied, in particular, the late Cretaceous and Paleocene fauna of Montana. I have also investigated factors leading to the extinction of dinosaurs. I am an acknowledged authority on Paleocene terrestrial stratigraphy in North America. I maintain a long-term interest in the stratigraphy and faunas of the Ordovician of southeastern Minnesota. Currently, I am investigating the biostratigraphy, evolution, and extinction of the trilobites of the Ordovician of the Upper Mississippi Valley region

My mind is analytical. It works in ways it appears many of my students' simply cannot. As an example, when I would design a locomotive kit, I would carefully construct the entire locomotive in my mind, going through every single operation mentally before I even started drawing parts or writing instructions. I mentally saw every single stage in the construction, and used that to help design the parts so that others would not have problems with the kit. Having completed the order of operations, I would then write the instructions even before I got the finished parts back from my producers. I very rarely had to revise them after the parts arrived and I built the pilot model. The same thing applies to my habit of lecturing without notes. I have the entire course in my mind, as a set of concepts to be covered in a particular order. When I have finished with one concept, I then go on to the next, and simply explain them, usually with stories of how the ideas came to be developed. The point is to stress just how ideas develop, that they do not come full blown out of someone's mind, fully developed like Minerva from the brow of Jove. It does help that all this is organized in my mind so that one concept automatically suggests the next. My mind works like a disk drive so that as I read something new and exciting, it automatically gets introduced into the correct place in the sequence. The next time I teach the new material is in the right place, the obsolete material is edited out, but not forgotten, at least not right away. What this means is that I have never given the same course twice. As I lecture, I sense how the material is getting across, by

carefully watching certain students, to see by their expressions whether the material is getting across. I pick these students by watching to see just who is paying attention among the students in the front rows. I generally just maintain eye contact with the students in the far back of the room, many of whom are simply serving time.

Sources for this epistle are my field notes, university personel file, National Guard 201 file, birth certificate, passports, university vita, Olson's Autobiography, Bretz's history of the Chicago Geology department, Schwartz's 1972 history of Geology at Minnesota, my publications, family letters, and of course my memory which is very good for trivia.

...SINCE I LEARNED TO READ

CHILDHOOD

I was born on July 17, 1929 in Champaign, Illinois at Burnham City Hospital. My folks, Jess Evan Sloan and Fairy Precious Schwartz Sloan were then living at 1015 West Main, Urbana Illinois, the twin city to Champaign. Dad was a student in Electrical Engineering at the University of Illinois. In effect I was the firstborn, since my elder brother had died of meningitis at 7 months. My brother Dale Norman Sloan was also born in Champaign on August 1st 1931. When I was about two, I was visiting my Schwartz grandfolks in LeRoy. My uncle Norman had filled a cup of kerosene and left it on the table in the kitchen. The cup was the same type of cup I normally used, I grabbed the cup and drank it all before anyone could stop me. My mother made me vomit right away, but my stomach and esophagus were badly damaged. For several years all I could keep down was Ovaltine, and I was a very sickly kid until I was about 8 or 10. At 16 I could not run 600 yards. My altitude limit is not far above 10,000 feet, and it is only with great difficulty and many rest breaks that I could walk up a mountain slope, even when I was in my 20's, let alone when I was 51 or 64. I have no memory of the kerosene event, my first memories are of playing in a chicken wire pen in the backyard and of digging cicada (17 year locust) molted shells from the hollow base of a tree in the front yard.

Another early memory from Champaign is watching a movie, Tony Sarg's 1933 production of "Alice in Wonderland" in which Paramount stars had bit parts wearing heavy rubber costumes matching the Tenniel drawings. Edward Everett Horton, W.C. Fields and Jack Oakie were all there, Gary Cooper played a bit part as the "White Knight" in a very early role. My only other early memory is of being carried on my Dad's shoulders at the Chicago World's Fair in 1932, I was higher than I had ever been, and I remember two things vividly. One was walking under the neck of the life-sized *Brontosaurus* in the Sinclair exhibit, and looking up at that head so very much taller than I was, the other was looking at a display of *Dimetrodon* and *Edaphosaurus*, mammal-like-reptiles from the Permian of Texas in another oil company exhibit. This event may have been the initial impetus to my career. My memories of this event were affirmed exactly when I found a book by Donald Glut on dinosaurs in popular culture in which photos of the exhibits were given. On the grounds of the fair there were touring busses made of blue tractors and white semi-trailers with open sides, longitudinal seats, low to the ground and with fringes on the sides. Norm and I had some toy models of these trucks and trailers that lasted throughout most of our childhood. I grew up in the depths of the depression, we never had much but used books were always available.

Pop never did get his degree in Electrical Engineering, the Depression, working full time with two kids stopped it. In 1933, Jess could no longer afford to continue working in Champaign,

so he quit and leaving Fairy and the boys there, went back to work at the main headquarters of Montgomery Wards on the near north side of Chicago. There he saw his old boss, Adam Williams who has been promoted to Chief Electrician on the retirement of Mr. Wilberham, the former Chief Electrician. The only work Adam had for Jess was part-time work at 65 cents an hour bossing a crew of 50 laborers cleaning and painting the entire mail order house. The laborers got 25 cents an hour. Jess, despite the "part-time" job, worked 11 hours a day for a year. At the end of that time he was put on permanent payroll at a slightly greater salary where he remained for 5 years. He stayed at Wards in the Electrical department until his retirement in June of 1966, at age 65, a total of 33 years continuous employment at Wards plus the earlier 4 or 5 years before he left school for the last time.

In 1934, Fairy and the family moved to a rented house at 5619 Trumbull Avenue, about a mile east of the Chicago Midway airport. They stayed at that house until January 1937. Next door to us there was a family with a boy, Billy, about the age of Norm and I. He was our main playmate those years. Because I was sickly, Mom kept me out of Kindergarten, I did enroll at the local elementary school for the first year and a half. While living there we were often taken over to Midway to watch the planes take off and land. Sometime about the time we moved, Dad and Mom took us over to Midway Airport, then the main airport for Chicago, and we were given a ride in a big blue Fokker Trimotor, taken out of regular airline service after being replaced by the new Douglas DC3. It was a short ride, perhaps 15 minutes and I can remember vividly the views of Chicago at dusk.

In January 1937 our folks purchased a tiny one story house without a basement at 10147 South Wallace Street in Fernwood, from an old friend, Dacy Neece. The house was cheap, and Jess figured they could expand and remodel it. Over the next four or five years Jess and Fairy's brother Norman jacked up the house, and hand dug out a basement out of the stiff blue clay of Glacial Lake Chicago, built a new concrete block foundation, poured a new floor, and installed a new coal furnace. Bob remembers carving figures out of the clay, and building toys from the piles of scrap wood. They were remodeling that house clear into the late 1940's, one of the first projects was completely replacing the stairway to the attic which we used as additional rooms. Mom had fallen at the top of the very steep stairs with 8 inch risers and 6 inch treads. She fell down the complete flight of stairs. precipititating the complete redoing of the front rooms of the house, for a new stairs. Later they raised the roof about 4 feet, adding a second story instead of the attic and later added a kitchen. Fernwood was a small neighborhood of Chicago, which was originally a stubborn independent suburb completely surrounded by the big city for several years before being annexed.

We had several door to door peddlers that came around regularly. There was fruit and vegetable man who used a horse drawn wagon for several years before switching to a truck. For several years we had an ice box instead of an electric refrigerator. We would put a square card in the front window with the number of pounds of ice we needed pointed up. The amounts were 25, 50, 75 or 100. Then he would use his tongs to pick up the block of ice, hoist it over his shoulder on a leather pad, and carry it into the kitchen and put it in the top of the ice box. Once as week a junk man would come around looking for scraps for recycling. His call as he drove up the alley was "Rags-O-Lia", an abbreviation for Rags Old Iron.

Fernwood was a middle class neighborhood, where the men went to work wherever, and the wives stayed home to raise the kids and keep the house. It was an urban equivalent of the modern suburbs. There was a major shopping area, Roseland another annexed town, about a mile east of Fernwood. Lots were mostly 25 feet wide but most houses were on two lots. Every one

burned coal, and had a coal bin, ashes had to be carried up the basement stairs to the alley for pickup. We produced about two bushel baskets of ashes a week, I did the hauling. I also did the grocery shopping, our folks ran a tab at the local store. I do remember being told to ask my folks for some money for the bill. There were inevitable errors, I remember bring home expensive ground steak instead of cheap ground beef, at the time I couldn't remember the difference, I did thereafter. I also took the coal money to the Van der Meer coal yard about a half mile away.

I transfered to Fernwood Elementary School for grade 2B. The teacher had each of us bring a wooden matchbox full of buttons to school for counting in mathematics, I was indignant, I already knew how to count, add and subtract. There were several kids in the area that we played with throughout our childhood. They were Eston and Lois Ellis who lived just to our south, Donny Matthews who lived directly across the street, and Stewart Woodward who lived to our north. We played all the usual kid games, but chiefly alley baseball, and street football. The baseball was a big softball that was so soft, the pitcher had to squeeze it back to round after each pitch. I preferred baseball to football and still do. After I went to college, I lost touch with most of them except Stewart.

Dad's cousin and foster sister Mary Lowe and her husband Ed worked for the Royal American Shows, a traveling carnival outfit. When young she had been a stunt person, riding a hinney (cross between a donkey jenny and a horse stallion) bareback off a diving board into a tank of water. When Norm and I were about 9 and 11, the carnival came to a field about a mile away. and we were invited over to their trailer for a few days of continuous carnival. She did ornamental glass work, and he made and repaired all the neon signs for the show. We had free passes for all the rides and had a great time. Many years later when our girls were a little bit younger than Norm and I had been, Mary and Ed were at the Minnesota State Fair, and our girls had the same treat.

Another relative that had us over many times were Aunt Ida Richards, and her daughter Mary Richards Roland. Both were widows by then. Aunt Ida was the sister of my grandmother Ella Mae Sloan Wiggle. Her husband Uncle John built the counterpart of a modern recreational vehicle on a truck in the late 1930's. May's husband Don Roland was a naval officer and was killed in 1942 in a sinking on the Murmansk run in WWII. When we visited we played pinochle all day long and had a great time. Mom was once frustrated with Norm and said "I'd sell him for a penny with a hole in it!", Aunt Ida looked in her purse, and sure enough had a penny with a hole in it, and ever after claimed Norm as her own.

Mary Roland owned a cabin on Silver Lake near Tomahawk Wisconsin. Many of her friends and relatives borrowed it for summer vacations. In about 1940 and 1941 we were given the use of it for two weeks both summers. Fairy's parents joined us along with Uncle Norman, they brought along their homemade rowboat, the "Mary Ann" Our folks fished during the day and played pinochle late into the night Norm and I played cards on rainy days, and fished for sunfish off the dock, dangling worms in front of the sunfishes noses. It was a pair of delightful vacations.

Very early I developed speed reading techniques on my own, involving minimum lateral eye movement and reading down, sentences rather than words. Through most of my adult life I could read a mystery or science fiction paper back novel of some 250 pages in 3 hours or so. This helped greatly with technical reading as well, though in that case I usually read things several times, occasionally word for word. Because of line length, paper backs and two column journals were easier to read than full page width paragraphs. One thing I found was that in fully justified type it

was more difficult to read than using ragged right. With few words per line, and large words, the spaces become so large that it is difficult to read.

During the Depression there was a strange psychology that can be found in the magazines of the era. I seriously doubt that most historians would think to look at them. No one had any money to spare, and there were three magazines that were very popular. When founded in the 1880's, Popular Science was very like Scientific American today, the founder of our department had a subscription to the magazine that became part of the Winchell Library. By the Depression, it, Popular Mechanics, and Modern Mechanix (the Fawcett version, later Mechanics Illustrated) were magazines with many ideas for the handy man to build machines, cars, boats, guns and tools from scraps for little or no money. Popular Science ran a monthly story about Gus Wilson and his Model Garage, where useful bits of automotive repair were presented in story form. Pop bought the first two every month, kept them, and I read them all from cover to cover. They taught me many aspects of fixing things at an early age.

As a boy growing up in the Depression, like most others, I learned to be resourceful. Christmases were always slim, by modern standards, what we got usually came out of Ward's Employees Bargain Room, where customer returns that could not be restocked were sold cheaply. The most exciting part of Christmas was the annual Christmas toy catalog that appeared late in October. It was about 64 pages long, had some color pages but was mostly black and white. It was our wish book, both Norm and I spent many hours looking over the featured toys of the year, making hopeful plans. One of my favorite toys was a small monoplane racing airplane which my Uncle Norman had carved from wood and painted.

Whiile I was in grade school, Ivory Soap had a contest to see what kids could carve out of soap, they also gave instructions on how to do it. So a great many kids bought a bar of Ivery and carved things from it, I was one of them. Much later I needed some skulls of mammal-like-reptiles for teaching purposes. A. S. Brink published some particularly good drawings of what turned out to be a baby *Theriognathus*, and a baby *Cynognathus*. I carved them from Ivory soap bars, and Don Wallace and I made rubber molds to cast a plaster version considerably more permanent than the soap carving. They have been very useful.

We always wanted a bigger A.C. Gilbert Erector set, the US equivalent of Meccano of Great Britain. These came in several sizes, from tiny sets that would build a few very simple things to monster sets in a steel chest that could build many very large constructions. They had steel beams, plates, pulleys, wheels, shafts and collars, all held together by short 8/32 machine screws and nuts. We had had some small partial sets, and finally we were given a large set, all were missing pieces, but we pooled all of them in the big box and had a ball. We added small electric motors, including one that Pop had had as a boy, and built not only the items shown in the books but designed those of our own. The surviving pieces are now owned by my nephew Dan. Gilbert also made Chemistry sets, we had one. We never could afford his American Flyer trains, they were too expensive.

Standard construction materials for toys and models were the Cedar Cigar boxes, today replaced by cardboard, and wooden Velveeta Cheese boxes, again replaced by cardboard today. These were beautiful knot free pine, 3/16" sides and bottom and 3/8" ends, that would just hold a Velveeta brick, and were held together with very nice small headed brads that could be reused. They were free for the asking at grocery stores. Since I did the grocery shopping from an age of about 10 on, I brought many of them home. They cut very easily with coping saw or knife and chisel. I built many cars and planes from these.

We often visited my mother's folks in LeRoy Illinois, where I continued to build things. I played with a boy across the street who had a large overgrown vacant lot next door. I remember very vividly an incident that happened about 1939. I found a cracked baseball bat. I converted it into a model of a 37 mm field cannon with a pair of wagon wheels and some 2 by 4's. (That cannon, though nearly useless, was popular in magazine stories about the Army manuevers going on as part of the rearming.) We fought the battles of the early WWII in that lot with the cannon. Another time my uncle Norman celebrated July 4th by sailing several tissue paper hot air balloons powered by candles. They rose into the air glowing from the candle light, a very memorable sight. We never had firecrackers larger than the zebra crackers (about 2 inches long and 1/4 inch in diameter), lady fingers (1/8 inch in diameter and 3/4 inches long) were much cheaper and we had many of those as well as sparklers. Uncle Norman did set off a few rockets for us. My brother and I spent some time each summer in LeRoy, these were always idyllic. I remember the fourth of July parades with veterans of the Civil War being honored, the bandstand in the park in town with brass band concerts, and the semi-pro baseball games on the edge of town.

As the family grew older I inherited many tools I had used as a boy, my workshop includes tools used by both of my grandfathers, my father and my father in-law, as well as those I have bought for my self. Sal claims I have too many tools, but many of them -apparent duplicates- in fact are highly specialized and are best for particular chores.

In Fernwood we attended Sunday School at the Fernwood Methodist Episcopal Church a block away. I only remember a few things about Fernwood Elementary School, Miss Bertha Van De Roovart was the music teacher, and I remember Mrs. Gradwell, my 5th grade teacher who was universally known as Mrs Crabwell. She made an impression on me, I suspect because she recognized my school problems as being underchallenged. I was given a special reading assignment to tear up 6th, 7th and 8th grade readers and turn them into remedial exercises, writing questions for my fellow students to answer. Since I was sickly, my folks had found a secondhand bookstore about a mile away, in Roseland, and had been bringing books home for the family. I went through everything I could get my hands on, I remember reading Parker and Haswell's College Zoology and understanding all of it when I was about 8. The principal, Miss Alice Wentworth had my IQ tested while I was in 7th grade, much later I found out it had measured 152. In about 7th grade I got the nickname of "Professor" which tickled me a great deal although it was not always meant in a kindly tone. Our folks put Norm and I into Band in about 1939. Norm got a second hand Cornet, and I got a used C-Melody Saxophone, both were cheap old intruments. Our instructor was Captain William Burnham, Captain by courtesy, since he had been an Army Bandmaster in WWI. He was the band instructer at the Christian Fenger Senior High School, and had a whole series of "farm" bands at all the Elementary and Junior High Schools that fed Fenger. This made his career at Fenger certain as there was always a ready made crop of new candidates coming up. I stayed with the saxophone until I left for college. After that I had no time for it. The repertoire was mostly marches and waltzes.

I became a fairly good technical artist very early. Among the books available to me were texts on mechanical drawing from my Dad's manual training, I taught my self perspective from books. I remember drawing cartoons of the WWII Disney Gremlin characters and excellent drawings of P-40 fighters and other planes while in the 6th & 7th grades

We had a console radio in the living room, and a small table radio in the dining room, as well as still another in our attic bedroom. I remember while at college listening to the Steinway Symphonic hour at night while going to sleep. It was on the dining room radio that that we listened

to the kids afternoon and early evening programs. They included the Lone Ranger, the Shadow, Terry and the Pirates, Captain Midnight, Little Orphan Annie and others. Of course we succumbed to the offers for "Secret Decoder rings". We also listened to the Cubs ball games. They weren't any better then than they are now.

My folks were conservative as to politics, they were raised in areas where you were born a Republican. They were also very conservative as to music, they liked the popular sheet music of the 20's and early '30's, couldn't stand swing and hated jazz. Concert music was highbrow, OK but not for them.

Mom was a den mother, and both of us were in Cub Scouts, from ages 9 to 11. I moved on to regular Boy Scouts a year late at 13, and rose to be a Star Scout, dropping out when I was 16 and went to the University of Chicago. Mr. Thorp was our scoutmaster. We did the usual day hikes, and cooked out.

Early on Mom took us to the museums downtown as well as to the Museum of Science and Industry. There my favorite exhibit was undoubtedly the complex O gauge train layout used to demonstrate automatic train control and signaling. By the time I was 10 we were trusted to take a mile long street car ride, and an 8 mile commuter train trip to the Field Museum, which was always my favorite. I loved all the exhibits there, although the fossils were clearly at the top of the list. On Saturdays the museum had educational movies that were free, and Norm and I went to many of them. We got to know the Museum very well indeed. We also knew the Shedd Aquarium across the outer Drive, and to a lesser extent the nearby Adler Planetarium. I was completely fascinated by the Field Museum, loved the fish at the Shedd, made a special effort to learn the classification of fish, and enjoyed the Adler. The Adler cost money so we didn't go there as much as to the others. I also remember the Paddle wheel aircraft carriers that the Navy had converted from excursion boats. They plied their way up and down the shore of Lake MIchigan, and carrier qualified many of the Navy pilots of the war.

I remember vividly the Sunday morning, December 7th, 1941, when we were in the living room, and heard the radio report of the attack at Pearl Harbor. The next day, the entire school assembled in the main auditorium to hear the radio broadcast of President Roosevelt to Congress, and the declaration of War. We all cheered. My folks had been die hard isolationists and Republicans, continually muttering about Roosevelt, but the signs had been coming in regularly for a year, we would not stay out of the war. Before the war we had been reading comic books in which it was very clear that the good guys were opposed to Hitler. The DC comics were the top of the line. I do remember reading Superman issue number one. Batman, Flash, and the Green Hornet were also comic book heroes Disney had Donald Duck and Mickey Mouse comics. There were also books like "Blackhawk" with heroic freedom fighters against the evil Nazis. They were a dime for a 64-page book. Dimes were scarce so we swapped around.

In 1942 our folks had their 4th son, James Richard, "Jimmy Dick", born on June 11th. It was a difficult pregnancy for Fairy, and she ailed for the rest of her life. Jimmy was a difficult, headstrong child. Both of us older boys baby sat for Jimmy often. I remember vividly taking Jimmy many times for a walk in his stroller, our standard trip was a half mile east to a small park half a block wide and two blocks long next to the tracks of the Chicago and Eastern Illinois railroad to watch the commuter trains. They were hauled by old small 2-6-0 Mogul steam locomotives and consisted of about four or five 60 foot commuter coaches.

While I was at Fenger, Norm and I became members of the Morgan Park Baptist Church, a member of the Southern Baptist Convention. We joined mainly because there was a very active teen group there. Somehow the southern Baptist fundamentalism in scientific matters never came up, or I would have been upset. I was active in many of their outreach activities, and twice gave a short sermon from the pulpit. This was my last formal church affiliation.

After graduating from Fernwood at the end of 8th grade, in June, 1943, I moved on to Morgan Park Junior High, for my Freshman year. I was immediately part of the football marching band. and continued through my Sophomore year at Fenger. Our band was an ROTC band. Those that I remember from the Fenger band are my closest friend in the band, Neil Bushey, the trombonist, Val Cantarucci, the showoff drummer who often broke out into jazz drumming, figuring himself another Gene Krupa, "PeeWee" Ritthaler, the clarinetist who was very very good, and of course the Cadet Captain leader of the band, the senior Roy Simpson. Fenger was the winningest football team in all of Chicago. we were still playing at football games in March. The ROTC Cadet Captain of the band, Simpson, was also on the 5th string football team. He only got to play one game, the one against Chicago Vocational. which we won with a score of 64 to 0, our illustrious captain was sent in late in the game, fumbled and was immediately taken out. He did get his letter.

I greatly enjoyed Geometry, it was my first exposure to formal logic structure. I also greatly enjoyed my Freshman General Science class taught by Mr. Eugene Jaros, who introduced me to the structure of Science. Both had major impact on my career direction. They added to my desire to become some sort of Scientist.

COLLEGE

In early Spring 1945, as a result of machinations by the school academic advisors, my old classmate from Fernwood, Harold Zimmerman and I were sent to the University of Chicago to take a day of entrance and scholarship tests. As a result, both of us were offered admission to the College, and I was offered a full 4-year scholarship. My folks were not at all sure I was ready for college, but the full tuition finally made the decision, and in the fall I entered the college. In those tests, I had placed out of nearly a full years worth of classes, and took the remaining class, German that Summer. I passed German with a bare D, but studied that fall on my own, retook the final and raised my grade to C. It was my only C in College. In all I got 4 degrees from Chicago, a Ph.B. (Bachelor of Philosophy) in Liberal Arts in 1948, a B.S.in Geology in 1950, an M.S. in Geology in 1952 and my Ph.D. in Geology in June 1953. So seven years after leaving High School at the end of my Sophomore year without a diploma, I had my Ph.D. The only reason I took so many degrees was the Korean War. Every time the war got hotter and it looked like I might have to go on active duty, I applied for the highest degree I was entitled to. Chicago was the first place I really had a peer group of my own level, very bright 16 year-olds, and returning WWII vets under the GI Bill who were bound and determined to catch up what they had missed. I never missed those last two years of High school, I had been mainly marking time. I was elated, finally I was with a group at my own level and was not being held back. In many ways the most important were the former Air Corps and Navy pilots who were equally bright and helped me grow up in my final teen years, they put up with me and provided a great role model. My College was inexpensive for my folks, I lived at home, Pop simply changed his driving route to work to go through the U of C campus and dropped me off in the morning and picked me up at night.

I remember well Millard Pierce Binyon, and Harold Hayden, who taught us Humanities 1 in which I rapidly developed my interest in Classical Music, which has lasted throught the rest of my life. At night I would listen regularly to the Steinway Symphonic Hour, sponsored by the chain of Steinway drug stores, before going to sleep. Stuart Northop was my professor in Mathematics 1, in which we developed all of algebra, and trigonometry, all on a postulational basis. I was a real pest in that class, the text was offset printed from a typed manuscript, and I carefully found typos and other errors each day and announced them to the class. Math 2 was Analytic Geometry and the beginnings of calculus and group theory. That was the only trig I ever had, but I have made very good use of it. I placed out of the first two years of English courses, my instructor in English 3 was Frederick Papp, I survived with an A by spouting off his opinions on the final without learning very much. My Natural Sciences 3 was in large part an analysis of Speman's work on the developmental embryology of frogs, in which we read all the original papers in order to see how the hypotheses had developed. That ultimately proved useful as a model.

I also remember that one of my classmates in the required men's Phy Ed course was William Grunfeldt Heerens, who murdered two student nurses that first quarter. It was a sensational trial.

I held several student jobs, one of them was with the athletic department, grooming tennis courts. I learned how to really use a spade, which came in very handy as a paleontologist. One of my chores was to spread dry clay over the court, then rake it smooth and level, raking out the stones. It takes a special knack to spread clay with a spade.

I finished off my first degree, the Ph. B., Bachelor of Philosophy in Liberal Arts in June, 1948, having had enough money in the scholarship to take an elective course the entire last year. I had known since grade school I was going to be some sort of scientist, but couldn't decide whether Physics, Mathematics or whatever. As to why I wanted to be a scientist, it sounded cool, finding new things out and expanding knowledge, finally I was good at it. I had read extensively the popular literature in Relativity, Quantum Physics, Non-Euclidian Geometry, and was attracted to all of them. I took the Introductory Geology sequence from Ninian A. Riley as my elective course in 1947-48, got an A in the course, and decided then and there I would be a Geologist of some sort. My folks then paid tuition for one year, while I majored in Geology. I also pledged and joined a fraternity, Beta Theta Pi, Lambda Rho chapter, where I was #586 in the chapter roster. Two of my fraternity brothers were also in the Geology department, David Krinsley and Bob Lindblom.

My fraternity activities took an academic toll, and I dropped one course each quarter. Having done so I got straight A's in the rest and made the Dean's List that Spring! I always thought that was cheating somehow. I went inactive in the fraternity after that year. I then became a full graduate student and applied for and received the Chicago Natural History Museum Fellowship, worth $1000 a year which I was given each year until I finished. That took care of the rest of my tuition. I had planned not to bother getting any degrees between my PhB and the PhD, but politics decided otherwise. When the Korean War began on June 25th 1950, I immediately filed for and got the Bachelor of Science in Geology that year, fearing our unit would be called up and sent to the front. As it happened, there were two National Guard Divisions in Illinois, the 33rd in the Chicago area, and the 44th in downstate Illinois. The downstate division, mostly Republicans went off to the war, and the Chicago Division, mostly Democrats stayed home. I always felt guilty about that as well, since I was very naive, not understanding the politics of the situation until much later.

As a Geology major at Chicago I became a member of the Luncheon Club. J (no period!) Harlan Bretz had started it during the Depression. It was a co-op , we had a kitchen on the 4th

floor of Rosenwald hall, and we ate in the basement of Walker Museum. Fortunately the buildings were connected at all levels and there was an elevator. Originally male only, by my last year it had become co-ed. We had a regular rota. one pair cooking each week day and another pair washing dishes. Others shopped at the Hyde Park Co-op. My partner in cooking was my good friend Ernest G. Ehlers, who went on to Ohio State as a mineralogy Professor. Meals ran to Spaghetti and meatballs, Chili con Carne, Beef stew, Spanish Rice and others for variety. It was cheap, filling and very welcome to poor and starving graduate students. Fridays were reserved for coldcuts, cheese and beer. I remember well Lee Horberg's class in Geomorphology. It was at one o clock in the afternoon in a well lit warm classroom with lots of south facing windows. Lee had a very soft voice and spoke in a monotone. Fridays, after the beer much of the class (occasionally including me, I am ashamed to admit) fell asleep, lulled by the professor.

My professors were D. Jerome Fisher for Mineralogy and Crystallography, Robert Balk for Petrology and Structural Geology, Francis J. Pettijohn for Sedimentology, Lee Horberg for Geomorphology, Robert Lee Miller taught Biostatistics, J. Marvin Weller for advanced Invertebrate and Stratigraphy, Heinz Lowenstam for introductory Paleontology and Everett Claire Olson (Shorty to his fellow faculty, Ole to his students) for Vertebrate Paleozoology and Cranial Morphology (Comparative anatomy of the head). Another member of the staff who helped me greatly was William Schmidt, the departmental machinist. He helped me learn metalworking on the side. Besides the professors I learned much from Bob Miller and Nicholas Hotton, both of whom had recently finished their degrees with Ole.

Although Bretz was retired, he was still a regular around the department, and I was fortunate enough to work for him drafting the illustrations for his last, most convincing Journal of Geology paper on the Channeled Scablands of Washington State. I also worked as an undergraduate for William J. Plumley running a tumbling barrel to find out how rapidly and by what curve cubic blocks of brick were rounded. I had a chance to design a large part of this experiment which pertained to his PhD thesis on stream gravels. I also worked part time in the Geology-Geography library in Rosenwald Hall, shelving and becoming well acquainted with the journals.

Weller taught and required a detailed knowledge of invertebrate morphology and taxonomy, which was very helpful in my development. E.C. Olson and his student Robert Lee Miller who took a lot of statistics from Kruskal, stressed statistics and vertebrate morphology and ecology. Both of them stressed the basic texts of the New systematics, and I read them all carefully. These texts had as much to do with my development as my professors. Huxley's "New Systematics", Mayr's "Systematics and the Origin of Species", Dobzhansky's "Genetics and the Origin of Species", De Beer's "Embryos and Ancestors", Simpson's "Tempo and Mode in Evolution", and the Simpson and Roe book "Quantitative Zoology" became my major texts, and the 1949 Princeton book "Genetics, Paleontology and Evolution" edited by Jepson, Simpson and Mayr was equally important. Less so was Allee, Parks, Parks, Emerson and Schmidt, the ecology text commonly known as "the Great APPES", it was full of special cases with no generalizations. Emerson taught my course in Ecology and Evolution, I don't remember much of it, which means it was not as important to me as Sewall Wright's courses. Much more useful later on was the new style 1963 "Ecology" text by Eugene P. Odum. On anatomy, De Beer' s "Structure and development of the Vertebrate Skull" was very important, followed much later by my discovery of the "Structure and Development of the Vertebrates" by E.S. Goodrich. It wasn't assigned for my comparative anatomy course but the conclusions from it were there.

My typical day at Chicago was arriving on campus about 7:30 in the morning, attending 4 classes a day, spending the time between classes at the Reynolds Club while I was in the College, some time on the rifle range, reading in Harper Library (often browsing in Britannica at random), discussing the whys and wherefores of the world at length, and then being picked up by Pop at about 5:30 PM. After I switched to Geology, I spent more time in our two adjacent buildings. They were Rosenwald Hall where most of the geology lectures were given, and the geology-geography library was located; and Walker Museum where the paleo exhibits were located on the ground floor, the paleo courses were taught on the second floor and where I had an office after I became a grad student. Weller taught taxonomy, invertebrate phylogeny and morphology, Ole taught vertebrate paleoecology, and vertebrate evolution, Lowenstam taught marine paleoecology and how important it was. Kappa Epsilon Pi, the local geological fraternity sponsored lectures/ seminars every week. The paleo students hung out together all the time.

When I was just beginning Graduate School in the fall of 1948, (the boundary between undergraduate and graduate student was entirely fictional in my case) I asked my advisor, J. Marvin Weller, if there was a research project he could suggest. He suggested the subject of the Pennsylvanian snail, *Glabrocingulum grayvillensis*, which was originally described by Norwood and Pratten in 1847 as part of their pioneering study of the Geology of Illinois. Marvin had noted that the type specimens of *Glabrocingulum grayvillensis* from Grayville Illinois, near where my Great Grandfather had mined coal, were different from the usual specimens, in that the apical angle was greater by about 10° than the usual specimens found most places. This might have meant that most of the snails usually called *Glabrocingulum grayvillensis* were actually a different species, and I could name it. The Walker Museum collections at Chicago were very large and had many snails of this genus. After measuring several thousand snails of this type from all over the midwest from Texas to Ohio, I concluded there was no great difference in time or space, it was just a variable species. In the process I borrowed the type specimens of the genus from Scotland, reillustrated them, discussed other species of the genus from many parts of the world at that time- the Pennsylvanian Period, and eventually published the article with the Field (Chicago Natural History) Museum. This would be the equivalent of my Master's Thesis.

I had taken Introduction to Paleontology with Heinz A. Lowenstam in the first quarter of the 1948-49 academic year, followed by Advanced Invertebrate Paleontology with J. Marvin Weller in the rest of the year. In the 1949-50 year I took the year long sequence in Vertebrate Paleontology which was given down at the Field Museum in the Paleo labs on the third floor. It was there that I learned to drink coffee. Orville Gilpin was the principal fossil preparator, and brewed a fresh pot of boiled coffee mid afternoon every day. The class would take a break and go to Gillie's lab to see what he was doing and to have a cup. There never was any sugar of cream, so I learned to drink it black. Robert Denison of the museum gave the Paleozoic Fish part of the course, Everett Claire Olson of the UC gave the primitive tetrapod and mammal-like-reptile part of the course, Rainer Zangerl of the museum gave the rest of the reptiles and Brian Patterson of the museum gave the mammals. Ole was a Professor, the others were all curators at the Field Museum. Each was lecturing on his own specialty, and was one of the peak professionals in the world! My fellow students were Robert Bader, Ernest L. Lundelius, Richard Beerbower, Ralph Gordon Johnson, and two others Gordon Thurow and another whose name I do not remember,.that did not turn professional. This was what Ole called his finest class of his career, the next year all of us, together with Richard Konizeski, (who had been hired as curator/preparator of fossils at the Walker Museum at the University) took "Cranial Morphology of the Vertebrates" taught by the above curators and Dwight Davis of the Zoology department at the Field Museum. Davis was the person who finally

demonstrated that the Giant Panda was a weird bear, while the Lesser Panda was a modified raccoon and not closely related. All of us students took several courses together, Alfred Emerson's course in Ecology and Evolution and Sewall Wright's spectacular courses in Genetics, Population Genetics, and Evolution. I never did take elementary Zoology, just jumped right in to graduate courses. That old Parker and Haswell text I read at 8 or 10, the Natural Science 2 college course that stressed Developmental Embryology, and the Paleo background were the reasons I could do it.

At the conclusion of the year's classes, Ole threw a party at his house for all the students. That party made an impression on me, and for many years I followed suit with my own graduate classes.

Bryan Patterson (Pat to all of his students and friends) was an interesting character. He had been a corporal in WWI, and became a fossil preparator under Elmer S. Riggs at the Museum. Eventually he received a Bachelors degree. But in the mean time he started doing field research in western Colorado and writing papers on his own. He became the curator of fossil mammals at the Field Museum when Riggs retired, and was widely regarded as one of the top Vertebrate Paleontologists in the world. Just before I was there, he, Rainer Zangerl and Bob Denison were on the way to Austin, Texas to attend the SVP convention there. They stopped on the way at some exposures in the Trinity Formation of Early Cretaceous age. At that time there were about 10 specimens in the whole world of Early Cretaceous mammals, none of them from North America. Denison announced he was going to find a Cretaceous mammal, and did! It was named *Astroconodon denisoni*, the "lone star tooth found by denison". Pat then wrote an important treatise on the theory of mammal evolution and those Early Cretaceous mammals. After I left, Pat was offered the position of Alexander Agassiz professor of Paleontology at the Harvard Museum of Comparative Zoology, a high position he shared with Romer and Simpson. His lectures were superb, and taught me much I was to use later. Some of his casually dropped ideas turned into important conclusions for Leigh and I, in particular his casual suggestion that mesonychids were the ancestors of whales, now fully documented, but never before offered in print when he mentioned it.

Pat told us many stories about the profession, one I particularly remember was about *Dinohyus hollandi*, a Miocene entelodont the size of a buffalo. O.A. Peterson was a scientist at the Carnegie Museum in Pittsburg. He worked on the Miocene of Nebraska, and one year found a complete skeleton of a giant entelodont, a relative of pigs. The museum director was W. J. Holland, a possessive director in the style of Marsh and Osborn who was want to declare himself senior author on any paper written by his staff. Peterson saw this coming and told Holland, "Come see this new entelodont, I plan to name it for you." That of course foiled Holland's plans. The specimen was duly prepared, mounted and put on display. The museum had a party for the unveiling and asked the reporters in. The next day in the Pittsburg paper there was a 2 column story on the front page with a photo of the skeleton, and a headline that read "Dinohyus hollandi, the world's biggest hog!"

In Walker Museum, there were daily coffee sessions in the morning where all the paleontologist gathered together. We met in Dick Konizeski's second floor lab where we boiled coffee over a gas hot plate. Those usually there were Ole, Konizeski, Ernie Lundelius, Dick Beerbower, Ralph Gordon Johnson, Bob Miller, Nick Hotton (when around), John Clark, and Judy Weiser. Early in our relationship, John Clark gave a wolf whistle for some reason. Just then Sal turned the corner, it was her first viisit tio the coffee group, and she was wearing a particularly flattering outfit. John was immediately embarassed! Sal and Judy got together one day and cleaned the coffee pot, which had lots of old moldy grounds caked in the bottom. They were ostracised for

a day or two, with some of the crew saying the coffee had no flavor! Judy wound up marrying Ernie Lundelius and later got her PhD.

Ernie had a surplus 1903A3 Springfield as issued. Having built my own rifle I offered to restock it for him. He bought a Bishop stock blank. and I inlet the rifle into the stock and reshaped it. In the processs of reshaping it, I had occasion to take off a lot of wood. As usual I used an axe, chopping against the grain. Ernie cringed at the sight, but as I expected all was well (or I wouldn't have done it). In the academic year 1951-52, I lived on campus in Marvin Weller's house along with Ernie. Other than that I lived at home my entire college career.

After I met Sal in 1952, I started smoking a pipe, I had many of them, and usually smoked either Edgeworth pipe tobacco which came in a blue tin or Douey and Egbert's flavored tobacco. I chain smoked pipes until about 1966 or 1967 when Sal had become highly allergic to tobacco of any sort. With a choice of divorce (which I didn't want) or quitting smoking, I quit. I gave all my pipes and tobacco away to a graduate student Noel Potter, and quit cold turkey. I did keep my Calabash pipe with the meerschaum bowl (Sherlock Holmes) because I couldn't bear to part with it for years.

In August of 1952, my official major advisor, J. Marvin Weller, took off for the Phillipines on a two-year project for the US Geological Survey. So I finished my invertebrate thesis under Ole. That meant that there was no one to teach the introductory paleo course, so Ralph Gordon Johnson and I were hired to teach it in Fall quarter. One of those students wanted to go on in paleo so I gave him Advanced Invertebrate Paleontology in Winter and Spring. This student was David Raup, who ultmately went on to the National Academy of Sciences. It was a very peculiar thing, Dave's first two research projects, on molluscan shell structure and the optical orientation of calcite crystals in echinoderms, were both developments of ideas I had given him in those two quarters.

My scientific lineage is O.C. Marsh who trained Henry Fairfield Osborn who educated W. K. Gregory who trained Alfred Sherwood Romer who trained Everett Claire Olson, who trained me. Stuart Weller trained Heinz Lowenstam and J. Marvin Weller who both trained me, Finally John Clark and W. Charles Bell had great influences on me.

John Clark had done his PhD thesis on the Chadron Formation of the Big Badlands of South Dakota, publishing it in 1935. He had found and mapped a great unconformity with over 200 feet of relief at the base of the Chadron. H.F. Osborn had written a great monograph on the titanotheres, with a large part of it from the Chadron Formation. He had drawn many evolutionary conclusions and had made species based on the evolution of these beasts in the Chadron. But Osborn had not known of the great river channel at the base of the Chadron and did all his subdivision of the stratigraphy based on the distance above the base of the Chadron. This put fossils of very different age in the same level and once corrected by Clark's thesis, made much of the monograph solemn nonsense. There appears to be little variation of titanotheres in the Chadron and they all appear to belong to a very few species at most.

In mapping the Chadron, John knew that any rock names he proposed for the three members of the Chadron would very likely be used to form time subdivisions, and to try to forestall this he chose the most uneuphonious names he could find for the members. They were in order, the Ahearn ranch, the Crazy Johnson and the Peanut Peak members. The inevitable happened and the corresponding time terms became the Ahearnranchian, the Crazyjohnsonian, and the Peanutpeakian.

During the war, John was in the Army in the Pacific theater, and was given an assignment to do a solo reconnaisance across China and Mongolia behind the Japanese lines. He drove the whole

trip in a jeep, and totally wore the jeep out. In the middle of war torn China he found an old dump of tin cans left from an old army encampment, melted the solder off the cans to get the lead-tin alloy to make new bearings from the solder. He made new piston rings from the steel sides of the cans, after which the oil consumption and compression were much improved. When he finally returned to the coast and reported his results, he told us "they pushed his battered jeep off the dock!"

After the war John had been an advisor to the Kingdom of Hunza, located between Pakistan, India and Nepal high in the Himalayas. John told those of us budding paleontologists in the Walker Museum Coffee Club many tales of Hunza. The one I best remember was about an invasion by Pakistan to conquer the kingsom. The Pakistani were using modern weapons, Hunza had not had to fight a war for many years, and their main arm was vintage 1600 matchlock Samarkand muskets. Now Hunza had no lead deposits since it is composed of highgrade metamorphic rocks. So the Hunza army instead used the dodecahedral garnet crystals so readily available in the schists of the country to load their muskets (I shudder to think of the effect of the hard garnets on the mild steel barrels). The Pakistani hauled Hunza before the UN claiming the use of garnets as projectiles was against the rules of war, and was cruel and inhumane. After investigation, the UN ruled against the Pakistani, saying garnets were inert to humans, far more so than lead, and their use was far from inhumane!

William Charles Bell was a Michigan PhD student of Cambrian and Ordovician brachiopods when he came to Minnesota in 1946 after a career as an Army Air Corps Navigator in WWII. He started at Montana under Charles Deiss, and considered E.C. Case of Michigan his mentor. He was here for 9 years, producing 4 MS students, and 6 PhDs. Two of these theses were on the Cambrian of Texas, two were on the Middle Ordovician of Minnesota, one on the Permocarboniferous of Colorado, and all the others were on the Cambrian of the St. Croix and Mississppi Valleys. Of these 10 students from Minnesota, 8 went on to be active paleontologists: 2 in industry, the rest in Museums or Universities. All were very influential. Because he could not get along with Fred Swain (they had many conflicts on the best way to train students, and Charley simply couldn't stand Fred's methods), Charley left for the University of Texas, at Austin where he continued to produce spectacular paleontologists. Most of the modern Cambrian trilobite paleontology in the United States was done by students of Charley. At the request of George Thiel, I became his Teaching Assistant on Geology 115, the two week long Southeastern Minnesota Field Geology course in 1953, just before I replaced Charley. When I arrived in the Twin Cities from Guard Camp at Camp Ripley, I checked in at the Department, but Charley had already left for the St Croix that day. So Fred's student, John C. "Chris" Kraft, showed me around the campus, around Dinkytown and put me up for the night. The next day Charley took the course to Lake City where we looked at some of Dick Grant's newly finished MS thesis localities in the Franconia Formation. These included the Lake City section 3.9 miles east of the Stone Pier, at Maple Springs, Reads Landing, and at the Wabasha section from the St. Lawrence to the Oneota along Highway 60. The next day we looked at the Biesanz Quarry in Winona and at the local Franconia section in Winona, at Lamoille Spring along Highway 61 (where Sal and I ultimately built our retirement home) and finished up at La Crescent, looking at the bluff with Galesville and Ironton Formations, where I slid down about 40 feet of Galesville Sandstone. We also went to Hell Hollow in Houston County where we exqmined the entire Franconia Formation in its most offshore exposure in Minnesota. We stayed at a motel in La Crescent. It was in these localities that Charley intoduced me to very rapidly evolving fossils, in the stratigraphic interval just following a biomere extinction, although no one as yet had connected the extinction with the rapid evolution. Never before had I seen such evidence of very rapid

evolution, I suddenly became very conscious of the extreme detail really necessary to do good paleontology. Some of those zones are less than 10 feet thick. The rest of the last week we went to Fillmore County to examine the thesis localities of Mac Weiss in the Middle and Late Ordovician. We stayed at the Park Hotel in Preston, where the students could bunk in the attic for a very cheap rate, I remember $2 a week. We looked at eight Platteville sections, a Decorah section, the type Cummingsville section and Rifle Hill, as well as the Devonian Cedar Valley and the Lanesboro highway section from the base of the Oneota Dolomite through the "Root Valley", now the New Richmond Sandstone and the Shakopee Dolomite. In the Platteville we measured the sections to the inch, and assembled a detailed cross section showing changes in facies, as well as traceable beds in the form of "Corrosion zones" or hardgrounds, and the beds around the Carimona and Decorah bentonites (now called the Deicke and Millbrig K-bentonites). I became a student of Charley's for that week and found him a better stratigrapher than anyone at Chicago. He had a very great impact on my career in that 8-day period.

On Sunday when the course was over, Charley showed me some of the more critical localities in the St. Croix that I had missed while at guard camp. These included the Hudson section, Middle Dam (a classic Dresbach trilobite locality), "Nigger Coulee", north of Hudson, where the Aphelaspis zone was to be found in outcrop (I have no idea what to call that locality in these more modern and enlightened days. It is in the literature with that offensive name!), and finally the classic graptolite locality in the St. Lawrence Formation at Afton, now destroyed by the relocation of the highway.

DEATHS OF PARENTS

Charles Crippa died of a pleural cancer unexpectedly to us in November of 1971 while we were in Washington DC for an SVP convention. We knew he was ill but had not been told just how ill when we left for the convention. Sal's mother Sally died 10 years later in 1981, we had been in phone contact, continuously, but again her death was a surprise. Sal's uncle never forgave Sal for not being on the spot when she died.

Jess died on November 26th 1978, a Sunday, at 11:15 AM of a third and massive heart attack, after a week's hospitalization for a minor heart attack and massive lung congestion. He had been a cigarette smoker since his late teens, this type of congestive heart failure is aggravated by smoking. He entered the hospital in Mason City about 5:30 PM the previous Sunday. He was cremated and the ashes dispersed. I visited him three days before he died.

Fairy followed him, dying on the 25th of March, 1981 at Mason City of heart failure. She had contracted diabetes in the fall of 1961 and was not as mobile as Jess was for many years. She also was cremated and her ashes dispersed. Again I visited her the week before she died.

In the late 1970's and the 1980's we got into a regular routine of visiting Sal's widowed Aunt Betty in St. Petersburg, Florida over the Christmas break. We would take her out to Busch Gardens, to Seaworld and to Disneyland and Epcot Center. I would do all the little things that needed fixing around her house. We always took bags of fruit from her very fine Mineola Orange tree and her Grapefruit tree. Nothing beats tree ripened fruit. On one of those trips to Sea World, Sal and I were walking from the Killer Whale exhibit back to the main area, and met a young gull on the sidewalk. Just then a big gull flew down and chased the little on away with a series of loud squawks. I duplicated those squawks exactly in a loud deep voice and chased the big gull away, he never knew what got him but the little gull did and came back!

SHOOTING

During the first year of college, I was in a required men's Physical Education class, that covered a potpourie of sports. During Fall quarter, half of it was a six week course in Rifle Marksmanship. Pop had been a great hunter as a boy and still hunted occasionally when we kids were small, but his opportunities became fewer and fewer with the house and growing responsibilities. He had promised to take both Norm and I out hunting but other things got in the way and he seldom went hunting. He did take us out once and let us blast a fence post with a .410 shotgun. So I jumped at the chance to do some shooting, and it really caught on with me. It was the first sport I was ever any good at, and I rapidly became part of the University of Chicago Rifle Team. Within a year I had set a national Junior record which lasted a year or two. My Coach was Frank Joseph Karcher, he and his wife Myrtle had no kids of their own. I became sort of a son to them. I built my first target rifle from parts given me by Karch, a Stevens 414 single shot action, a used Winchester 52 heavy barrel, some obsolete old Vaver sights, and my own stock. The metal work was done by the head of the Gunsmith Shop at Wards, where Pop worked. It worked fairly well but it frequently broke firing pins. During the school year we shot in the Midway League with weekly matches around Chicago. During the summer, we shot prone outdoors at 50 and 100 yards, and 50 meters. Once or twice a year we would shoot with other colleges, Wheaton or Northwestern, or in a Collegiate Regional match. While a junior, I set a few National records, none of which stand today. When I was 18, Karch took me to the 1947 National Matches at Camp Perry, Ohio where I competed as a Junior for the last time, competitor #891, using a borrowed Winchester 52 heavy barrel rifle. My very first rifle was a Mossberg .22 bolt action given to me by my Dad, which I later swapped to my Uncle Norman for a Winchester model 69 .22. To that rifle I added a good Redfield peep rear sight, and later restocked it, finally giving it to my nephew Danny, many years later.

Karch and the rest of the senior members of the U of C Rifle Club had run a major preparatory marksmanship class for several years during the war, They had rebuilt about 16 Winchester 52 target rifles to new condition, and used dummy rifles made of scrap M1 Garand stocks, lead filled heavy dowels for barrels, simple sights and surplus slings for position training. This was all done according to the instruction program worked out by the National Rifle Association and the Infantry School and used at the Small Arms Firing School at Camp Perry both before and after the war.

The University of Chicago Rifle Club had two 50 foot ranges. The first was in the famous West Stands of Alonzo Stagg Field, that had also hosted the first nuclear reactor during WWII. That range had 4 points each in four bays, facing both north and south. The range was infested with 3 inch long cockroaches, and sometimes in the late evening, we would shoot our rifles from the hip, trying to cut cockroaches in two with the bullet as it ricocheted. We got fairly good at it. Shooting is a head game. Anyone can shoot one perfect shot with a little training. The trick is not making mistakes. Most of the mistakes are psychological, and are self-induced. One of the standard tricks we used to induce confidence in our shooters was a single shot standing match. Each member of the team would ante up a penny (then worth about as much as a dime is now) and then each of us would take a single shot standing. The person with the highest score would take the pot. If two or more were tied for the high score, we anted up again and the pot rose in value. It was a very inexpensive way to teach shooting under pressure.

Eventually the west stands were destroyed. For a couple of years we were a peripatetic team shooting nothing but away matches. Eventually I found that it would be possible to erect a 2 1/2" wood wall and roof of timbers inside the steel frame of the grandstand in the Field House. It

would stop .22 bullets at a glancing blow which was safe enough. We had all the steel from the backstops in the old range, so that was not a problem. The workers of the Athletic department then erected it according to my plan. We were able to erect a four point range and were back in business. We had enough rifles for the 16 point range, so we sold off extras to club members at reasonable prices. That was when I got my Winchester 52 standard barrel 54101B.

Besides the indoor ranges, we had a 100 yard outdoor range in the north east corner of Stagg Field, shooting north, inside the 15 foot high concrete walls. Some of the neighbors would complain of the noise of 22 caliber rifles, especially on Sundays. I once shot a 1" group on that range, which was very good. One summer I worked for Montgomery Wards, and bought an Argus spotting scope, which we still have. Another summer my folks bought me a Remington 37 target rifle as a special birthday/graduation present. When I decided in 1955 I would not sell my Mauser 30-06, it was the Remington that went to make a mortgage payment on the house at 984 St. Paul Avenue.

While there were many members of the club and team during my seven year membership, those that I remember were Al Demmler, who was a year or so older and had a Remington 37 match rifle of his own. Robert McFerron was a member and was also in my fraternity. John Wainhouse was a very good friend. Alyce Kahn was a tiny redhead with one leg shorter that the other as a result of Polio, she was very good. Robert Reagan, supposedly a cousin of the then movie star, later President Ronald Reagan was a member for a year.

The team regularly shot in the Midway Rifle League with teams all over the city. Other teams included Consolidated Bridge and Iron, a YMCA, and about 5 other teams besides us.

As a dedicated rifleman, I read all the back issues of the *American Rifleman* around the range, and heard all the tales about high power rifles so I wanted a 30-06. A friend from the rifle club, John B. Stetson took me out to a range in the Indiana Dunes, (now covered in freeways) and let me use his 1917 Enfield and some government ammo to qualify as an Expert Rifleman on the first try. I was hooked. A friend of mine from church had a WWII souvenir German Mauser 98 which had been lying about his basement since the war, it was red with rust, I got it for $10. John traded me a brand new Johnson Automatics 2-groove barrel he had bought from the DCM at the same time as he bought the Enfield, for 6 boxes of semi-smokeless match 22 ammo. Karch gave me a new Lyman 48 rear sight for a flat top 52, and I took the package to a gunsmith who put the barrel on the action, chambered it for 30-06, blued it, swapped the sight for a Lyman 48 for the Mauser and mounted it. I blew $6 on a fancy front ramp and mounted a Lyman 17A front sight from a junked rifle at the range. Pop gave me a $8 Bishop stock blank, and I suddenly was in business with my very own, low budget 30 caliber target rifle. I still have that rifle, I have shot over 12,000 rounds of ammo through it and it is on its 4th barrel. It has been my target rifle, deer rifle (though I never saw a deer in season) and squirrel rifle. For squirrel, I loaded my own cartridges, a light 100 grain hollow point cast bullet I cast myself, and enough fast burning powder to give it 1600 feet per second. This load was wicked on squirrels, It shot groups of 4" at 200 yards, and would decapitate squirrels, you only took head shots, it was also very quiet, not much louder than a 22. I have shot it from every range from 50 feet to 1000 yards.

While still a graduate student, I purchased a British war surplus Colt New Service revolver in .455 Webley for $15, stripped off the bluing in HCl, reblued it, made new stocks and new adjustable sights, and converted it to shoot the US 45 ACP service cartridge with half moon clips. That was a simple job of chucking the cylinder in Bill Schmidt's lathe in the Geology shop and facing off the

rear of the cylinder about 1/16 of an inch to provide clearance for the 3 shot half moon clips. It was very accurate even though the chamber was slightly oversize and cases bulged. I qualifiedwith it at my first guard camp as an officer, shooting against the regular model 1911 Colt automatics, I beat every other officer with it. Ultimately I sold it to one of our PhD's at Minnesota.

After I joined the National Guard, I rapidly became the Battery's prime instructor on a variety of topics, including shooting, maps, and surveying. It started with marksmanship training. I would get a rifle team going in whatever unit I belonged to, and the other team members would become my cadre of instructors. There was a call for those who wanted to try out for the 33rd Division Rifle Team. At the same time the 44th Division, the downstate national guard, also issued a call. I went to the tryouts and did very well right from the start. There were weekend team practices at Camp Zion on the shore of Lake Michigan about 3 miles south of the Wisconsin line. Once I was on the team, I could draw a jeep from our motor pool and use government gas to drive there, eat in the messhall and sleep in the barracks. Free ammo was issued, we were told not to turn any back in. So we shot and shot. My closest friends on the Illinois Guard team were Sergeant First Class Johnny Freitag, an old shooter from prewar guard teams, Sergeant August "Red" Garleff, a welder who had served in the Americal Division in the Pacific, and his buddy Sergeant Willard "Swanny" Swanson. Sergeant First Class Bill Blum from the Ordnance Company in my armory was also on the team and we often drove up together. The others were Major Theodore Urbas, and Colonel Earl Cosby, the coach. Every year in September there was a major match, the Bliss Match, held at Fort Sheridan, 15 miles closer to Chicago. The Army Reserve Team, Great Lakes Naval Training Station, the Illinois State Civilian Team, National Guard and a few other teams always entered. We had been issued some new Springfield 1903-A3 rifles for team use, but they did not have the best sights for target shooting. My Mauser was one of the best rifles on the team, and it got shot a lot. I can recall one weekend when I shot most of a 1500 round case of 30-06 ammo myself! We always placed well and one year, 1950, we won it.

After I transferred to the Minnesota National Guard and the 47th "Viking" Division in 1953, I joined the Minnesota Guard team, and rapidly improved to be the best shot on the team. In 1956 to 1959 I was always sent to the National Matches at Camp Perry Ohio, as a member of the team for two weeks each year. Regular members of the Viking Division team besides me included Lt Col. Edward E. Teske of Northfield who was always the team Captain, Captain Clarence A. Trosvig of Fergus Falls who was always the team coach, Captain Henry M. Fauskee of Worthington, Captain Jerome Motzko of Alexandria, Lieutenant Donald G. Anderson of Lake George, Master Sergeant Clinton W. Weber of Faribault, and Corporal David G. Weise of Long Prairie and others. There were about 3000 competitors each year at the High Power Service Rifle National Matches. Since my way was paid, Sal went too and entered as a competitor, her expenses were only about $5.00 per day. It was a very inexpensive vacation for the two of us. Each year we drew a newly rebuilt National Match M1 rifle for use in the matches, and there were always service armorers to do further final fitting to make then shoot as well as they could. In 1958 I drew Springfield Arsenal NM M1 X6001063 (the X was added because somehow the arsenal had built two rifles with the same number.) This rifle was the best M1 I had ever had and it was sufficiently good so I was not equipment limited. I placed in the top 10 percent (top 300) of the National Trophy Individual Rifle Match that year with that rifle, which gave me the first and most important of the 3 "legs", the "Perry" leg, and a bronze excellence in competition medal. The rifle was sufficiently good that we decided to spend the $103 to make the one time purchase. A sergeant from the Army Advanced Marksmanship Training Unit offered to glass bed it, and we let him take our brand new rifle with him to Fort Benning. After writing him about Christmas time, it finally came back even better than

it had been before. In 1959 at Perry I was made part of the All-National Guard team, the top 10 guardsmen in the US. I was of course the top man in the Minnesota Guard, and the leading member of the "Governor's Ten."

While at Perry we always made a trip or two to South Bass Island out in the middle of Lake Erie. You could go by ferry or you could fly the shortest International Airline on the continent. It flew 1929 Ford Trimotor airplanes with the corrugated aluminum skin and 97 foot wingspan, from Port Clinton to the islands and on to Canada across the lake. They held 13 in wicker seats, and someone always got to ride up in the cockpit with the pilot. Those planes were the school bus, the ambulance and the hearse for the island. When it was my turn I found it flew exactly the same airspeed as my Champ, took off at 45 mph, cruised at 95 and landed at 45. It just had two more sets of engine instruments. visible through the window. South Bass was a peculiar place,.5 miles long with an airstrip and two wineries. There were no taxes on the island, once each year there was a wine festival, with three circus tents, one with food, one for dancing and one for wine. They ran the entire island on the proceeds of that festival. The taxis were all old four door convertibles, with the top down. I can recall once the whole team was on the plane and one of the engines hiccupped. We all joked "save the wine!", because we were all bringing some back.

The normal matches were 20 shots standing at 200 yards, 20 shots sitting rapid fire at 200 yards in 50 seconds per 10 shot string, 20 shots prone rapid fire at 300 yards in 60 seconds per 10 shot string, and 20 shots slow fire at 600 yards. We also occasionally shot 20 shots slowfire at 1000 yards where the target was a 3 foot black bullseye on a 6 X 6 foot frame. The National Match coures was 10 standing, 10 sitting at 200 yards, 10 prone 300 yards and 20 prone at 600 yards. The maximum score was 250 points. Ties were broken with a smaller ring in the black called a Vee ring.

I remember that we were (as usual) short on money in 1957 and I was going to sell my old Mauser. It had not been shooting well since I had put the 3rd 30-06 barrel on it. I decided to try one last trick and put some glass bedding to make the action and barrel fit the stock better. I did it in our hut with very crude tools. The practice match the next day was at 1000 yards. My two sighting shots missed the paper, as did my first two record shots. The 3rd record shot was a 3, and they were all 5's and V's after that for an 88 with 2 misses. I decided I would keep it after all.

Another year I was shooting the Wimbledon Match, at 1000 yards. I was using a team Winchester model 70 30-06 target rifle, with iron sights, (Scope and magnum cartridges were allowed, but I didn't have any) at dusk. Out of the 20 record shots I scored 100 with 14 v's. a very good score, but not enough to go on to the shoot off.

In 1959, before the Matches we were practicing at Camp Ripley. Using the same model 70 30-06 , I was hitting the V ring consistently. I had also been practicing 300 meter Free Rifle shooting with Palm Rest and Hook Butt plate for standing. I though for fun I would try 1000 yards standing (which no one ever did). I got up, put on the fancy buttplate and palmrest, and touched off a shot. It came up a center Vee, no better shot was possible. So I stopped, it would be all down hill from there. So I have a perfect record at 1000 yards standing, a 5V in one shot.

One year at Camp Perry, Vaile Range, the biggest range had a new 300 yard firing line added, but it had not been sodded, it was bare clay. That year was very wet and rainy. And of course we were squadded on Vaile for 300 rapid. By the time I got there there was a deep pit full of water for your elbow. Instead of calling it the usual Standing to Prone, we called it Standing to Splash!

Another time in a practice 300 yard match on Vaile, we were all loaded and locked, ready to go and the targets were just about to rise when a rabbit chose just that moment to start slowly

strolling across the grass in front of the targets. The Range Officer interrupted his usual chain of commands and substituted "GIT HIM!". We all hit the dirt and each of the 100 of us on that line emptied our 10 rounds at that poor rabbit, who never knew what hit him. Then the range officer declared a "Range Alibi", a procedure usually reserved for a range goof up, issued fresh ammo and we shot the match correctly.

I remember 1959 well, the year the Minnesota Guard team won the Bausch and Lomb High National Guard trophy in the Herrick 1000 yard team match. Clint Weber had built a pair of 14-pound bull guns chambered for the .300 Pfeiffer Improved Magnum Wildcat cartridge. This had to be handloaded but had a much higher muzzle velocity than the usual magnums. These were equipped with good scopes, and we all shot them. We had two shooters on the line at a time, alternating shots. The rest of the team was sitting around the big Unertl team scope box playing whist (an antique card game ancestral to bridge). When it was time for new shooters to move up to the line, they put their hands down and the old shooters picked them up. We were a cool bunch and it got on the nerves of our neighboring teams. I think we only lost 1 or 2 points for the whole team.

We also shot the Infantry Trophy match, commonly known as the "Rattle Battle". The team consisted of 6 shooters, a coach and captain, and 8 targets. We were issued a whole case of 384 rounds of ammunition at the 600 yard line. Any hits on the silhouette targets counted 4 points at 600 yards, 3 points at 500 yards, 2 points at 300 yards and 1 point at 200 yards. In addition you received a bonus of the square of the number of targets with 6 or more hits on them. Prone was the position at 600 and 500 yards, sitting at 300 yards and standing at 200. Our optimum strategy was to shoot as much as possible on the long ranges and have a only a few rounds left for 200 yards. The weaker shooters were to shoot straight away on one target, the others were to shoot their own target and to put some rounds on the spare target on each side of center. I could get as many as 24 well aimed rounds off in 50 seconds, so I was a swing shooter. We always did well on that match. It was also a great way to relieve the frustrations of the matches.

In 1959, I placed third in a Regional match and won my second Bronze Excellence in Competition badge, and on June 26, 1960, at the Minnesota High Power Regional I won the Minnesota State Championship, as well as winning first place in the leg match, which gave me the last gold leg, needed for the Distinguished Rifleman Badge. I had promised Sal that when I went Distinguished, she could have the rifle, she took it from me as I came off the firing line. That summer she used our M-1 to win the National Woman's Service Rifle Championship at Perry. She made two of her legs for Distinguished with that rifle and our friends Dr. Kenneth Erickson, and John "Buddy" Colombo also got legs with that rifle in the process of going distinguished. The total number of Distinguished riflemen is still under 600 even though it has been awarded since 1900 or so. Sal won her Silver excellence in competition badge, on June 24th 1961 at a regional, Her second, a bronze was won on July 21 1962. She won her third and Distinguished in 1964 at Camp Perry. and made the Presidents Hundred in 1970 by placing in the top 100 in the 600 yard Presidents match.

Having given Sal the M1, I bought a Winchester model 70 sporting rifle in 30-06, and rebuilt it into a target rifle by cutting a clip slot for reloading in rapid fire. fitting a Lyman 48 rear sight, and restocking it with the other half of the cherry stock blank I had used for Don Bevis's rifle. I widened the forend with scraps of walnut which made a nice contrast with the cherry. Unfortunately it did not shoot as well as it looked, so I disposed of it.

In 1960 I competed on the Minnesota State Civilian Rifle Team shooting M1's , the other team members were Sal, Fred Hallberg of St. Paul, Robert LeVang of Newport, Charles Peterson of Judson, and Rudolph Wadekamper of Faribault.

I tried NRA match rifle the next year 1961, but my injured leg would not let me shoot sitting well, and match nerves (the 90 mile an hour wind across the knee caps) made me drop 13 points standing in the Navy Cup match where I was sure I would do well, I had only dropped 4 points all summer in standing. Oh well, I concentrated on my research and shifted to pistol. I was never as good with the pistol as I had been with rifle, but I enjoyed it immensely - No more Wallowing in the Mud!

Dr. Emmet O. Swanson of Minneapolis, a reserve colonel of Marines and many times Olympic shooter, gave me 100 empty cases for a 300 H&H Magnum, so I built a 13 pound bull gun in that caliber for $95. I used a war surplus1903A3 Springfield action, a Lyman 48 rear sight, Redfield front sight, a Timney replacement trigger and a Herter's single shot target rifle blank. My good friend, dentist and fellow competitor Dr. Kenneth C. Erickson fitted a preturned and chambered Douglas barrel and I was in business. I shot 100 with 13 V's in the Wimbledon with it, loading all my ammunition.

We hung around several good friends in "Commercial Row" at Perry, in particular Al Freeland whom I had known since 1947, Charley Lyman of Lyman Gun sights, and Roy Dunlap who was instrumental in developing the US international free rifles. Ultimately I bought a Dunlap High Power Target Rifle in .308 caliber for $250. This and many others of my rifles were sold in times of financial stress.

At Perry the highest ranking I ever made was in the 20 shot standing match, the Navy Cup. I was always the best standing shot on the team, and one year I was 13th out of about 3000 of the best shots in the country in that match. Don Bevis and I went squirrel shooting often in southern Minnesota. We were scraping the bottom of the barrel financially. Sal and I had long discussions as to whether we would get enough meat from the $2.50 small game license to pay for hunting. I did. At first I used one of my .22 long rifle rifles. But several well hit squirrels escaped into their nests, to die a slow death there. So I took my 45 Colt ACP revolver and shot them with that until I found out that at that time pistol hunting was illegal. Those 250 grain punkin balls killed squirrels very well, and would knock them out of the tree. So it was at that point that I began reloading my pet squirrel load for my 30-06 Mauser.

I was introduced to reloading by Byrl Thompson, an Olympic grade shotputter who got a bachelors degree in Geology under Dr. Schwartz in about 1955 or 56, and went on to work for the major copper mine in Chile, Chuquicamada. Byrl was a great hunter and used a custom made bolt action rifle with scope (rare in those days) for an even rarer wildcat cartridge, the 7 mm Gradle Express, a short, fat sharp shouldered very high velocity cartridge based on the .348 Winchester cartridge, with the rim cut off and completely reshaped. It was a precursor of the modern 7 mm magnum cartridges.

Byrl gave us a old buck shoulder roast that had been in the freezer for 4 years. It was a really tough piece of meat. So Sal looked in an old Hunting cook book that recommended potroasting it in Claret red wine. We used "Dago Red", the cheapest of the cheap Vino de Tavolo, with the red checkerboard tablecloth on it. It turned out to be very tasty and tender done that way.

I did go deer hunting several times with Don Bevis, but never saw a deer in season. I also went up to Black Duck Minnesota with most of the Guard rifle team one fall to go hunting with

Don Anderson of the team. Sal went along. She will never let me forget what happened there. She had the M1, I had the Mauser. I fell asleep early on a warm sunny afternoon, and she found me later, sound asleep with many fresh deer tracks around me.

We shot pistols both indoors at 50 feet and outdoors at 25 and 50 yards, in .45, .38 and .22. My pet .22 is a Ruger Mark I bought for $15 from the Director of Civilian Marksmanship, and restocked, and with a new trigger. It shoots very well. Eventually as my farsightedness got worse, I mounted a pistol telescopic sight on it, using the Bridgeport milling machine at the department to drill and tap the holes for the mount. For several years we shot an indoor pistol league with all three guns. Sal and I often shot on a 50 foot range in our basement, wearing good ear protection. Once the steel backstop slid off the stand it was on during a .45 rapid fire string and the backstop wasn't there for the last 3 shots. They went through the target and on through both sides of a lovely aluminum ladder before hitting the concrete wall where they stopped. That 3 shot group had to be fixed by having the holes filled by Heliarc welding by our airplane mechanic, and is still in use with the group preserved for posterity, the 3 rounds can be covered by a quarter.

While in Montana in 1961, a rancher let me try out his Ruger Blackhawk revolver in 44 Magnum, I out 20 consecutive shots offhand into a 2 foot rock at 100 yards. Since it did so well, when my friend Kenny Erickson wanted to dispose of his, I bought it along with 4000 cast sized and lubricated bullets for reloading. I packed it in Montana for several years as a rattlesnake gun. Bill Nelson had a Ruger 22 Bearcat revolver in Montana. It was even beter on snakes than the 44. When Giles MacIntyre visited us at Rock Creek he bought a duplicate in town, but left it with me when he returned to New York.

As a result of my shooting for many years with inadequate ear protection, (only earplugs were available until about 1958 or so) I lost the higher pitches of my hearing, a standard old shooter's complaint. When finally tested my hearing had been reduced to an 80% loss above 2 kilocycles. Hearing aids helped somewhat but also amplified tire noise and other odd noises. It has been a continuing problem, made worse by loud ambient noises. I first noticed it, when at parties after about an hour suddenly all I heard was a roar, and I could not discriminate any words. For years I have not been able to hear a whisper.

In the 1970's Bob Van Gene was an international rifle shooter, and needed help setting up a range for the Olympic Biathlon team tryout which was to be held in conjunction with the St Paul Winter Carnival. We found a farm north of Stillwater where we could set up a ski course and a 50 meter rifle range. Van Gene worked on the Ski tour, and I surveyed and laid out the range at 30 ° below zero, with a Brunton compass and a 50 foot tape. The tryout went all right, but the team coach was not impressed with the 50° below zero wind chill the day of the match!

When I quit competitive shooting, I became an NRA referee to oversee competitions in the area. Sal had been one for several years before.

After I quit competitive Rifle shooting, Sal went into International Pistol shooting. To hold regional tryouts for the US International team, we had to build a 25 meter and 50 meter pistol range, with turning targets. Another friend, Pete Allen and I reworked the Minneapolis Rifle Club 50 meter shooting house into a pistol range, we sent 5 local shooters (including Sal) to the International tryouts in Phoenix.

Kenny had a 22 Hornet pistol he had made from a Australian BSA Martini cadet rifle action, and a scrap of target 22 barrel. I bought it from him in the late '60s and rebuilt it as a collapsible survival rifle to carry in the airplane. I restocked it in curly maple. In the fall of 1993 I found the

magazine *Precision Shooting*, which is about accuracy in rifle shooting. Over the winter of 1992-1993 I decided that I wanted to replace the Dunlap .308 target rifle, so I built one with an action from a Brazilian model 98 Mauser, a Shilen preturned heavy barrel, Redfield Palma rear sight, Anchutz front sight, Cloward target stock blank and a Timney trigger. Kenny Erickson (who is a fine amateur gunsmith) fitted the barrel and sights. Again in the next winter I built a .243 Winchester rifle from an Argentine model 1909 Mauser action, a mid weight Shilen preturned barrel, Timney trigger and a Weaver 3-9 variable power scope in Weaver mounts. Again Kenny fitted the barrel and the sights, I mounted it in a Kevlar stock. I wanted it as a combination varmint, deer and bench rest rifle. When Jim Platt's dad died in 1995, he left a large legacy of guns, including about 20 rifles chambered for the 6.5mm x 55 Swedish cartridge. One of them was a Schulz-Larsen free rifle, so I bought it. I bought a Smith and Wesson .32 long Kit gun from Jim as well and of course restocked it with the usual good results.

NATIONAL GUARD CAREER

In 1948 the Cold war was on and the Draft was reinstated, folks were being called up. Both Norm and I were registered with Selective Service, and both in college. Draftees were not getting much training before being thrown into occupation duty and possible combat, so Norm and I decided to join the National Guard in June 1948, to make sure we knew something before we had to go. I was just under 20, Norm was just under 18, both of us had registered for the draft. I enlisted on June 24th 1948, Norm a day or so later. We got neighboring serial numbers, mine was 364-60-873, Norm's was 364-60-876. The most convenient unit was at the Washington Avenue Armory on Washington Avenue (now Martin Luther King Jr. Drive), near 57th street south, a few blocks west of the University of Chicago. Norm and I joined Headquarter and Headquarter's Battery of the 33rd Division Artillery, Illinois National Guard. This unit consisted of the Commanding Brigadier General (one star) of Division Artillery, his assistant Artllery Commander, Col. Otto A. Koerner, who later rose to be Major General (two star), Division Commander, US District Attorney, Governor of Illinois, and served a term in the Federal penitentiary for graft. It contained the Staff officers; S1, plans, S2, Intelligence, S3, operations and S4 Supply, the battery supplied the staff and worked for them. We were required to attend drill (mostly instruction) one night a week from 8 to 10, and attend a two week summer encampment. In return we got a full day's pay for each evening. Occasionally there would be a weekend drill. Our first encampment was at Camp McCoy, near Sparta and Tomah, Wisconsin.

At the 1948 summer encampment, about 2 weeks after we joined up, Major Paul D. Lynch (commonly known as P.D., in artillery, it is the abbreviation for Point Detonating) was the staff officer who called me in about the second day of camp, and told me of his plans for me to run the survey section. I reported to him as long as I had the job. I was put in technical charge of the Survey section, since as a geologist I had done a little bit of surveying. (I had made a plane table survey around Rosenwald and Walker buildings and finished with a 3 foot vertical error of closure. Not at all good, but I knew more about it than anyone else available!) So I, as a rear rank raw recruit, was given a batch, mostly of college kids, including Norm, a staff sergeant to keep us honest, and we learned Surveying. We were issued a couple of $1000 worth of surveying equipment and in effect told to teach ourselves surveying. So we did. It was great fun and even useful to a geologist. Norm and I finished our driver training on WWII jeeps , Dodge 3/4 ton 4X4's and WWII 2 1/2 ton 6X6 GMC trucks with 5 speed transmisions, two speed transfer case, and no synchromesh.

Our Battery Commander was Captain ___ known as "Dinty", who was a real character. He was a very large man with a very large head, so large that his steel helmet sat up on top of his head.

Two incidents will give an idea of his character. We were on the range, Dinty was demonstrating the 50 caliber machine gun, He froze on the trigger, and the gun started to turn toward the entire battery sitting there before he finally let go. Another episode of that first camp, we were due to go on an overnight bivouac (Campout) Dinty picked the bottom of a valley as the Battery campsite, "because the sand will let the water drain away." It didn't work that way, because the water table was high, and at 3 o'clock in the morning everyone was woken up by the camp being in 4 inches of water during a thunderstorm. A miserable time was had by all. The First Sergeant was named Charles Allen, a former cook in WWII, and the motor pool Sergeant was "Jocko" Dittman, a fat man who occasionally showed off by steering a jeep with his belly.

The first year (1948) I was a Recruit, by the second year (1949) I was a T5, a specialist rank comparable to a corporal, (2 stripes with a T below it). During the third year (1950) I rose to Staff Sergeant (Three stripes and a rocker), skipping buck sergeant.

We always went to camp with a long motor march, All the trucks of Artillery units drove to camp in convoy at 35 miles per hour. It was a one day trip the first year (250 miles), but a two day trip (400 miles) the second year when we drove to Camp Grayling, Michigan. There we finally performed our first big survey, from the gun sites about 15 miles to the Artillery impact area. We were still learning our trade and were slow, so every time I occupied a station we took bearings on a major fire tower. Just before the survey was used, we went to the fire tower, climbed up a 100 foot ladder, pulled the $1000 transit up to the cabin on the same rotten clothesline the fire watch used to haul up their lunches, and set the transit on the center of the azimuth circle in the cabin, sighting back on all the other stations one by one and completing the survey by triangulation. By this time John Wainhouse, one of the members of the rifle team at the UC was in the section. He was our best driver, but managed to drive a 3/4 ton Dodge 4-wheel drive truck into a swamp, burying all four wheels. At our third summer camp, we went to Camp Ripley, just north of Little Falls, Minnesota, a 550 mile trip, again two days.

Korea had been occupied by Japan before and during the War. When Japan surrendered, the Japanese troops north of the 38th parallel surrendered to the USSR, those south of the 38th parallel to the US. By 1950, there were two Koreas, and on June 25, 1950, North Korea invaded the South. Between then and September, we were losing badly. There was a complete remobilization of the Army and Navy to reinforce the south. When this happened, expecting to be called up, I quickly took my BS (which I had been planning to skip) figuring I would not be able to finish my graduate training and wanting all the degrees I was qualified for. As it happened my unit was never federalized.

For the fourth and fifth encampments there was the usual motor march, and instead of the box lunches we had been offered in the past, we were issued a box of C-rations per man. This was a cardboard box with enough meals for 1 man for 1 day. There were 6 small cans about half the size of a Campbell's soup can, with three main meal cans, (beans and weiners, pork sausages, beef stew, etc., a can with cigarettes (I gave them away), candy, toilet paper, gum and a can opener, and two beverage cans with powdered coffee, chocolate and some crackers and cookies. Unless they were heated, they were not very palatable. I had learned how to warm dinners on a motor block in past encampments, so my crew didn't suffer, and thought them not bad at all. But most of the men in the battery opened only the beverage and cigarette cans and only tried one dinner. They went hungry I guess. When we got back to the armory, Jocko Dittman was cleaning out the trucks and I saw all the C-rations, so I collected them, took them home and took them to Texas in the truck of my car for my camp meals on my last 2 weeks of thesis collecting. It was a great supplement to my

very meagre finances. By the fifth encampment (1952) I was a Sergeant First Class (three stripes and 2 rockers, at that time the next to the top enlisted pay grade). I rose in the ranks because I couldn't really do my job without the promotions, and I liked what I was doing. I was working on a commission, because as an enlisted man I was far brighter than any of the others, and fit better with the officers.

I had been taking the 10 Series Army Correspondence School lessons for promotion to 2nd Lieutenant, had passed the course with a high grade. The lessons would take an evening or two a month and introduced me to correspondence courses. I also attended an Officer's Candidate School at Summer camp in 1952. During the late spring I went before a review board, and my qualifications were examined.

I was commisioned on July 3, 1952 after camp, as a Second Lieutenant (Shavetail, so-called because tradition was we cut off the tails of their shirts to make the new officer's shoulder epaulets on our old shirts), given a new serial number (O-2266459) and assigned to a different unit, Battery C, 210th Field Artillery of the Illinois National Guard at the same armory. This was a 155mm Howitzer outfit, I was a platoon leader. I gave all the enlisted men in my armory hope since I was the first enlisted man promoted to officer from the ranks in that armory since the war. So in 1953 I went to summer camp with the Illinois National Guard for the last time, from July 4th to the 18th, and flubbed my one and only very expensive experience as a Forward Observer. Because of a shortage of 155 mm ammo, (the Korean War was still on) the unit was issued spare 105 mm howitzers which were much lighter and easier to manage. I was given some 15 shots to take out a target, and blew it. I was supposed to bracket the target with long and short rounds (longs beyond the target, and shorts in front of it), but I was fooled and never saw a short though I thought I did. As a result my exercise was graded unstatisfactory. I never got a chance to repeat it.

Norm stayed in the old unit and went into the Communications Section since he was an Electrical Engineering student, he rose to head the section as a Sergeant, and finally to be the First Sergeant of the Battery.

In 1953 after attending my last camp with the Illinois N.G. from July 1st to 18th, I did not return to Illinois, dropping off in Minneapolis on Saturday the 18th to work as Charley Bell's assistant. That summer on July 27th, 1953 the Korean Armistice was finally signed after two years of truce talks. I transferred to the Minnesota National Guard, 47th Viking Division, and was put in Headquarters and Headquarters Battery as a second lieutenant platoon leader. I also functioned as a survey officer. As usual I built a rifle team in the battery, a fellow second lieutenant from Iowa also transferred in, his name was Don Bevis, he was a science teacher in the Minneapolis Public Schools, who rose to be Assistant Superintendent. Don and I worked on our 20 series (1st Lt course, completed on December 10th 1954) and 30 series (Capt.) correspondence courses. I was given my semi automatic promotion to 1st Lieutenenat on July 2nd, 1955.

Don and I played canasta and scrabble with Sal and Peg, his wife. We hunted squirrels together, and I built a rifle for him. He had been on occupation duty In Japan after the war, and brought home a model 99 6.5mm Jap service rifle. We got a surplus Springfield barrel, a surplus Lyman 57 rear sight, and one of our sergeants on the rifle team gave us some Cherry and Maple planks. After a Gunsmith had fitted the barrel and chambered it for 300 Savage, I hand inletted the cherry for his action and barrel, and we started to shape it. We went up to Camp Ripley for a match, taking the inletted rifle along. We finished shaping it behind the firing line and then sighted it in at 600 yards in the afternoon!

I took an axe and chopped it to shape. This sounds awful, no one thinks of an axe as a precision cutter, but if you carefully mark in pencil on the stock the lines to cut to in removing the corners to turn a square bandsawed blank into an octagonal blank, then trim to the octagon, most of the work is done quickly and accurately. The clue in using an axe is to know which way the grain runs in the wood, and alway to chop in such a fashion that the splits move outward away from the core of the wood. Every time I have done it, the owner cringes, and every time it works out just fine. It turned into a beautiful rifle. I did the same thing with some redwood duck decoys he was building, he used the rasp, and I used the axe.

On July 2nd 1955 I was promoted to 1st Lieutenant, in the same role I had before. Don and I worked together well and in 1955 or 1956 we had to make a full artillery survey from the guns to the targets. Our crews were inexperienced, and we were running out of time. I had Don make the position surveys and the target surveys. connecting both to well located U.S.Coast and Geodetic survey benchmarks. Then in a half hour late night session I plotted the two benchmarks on very large scale graph paper, and used an Artillery fan to measure the correct angle between them, as well as the distance. This was cheating of a sort, but it finished the job in jig time and was more accurate than it needed to be. The Assistant Artillery Commander, Colonel Grant, complained about our survey, "It did not agree with his compass!", I told him his compass was off since the artillery range was built on top of the underground extension of the Cuyuna Iron Range and it deflected the compass. The entire Division artillery fired a Time On Target mission, with every gun in the outfit fired at a predetermined time so that all rounds landed on the target at exactly the same time. The target was a rockpile about a hundred yards long and 50 yards wide, left over from when farmers tried to make a living on this land. It was a spectacular sight, the rockpile just disappeared in smoke! The rockpiles were there because the fields grew more rocks than crops. The farms were all returned to the State during the depression in lieu of back taxes. Minnesota then turned them into the Camp Ripley Military Reservation, which became a major money maker with guard units from the surrounding states coming every summer for a two week encampment.

In 1957 Thiel assigned me to teach a Field Geology course in the Black Hills, with J. Campbell Craddock, our structural geologist. This conflicted with summer camp, and I had to be excused. So on December 24, 1957 I was transferred as the Executive Officer to a real sad sack of an outfit, Battery C of the 256th Antiaircraft Artillery Battalion, Automatic Weapons, Self Propelled; the 256 AAA Bn AWSP. This outfit had never gone to camp with the Division since the Korean War ended. Instead they had gone off to a separate range where they could shoot at small radio controlled drone aircraft powered with 2-cycle 40 hp McCullough engines,- glorified 4 cylinder chainsaws. I became a platoon leader again. Again I set up and trained a rifle team. That spring the Battalion commander called me in for a chat, it seemed that in the summer of 1958 we would go the Ripley with the rest of the division and work in a ground attack role. He was very rightly concerned about the annual federal inspection, we were not in good shape on Individual small arms qualification, to put it bluntly we stunk. He asked if there was anything I could do to raise the level of weapons qualification. I told him I would do it. We scheduled a whole week of range time at summer camp, with my team as assistant instructors. I gave an abbreviated version of the Fort Benning Small Arms Firing School (that I had been through many times at Perry) trimmed down to the absolute essentials, then we moved to the range. Anyone who qualified the first time became a coach, and we then reworked the others until they qualified. We managed to get the entire 500-man battalion qualified, and only a handful were transferred to a TOE slot that called for submachine gun. As usual I gave other lectures (map reading, etc., I was the best instructor in the outfit) for the

benefit of the inspectors, something I did throughout my guard career. Anything to give the inspectors the best possible impression of the unit.

That same summer we had to fire our M-19 Motor Gun Carriages with twin 40mm automatic antiaircraft cannons in a ground support role. A total of 285 M19's were built in 1944 by Cadillac in Detroit and Massey Harris in Milwaukee, they were powered with twin Cadillac flat head V-8 automobile engines. They were on the same chassis as the M-24 Chaffee light tank and the M-37 and M-41 Howitzer carriages. This was the only time I drove a tank, and then not for long. I used my rifle team for a gun crew, and we fired a shot at a time at some 55 gallon oil drums at 800 yards. We used one ranging shot and after that we blew up one drum with each shot. They made us quit so others would have something to shoot at!

On February 18th 1959 my outfit was converted to Infantry, Company C of the 135th Infantry, the First Minnesota Volunteers of the Civil War. I first became a platoon leader, by this time I had been a first lieutenant for several years. By May 1st I became the Executive Officer (number 2) of the unit. I was not happy in the infantry, (I considered myself a cut above them as a artillerist, a far more technical field, a view as old as Napoleon), and when I was told I would have to go to Fort Benning, Georgia for infantry officer school, or to Fort Sill, Oklahoma for artillery officer school, I became less so. I would not have been able to support my family on my salary as a 1st Lt. for 3 months. The broken ankle in September did not help either and so on December 31st 1959 my resignation was accepted. I was relieved to be done. I had done my duty.

SALLY ANN CRIPPA SLOAN, Always Exciting, Never Boring

Sal was born in and raised in Chicago January 19, 1935 the only child of Charles John Crippa born July 22, 1910, and Saraphina Antoinetta Piermattei Crippa always known as Sally, born October 2, 1909. Charles was the second child of Charles Crippa and Christine Bohlen who was the daughter of a Hamburg sea captain. His elder sister was Elizabeth, his younger sister was Marie who married Joe Kaplan. Sally P. Crippa was the eldest daughter of Onorio Piermattei a former Carabinieri, and Rosa Angel Lombardi, daughter of Giuseppe Lombardi MD of Italy. The other children were Alphonse, Joseph, Constance and Rita. Onorio and Rosa eloped against the wishes of Guiseppe, and later emigrated to the US when it looked as though he would have to serve in combat. Crippa is a northern Italian name, only common in the towns of Cervina, Bionaz and Chamois in the Italian province Valle D'Aosta, the extreme northwestern corner of Italy, next to Haute Savoie in France and the Zermatt area of Switzerland. Charles was born in Milano in Lombardia.

She attended St. Ferdinands Parish Catholic school, for 8 years and was well taught by the nun's, she was the Saludatorian. She rode her roller skates or bicycle the 4 blocks to school. She did not want to go the the Catholic girl's High School, Notre Dame because the girls were so cliquish. So she went to the nearby Public High School, Steinmetz High School near Belmont and Central on the northwest side of the city. There as a freshman she was in choir, there were only two who had deep enough voices to sing baritone, so she and John Warren became acquainted. John was 2 years ahead of her. They became lifelong friends. She learned and played piano accordion at the Wilkins School of Music, in Chicago, eventually becoming an Instructor, from 1951 to 1955, giving private lessons. The school had a symphonic band of which she was a part, they played major symphonic works. She won a competitive half time scholarship to the University of Chicago, where she attended from 1950 to 1953 in the same Hutchins program I was in that lasted from 1936 to the 1980's; her parents paid the tuition the second and third years.

Since I was the president and resident rangemaster of the U of Chicago Rifle Club, I was asked to teach a course in rifle shooting for the Women's Athletic Department in the spring quarter of 1952. as a starving graduate student I was happy to oblige. So on the first afternoon of the quarter, there I was in the range when six lovely coeds came trooping in. Among them was Sally Ann Crippa, who stared at me the whole class, and I stared at her as well. It was so intense that the other girls commented. I asked the usual question, Have any of you ever shot before? Sal like all the others said no. In her case that was a fib, she had shot with a girls team in the high school ROTC program, and owned a rifle she had shot with her father.

I irritated her by requiring her, like all the other girls, to wear a shooting jacket. She thought I was a sissy, and didn't realize that it helped to learn with one. She was the best of the lot and rapidly improved even more. She rapidly earned a place on the rifle team and an A in the course, and ultimately the instructor. She was using my personal Winchester 52 #54101B, and asked what she would have to do to get it. I told her "Marry Me!", she did not appreciate that. Her plans were to enter the space program as an astronaut, and she had no plans for marriage of a family. I needed a date for the annual banquet of the rifle league, so I looked up her number and called, asking for Sally Crippa. Her mother had the same name, answered and accepted the date. Sal was irate, but went along with it.

The night of the banquet I picked her up at the dormitory at which she was spending the night. We drove to the banquet and when there was invited out to my coach's car. Karch had a bottle of something and offered us shots of very good whiskey out of platinum crucibles. I was very nervous, but Sal went along, I suspect fascinated by the platinum. When we got back to the dorm, I kissed her and was told "Professor Sloan, do you do that to all your students?". I threw her out of the car, into the dorm and left, not leaving first gear for a block!

When we met a day or so later, I apologized and so did Sal. That summer she went with me to several ranges and shot my Mauser, we took long walks in the park around the Museum of Science and Industry. I fed her good Kosher sandwiches from a local deli and we found a Chinese restaurant near campus where we could get eggdrop soup for a quarter. Several times I took her to a pleasant restaurant on the southwest side called Mickleberries, which had special sausage dishes, and a fancy mint chocolate Ice Cream that was definitely above the quality of the usual Chicago Ice Creams. After we moved to Minnesota we found that cheap brands of Minnesota Ice Cream were the same quality as premium Chicago ones!

At some point I drove her home and was introduced to her folks. They offered me a drink, somewhat flustered I accepted. They poured me a glass of vermouth, used for mixing martinis, but no one had any thing to drink but me, that embarrassed me greatly but I put up with it. After I left, her mother said "That is the man you will marry." Sal said "Oh Mother", but she was right.

That Fall I took her to a dance at Ida Noyes Hall. Ida Noyes was a lady who had been rejected by the sororities on Campus, and when she came into money, she gave enough to the University to build a building to serve all recreational and athletic purposes for women, in return for not allowing sororities to exist on campus.. To quote Heinlein from "Number of the Beast" , "A univer$ity alway$ $tand$ $taunchly by it$ $olvent a$$ociate$; that$ the ba$ic $ecret of $chola$tic $ucce$$". Sal wore her formal gown, a black strapless top and a white calf length skirt. It was the same dress she used in her concerts. There was a famous folk singer, named Josh White, singing and playing his guitar. Sal was sitting on the arm of my easy chair with my arm around her, I asked him to sing the old English folk tune "Greensleeves". White said "I recall the tune, but I can't remember

the words." I said to a hired professional singer, "That's OK - you play the tune and I'll sing it." So in front of some hundred couples, I sang it to Sal. She tells me she decided than and there "You can't let this one go - say yes!". Ever since that has been our song.

We attended an Interfraternity Sing and after the party was over, we ate a Peony while talking at Botany Pond.

By Christmas 1952, I had proposed in Albert, while we watched the constellation Orion, and she accepted. I asked for her hand, and her father grilled me about my financial expectations. But they were pleased at the notion of their daughter marrying a professor. We found an artist who carved our rings out of palladium, we couldn't buy platinum at the time. The engagement ring has both our birthstones, a ruby and a garnet, and a bagette diamond. After I was commissioned the officers of my new outfit gave me a bachelor party, and presented me with a magnificent coffee pot. By that time I was spending much time at her folk's house. Sal got to see me on one of the few occasions I was drunk, when I came home with that fancy percolator. She was reassured I was a happy (but sleepy) drunk.

Sal had been doing well at the U of C until I came along, her last year was an academic bust. The typing of my thesis and our plans took up much of her time. We got married on August 8th 1953. Further events of that summer are described under the Summer of 1953.

Jumping ahead to her later career, she was a member of the U.S. Army Instructor Training School, 1958 to 1964, an intensive week each summer on teaching methods and strategies, in connection with an NRA instructor training program at National. Marksmanship Matches.

She attended the University of Minnesota from 1954 (we couldn't afford nonresident tuition in our first year of marriage. She took undergraduate major coursework (not used in her degrees) in Engineering, Physics, Computer Science, Geography, and Astronomy, (primarily part time until the children grown) finally graduating with 285 credits (180 were needed) with a Bachelor of Arts Cum Laude, (Math Ed major, Art Ed minor) from the University of Minnesota, in December, 1971. Her hobbies have included flying, dog training, marksmanship, cross country skiing, cycling, swimming, walking, weaving and raising orchids. She is an NRA Referee. While an undergraduate she won many marksmanship records and awards including 5 National Championships, was a member of the U.S International Marksmanship Team; She also was a Member of the U of M Competitive Flying Team [various awards], won the 99's Woman Pilot Achievement Award and many ribbons at Orchid shows.

From 1972 to 1974 she was a Secondary Mathematics Teacher, at Southwest Junior High, Minneapolis, Minnesota. She taught 8-10th grade Mathematics. [Accelerated program, regular Algebra, Geometry and remedial classes]. She was elected to the Faculty Council. She was elected to the Minnesota Council of Teachers of Mathematics (MCTM) Board of Directors, and elected to Board of Minneapolis Mathematics Club (local organization to increase mathematics knowledge and professionalism among MPS teachers).

From 1974 to 1986 she was the Instructional Computer Coordinator of the Minneapolis Public Schools, There her responsibilities were K-12, interdisciplinary; with responsibilities related to hardware, software, courseware, curriculum development, management of resources and staff training for all schools [originally 97 sites] regarding the use of computers and calculators in instruction, and involving research, grant writing, presentations, training and interactions with students, administrators, staff, community, industry and other professionals in the field. She was Awarded membership on College Board Writing Team for first Computer Science AP Course

(served 2 yrs). She was Elected President Minnesota Council of Teachers of Mathematics (MCTM) She chaired NCTM Regional Conference 1981. and was elected President of Upper Midwest Hewlett Packard Users Group (UMHPUG). She was elected President of National Council Supervisors of Mathematics (NCSM) was the Editor NCSM Newsletter 1976-78, Chaired NSCM National Conferences 1980, 1981. She won Grants: 'Compu-MICE' APPLE "Next Steps" grant in 1986; and 'ZOO-M' (Zoo Orientation on Metrics) in 1979.

She took her M.A. in Mathematics Education, University of Minnesota, in 1978, her advisor was Professor David C. Johnson (currently Shell Chair Mathematics Education, Chelsea College, London University) Her Dissertation Title was "A Consideration of Lateralization in the Estimation of Length".

From 1985 to 1990 she was a Secondary Mathematics Teacher, at Edison Senior High, in Minneapolis. There she taught the standard range of 9-12 courses with specialization in Geometry, Computer Math (BASIC) and Computer Studies (PASCAL). She was Department Chair, on the Building restructuring committee, was AIDS trainer. She was elected to the Board of the International. Society for Technology in Education (ISTE) She became Editor of DATABASE, professional journal of the SIG Business Data Processing of the Association for Computing Machinery (ACM) 1987-90.

From 1984 to 1990 she was Adjunct Professor of Mathematics Education, Computer Science and Graduate Faculty at Winona State University, Winona, Minnesota, There she taught courses on uses of technology in classrooms, summers and for various regional school districts on weekends (graduate and undergraduate credits).

In 1980 she worked for Seattle Pacific University, giving special courses in the use of computers in Mathematics education in the Barrow and Anchorage School Districts, Alaska. In 1981-82 she taught courses on uses of technology for College of Education ,University of Minnesota and in 1988-89 she taught Computers in Society for the IT Computer Science Department. In 1985 she gave a lecture at the Birmingham Schools, England, sponsored by the University of London, Chelsea College, 1985 , and also gave a 4 week workshop for secondary faculty and Principals on use of computers in Mathematics education for the City of Hobart, Indiana. In 1990 she gave Pre-School workshops for secondary mathematics teachers on the application of cognitive science to the teaching of Algebra. in the Anchorage School District, Alaska, 1990

In 1990 she became Assistant Professor of Mathematics Education and Graduate Faculty. Winona State University, where she taught courses in Elementary and Secondary Education, Mathematics and Geometry for Elementary Teachers, Geometry, Pre-Calculus, Intermediate Algebra and Contemporary Mathematics. She served on the following committees: Merger, Restructuring, Math/Sci Initiative, Computer (all campus), Library, Honorary Degree, PEAC, MathEd Subgroup, Mathematics Education Search (Chair), Mathematics Search, Vision, Hardware/Software, Bush Grant Math Conference (Co-Chair), MAA Conference.

She was elected President of the International Society for Technology in Education (ISTE) She served on the NCATE Accreditation Guidelines Writing Team, served as Secretary NECA, was on the Program Committee for the 1995 NECC convention, and is Program Chair 1996 NECC.

In 1993 she earned her Ph.D. in Mathematics Education, University of Minnesota, her advisor was Professor Thomas R. Post, her Dissertation Title was "The Effect Of Cognitive Processes On

The Learning Of Mathematics By Pre-Service Elementary Teachers". Following that she was promoted to Associate Professor in 1995, and given tenure.

THE SUMMER OF 1953

The spring and summer of 1953 was the one in which more of the major events of my life happened in 6 months than at any other time of my life. In that time period, in order: I was hired for my first major job (U of M), received my Ph.D. degree, went to Guard Camp as a new officer, went to work for the University of Minnesota, transferred from one state Guard to another, got married, got my first new car, moved 450 miles and set up housekeeping, bought a house with first and second mortgages and a contract for deed, wrote a new correspondence course from scratch, and wrote my outlines for a full years set of courses, several of them new, bought a collie dog, met my first classes as a professor, and started a series of lectures on the "Geology of Minnesota" for the members of the Minnesota Geological Society, many of whom knew far more about the state than I did! Any three or four of these are supposed to be very stressful, I was too busy to notice I was stressed!

In the spring of 1953, I knew I was going to finish my Ph.D. in June, so I started applying for appropriate jobs. There were three openings in the country for me, one at Penn State, one at Notre Dame, and one at Minnesota. I never heard back from Penn State, and Notre Dame hired Ray Gutschick since he fitted their needs better. George Thiel, Head of the Department of Geology and Mineralogy at Minnesota wrote me on Tuesday February 3rd and said they needed "a man to teach invertebrate paleontology, and historical geology". It seems that there were two paleontologists at Minnesota, Frederick M. Swain who taught Micropaleontology and was very ultra-conservative in his teaching mode (lecturing out of his notes without looking up, and repeating much of what he had been taught), and W. Charles Bell who was far more progressive and innovative, and in my opinion and that of many others was a better trainer of graduate students. Charley and Fred got along about as well together as oil and water. So after Charley had finished a major research program at Minnesota, he decided to move to the University of Texas at Austin. This left a vacancy in a 7 man department, and they invited me up to give the usual interview lecture on my thesis. So I went up in on Tuesday night the 7th on the Chicago Burlington and Quincy "Twin Zephyr" in a lower booth in a Pullman car. I gave my lecture on "Paleoecology of the Pennsylvanian marine shales of Palo Pinto County, Texas", my thesis topic on.the 8th, in the big 250 seat auditorium in room 2 of Pillsbury Hall. I visited with the dean, looked over the Twin Cities, liked what I saw, and they liked me. To this day I have never asked if they interviewed any others. Thiel wired me shortly thereafter " Dean not available today. Expect offer shortly." At 10AM on the April 14th. he wired again, saying "Authorized to offer you Instructorship at $4500 for academic year. Acceptance sincerely hoped for. Rank increased after degree granted.", by 12:38 PM, I wired back "Accept your offer under terms stated. Thank you". Minnesota was then ranked number 10th among all research Universities in the country, and was the clear plumb! It was the position I had wanted from the start.

So I went back to writing the final version of the thesis and Sal finished typing it. In those days there was no xeroxing, and each copy of the thesis had to be an original on special paper, no carbons, erasures or pen corrections; she wound up typing 19 copies of it in one form or another. Thank heaven it was only about 50 pages long, If it had been as big as those my students had to get typed or for that matter, hers, neither of us would ever have finished. As it was our preparations for marriage, the thesis and moving completely blew her last year at Chicago.

When Thiel offered me the position, he also suggested that I act as Charley Bell's Teaching Assistant in his last course, a two week course in "Field Geology of Southeastern Minnesota." The purpose of doing so was two fold, to get me a little more money, but also to provide an introduction to the rocks I was expected to work on and direct student research on.

We finished the thesis, and I took my final oral examination. With my major advisor away on leave in the Philippines, Everett Claire Olson chaired the committee, Bob Miller was there and so was John Clark, the visiting professor and one of the all-time characters I have known. The object of a final oral is to look for any possible holes in the thesis and training. John was the only one who was able to make a dent in my defense, and asked embarrassing questions about the details of the stratigraphy. When doing the field work I had depended on Fredewrick J. Plummer's geologic bulletin and geologic map for my stratigraphy, not paying too much attention to where in each unit of some 20 to 100 thousand years in duration my fossils came from. John pointed out I should have paid more care in the stratigraphy. It didn't make any difference in my passing, but it did affect my work later in my career. I never forgot John's questions and they slanted my paleontological career in the direction of biostratigraphy. So I got my Ph.D. degree at the June Commencement. and almost immediately left for my 5th National Guard encampment, leaving further preparations for the wedding in Sal's hands and those of her mother.

The first week of the summer course conflicted with Guard encampment. So I helped Charley during the second week, which was on the Ordovician rocks of the Winona-Fillmore County-Rochester region. I learned a great deal in that week , as much as from any of my professors, about practical stratigraphy and the rocks I have worked on for the rest of my life. Charley was a great teacher, far better than Fred.

I came home from Charley's course on July 28th, just over a week before the wedding. We had traded in my second car, the 1939 Ford Deluxe coupe repainted metallic green and called Albert (after the alligator in the comic strip Pogo) on a brand new 1953 Ford V8 Station Wagon in Seafoam (pale) Green, our first new car. It was supposed to be delivered before the wedding. Then it was to be ready before the reception. Finally at the reception we were told by phone that the car was ready in St. Paul where it was built. (Ernie Lundelius and John Warren were groom's men.) So my brother, who was best man, and his fiancee (later his wife) got together with my folks, we borrowed the family 1949 Hudson 4-door sedan, and all four of us left for the Twin Cities. We drove the 450 miles all night, got to the motel we had reserved space in and Norm and Romeyn left for the return trip. The next day to get the car we took a cab to Minneapolis to see the dealer who had gotten the car from St. Paul.

Very early on the morning of the wedding about 3 AM Sal's mother took her to a theatrical hairdo shop where her hair was styled. Unfortunately they set it with so much lacquer, so that Sal had major problems getting the lacquer out! She was in tears when we got to St. Paul and it was still solid. The stuff was not gone for days!

That first year I was an Instructor since the contract had been written before I got my degree. There was no reduction in salary, which was $4500 for nine months, I thought this was very good, since my father made $6000 in 12 months at the time. My dad was pleased. I much later found out that Jerry Fisher's salary as a senior Associate Professor at that time was only $7000. The next year I became an Assistant Professor. I was made an Associate member of the Graduate Faculty in December 1953, which meant I could teach graduate courses, but was not made a full member of

the Graduate Faculty until December 1955, when I could finally advise theses. There were always graduate students older than I was until 1969, when Robert Rutford finally received his PhD.

My salaries never rose as rapidly as they might have, every new hire for 10 years was given more than my salary as a starting salary. Raises were on a percentage basis so I suffered there too. From 1974 on my raises were almost never as great as the increase in the cost of living.

[Graph Deleted]

In 1972 when Sal went to work for Minneapolis Public schools, she received $4500 for 9 months compared to my $17,000, but it made a great difference in the family income. She was able to have a fur store in Downtown Minneapolis custom make a replacement coat patterned on a great Alpaca coat she had been given when she first went to college. The black luxurious replacement was made of the artificial fur Borghazia and was a truly warm coat that cost $250, it is still warm. That same year she saved $650 for a large 1 1/4 caret, but very inexpensive diamond. She couldn't decide whether it should go on a ring, a broach or a pendant. So I suggested all of the above. I gave her a brass 2/56 machine screw of the sort I used in my model trains, and had the jeweler solder it to the head of a Tiffany stickpin mount. Then she could bolt it into many items of jewelry. She was often asked why don't you wear that matching brooch or ring or whatever!

KIDS

We were warned before we married that Sal was Rh- and I was Rh+ and that would pose problems. Our children would likely be Rh+ and immune problems would result between the fetus and Sal. We went ahead anyway. We had two girls and two pregnancies that did not survive. Our eldest child Sally Lee was born on December 10th 1954 at Midway Hospital in St. Paul, weighing in at 7 pounds 9 ounces. Sal's doctor was Jane Hodgson, a very famous Ob Gyn. Sally Lee was indeed Rh+.

Our next child was a Stillborn full term boy, born January 27 1956 at Midway Hospital, St Paul , the Rh+ boy died just before delivery, weighing in at 8 pounds 3 ounces. He was delivered by Dr. Harold Adams, an associate of Jane Hodgson.

Our third child was Elizabeth Jane, born December 28, 1957, at Miller Hospital, St Paul . She turned out to be Rh-, which meant I was heterozygous. She weighed in at 5 pounds 6 ounces.. She didn't have any problems but her birth was induced a month early. Hal Adams was again the physician. Betsy had serious allergy problems early and cried continuously for a month or two. Sal's mother came up and took care of her, she needed a special formula as a result of the allergic reaction. Sal won medals in August at Camp Perry while pregnant with Betsy, everyone called her a two-man team!

Our last pregnancy was in 1961. Five months before term, while I was out of town, Sal developed Toxemia, and had to go into the hospital immediately. Sal's mother again came rapidly to take care of the little girls. The girl died in the hospital, and delivery could not be induced. Sal had to carry the fetus to full term, Hal Adams was again the Doctor of record, but it was a mature maternity nurse, Margaret _, who was with Sal when the fetus was born December 9, 1961 on the gurney at Miller Hospital.

When she was four Sally Lee was a delightful child, but she developed strabismus, became cross-eyed. She went into Children's hospital for what we were assured was a minor operation "to take a tuck in the eye muscles". She awoke terrified and in great pain. Neither we nor the doctors had prepared her for this. The Opthalmologist was concerned about her behavior, and

recommended she be tested. We took her to the Institute of Child Development where she measured to have an IQ of 185 We were elated until we were told that was a concern, since many children with IQ's that high have serious problems. They were right. She had great difficulties with relationships. By the time she was in 4th grade she had been kicked out of three public schools. In 1962, we consulted a child Psychologist on Summit Avenue, Dr. Grace Arthur, and ultimately enrolled Sally Lee in an expensive private school, Visitation Convent run by the Sisters of the Visitation, near Summit Avenue in St. Paul. Betsy went too, entering first grade at barely 5. (All her life Betsy was "Me Too!") There, after extensive testing, they set up a special program for her. Sally Lee was in a very high reading program, she was assigned to classes based on her level of preparedness, each class she went to was in a different grade. The problems were still there. I remember an overnight sleepover that ended when the other mother called us to come and get her. Those problems made things difficult between Sal and I. I do remember reading to both Sally Lee and Betsy, we read lots of Dr. Suess, all of Baum's Oz books and some of the others, and Tolkien's *Hobbit* and the *Lord of the Rings* Trilogy, among lots of others. As she approached puberty Sally Lee's problems became worse. Our marriage was suffering greatly. Sally Lee decided she didn't like herself and applied for a social security card in the name of Kantele Sloan, which everyone ignored.

After counseling at the Institute of Child Development at the University of Minnesota, she was diagnosed with schizophrenia in 1968. We had to commit her to Anoka State Hospital for treatment in 1969 when she was 14. We had to go through one to two years of therapy for ourselves. Our marriage came out stronger than ever but it was a great trial. After Sally Lee was released from the hospital, she went to Desplaines to live with Sal's folks. She decided she did not want to be Sally, and became just plain Lee Sloan. She graduated from Elk Grove High School on June 12 1972. She went to the U of Minnesota for one quarter, living in the dormitory, but flunked out for inattention to classes. She then went back to the Crippa's and attended William Rainey Harper College in Palatine Illinois. She changed her name again to Adrienne Sloan and married David Thornley, a very mild mannered man, in 1977, but goaded him to strike her and then divorced him. After a while she decided she was really a man in a woman's body and changed her name again to Adrian Charles Morgan. She was always a very good artist, and is now a starving artist in New Orleans.

Her sister Betsy spent a worried childhood, wondering if she was going to be like her sister. When Betsy was about 5 her grandpa Charley took both girls fishing in Sucker Creek just outside of North Oaks. Betsy caught a 4-inch Bullhead and she insisted that we cook it for her. When her sister went to Visitation, in 1962 Betsy went too, entering first grade at not quite 5. At Visitation all the girls wore uniforms of dark blue wool gabardine skirts and jackets. Uniforms were recycled. They had to be sponged clean nightly, and drycleaned every other week. Betsy was hard on uniforms. Every night Sal would restitch the hems, and every afternoon Betsy would come home from school with the hem held up with lots of safety pins. To this day she almost always has safety pins in reserve somewhere. The bain of her life at school was Martin, a big St. Bernard watchdog. Martin was forever eating or stealing hats or mittens, and got blamed for many other things as well.

Betsy was at Vis from her 1st through her 4th grade, until her sister entered the hospital. At Vis, she and all the other girls could only speak French at Lunch. Then she went on to Snail Lake Elementary just outside North Oaks, for the 5th and 6th grades.

When Betsy was between the 3rd and 4th grades, in 1966, we took a vacation in a rented camper trailer to the Black Hills. It rained for two weeks. Besides Sal, Sally Lee and Betsy we took Rinky and Karen Ostrand, a family friend of about 30. We were camped in a campground near

Keystone and Hill City one night. The girls had been "panning" garnets out of the creek, they came from the weathered material from the Precambrian schists of the area. All the ladies were chattering late at night and I said "Quiet". They all replied "Nope, Majority rules!" I replied in a deep voice "I am the Majority!" They let me get away with it, giggled and shut up.

When Betsy was in sixth grade she and a friend came home one afternoon and announced they were going to make Santa Lucia Buns for their 36-person class the next day. They had a recipe. Sal was at school taking classes, so as a good father I made sure they knew what was needed and helped them in the kitchen. The recipe was in a "Christmas of All Lands" song book, and was a huge recipe. I let them putter in the kitchen until they asked "Dad, where is the saffron?" I searched the spice cabinet, but we had none. An incredible amount, about half a teaspoonful, was needed. I called all the stores open at 8 o'-clock in the evening and no one had saffron. Sal came home to two crying little girls, and two huge pots of fully mixed sweet bun mix, less the all important saffron. Sal called Peg Azad, a neighbor who was sure to have it. She did, but said "that is a dowry in saffron!" We put the girls to bed, spent the rest of the evening and part of the night making the fancy small rolled Santa Lucia buns, and baking them so the girls did indeed have their party at school. We had those buns all the way to Christmas. Betsy made more of them in later years, but never such a huge batch and always making sure she had the saffron.

For Betsy, grades 7 to 9 were at Edgewood Junior High School, 10 to 12 were at Moundsview High School. For several years she took piano lessons from Mrs Grendahl across the street from our old Turtle Lane house. Then she transferred to Philip _ , a graduate student at the U of M, for several more years, Daddy had to drive her to lessons.

On another vacation in 1961 or 1962 we first went to Los Alamos, where we met Sal's "brother" John Warren, his wife June and their daughters, Mindy and Rita. John showed me Valle Grande, the giant volcanic caldera near town. Then all of us went north to the San Juan Basin of New Mexico, where I looked at some of the rocks. The four little girls were shrieking with laughter and chasing lizards across the desert.

On another family vacation we drove to Yellowstone with Sal's folks and the girls. We were all in the 65 Ford station wagon, Sal and I were in the front seat, with Rinky between us, her folks in the middle seat, and the girls were in the back seat. We got caught in a bear jam, and a cub was right in front of the car. Momma Bear was next to the right hand side of the car. Momma put her paws on the door, and peered in the window. Rinky smelled the bear and started to rise and bark, chasing that big dog away from her territory. The bear got a whiff of Rinky and her hackles rose so she looked double the size. Rinky didn't let out a peep, just closed her mouth and scrunched down between us, making herself small. Sal's mother threw a bag of marshmallows out the window for the bear, and I left with all deliberate speed. That night we stayed in Red Lodge, Montana, and ate at a Game Cafe. We had some bear steak, and brought Rinky the leftovers. She looked at us with gratitude, as if to say "You killed it for me!" and attacked (there is no other way to describe it) the bear steak!

The girls bedroom in North Oaks was only 9 feet by 12 feet, having been reduced when we trimmed the length of the house from the original plan. With two growing girls it got crowded. So about 1964 Charlie framed up another bedroom in the basement, put in a drop ceiling, wiring, and paneled it with fancy plywood. It was left for me to finish it with moldings. The job went smoothly until I caught the middle of the last joint of my left thumb in the table saw, making a 3/8 inch deep cut across the ball of my thumb. I went to the hospital, and had some stitches taken. A

day or so later I kept smelling "a dead mouse", finally realizing it was my thumb. Back to the hospital for more work. I eventually regained the feeling in the tip of my thumb, but the scar remains, along with the knife cut from about age 9.

About 15 years later, Betsy wanted more room than there was in the tiny bedroom. She climbed through the scuttle hole into the attic, which had only been used for very dead storage. Looking the space over and crawling around in it. she decided she wanted to use the space. So I looked it over and decided to build her a low sleeping and storage room up there. I cut a hole in the ceiling of her room, and put in a prefabricated folding staircase from Knox Lumber. The opening was now large enough to take 4 foot by 8 foot panels, so I pulled up 3/8" plywood for a floor, and a large number of sheets of prefinished 1/8" paneling for the walls and ceiling. I wired it on a single switch, added an escape window and a rope ladder on the end of the house, and she had a room 4 feet high in the middle, 2 feet high at the edges, about 24 feet long and 12 feet wide. This gave her the expansion room she craved.

Betsy went with her mother to Switzerland in 1976. While there, our friend Mrs. Biner, the hotel owner, was remarking how hard it was to get good help. Betsy piped up "How about me?" She had been working at the North Oaks clubhouse washing dishes and serving. So for several years Betsy went to Switzerland to work in the hotel. On one of these trips she decided she wanted a portable lap harp. She had already made a small floor model folk harp, so it was not too difficult. We traced plans from another kit, went to Knox Lumber to get some birch plywood and cut out and assembled a 20-string lap harp in a couple of evenings. The night before she left we finished it, and strung it in the morning. She took it on the airplane and all the stewardesses had to try it.

Betsy Jane lived at home as the model of filial piety until she married. In fact, her nickname was "Filial Pi". She graduated from Moundsview High School at 17 in 1975, after which she went to the U of M, getting a degree in Classics. She then went on the Business School at the U getting within one course of an MBA. She worked at a variety of jobs, B Dalton's bookstores, and was the manager of a Software Etc. She married Scott Kimball, on May 12 1987, but divorced him within a year. Her second marriage to Gerald Dagel, on September 2 1991, was much more successful but she decided never to have children, in part because of the Rh problem.

GENEALOGY

Mom got interested in genealogy in the late '30's at the request of her sister Marguerite, Aunt Peggy, who wanted to become a member of the Daughters of the American Republic, to do so requires at least one ancestor who fought in the Revolution. She did her research at Newberry Library in Chicago. Mom found two; there are others. She was interested because there was this well-traced tradition that we were descended from Daniel Boone's sister, Hannah, who married Richard Pennington. That sort of data is well remembered by families. Among many others, I told the tale at school and was sent home with a note from the teacher saying in effect, Little Bobby shouldn't tell lies at school. Mom quickly disabused her of the idea. I became interested in the early '70's, and continued until 1978, pushing our ancestry farther back, at the end I was pushing our ancestry along 40 lines, and had many lines back to pre-revolutionary days. I decided to write this autobiography after typing Evan Wiggle's autobiography, thinking my life is at least as interesting as his was. While Evan Wiggle traced us back to his father Richard and Grandfather Miles, he could go no further. His son Percy got more information about Richard and Miles but still could trace our ancestry no further. In June of 1976 while on a vacation trip to England, I met Charles Kerr, Lord Teviot and his wife, gave them our known data and asked him to look further into the Wiggalls and

my Penningtons. The total cost was about $200. We managed to push the Wiggall ancestry back to the 1630's. In the meantime in 1976 I traced the Wiggall family area around Gloucester for landmarks, and in 1977 went back to Cumbria to look for Pennington areas and sites.

During 1976 I had found the magazine *Pennington Pedigrees*, which was the publication of a group of about a hundred Pennington's or their descendants, that gathered and accumulated data from all sorts of places. I organized the data around times, places and family groups, and came up with new ideas that showed where the missing data connecting many Penningtons had to be. It was founded by Bee Holmes, and over its first 8 years of publication, she was able to group family lines into 14 groups, each named for the oldest male ancestor in the Colonies or states. Censuses, tax rolls, ship lists, will, deeds and many other documents were there in unorganized state. I found the wealth of data, copied all that was available and went to work. I showed by use of maps and name patterns that some of these groups were probably closely associated in what I called "Clusters" of Groups. These are defined below. Most Penningtons in the US are descended from about 18 founders and are related. Our Penningtons are Group IV, founded by Richard and Hannah (Boone) Pennington, there are many others in this group since it was very easy to remember that Hannah was the sister of Daniel Boone. This Group belongs to Cluster A which also includes Group I- Ephraim of CT; Group V- Rev. Charles, Baptist of PA; Group VII, Benejah and Micajah 143 of NC-VA;.XI, Abel of NC, SC, GA and MS;XII Samuel of Ashe Co. NC, VA; Group XIII Timothy of NC; and Group XVI, Simeon of NC, VA and KY. The Pennington data are summarized in my bibliography, and in the computer files on the Penningtons.

I quit my genealogical work because I came across insurmountable roadblocks (e.g., seven John Johnsons in one town, one of whom was my ancestor, seven Ephraim Penningtons in another town, one of whom was my ancestor). I gave copies to my relatives at the time, but decided to redo it in 1995 when there were new relatives and the old paper copies had begun to decay, I decided to computerize them.

While my great grandfather Evan Wiggle traced us back to his father Richard and Grandfather Miles, he could go no further. His son Percy got more information about Richard and Miles but could trace our ancestry no further. In June of 1976 while on a vacation trip to England, I met Charles Kerr, Lord Teviot and his wife, gave them our known data and asked him to look further into the Wiggalls and my Penningtons. The total cost was about $200.

To answer Percy's question on how the name was spelled, Teviot found many different spellings for the same people, Wigal, Wiggale, Wigale, Wigole, and Wiggold, Wiggall was most often used, and is the variant that still exists in the area. In the Gloucester area phone book of 1976, it is the only spelling given, there were 10 in the town of Cheltenham, 3 in Gloucester itself, and one each in Tewkesbury, Winchcombe, Stroud, Stonehouse and Dursley. Since there was only one Wiggall in the area in the mid 1600's and he left lots of descendants, I would guess they are all our distant cousins.

From July 6th to 8th 1978, I went to Wichita, Kansas, for the First Pennington reunion, held at a Holiday Inn, where I was elected President of the Pennington clan for my genealogical work. About 100 attended. I was the banquet speaker, talking about my visit to Cumbria to look at early Pennington scenes. I showed slides of St. Michael's Church in Pennington; as well as the tympanum from over the door at the original church at Pennington, it was donated by Gamel de Peninton, 1154-1189, the oldest Pennington known. I showed slides of the original Pennington Castle which lasted from 1066 to 1242, and is now a cow yard, the original Pennington coat of arms from the

Pennington Arms Hotel in Ravensglass, the Muncaster Church built by Gamel de Peninton, and Muncaster Castle, the last Manor house of the Pennington lords.

ANKLE AND CONSEQUENCES, OTHER HEALTH PROBLEMS

I had collected the conodont samples that Jerry Webers ultimately used in September 1959, at some very well known localities in southern Minnesota. While collecting these samples at a roadcut a half a mile north of the hamlet of Cummingsville, about 15 miles south of Rochester, on September 10th the rock I was standing on, exactly 29 feet above the Decorah Shale, broke out of the cliff. I fell 6 feet , landed in a gravel slope, and broke both my tibia and fibula just above the left ankle in a very bad compound fracture. At the same time I dislocated my right shoulder. I was working alone, because the Minnesota Geological Survey did not have enough money to hire a safety man. I was right on a well traveled county highway. Four cars went by in the next hour, without stopping, even though I was in plain sight. By the time the fifth car finally stopped, I had straightened my leg, used the saw on my Swiss Army knife to cut down a 1" diameter cottonwood tree next to me, cut it into three 12" sticks and had splinted my leg using the ripped out front of my shirt. I told the kind motorist to "Just call an ambulance, I can wait a little longer". He did and the ambulance arrived. I was wearing a new pair of custom made Gokey Boots that cost $35 then, and I remember telling the ambulance crew "Don't Cut The Boot!" After I was put under anesthesia, Dr. E. D. Henderson, chief of Orthopedics at Mayo and St. Mary's, carefully cut the stitches of the boot and rinsed out the blood before taking care of more important things, Gokey resewed it later and I got several more years wear out of them. I spent a week in St Mary's Hospital. The Minnesota Geological Survey paid my medical expenses. In order to get my salary for Fall quarter, I had to teach my classes. I couldn't get into Pillsbury Hall (it still isn't handicap accessible) so I taught my courses left handed in the Bell Museum using an overhead projector from my wheelchair. Richard Benson, one of Fred's Ph.D. students of ostracods lived with us that fall and drove me to work every day, my office was in the Bell Museum.

That accident was the cause of several problems that grew steadily worse over the next 30 years. The ankle healed badly, and ultimately fused across the shin-ankle joint, so the ankle would not bend.

In 1967 I was given a Distinguished Teaching Award, from my college, the Institute of Technology, it came with a fancy certificate, and $500 which Sal and I spent on an SVP convention in Berkeley, and tours of San Francisco. There I missed a step on a staircase and jammed my bad ankle. It was very painful, and ultimately lead to further deterioration. from that point on my ankle became worse. I bought my first cane there at the first Pier One store in the country as a result.

The weight distribution changed on both sides of the knee, wearing out the cartilage on the inside of the left knee. That was corrected by an Osteotomy on May 2 1977, where they cut out a wedge of my left shin (tibia) to shift the weight to the outer part of the knee. That made the left leg shorter than the right, and lead to a back problem with a pinched nerve in the 5th lumbar vertebra, corrected by bi-weekly chiropractic treatments and orthotics for the left foot. At the time of the accident my weight was about 180 pounds. Starting in 1965 my weight began ballooning to my present weight of 285, mainly as a result of reduced mobility. Most of my health problems are the result of that unfortunate mistake I made in 1959.

From 1952 to 1966 I smoked a pipe and occasional cigars. I was addicted to coffee from 1950 to 1972, at the end drinking as many as a dozen cups of coffee a day. In the middle of one night I had a large gastric "explosion" and racing heart which woke me from a sound sleep, thinking

I was having a heart attack. After a trip to the emergency room, I was told it was nothing but a reaction to caffeine. I realized I had become allergic to caffeine then and since have drunk decaffienated coffee.

In about 1969 I developed a diverticulosis problem, a diverticule (or little pouch) in my sigmoid colon would become impacted and infect, flaring up about every 6 months, producing the equivalent of a case of appendicitis. This was kept more or less under control by a restricted diet, and by antibiotics, first Penicillin, then Tetracycline until I became allergic to the stuff, then Amoxycillin. Finally about 1992 my physician suggested I try a stool softener, that now does the trick. I am always knocked low with a fever for a couple of days when it hits.

For many years I had been a serious snorer. On field trips I often kept my friends awake. Sal always had to poke me to get me to roll over. She was also seriously worried about sleep apnea, I would stop breathing, then snort loudly , breath deeply and then go back to increasingly shallow breaths, repeating the cycle all night. It was disturbing her sleep. I was getting very tired all the time, and incidentally although I hadn't noticed it I had stopped dreaming. This is a sure sign of Sleep Apnea. I was never asleep long enough to go into deep REM sleep (Rapid Eye Movement) which is when dreaming takes place. I was being woken up . I turned out not to have dreamed in 3 or 4 years, although I hadn't noticed the loss. Finally I asked my physician what to do. He referred me to Sleep Disorders Clinic at Hennepin General Hospital. There I consulted Dr. Scott Davies who agreed this was sleep apnea. He scheduled me for a night long visit to the hospital on July 22 1994., in which I was outfitted with many electrodes, slept part of the night in my regular way, then was fitted with a air splint which would hold my tongue away from the back of my throat to allow continuous breathing. It turned out I was waking 30 times a minute all night long! After the CPAP (Continuous Pressurized Air Passages) machine was fitted I slept the rest of the night and was observed to be in REM sleep. I was given a prescription for a CPAP machine of my own and have used it ever since. Shortly after I started dreaming again. The CPAP machine has worked wonders.

By 1967 I was wearing half glasses for reading. They were light and convenient. As long as my distance vision was fine I needed no more. But eventually, by 1980, I had difficulties reading road signs at night from Astigmatism, then bifocals became necessary. By 1990, I couldn't focus on things at arms length, trifocals were necessary.

CULTURAL INTERESTS

When we first moved to the Twin Cities we were without classical music except for records. We could not afford concerts very often. Eventually we found a small radio station in the western suburbs that played nothing but classical music. It limped along with a few sponsors, the only one I remember was Borton Volvo. Finally the station changed to an all rock format. About that time we found KSJR, at St Johns College, in Collegeville, the first station in the Minnesota Public Radio network. We were just on the fringes of reception of KSJR. We were fascinated with Garrison Keillor and his Prairie Home morning Show, and with Michael Barone and Arthur Hoehn, the classical announcers. KSJR was given the music library of the old classical station. Finally in 1969, we succumbed to the pledge drive, and became members 6957. The item that finally convinced us was Garrison composing and singing a little ditty about "We are growing colder! Our light bulbs are burning out, we can't afford to replace them, please become members now!" Since then our radios have almost always been tuned to MPR.

In 1963 or 64 on a first visit to Broadway, we saw "A Funny Thing Happened on the Way to the Forum", a play by Burt Shevelove and Larry Gelbard with music by Stephen Sondheim. The

star was Zero Mostel, playing Pseudolus, the lyingest sloppiest slave in all Rome, 2nd banana was Jack Guilford, (in real life a 30 year friend of Mostel) playing his friend Hysterium, a slave with a collection of erotic pottery; John Carradine played Lycus "a gentleman and a procurer", Robert Burns played Senex, a middle aged Roman citizen, his wife played by Ruth Kobart, Miles Gloriosus, a Roman general, Ray Walburn played an elderly gentleman; Preshy Marker playing the ingenue named Philia, Brian Davies played a young hero, named Hero, 4 spearcarriers and 6 showgirls. Mostel was superb, as was the entire cast. Mostel could and did bring down the house with a wiggle of the little finger. We, of course, saw the movie when it came out in 1966, and have the tape, but two important songs, "Free" and "Pretty Little Picture" were omitted from all but the first cut of the movie. They are on the original Broadway album. For the movie, Phil Silvers replaced John Carradine, Buster Keaton replaced Ray Walburn, Michael Crawford ("Phantom of the Opera") played Hero, and Michael Hordern played Senex. The movie is almost as good as the play, and well worth rewatching. It is one of our favorites.

We attended the Tyrone Guthrie theatre regularly for many years, when they had an ensemble cast.including Barbara Brinn, James Lawless, and Ron Glass. Barbara Brinn went on to play Mozart's mother in law in "Amadeus", James Lawless was the announcer for St. Paul Sunday Morning on MPR, and Ron Glass went on to play in the TV show "Barney Miller". When they changed from the ensemble we moved on. We had a friend, Paul Thomas in the Minneapolis Symphony, later the Minnesota Symphony. We attended that regularly. But when we were invited to an open house in 1979 for the St Paul Chamber Orchestra, we met our neighbors Julia Bogerad, flute, and Charles Ullery, bassoon, as well as James Lawless, whom we had known from the Guthrie. We started to attend at the auditorium at St Catherine's, and moved to the Ordway when it was built. We preferred the SPCO and have had season tickets since. We have had season's tickets to the SPCO since Dennis Russell Davies' last year. We sat through Pinchas (Pinky) Zuckerman's attempts to expand the orchestra from 1980 to 1987, but since 1988 Hugh Wolff seems to understand the character of the orchestra better than anyone else and gets more from them! The SPCO is something very special, 35 (more or less) players, all very competent soloists, that can play well together, just waiting for a good director that understands them. Listening or going to the SPCO is very different from attending performances of the Minnesota Symphony. There is no individuality left there, the orchestra is too large to hear any single player well. The sound is not as crisp and clean as the SPCO. The SPCO on the other hand is like the Twins, you know and love every player, know their strong and (few) weak points. We watch Katherine Greenbanks fiddle with her oboe reeds (to great results), watch Leighton "Skip" James come down front during the intermission to talk to concertgoers, Earl Yowell, the percussionist is an unappreciated genius, and so on.

In about 1972 Sal and I took a couple of years of evening coursework in Oriental art by Professor Robert Poor, of Art History. It was fascinating, and covered both Chinese and Japanese art. At the same time one of Sal's colleagues at Minneapolis Southwest Junior High introduced us to Mark Chou, of Winnetka, a northern suburb of Chicago. Mark was a dealer in Chinese art, and sold us the elements of a collection of Jade and pottery. We have enjoyed them very much.

In the 1970's Sal and I were introduced to the pleasures of Orchid culture. We tried many different species and hybrids, had over 100 plants, and had much success with *Cymbidium, Paphiodelium, Cattleya, Ornithocephalus, Oncidium, Epidendrum,* and *Encyclia*. Eventually due to the pressures of time, our collection wore down to a dozen paphs. My fascination with Orchids results from the fact that they are in an adaptive radiation right now, and the plants and literature gave me

ideas about some of my fossil radiations of animals. Recently in the new house the collection has been growing. Our main sources have been Hausermann's in Chicago, Herman Pigors of Oak Hill Nursery in Dundee, Illinois, and Neil Amundson formerly head of the Chemical Engineering department, who was a semi -professional orchid grower.

Over the years fiction reading had been a major part of my life. I was introduced to *Astounding Science Fiction* in 1946 at a dentist's office. Since then I have read it every month continuing with its successor, *Analog Science Fiction and Fact*. I have devoured most of the hard science fiction written, and after I was introduced to Tolkien, in the form of the *Hobbit* and the Trilogy, I have read much fantasy as well. I have reread Tolkien often. I have followed with great interest Christopher Tolkien's 10-volume work on his father's writing. Sherlock Holmes was an early favorite I often reread. I early met Nero Wolfe by Rex Stout, and have collected all of them, I also read most of Agatha Christie, Margery Allingham, Dorothy Sayers, and many other mystery authors. I early got a complete Lewis Carroll, and often reread. it. I have read all of Heinlein, Clarke, Asimov, Niven, Pournelle, and Tom Clancy. In general, my fiction reading is as eclectic as my research.

John Warren was a fellow student of Sal's at Steinmetz, both won scholarships to Chicago, and considered each other as brother and sister. In 1963 we took a family vacation to the Rockies. On the way we saw sod houses and Fort Kearney in Nebraska. We got to the Four Corners, where four states, Arizona, New Mexico, Utah and Colorado meet in a point, the girls had to have pictures taken with one hand or one foot in each state. In southwest Colorado we visited the San Juan Basin and my favorite Late Cretaceous and Paleocene rocks, as well as the Cliff Dwellings in Mesa Verde National Park near Cortez, Colorado. We then moved south to New Mexico where we visited John at Los Alamos, where he showed us the famous Valle Grande caldera, a volcanic crater about 16 miles in diameter, up in the Jemez Mountains west of Los Alamos. In later years Los Alamos was to try to develop geothermal power from the still hot igneous rocks at the core of the caldera. We saw the Bandolier tuff, a volcanic ash which the local Indians had carved dwellings. and then visited several pueblos, including San Ildefonso, and Taos. We also visited Chaco Canyon or Pueblo Bonito which was a great apartment town, abandoned in about 1300 AD as a result of a drought. Our girls and John and June's pair, Mindy and Rita were scampering through the desert of the San Juan Basin, chasing lizards (who always won) and shrieking in joy at the top of their lungs. We bought Navajo weavings, pots and silver. I got an old pawn beltbuckle with a great lump of turquoise, Sal got a beautiful Squash Blossom necklace, and we bought a two tone black bowl by Blue Corn, the foremost student of the famous Navajo potter Maria. We called this trip the "Trip through Time" since we went from the origin of the Pueblo cultures up to the present time. On the way home, we drove through Durango where I wanted to ride the D&RGW Silverton Train but the family was tired of traveling and wanted to go home so that had to wait.

HONORS AND AWARDS

In 1967 I was given a Distinguished Teaching Award, from my college, the Institute of Technology, it came with a fancy certificate, and $500 which Sal and I spent on an SVP convention in Berkeley, and tours of San Francisco. In 1955 or so I was included in *American Men in Science*, which is basically a directory of who does what, where, in all fields of science.

My 1969 paper, "Cretaceous and Paleocene terrestrial communities of Western North America". published in the Proceedings of the North American Paleontological Convention., part E, p. 427-453 turned out to be a very important one, I was asked for a total of 800 reprints of this paper, somewhat of a record.

In 1983 I received a $10,000 Busch Fellowship in Undergraduate Education, to supplement my half salary in association with my only sabbatical during the academic year 1983-84. I worked on my abortive paleontology text.

In 1984, the 1966 paper "The extinction of multituberculates". from the journal Systematic. Zoology, v. 15, p. 261-2 that I wrote with Leigh Van Valen was included in "Benchmark Papers in Vertebrate Paleontology", edited by R. Schoch, and published by Van Nostrand, Reinhold. There were only 22 of these papers chosen, they were written from the 1880's to the 1980's, this paper was regarded as a seminal one. We were very gratified to say the least, it is a very special kind of recognition that I never got from my department. My department was more concerned with the annual count of papers than how important they were.

In 1984 I had been given $1000 from the Graduate School to take an exploratory 2-week trip to China. In 1986 I was given a grant of $7,500 from the National Academy of Sciences to support my research in China, and went back for 3 months.

In late 1977 I was selected to be the President of the North Central Section of the Paleontological Society for 1978-79, that entailed developing a program and theme for the spring 1979 meeting in Duluth. I was chosen as a second choice after the first choice had to turn it down. My topic was the Ordovician paleontology of the Upper Mississippi Valley. I was not able to have a very full program, because I did not have enough time to find appropriate speakers. But eight years later, of course I did carry it off. As a result of the selection I was on the Paleontological Society Council for a three year term from 1979 to 1982. Finally I was selected as 1996 President of the Great Lakes Section of the Society of Economic Paleontologists and Mineralogists, the first society I joined way back in 1951.

PETS

As a boy we always had dogs and cats. The first one was "Heck" the small white fox terrier my folks got me when I was really too young for a pet. When I treated him too roughly, he nipped me and Heck became my grandfather's dog. I remember Heck well into my teens so he clearly became a very old dog. He loved to go fishing and car riding. When we moved to Wallace Street in Chicago, we got a coal black half cocker spaniel-Half Terrier called "Corky". We loved him but Mom wouldn't let him in the house so he lived in a pen, with a door into the garage. He was joined by "Jock", a brown and white English Spaniel that Pop got to be a hunting dog, just about the time he quit hunting. Mom had a white angora cat that only she loved. She was "Sally Pat" for Sal Hepatica, an Alka Seltzer like remedy that fissed when you mixed it with water. Sally hissed at everything in sight, definitely including Norm and I. She never had kittens, which was surprising since shortly thereafter we picked up a very virile yellow tiger striped tom in LeRoy, which we called "Punk" short for "Some Punkin's". Punk was the sweetest and most gentle cat I have ever seen. He loved to drape himself over my shoulders, hanging around my neck and would purr himself to sleep there as I read. At the same time he was a great mouser, and sired many litters around the neighborhood, getting into many fights with other toms. In one of these a toe became so badly infected that it had to be removed, It didn't stop Punk. Once he was caught under a porch across the street by a pack of dogs. Their access to him was limited so Punk stood them off for quite a while, finally climbing on the back of the most venturesome dog, hanging on with his claws and riding the poor dog out and away!

After we got married, Sal and I purchased a collie. I had been afflicted as a kid by the books and TV program "Lassie". We got a gold and white collie, male and named him "Cottonwood

King" after the big cottonwood tree in the front yard of 984 St Paul Avenue (it is still standing in 1995). King went along with us on our researches into the Minnesota Cretaceous. He loved Dairy Queens, and got excited when he saw the signs. Eventually he went blind, and had to be put away. We replaced him with another similar collie that we bought as a 6-week old pup. We picked this one because he was the most adventurous of his litter, taking off across the plowed furrows in a field, tumbling down the 6" furrows and getting up to continue. He became "Rex". Sal took him to the St Paul Dog Training club for obedience training, as we went along, they joined a precision drill team of 16, marching in formation and having the dogs do standard obedience tricks in formation. While in the club another of the members said she had a female poodle she was going to put down as surplus. We took the dog for pick of her litter, and she became "Cleo" for "Cleopatra". Cleo had spent 6 months in a cage and was most anxious to please us. We took her to the training club, and one night the instructor said "She watches everything you do, try her out." So Sal threw the big collie-sized dumbbell and told Cleo "Fetch." Cleo went directly to the dumbbell, tried to pick it up but it was too big, so dragged it to directly in front of Sal and sat waiting, in the proper pose. From then on Sal worked both dogs in the drill team. Cleo had a special trick. When Sal said "Come!" and made the hand signal both Cleo and Rex would come forward and sit in the correct pose in front of Sal. But if Sal clapped her hands, Cleo would leap into Sal's arms. That became a regular feature of the drill team, with Sal working both the big collie and the 10" poodle at the same time. One of the standard places the drill team worked was the St Paul Saints minor league baseball games in old Midway Stadium, at Como and Snelling. They would put on the show at the 7th inning stretch, and got free seats in the stands. Cleo saw all these people eating peanuts and drinking beer and decided she needed it too. So ever after Cleo had her own cup of beer and peanuts.

At the time we were living at 4944 Turtle Lane, and Cleo appointed herself Nanny to Sally Lee. Every day she would go around and collect all the toys the toddler had left around and take them to her basket. She would walk alongside the baby and try to keep her from tumbling. She answered the phone because she couldn't stand the ring. Once Sal's mother got disturbed because all she got on the phone were these strange "wurfs", she had the phone company check the line fearing something was wrong. When we got home an exasperated phone person said "Lady I'm glad you're back, I've been talking to your dog for a half an hour!" Cleo was finally poisoned, just how we could never figure out.

In the early summer of 1957, just before we moved into North Oaks, we decided to buy another miniature poodle. This time we purchased a show quality white puppy, picking it up just before we went to Camp Perry. We thought what we might call her, saying she was a rinkydinkulous dog (combination of rinky-dink and ridiculous). We thought we would call her Buttons for her black eyes and nose, but 3-year old Sally Lee would have none of it, she was "Rinky-Dinky." And so she was "Rinky-Dinky de Bergerac.". When she got to Camp Perry she was so small she ran around in Sal's western shooting hat, and comfortably rode in her fatigue jacket pocket. Rinky won several blue ribbons in puppy class shows, but her papers never came through, an English Champion in her background had never properly been registered, so her show career was not long. That dog lasted for 18 1/2 years and haunts us still. I am not sure I will ever be able to write all the many tales about Rinky.

The girls and Rinky played together all the time. The bedroom door would be closed and there would be much giggling, then the door would open, and out would come Rinky wearing Chatty Cathy doll clothes, showing off, tail wagging and not at all unhappy. We got a parakeet for

the girls, the cage and bird lived on the mantle. Rinky was sure the bird was for her dinner, and she pointed it in the time honored fashion of all hunting spaniels (which is where poodles came from). She was very exasperated when we didn't give her the bird. One day we came home and the cage was open on the floor, no bird and no dog. We heard some noises from the bedroom, the dog had the bird between its paws and the bird was very wet, the bird had been pecking the dog's nose. The bird was very frightened and pecked Sal when we picked it up, the dog showed no remorse whatsoever. The poor bird did not live too long after that, I wonder why.

One weekend we were going to Chicago, everything was packed , then we couldn't find the dog. We searched for 20 minutes calling for her, finally she showed up. She had gone off to the swamp in the neighboring lot, and gotten filthy with stinky green algae. We gave her a quick bath, but she still stunk the whole trip. She was not at all repentant. We had Liz Espointour living with us at the time, she was another shooter, a bachelor girl, and stayed with us in return for help with the house. Rinky would sit at the top of the stairs and count to see if all 5 of us were home, than she would go about her business. We fed Rinky in aluminum pie plates. We had learned she would tip over one if she wasn't getting enough attention and it was time to be fed. So we got her a crockery water dish too heavy for her to spill. That didn't stop Rinky. She learned to first rattle her pan, then fling it across the room like a Frisbee. That always got our attention. She learned to spell all the important words like O-U-T, or F-O-O-D and clearly understood many English words. I suspect she had a 200-word vocabulary.

A big Irish wolfhound came into our yard wanting to play. Rinky got protective of her turf, and ran inside the dog's legs, nipping at its heels. The poor dog ran screaming home. Rinky was a social butterfly. She would not do any training, she couldn't be bothered to pay attention long enough.

Rinky had two litters of pups. She was a very good mother, training her pups to behave much better than she did. We sold one whole litter to a group of Northwest Airlines stewardesses, that fed their puppies on leftovers from the airlines. The other litter included one we gave to Sal's Aunt Betty in Florida. When we got a replacement black poodle for the first Cleo, we called it " Cleo II". She was a complete disappointment, with no personality, and really dumb. We bred that Cleo, but she would have nothing to do with the pups. Cleo decided to have her litter on the coldest night of the year when the power and light went out. We had a fire in the fireplace, and were using candles for light. A puppy would be born, and then would disappear. We were busy with the mother, when we finally found the puppies, Rinky had stolen them and cleaned them up. She took all the care of that litter, all Cleo did was nurse them, under duress. Cleo II finally died when we had an exterminator in at the North Oaks home to kill wood roaches, she got some of the insecticide.

Rex moved outside to a pen in North Oaks, I built a flat-roofed doghouse from building scraps, made sure it was well insulated and used a carpet sample for a swinging door. Rex preferred to live outside most of the time and stayed on top of the roof all day long in the winter. He developed a great coat. We let him out to play with the girls and the poodles. On one of these occasions he ran into the street and was killed by a truck.

When Rinky was 12 she was very ill, we took her to the vet, and he gave us some canned dogfood specifically for old dogs, saying if we didn't use it all we could bring what was left back for a refund. She lasted until the fall of 1975, still using that food at age 18 and a half. Both Sal and

I were out of town and Betsy, then 18 had to take her dog in to the vet to be put away. Rinky's kidneys had failed.

We also had a lab rat the Sally Lee had brought home from school. It was named "Sir Reginald Puck Rat" and like Rinky got dressed up in doll clothes, this time from Barb. Puck would sleep with the girls. We also had a series of mice that usually lasted 9 months or so. One of them was notable, it lived in a birdcage on the mantle, but did not want to sleep there. It crawled out through the bars, pulled its blanket out, took it to a corner of the mantle and rolled up in the blanket. Another loved to crawl inside my shirt, occasionally peeking out.

SPECIES NAMED FOR ME

One of the things that is regarded as improper is to name a species after oneself. But there is nothing in the Code of Zoological Nomenclature forbidding others from naming things for you. When Ashok Sahni returned to India, he immediately went to work and found a very primitive early Middle Eocene whale in the foothills of the Himalayas, he named it for me, something that had always made me feel very good. He put in the genus *Pappocetus,* so the name is *Pappocetus sloani*. Loosely translated in means Sloan's Grandfather of Whales, or perhaps Sloan the grandfather of whales. In about 1975 or so, Dr. Zofie Kielan Jaworowska had been assigned by the Polish Academy of Sciences to head a Polish-Mongolian joint expedition to Mongolia. Previously she had worked in Ordovician trilobites. While there she found many fine specimens of skulls of multituberculates. She came to visit me and stayed several days, while I coached her in what I had found out about multis. She later named one of the new species and genera *Sloanbataar mirabilis*. Bataar is a mongolian word for hero, a word she adopted for multi names so as not to suffer the problems of inadvertant synonymy. So the name translates loosely as Sloan the miraculous hero.

Minnesota Geological Society

I started giving lectures and leading field trips for the Minnesota Geological Society, a group of amateur geologists in the Fall of 1953. They were very kind to a very green assistant professor (actually instructor) who was lecturing out of books on the Geology of Minnesota. Their frank questions and comments greatly improved my lecture style and are a major reason for the success I have had as a teacher. I have lectured to them on a variety of topics ever since. In 1994, after having lectured for 41 years they voted me the first Honorary Life Membership the society ever granted. It pleased me very much.

Throughout all the early years I routinely had at least four jobs at a time. There was my regular job of Day school, and the extra pay for evening school. In addition I graded the correspondence lessons, and one night a week went to National Guard meetings, getting a full days pay for a 3 hour evening. In addition I also lectured to the Minnesota Geological Society every other week during the fall and winter. Summer salaries were pieced together from Summer Session classes, field courses, Field work for the Minnesota Geological Survey, the inevitable correspondence lessons, and National Guard summer camp, 2 weeks long, and in later years research grants. September was always the month with more month than money.

DEMOCRATIC FARMER LABOR PARTY

Despite having been raised in a conservative Republican family, I had developed strong liberal political leanings, due to empathy learned from my church experience and from the coursework at the University of Chicago. This coursework provided constant demonstration of persistent political injustices done to black, indians and other minorities. When coupled with

increasing knowledge of Republican graft and submergence of all important questions to the never-ending stress on the next quarter's bottom line, it completed my conversion her in Minnesota. Of course there have been crooked Democrats too, venality is human. But of the two major parties I have always thought the Democrats had their hearts in the right places.

I was inactive in politics until about 1974 , when it became apparent that the only way to increase my salary was to raise the salary levels of the University and that involved getting active in local politics. Eventually it did raise the legislature's views on what the University was worth, so it worked. I attended the DFL caucus in North Oaks, and was shortly elected Precinct chair. This was in part laughable, since North Oaks was the most heavily Republican city in Ramsey County, the 4th Congressional District. Nonetheless we always turned out more DFLers for the caucus than other cities. They also always voted. I went on to state conventions and served on the nominations committee to find the best candidate to replace longterm 4th district congressman Joe Karth. We picked Bruce Vento, who had been my student in an NSF summer institute for High School science teachers. He, of course, won and has been our congressman ever since, doing a great job.

In 1984, Walter Mondale ran as the Democratic candidate for President of the US. He moved back to Minnesota for the election and for reasons of privacy bought a home in North Oaks, which has anti-trespassing ordinances. As the local precinct chair, I was invited to a housewarming party at his house early in the campaign. I saw his bookcase in which he had the memoirs of most of the Presidents filed. All were heavily read and dog eared, which impressed me. His new refrigerator didn't have any ice cubes in it, because the automatic Icemaker hadn't been properly set. So we sent Betsy home to raid our refrigerator for all the ice cubes there were and saved the party.

I continued to serve in my Minnesota Senate District continuously and learned of the "10th Ward and Rural Ramsey County" donut booth at the state fair. I worked at the booth for many fairs, starting about 1976. Eventually I became the representative to the Donut Booth Committee in 1991 after we were finally redistricted and away from a certain activist who had held our district back by not sharing power. Max Fritzler and I did a lot of research on what was right and wrong with our old district constitution and bylaws, correcting problems and railroading the reorganization of a new district. It became a healthy and happy, well-run district. In the Donut Booth Committee I rapidly became the secretary , and organized our records on computer. We made lots of money, on the average about $3000 per senate district per year, which was by far the biggest source of funds. All of this for the work of the committee during the year, and about 3 days efforts per district by volunteers at the fair. After I moved from North Oaks in December 1994, I continued my work with the committee.

AAUP

I became active in the local chapter of the American Association of University Professors in about 1972 or 73. I was concerned about my salary, and the local chapter was beginning a collective bargaining campaign. A local American Federation of Teachers chapter had been formed with the intent of starting collective bargaining for the faculty. Many faculty thought that AAUP would be a better bargaining agent, since AFT was basically a K-12 organization, and the services they had given to college and university faculties had been minimal. No research university had yet gone for bargaining. The campaign went on for years, the AFT was supplanted by the Minnesota Education Association, also a K-12 group. Finally in 1978 we had the bargaining election. It was a two-stage vote: first for the bargaining agent, then for bargaining. In the first election AAUP won over MEA,

but in the second election no agent won, had the order been reversed AAUP would have been the agent of the university.

I had risen through the ranks of the local chapter, and in 1979 was reminded that we had been illegal all those years. Many of us were "local" members, not paying National dues. I finally joined up with the national. After the bargaining election, AAUP suffered heavily in membership, ever waning. I suspect this was mainly due to a widespread feeling that unions were "blue collar" and faculty had risen above such things. I kept a few activities going as long as I could, mainly Committee A (Academic Freedom and Tenure) investigations, and my salary surveys. Both did the University a great deal of good, but I got little credit from the department.

In legislative years (odd-numbered years) from 1977 to 1993 I gave the AAUP Testimony on the condition of University faculty salaries to the Education Division of the House Finance Committee and to the Senate Education Committee in the Minnesota Legislature. The problem was that the legislature had stopped funding University faculty salaries at the cost-of-living rise, and the U of M was dropping rapidly behind its peers institutions.

In 1985 in connection with rejuvenation of the Minnesota Conference of AAUP, I was given the National AAUP Membership Award for the individual who has done most for membership. The Minnesota conference had gone completely inactive as a result of the then president not doing anything, even calling meetings. As Vice President, I called a meeting of chapter representatives from all over the state, rewrote the constitution and by laws , set up a program of meetings and got things moving again. I served the state conference as Vice President, Minnesota Council of AAUP l98l-82, President, Minnesota Council of AAUP 1983-85, and 1987-90. as Past President, Minnesota Council of AAUP 1985-87, and 1989-90. I served the national AAUP as Treasurer, Assembly of State Conferences, AAUP 1989-90.

Each year the American Association of University Professors publishes a survey of salaries and total compensation at colleges and universities. 179 Class I universities are included, of which 119 are public; the others are private or church related. These AAUP data go back on a yearly basis for over 35 years. While there have been changes in the manner of reporting, there are enough data to show comparative trends in salary over this period. Each spring I obtained early prepublication reports on this data for dissemination to the faculty and the legislature in time for decisions for the next year.

Our administration, especially Vice President David Berg, had always made our comparisons to the other schools of the Big Ten, as if football was the prime reason for comparing schools. There are about 200 Class I Universities in the country, defined as those that grant 30 or more Ph D. degrees yearly. These institutions were our real peers. But a still better group of peers for salary comparison is the 1982 ranking in which the universities were each assigned a prestige score based on quality of programs by the Task Force on the Quality of Graduate Education and Research. There is a list of the top 31 Research Universities based on this ranking, the University of Minnesota (Twin Cities) is ranked 16, exactly in the middle of this group. This group of 31 Universities, with which we compete for faculty and students, is the most reasonable group to compare ourselves to.

Faculty salaries at the U of M had been seriously underfunded by the legislature since 1972. In all that time there have only been 3 years in which the raises were more than the cost of inflation. On the other hand, our peers were far better treated. Even Iowa (not in the top 31 or even very close to it) passed Minnesota salaries in 1990! The reasons were complex on the part of the legislature. Part of it was a rampant egalitarianism, "you are well paid by Minnesota standards, we'll

put our money elsewhere where it is politically more useful". Part of it was also a dissatisfaction on the part of individial legislators, whose children had not done well and blamed the school.

For the 1992-1993 school year, compared to the peer group of top 31 research universities, our full Professors now rank 26th out of 28, Associate Professors rank 24th out of 28, and Assistant Professors rank 21st out of 28. Mean salary is 23rd out of 28, $7,860 below the mean, total compensation ranks 20th out of 28, $7,150 below the mean.

The average full professor at the U of M lost the equivalent of 2 years salary to the raises that were far below cost-of-living over the decade from 1972 to 1983 and far below the peer group and all other Minnesotans. After a 35 to 40-year career at the U of M, their retirement income was based not on the salaries they should have made in the year of retirement, but rather the equivalent of those of 3 to 5 years earlier in 1993. Our average professors got the same salaries those of our peer institutions got two years earlier.

Some years the legislators heard our plea; other years they let things slide. Part of the blame can be laid at the feet of Malcolm Moss,and C. Peter McGrath, our presidents during the critical years of over inflation of the cost of living. They were very ineffective, and so were their assistants. We were stuck with them, and the regents did not pay close attention. The reason we were concerned was that the other research Universities were raiding the U of M for our best faculty. Some we kept, but only by raising their salaries at the expense of others.

HOBBIES, CRAFTS, SKILLS, AND THINGS

TRAINS, AND OTHER MODELS

One of the magazines that I devoured every month as a kid was *Popular Science*. The magazine was very different then than it is now. Every month it had construction projects for models and objects of all sorts, cars, guns, planes and boats. In reading them I learned to see plans in 3-dimensions, and was primed to build things. I never realized until much later that this was such an important skill, and that most people couldn't do it. Being able to construct a mental three-dimensional model in my skull and rotate it in any direction gave me great spatial sense, which turned out to be very important in my future career. When I was only 6 or 7, Pop gave me free access to all his hand tools in the workshop except the big Drawknife. There was also a big pile of scrap wood left over from the remodeling of the house, so I built lots of my own toys.

Norm and I had Marx trains, bought used or in the Wards bargain room, and mounted on a 4 by 6 plywood sheet with enough braces to keep it stiff. We had the remnants of several sets, with at least three locomotives and lots of cars. We staged many railroad crashes. Later, while I was still in grammar school, I met a neighbor boy from a block away. Carroll Repasi, who was a serious modeler. Like me, he built the balsa and tissue paper model airplane kits that could be bought for 10 cents, and included everything but glue and paint. The ten centers were models of famous planes, usually had a 16 inch wingspan, made of balsa wood strips and tissue paper with a rubber band motor and could be coaxed to fly at least across the yard. I wanted to build a gas engine powered version, but never could coax enough money out of my folks. I tried my first flying model at about 8, it was a model of the Winnie Mae, the Lockheed Vega that Wiley Post and Will Rogers attempted some record flights in. It went well until I tried to make the ailerons moveable. Not only did Carroll build airplanes, but he also built HO railroad cars and equipment. So I bought Mantua and

Varney kits for cars and tried to scrape enough parts together in wartime to build a locomotive. I never quite succeeded, but with each failure I learned more techniques and what would not work.

After I got married I tried to continue modeling trains in HO standard gauge, but the time pressures of family, tenure and promotion got in the way, and the ready availability of ready to run equipment with no construction lead to disinterest. In 1972, my summer job of teaching was canceled at the last moment, one day before the class was to begin. The troubles of that summer are listed elsewhere, but one of my former students, Garrie Tufford reintroduced me to model railroading. He was modeling Narrow Gauge, HO scale modeling (1/87 life size) of railroads only 3 feet between the rails rather than the standard 4' 1/2", hence, HOn3. I became fascinated with Col9orado Narrow gauge, because much of it still existed, unlike narrow gauge elsewhere in the country, and it was close to areas I was intersted in from thje standpoint of field work. Colorado Narrow Gauge as it exists in basically turn of the century railroading, still around!

With lots of time on my hands, to avoid depression, I built cars from raw materials, laid track and did it all inexpensively. Garrie also loaned me most of his extensive collection of narrow gauge books, and I began to see what was available in Colorado mountain railroading, and to write articles about it. Shortly afterward we founded the Twin City Narrow Gaugers, to have a monthly forum for discussion bragging about models and showing of slides and movies, and much later videos. We had no rules save one, there were to be no arguments over which scale was best.

In the winter of 1972, I had run across a photograph of a pair of very fancily lettered refrigerator cars in a book, and desperately wanted to build those cars. But I didn't want to hand letter them with a 0000 brush or a crow quill pen under a microscope. So I spent many hours deciphering the letters on the photo, Sal even got into the act as we would think of what the letters might be at night in bed, then get the book with the photo and check likely candidates out. (Between us we called it "Retches Barley" since that was one of the words we thought we figured out late at night.) After there were few more changes, I drew the lettering on a car side drawn to scale at 1/2" to the foot, sent the artwork to the only decal manufacturer I knew of, the Meyercord Company, that had made the prewar model airplane decals I had used. I set it up so that on each sheet there would be a full set of O scale decals, 1/2 set of S scale, 7 1/2 sets of HO scale and tucked away in otherwise waste space 2 sets of N scale (That, so far as I knew, no one was doing). 800 sheets of decals cost $300 to make, so I took a gamble thinking there might be enough modelers out there to buy them, drew up a set of plans and a set of instructions and sold them as a set. I announced them in Slim Gauge News, in Spring 1973, a modeling and historical Narrow Gauge railroading magazine, where I had started writing articles. My gamble paid off, in the first 30 days all of my investment was returned, when I sold the decal business in 1984, I still had half of the original decals left. This lead to the Sloan Decal Business, which made enough money to cover the costs of my railroading and my professional research. The business went from lettering to specialty brass etchings when I took over the Beaver Creek Line of etched cabs and tender wraps, I wound up making brass etchings to convert existing inexpensive models to Narrow Gauge locomotives in the next larger size, N to HO narrow gauge, HO to S narrow gauge, and Z to N narrow gauge. I added a few white metal castings into the line as well, again for conversions. This made it possible for many to model narrow gauge cheaply. Over the years I wrote some 65 articles for various magazines, organizing them into several books. My model railroad and historical railroad bibliography is almost as large as my professional bibliography, although the papers did not take as long to write.

Two of the books that Garrie Tufford loaned me were "Narrow gauge through the Rockies", by Lucius Beebe and Charles Clegg, who wrote interestingly but never let the facts get in the way of a good story, and Josie Moore Crum's little 64 page tourist book "Three Little Lines" about the three narrow gauge railroads that started in Silverton Colorado at the end of the D&RG and went up into the hills. I was very interested in these roads because they were small, interesting, and there were no kits available for the cars, I would have to scratch build. I was certain there was more information. So I took my tape recorder over to the Walter Library stacks, dictated notes on the old journals, and in a week of afternoons had more than doubled what was known about them. This lead to stories in Slim Gauge News, which became a small book, and ultimately the large book "The Rainbow Route" I wrote that in a period in which I was trying to write a paleontology text, and suffering a terrible case of writer's block. The big book came about because Charles Skowronski of Saginaw, Michigan had read my articles in the magazine, and wrote asking if I wanted to buy his files and photographs. It turned out he had also been researching the three roads (Silverton Railroad, Silverton Northern , and Silverton Gladstone and Northerly) and had accumulated a xerox copy of the complete surviving letter books of the SN, and had many photos. I bought them from him, insisted on his being a co-author, and published the book through Sundance Ltd of Denver, a small specialty publisher. Jack Thode of the D&RGW served as copy editor. The book was introduced to the railroad press on a special trip from Durango to Silverton hired by Model Masterpieces of Denver, I had the first two copies of the bound book, giving them to Col. Hal Carstens of Railroad Model Craftsman and Fred Hamilton of Model Railroader as review copies. The trip was in a chartered private car "Nomad" at the back end of a regular Silverton train with a pair of hostesses from the Strater Hotel to provide us with a specially catered gourmet lunch on the train! By this year the book has been printed in 16000 copies, and set a new style in railroad books. This is one of the all time best sellers in railroad books. Besides the railroads themselves, I wrote about the mines that were the reasons for the roads in the first place, the folks who worked the roads and their weird neighbors, and the Geology that put the orebodies where they were and was the cause of it all.

I kept the business until 1984, when it became too time consuming, then sold it, the items are still mostly in production. In the process I made many models including about 20 narrow Gauge locomotives and many cars in several different scales, all of them one of a kind. I gave most of them away to friends. I modeled and built locomotives and cars in the following gauges and scales. On3, On 2 1/2, Sn3 1/2, Sn3, HO, HOn3, HOn2 1/2, OOn 2'3", N and Nn3. I never did develop a complete layout, construction and history was more important to me than operation.

With Jim Platt, I ran the Mason City convention of the Thousand Lakes region of the National Model Railroaders Association, from May 18th to 20th, 1979 including writing a story, presenting a clinic on soldering, and one on decaling cars and finally leading a field trip on the Iowa Terminal Railroad of Mason City and Clear Lake Iowa. Again I ran it because no one else volunteeered, there was an interesting small railroad, and I was familiar with it because my brother lived there.

I went with Jim to the First Narrow Gaugers convention in St Louis in where I spoke on the Silverton Railroads. At the 2nd Narrow Gauge National convention in Denver, in 1982, Jim and I drove the high line of the old Denver and Salt Lake which I then presented in 1984, several years later at the 4th Narrow Gauge convention in Denver. At the 1977 NMRA convention in Denver I submitted my version of Otto Mears solid silver pass and won the pass contest, hands down(passes on real railroads were complimentary passes handed out by management to likely customers or

fellow executives in return for similar passes). In Winnipeg at the 1983 National NMRA convention, I talked about the Silverton railroads again.

NARROW GAUGE CONVENTIONS

I attended many of the early Narrow Gauge Conventions. I always drove with my close friend Jim Platt. The first was held in St Louis in 1980, I presented a talk on the Silverton railroads. The second and fourth were held in Denver in 1982 and 1984. The third was held 1983 in Valley Forge and the associated field trip was to the East Broadtop Railroad of Pennsylvania. From 1985 on they were scheduled after my classes began in the fall, and so I could not attend them. At these conventions there were clinics on advanced ways of model construction, scenery modeling or railroad history, and exhibits of prize-winning models, exhibits of new kits by vendors, swap meets, and simply enjoyable talks with like minded people. I gave clinics on many of these things. I also had an exhibit of my narrow gauge railroad model parts. It was great fun.

CARS

In 1940, my folks bought a secondhand 1936 gray two-door Ford V-8 sedan. This old and reliable car lasted through the war years until 1950, traveling perhaps 200,000 miles in all. Norm and I both learned to drive on it. During the war gasoline was trationed and there wre three levels of allocation for civilian driving. A was the smallest, B was next and C was for civilian driving essential to the war effort. A standard saying of the war years was: "Great jokes from little A cards grow". Pop always had an A card and was forever trying to scrape enough gas ration tickets together. Pop always drove to work from Fernwood to Montgomery Wards, at Chicago Avenue and the Chicago River on the near north side, a 13-mile trip. A street car trip would involve about 4 transfers, and was through several dangerous neighborhoods.

I vividly remember my first long highway drive, in about 1948. We were all driving to LeRoy Illinois to visit Grandma and Grandpa Schwartz. When it came time for me to slow down for the turn into the side street at the edge of town, I took my foot off the accelerator and we started to slow down but not fast enough. Pop said "Brake it!", but I didn't. As I started to turn I realized we were going too fast for the turn so I didn't complete it. There was an octagonal stop sign on the corner on a U channel post. I hit it going about 20 mph and came to a stop on top of the sign. We got out, and Pop and I pried the sign out from under the car, and backed it off. The sign was nearly touching the ground, the only damage to the car was a small crease in the bumper. Bumpers were spring steel and a lot stronger then than now. I drove the rest of the 4 blocks to gradndpas's house more carefully.

My first car was a 1935 Ford V8 5 window coupe. I picked it up at a junkyard in 1950 for $35 and rebuilt it, reupholstering it in the hide of the Nauga, (Naugahyde plastic), rebuilding the motor, the carburetor, distributer, repainting it after patching the rusted out spots, adding a hydraulic brake kit to replace the old and difficult to adjust mechanical brakes. Later I added a master cylinder and steering wheel from a junked 1939 Ford. I relocated the battery from under the seat to the firewall, added a radio, and a Stewart Warner "Southwind" heater which was a little gasoline stove run on gas siphoned off the carburetor., a vacuum gauge, radio, and a Lincoln-Zephyr transmission. The cost of rebuilding came to about $600 including all the tools I had to buy. Pop paid most of this, I paid the rest. I had trouble getting it registered, because the old owner had covered much of the signature area of the title with carbon wax from a carbon paper. I finally removed the masking carbon with paper toweling and an iron to melt the wax.

I drove the 35 to Texas with Ole and others for my 1951 vertebrate paleo field work and the connecting rod bearings failed. Ole paid for the repairs out of his field budget, for which I was eternally grateful. When I returned I replaced the motor with a 1948 Mercury engine bored .060" oversize which of course worked very well. I learned a great deal of automotive mechanics from that car; it was worth every penny.

Early in 1952, I found a maroon 1939 Deluxe Ford Coupe. I got it for $85 from a junkyard. It had good hydraulic brakes, but had a rusted out floor and a bashed in trunk lid. I replaced the floor with a flame cut 3/32" sheet of steel, bolted over the remains of the old floor. I found another trunk lid, black, from a 1940 coupe, exactly the same sheet metal, and got the lid and the lock area of the back of the trunk for $15. My friend Red Garleff welded the latch area in, replacing the dented parts, and the trunk lid bolted on as if it was made for it. I put primer over the rust spots, and eventually Karch helped me spray the whole car a dark metallic Green. When I met Sal, we called it Albert after the green alligator in "Pogo". The running boards were bad so I removed them.

The '35 coupe was now free, so I gave it to Norm who needed a good car to commute from The University of Illinois to Guard meetings. It continued to give yeoman service until he stopped at the scene of a night time accident, another car ran into it and squashed the trunk. He had stepped out to help at the accident and was not hurt. It split the gas tank open. I drove the car back to Chicago with a bucket of gas in the front seat.

These flathead V8 Fords were great cars to learn on, they were sturdy and very common, and more importantly any part from 1932 to 1948 could be bolted on any Ford in those years. They were the standard base for "Hot Rods". I became very good at fixing them, and finally got so good at fixing them that I cut the time down to 3 hours flat out for swapping one engine for another, hood on to hood on.

In 1951 or 52, my shooting coach, F.J. Karcher bought a 1938 four door Ford V-8 in very good shape. But it developed a bad bearing knock, something that had to be fixed, before the engine self destructed. He asked me to see what I could do, he didn't want to spend much money on it. So I drove it into our garage and crawled into the pit, dropping the oil pan for inspection. On a flat head Ford, there were 4 journals on the crank, each with 2 connecting rods. All was in good shape except for one journal. The bearing had been destroyed, and the crank journal was as rough as a file on one side. I was not sanguine about being able to fix it but Karch said try anyway. So I removed all the sparkplugs to release the compression, took the bad bearing off, and turned it around. I shortened the con rod cap, coated the journal with Valve grinding compound (fairly coarse emery), bolted things back together and worked the crank around using that bum con road. I ground away until the journal was smooth, bought an oversize bearing and a used conrod, and bolted everything back together. Karch got another 60,000 miles out of that car! That definitely was not the factory way of fixing the problem, but the cost was only about $10 and my time.

Our first new car was a 1953 Ford 2-door station wagon, a V8 with overdrive, it hauled everything we had from Chicago to Minnesota in many trips, and on field trips at 10 cents a mile. There were summers we lived on that mileage. We replaced it at about 100,000 miles with a 1958 Studebaker equivalent, with the famous Champion 6 engine that had powered the Weasel during WWII, and overdrive of course. It was almost the last of the Studebakers and served us well, getting as much as 35 miles per gallon. We also had a used English Austin A40 and a 1950 Dodge 4-door sedan around 1956.

In 1955 Sal got a BMW 600, a small car with a BMW 600 cc motorcycle engine in the back, the whole front opened as a door, it had a back seat with one side door, and a 4 -speed transmission. It was serviced at Karl's Cycle Shop in Minneapolis. She bought it with the money she earned working at a department store for her Aunt Betty and from teaching music at her old Wilkins Accordion school in Chicago. It was the rarer big brother of the Isetta, which was another bug car. At Camp Perry, at the National Matches, any four marines could pick up the car and carry it off, they frequently did. One of our memories of that car was going for a Christmas tree, and loading a 14 footer on top, it was as big as the car, people stared as this Christmas tree drove down the road! The kids got a real kick out of that.

Sal replaced it with a 1963 Ford Falcon 6 cylinder red convertible which lasted for many years. A 1965 Ford V8 Station wagon , white with blue interior came along as the next main car. Sal replaced the convertible with a Ford Maverick 2-door, which got lousy mileage. When Sal's mother died in 1981, we inherited her monster 1968 4-door Chrysler New Yorker, with the 458 cubic inch V8 engine, the biggest engine Chrysler ever used. Sal drove it to work in South Minneapolis, and finally felt safe in rush hour.

In 1970 I got one of the first Ford Pintos, and had my worst experience ever with Fords. To start with as Sal was driving it back from Chicago, a month or two after we got it, the oil pump fell off on the freeway and the engine froze up. I had a battle with Ford to get it fixed correctly under warranty. It rusted out rapidly, and the last straw was when the engine caught fire the day after I got it back from the Ford shop, and the whole car burned to the ground. This was early in 1979. Sal took pity on me and bought me a new 79 Plymouth Sapporo, made by Mitsubishi, for my 50th birthday, but about 3 months early, that car lasted until 1986 when I replaced it with a new Plymouth Turismo sports coupe and passed the Sapporo on to Betsy, who used it until 1990.

In the summer of 1982 Sal and I took another trip to England, and rented an MG. We had so much fun in it, that when we got back, I started looking in the papers for one. We found one in Stillwater, drove over and bought it. I had been planning to go to Switzerland with Sal that summer, but instead spent the equivalent of the fare and trip on buying the MG. It was a 1979 MGB roadster, the last year it was built, GHN5UL49786G. We bought it on February 14, 1983 with some 21104 miles on it. Since it was Valentines Day, I told Sal that I would not ever buy her another Valentine, I haven't to this day. It was great fun, we took it to the Black Hills for an SVP convention and had a great time touring. It really was a touring car, not a race car. We finally sold it on Labor Day, 1995 to some old friends, Marc and Susan Asch of North Oaks, for just about what we paid for it. It had 51,830 miles on it by then. It was like putting a baby up for adoption.

When Sal's Aunt Betty married her third husband, Cliff Warren, she had no more need of her ten year old 1978 Cadillac Fleetwood Brougham with 26,000 miles on it, we bought it from her. Betsy and I and drove it back from Florida, stopping off in the Shenandoah valley to collect some trilobites. It was a big old comfortable car, but a real gas hog, the best we ever got was 13 mpg in town and 18 on the freeway. In 1986 while I was in China on a research grant, Sal bought a used demo 1983 Dodge 400 convertible, a pilot model for the first LeBaron convertible. Finally in February 1992, I had been looking at LeBaron coupes. Since my leg was now aching from using the clutch and manual transmission, I needed to go to an automatic transmission. I took Sal over there to look at it, we decided to get a white 1991 version with 91 miles on it. She was moping around about "You always get the new cars", so I showed her the matching LeBaron convertible. She wound up getting a matching white demo car to mine but convertible and the fancy interior with 13,000 miles on it. It has been absolutely great having matching cars, with all the gauges, switches

etc. in exactly the same places. Betsy got the 83 Dodge to replace the Sapporo which by this time was worn out.

My field vehicles were usually the family station wagon until I started going to Montana. When Bruce Erickson and I got the Hill Foundation grant in 1961 to work on a mounted Dinosaur and my paleoecology, we needed a bigger truck. We didn't have enough money for a new one, so we bought a surplus Dodge 1 1/2 ton 4x4 Power Wagon previously owned by Erie Mining Co. It had a 4 speed transmission and a 2 range transfer case, they had beefed up the springs with many extra leaves. We joked it was the world's shortest 2 1/2 ton truck. After we had all the gear for 6 people for 6 weeks packed it rode fairly smoothly. The truck was Cab only and looked exactly like the WWII Dodges, although it was a 1952. Fenders were fully 1/8" thick steel! We found a surplus military Dodge 3/4 ton pickup bed, and bolted it on. It was about 18" too short so we built a waterproof plywood box to fill the gap between the cab and the box, rebuilt and used all the top bows, adding one, and adding new oak planks to the folding side benches. As part of the Science Museum we had access to military surplus at giveaway prices , so we bought a lot of 12 oz tenting canvas in GI Olive Drab (OD), and had Harris Machinery near the University sew up a canvas top so we looked like a regular GI truck. Every thing was painted issue OD paint since that was extremely cheap. Bruce had a lowboy trailer on which he carried his WWII surplus jeep, again OD in color. To complete the picture instead of the WWII white star on the door, I cut a stencil for a *Triceratops* skull and that was stenciled on both doors. It wound up looking like an army truck, and we christened the outfit the "First Underground Light Dinosaur Repair Brigade, Semi-Mechanized-Self propelled" an obvious pun on my ragtag national guard outfit. (Another joking name for our group over the years is "Sons & Daughters of the Laramide Revolution".)

The Dodge was christened the "Big Pig" and hauled all of us out to Montana, as well as serving as a tractor to strip overburden off the dinosaur quarry. There was about 4 foot of overburden over most of the skeleton and hand digging it away got very old, very fast. One of the abandoned ranches had a horse scoop, basically a 3 foot wide sheet of steel, with a bridle across it, with a place to tie it to a horse. There were handles on it like a wheelbarrow, the original idea was for one man to hold the handles. While the horse pulled, the man would guide the scoop so it would make a 4"-6" deep cut till full, then dump it someplace and go back for another load. We had several logging chains in the truck mostly for towing cars, but we knotted the chains to the back of the Big Pig, and to the flexible bridle and proceeded to use the Dodge in compound low to provide the traction. It worked, although the chains stretched and frequently broke, we simply added more knots and stripped away. Necessity is indeed the mother of invention. By the end of the summer the links on the chain had stretched so much they were figure 8 shaped, and the holes were so tight the chain would hardly bend. That year I took along two of the best Boy Scouts from the North Oaks troop, James Nelson and Philip Fitzpatrick. I had taken over the troop as scoutmaster in a pinch that year at the behest of some of my neighbors.

In 1962 when we found Bug Creek and Purgatory Hill, we did the initial field work in McCone Co. with Bill Nelson's Rambler and Don Beckman's Jeep. For 1963 with our NSF grant, we needed a new 4-wheel, Bruce still had the Big Pig over in Garfield Co. So we looked about and found a used white 1962 International Harvester Scout 4x4, with an 80 hp slant 4 engine (one side of their V8). For 1963, we rented a small trailer. But we needed one of our own, the rental trailer was not strong enough. I had access to the surplus equipment at the Fairgrounds, so I bought a much used surplus 1952 Ford pickup. Stan Duff our departmental machinist used a cutting torch to cut off and junk the cab and engine, cut off the frame rails at the front of the cab, bent them together

and welded on a short stub tongue with trailer hitch, and towed it back to the department. There he found some Shelby tubing the same diameter as the original rear axle, and welded the front spindles to the tubing to make a new rear axle that just bolted in place of the old one. The chopped off running boards were turned into 5 gallon jerrican racks both for gas and for water. I bolted in a new waterproof plywood floor, and we painted it University Maroon. The old pickup bed made a great trailer, it and the Scout were a pickup with a hinge in the middle. It is still in service for the department in 1995!

The Scout was used up in all sorts of other activities of the department, and ultimately sold out from under my grant. In 1976, Malcolm McKenna casually mentioned he was no longer using his 1963 Scout, (originally bought because he was impressed with my '62). I offered him $200 for it and he took me up on it. Douglas Hodgdon of the Narrow Gaugers and I flew out to Denver the spring of 1977, drove the Scout down to Boulder, and immediately started rehabbing it. We gave it a much needed tune-up, new battery, new belts, retread tires etc. James Mellett, one of Malcolm's friends, who was the last to borrow, it had kept a dog in it at night in the field. The dog destroyed the seat upholstery by digging through it to hide during a thunderstorm. We put blankets over the seat, and drove it home, looking at the Colorado RR Museum in Golden, and trains all the way back. I now had my own 4x4 that the University couldn't abuse. It had a lovely Power takeoff winch on the front bumper we often put to good use. Stan Duff rewelded all the breaks in the seat frame, setting several small fires in the cotton padding in the process. I reupholstered it with a heavy Naugahyde seat cover from a mail order house in Chicago. I added a new radio, painted my *Triceratops* head on the door and sanded off the AMNH logo on the back, replacing it with the 1st Udg. Lt. Dino. Rpr. Bg. S.M-S.P. slogan, touching up the white top and the red body. This was my very own sports truck!

CAMERAS

When I went to Camp Perry as a junior in 1947 I used an old box camera to take my pictures. I started my serious photographic career with a German made 2 1/4 by 3/14 film pack camera. It took beautiful photographs but film was expensive. The Geology Department at Chicago had a fine darkroom which students were permitted to use. I taught myself photography and darkroom work from books of all sorts and a very short introduction to developing by fellow students at Chicago. In about 1949 I bought my first 35mm camera, an old Argus model A from Art Lees, a fellow graduate student. That greatly reduced the film expenses. When I came to Minnesota I found some German Voigtlander 21/4 by 3 1/4 inch cut film cameras with ground glass back and double extension bellows for which I could use 120 roll film in an adapter. These were ideal for making field and laboratory photographs. I used these routinely for all purposes until about 1955, when I read a Consumers Reports article on 35 mm single lens reflex cameras. They recommended the Minolta SR1 as the best buy, so I bought one at a discount house. Ever since I have used Minoltas, since they all can use the same lenses. I now have about 8 different lenses for a variety of uses, and have worn out an SR1, an SRT 101, an XE7, an XG7 and currently have X-370 and an X-700, and about 8 lenses of varied types. They have served for landscape photography, models, portraits and slides. They have served me well.

HOUSES

The first house we lived in after we were married in 1953 was at 984 St Paul Avenue in the Highland Park neighborhood in St. Paul. We had planned to build with a contractor named Carmen Tuminelli, but he went bankrupt before we could start. We knew we wanted to live in this part of

St. Paul and were driving around when we saw this forlorn house on a hill. It was a flatroof house, very unconventional in those days, built of redwood, but had bleached pure white, the grass hadn't been mowed all summer and was 2 feet tall. We checked into it. It turned out to have been built by an architect for himself, but he was never able to occupy it. He had been called back into the Navy during Korea, and had rented it. The renters had left, it had been unoccupied for a year, and the price was affordable. $16,000 was what we paid. Fred Swain introduced us to an attorney, Arthur Hallgren, who gave us a second mortgage and made it possible. Sal's folks and Aunt Betty also helped. I forget where we got the first mortgage, but we were in a house. It was a lovely house, with all the walls finished in wood paneling of various sorts. We quickly bought a power mower and mowed the lawn, stained and varnished the redwood siding back to a dark redwood color and painted the trim Seafoam green, the same color as our new station wagon. It was again respectable, and a lovely first house. We lived there from the fall of 1953 until 1955 or early 56. We were taken out to North Oaks by Bob Dickerman and Patsy DeBell of the Bell museum, to meet the wildlife artist Frances Lee Jaques, and fell in love with North Oaks. It was uncrowded, important to both of us, Sal had grown up in apartments in Chicago where there was only 3 feet between buildings. It was also being developed for owners with an appreciation of nature. We found we could get an 1.2 acre lot of hilly woods for $3000, and build a house on it for what we could afford.

We bought our lot, #30 East Pleasant Lake Road, Tuminelli was going to build our house, but after his assistant drew the plans, he was again unable to do it. We had to leave Highland Park because we had sold the house, and we wound up staying a month or two at a ramshackle place in a posh neighborhood, Dellwood. Sal's folks bought "as an investment" a nearly house at 4944 Turtle Lane in Shoreview, and we moved there while we looked for a new contractor. We found James Welsch, a new young contractor, he agreed to build the house but for more than Tuminelli had planned. So we had to cut a couple of feet out of the middle of the house to cut the price. The basic house was 24 ' by 48', with a carport. We moved into the new house in September 1957, Betsy was born in December. We lived in that house until December 1994, finally selling it on January 13. 1995. The house grew as our needs grew. First we built an underground 2 car garage under the carport, with a rough terrazzo floor on top of spancrete beams as a roof for the garage.

Shortly after we moved in an arsonist set two fires in the woods in the northeast part of North Oaks. Both 3M and Honeywell announced over the plant speakers that North Oak residents should go home immediately. We were the 51st house in the village, and were the last house on East Pleasant Lake Road at the time, and the closest house to the fire. It was about a mile and a half further in. The fire department issued shovels, back pack sprayers and gunny sacks and all the men fought the fire. The sheriff told Sal to pack and be ready to evacuate within 15 minutes. Fortunately we got it under control. Two days later the arsonist set the second fire and we were all back at work on it. That fall a new house was going up about a block away from us, a contractor's fire got away after he left, and the poor owner didn't know what to do. We still had all the equipment for the fire, we converged on his house, put the fire out and disappeared back into the woods. The poor man was absolutely stunned and asked "Who were those people?" The village was very close in the early years, but degenerated later when it became known as a ritzy place to live.

In May of 1965, we noticed that one of the walls of the garage was shifting inward, so we hired a contractor to replace the wall and add more tile to drain the water away from the wall. The contractor agreed to use a steel beam to hold up the 24' spans of spancrete, that made up the roof of the garage. It weighed about a ton a foot. The strawboss however tried to hold up the 20 tons of roof with one 20' 4" x 6" and 3 4"x4" posts. When Sal, who had had several engineering

courses complained, he told her not to worry but to go bake some cookies! She said she would go into the far end of the house and when it fell down she would call the ambulance. His supports lasted just long enough to get the old concrete wall out of the way. Then as the contractor got there and started screaming at the strawboss, the whole set of supports gave way and a third of the house tipped into the basement. The spancrete fell in the hole, and the only things that saved the contractor and his crew were his Bobcat, my table saw, and an old sewing machine. They caught the spancrete and left some holes for the men. No one was seriously hurt except the contractor who got an eyeful of hydraulic oil from the Bobcat.

However the damage was extensive. The foundation of the house twisted and cracked, the carport roof was twisted about 15°, we were worried that the rest of the roof might go, the entire living room had a laminated beam holding up the roof, and if that went so did the rest of the house. As the contractor was moaning and saying you are fully covered by my insurance, Sal looked in the Yellow pages for a Crane company to lift up the roof, she called Rocket Crane, who sent out the most beautiful bright red brand new crane anyone had ever seen. When they got there, they would not touch anything until the insurance companies settled liabilities. Our agent gave the go ahead, and the crane set up blocking, and lifted the roof back into position. About that time I drove up in the 1963 red convertible with the girls, It was my day to drive the North Oaks car pool from Visitation. The Crane people then called a house mover who brought two 30-foot long by 18" square timbers, and built up two cribs of 4" x 4" four feet square to hold the roof in place. The spancrete was still in the hole. Then his insurance representative found out the contractor was insured for lots of medical liability, but only a $1000 worth of property damage. His agent had sold him the wrong policy! The agent was unemployed rapidly! The rubble was in the hole and sat there until next spring while the insurance companies fought it out. Several years later the case finally came to court we had to give a deposition, the contractor was bankrupt. We rebuilt in the spring, and had to replace our spancrete roof with the rough terrazzo floor with a much cheaper room over the garage and a porch over the end of the new garage. The old spancrete was placed along the south edge of Lake Gilfillan to keep waves from eroding the shoreline.

Later after the porch of that rebuild succumbed to dry rot, we built a new room in its place off the end of the old carport for Sal's office. Her room had great tile, rosewood furniture, a fancy wood stove from Australia and large bright windows.

In 1990 Sal took a mobility leave from the Minneapolis Public Schools, and took a position in the Mathematics Department of Winona State University. She had taught there as a summer Adjunct professor for seven years before, so she was well known. We looked for an apartment for her, but couldn't find one, it was cheaper to buy a house than to rent. So we bought a little 2 bedroom 28' x 36' 1952 house with a breezeway and a big two car garage at 116 RR 2 Winona, (Highway 43), south of town.

After Sal finished her PhD thesis in May of 1993, we decided to build our retirement house near Winona, since Sal could work 5 years longer than I was likely to. Besides, it was southeastern Minnesota where I had had so many successful studies and could do more in my retirement. We looked over all the best features of all our houses, of our timeshare units at Causeway on Gull, measured all our furniture, and looked for a lot with a view of the Mississippi River. We found the lot in section 1 of Homer Township, it overlooked the river and Trempeleau Mountain. We planned our house with the view in mind. We knew we needed large picture windows, and found some that had an R value of 7.15, almost as good as walls in insulation. They were triple pane with two layers of Argon gas and a high UV reflectance. We carefully measured all the furniture we had

and wanted to keep, measured all the rooms in the North Oaks house, the little house and our time share units at Causeway on Gull, deciding just where to put things. We designed interior walls to fit the furniture. I found an issue of the *Smithsonian* magazine, which had an article by an architect who had studied stairways for 30 years. We followed most of his advice with risers of 6 1/2 inches and treads of 11 inches, carpeted in alternate colors of white and burgundy. They are very much easier on our knees than the usual stairs, and we don't miss steps in poor light. We installed Sal's pool in the basement, and put all the Litolier track lights from North Oaks into the new house. All the doors are 3 feet wide, and those on the main floor are all sliding so as not to be a hindrance to wheelchairs. We wired the entire house for stereo. We picked a contractor, Lee Herold of Winona, on the advice of many in town. The lumber yard drew the plans from our preliminary but very detailed sketches in return for our buying the lumber there. We signed the contract in June 1994, but construction was slow getting started.

Meanwhile in September, even though we did not list the little house in Winona, word got out. Cindy, a teller at the bank asked us if she could come look at the house, since she and her husband were expecting, and had heard good things about the little house. She and her husband Eric came over early one Saturday afternoon, went through the house carefully and clearly were enchanted. After they left a woman drove up, had heard while camping on the river that our house would be for sale, and wanted to see it.. She went away obviously entranced with it, came back 2 hours later with her husband who whipped out his checkbook and offered us cash. We had not even set a price!. On Monday we had our Realtor over asked her to make a market analysis, and finally told Cindy and Eric that they could have the house. Lee fixed up the basement so Sal could live in the new house. Cindy and Eric moved in on Friday and she went to the hospital for their baby on Sunday after cleaning the house with her folks that weekend.

The new house was more or less finished by November, 1994. We moved the stuff from the North Oaks house down south, it was a long chore. Bob had been cleaning it up and preparing for packing all fall. with the help of Gerald and Craig LeVay of the Narrow Gaugers. On December 7th Bob moved to an apartment at 1943 Lexington in Roseville, with the help of Gerald and Betsy, Eric Platt and his wife Tamara Baker, Craig LeVay and Jim Platt, all from the Narrow Gaugers. We had Royal Movers of Winona come up and do the packing and moving. Carol Felton and a friend of hers came up first and boxed stuff, then the crew came in. It took two trips, and loads of boxes. The North Oaks house finally sold early in January for much less than the county assessor had it valued, mainly because it had been well used.

FLYING

I had always been deeply interested in flying. My boyhood favorite comic strips were Smilin' Jack and Terry and the Pirates, both about pilots. I built many balsa wood and tissue paper rubber band powered flying model airplanes as a boy as well as many solid models. I was incensed that there was an age restriction on building solid model identification airplanes for the Navy in WWII and that I couldn't do it. I was sure my models were good enough. They were - almost. In the summer of 1949 I took Field Geology for a short two-week course around Baraboo and Devil's Lake Wisconsin. David Peter "Don" Lande was my close friend and fellow student. He was a Captain, pilot in the Guard, and even though the Army Air Corps had separated from the Army as the Air Force by that time, as I was a guard member, he could take me flying. So we went out to what was then Orchard Place (later O'Hare field, named for a WWII Navy Congressional Medal winning Pacific Ace) and we fired up a North American AT-6 Texan two seat fighter trainer and flew to Baraboo to take aerial photos of our field work. Later that fall we took another flight,

when I rode in the bombardiers compartment in the Plexiglas nose of a Douglas B-26C Invader (formerly A-26, until the original B-26's, the Martin Marauders were all destroyed after the war, when the A-26's were renamed B-26) and took still more photos. These were my second and third flights. The last one was very interesting, 125 miles per hour 5 feet off the runway during landing and takeoff with just the Plexiglas around me! We used the photos in our field trip reports.

In 1963, Sal and I both took flight ground school and flight training from the University of Minnesota Flight facilities at Anoka County Airport, Jane's Field, a few miles northwest of our house. Sal started first, and I followed shortly. The expenses of training were the reason for not doing it together. Both of us had always been fascinated by flight. We trained in 6 Champion 7EC high wing monoplanes, with 90 horsepower Continental engines. They held two people, one in front and one in back, both seats had controls. Top speed in level flight was about 90 miles per hour, and stall (minimum flying speed) was 40 miles per hour. The facilities also had a old Cessna 170, an old Cessna 172 number N8910B, a vee-tailed Beech Bonanza, and a war surplus 13 passenger AT-9 twin Beech. She got to fly all of them, I got to fly the 172 since it was very inexpensive, the others had been sold off, by the time I was ready for them. Later they replaced the Champs with a fleet of 6 Piper Cherokee 140's, which Sal flew more than I. I preferred the 172 because its high wing let me see the ground more easily for photography. We both received our Private Pilot rating Single Engine, Land.

Don Uhlenberg was my primary flight instructor. He had great difficulty getting me to steer the plane straight on takeoff, but on the other hand I had no problem with landings from the very start. Usually the problems are reversed. Eventually I soloed at about 10 hours. Shortly after solo I was practicing wheel landings, and managed to pop the stick forward fast enough so the tips of the prop hit the runway, and bent the last 1 inch of the prop. I was most chagrined. Waldo Anderson was another of my instructors with whom I had many hours. My map reading skills never ceased to amaze my instructors, I always knew just where I was within a quarter mile, just from map reading. My only scare in flight training was during a night flight, when Hal __ my instructor had me doing deep power stalls over Pleasant Lake on a moonless night, and I fell into a inadvertent spin. I was my first spin. Both of us lost orientation because the reflections of the stars in the lake made it seem that there was no horizon. Later I went out in Funnyface with George Spettigue, an instructor friend of mine and we did many spins until I recovered from the fear of them. George was one of the most instinctive and precise pilots I ever knew. He had done all his flying in tricycle geared planes, while I had trained in the slightly more difficult tail wheels, prone to ground loop (rapidly swap ends, and usually damage a wing or landing gear) if you didn't watch carefully. I gave George his tail wheel training, and caught him just as he was about to ground loop. Ever after he was more careful.

[figure of plane deleted]

We rented U of M airplanes and occasionally others until March 1st 1967 when we bought a 1965 Champion Citabria 7ECA N2555F (two triple five funnyface) with a Continental O-200 100 horsepower engine for $5000 from Marvin Battig of Brookings, South Dakota. Today it is worth $20,000. This was an upgraded version of the Champs we trained on but had been beefed up to be fully airbatic (read Citabria backwards) stressed for 9 g's positive and 6 g's negative, with a 40 gallon tank and 7 hour range. It was a great airplane which we owned for 7 years, and sold for just what we paid for it. After half an hour of dual instruction, I flew it home, I was really High! Sal drove the car home. We hangared it at Crystal Airport since we could rent a hanger there.

I flew 450 hours in it and did lots of Geology from the air. Besides the local flying I flew two long trips to New York, one solo flight in February 1968, and another in 1970 when I flew into three 6" blizzards and had to wait each time a couple of days until the airport was plowed. One of the Apollo Flights left for the Moon at the same time I left Crystal, and splashed down in the Pacific after their flight the same time as I finally landed in New Jersey. There is an old saying among pilots "Time to spare? Go by Air!". These trips took about 33 hours of flying time each, the route was due southeast down the Mississippi River from Crystal Airport near Minneapolis to the first Smog patch, (Chicago), then due east and stop at the first Ocean. On the first trip my destination airport, (Totowa-Wayne) was a narrow east-west runway, final approach was right down the slope of the First Watchung Mountain, 200 feet above ground all the way, across a Highway, set down on the end of the runway and taxi down the runway across a bridge over a creek! That Airport was closed when I went back two years later so I landed at Caldwell-Wright airport. I flew most of the first trip without a radio because a relay had frozen, I was still perfectly legal just by picking where I flew carefully and which airport I landed at. All the way I knew exactly where I was within a tolerance of half a mile just by reading the 1/8 inch to the mile airchart.

Dave Berg was a former instructor at the U of M flight facilities and North West Airlines First Officer who rented our plane to do aerobatics. Once when he was taxiing to the active runway he called the tower, saying "Northwest 2555 Foxtrot ..." The tower answered "since when does Northwest fly Champs...: When Sal was taxiing durng the winter, wearing her white fur hat, the Tower called her "Foxy" instead of Foxtrot..

Another notable flight was when I flew Betsy and Rinky Dink to Chicago the 7th of June 1969. It was a very rainy day, and I could not go all the way, landing in Walworth, Wisconsin at a country sod airport fairly close to Chicago. On the next day when the sky had cleared and I had to fly back to the Twin Cities, Mom and Pop came to the airport with me, and I had a chance to take Jess flying. He had flown in the '20's in a Curtiss Jenny barnstormers plane and of course in the Fokker trimotor. He enjoyed the flight. I could not have gotten my mother into the plane due to her mobility problems. I also got a chance that day to fly a takeoff and landing in a 65 hp Aeronca 7AC, the ancestor of the Champ.

One winter day I was out with Betsy flying west to Waverly to see Hubert Humphrey's beautiful country place, when the pitot tube iced up. I suddenly was without my major instruments, the all important Air Speed, Altimeter, and the less important Rate of Climb. I knew the power settings by heart, and knew the reference of the bottom of the wing to the horizon so I flew back home as if nothing serious had happened, and made a smooth landing as usual without any of my usual instruments. Then we taxied the plane over to my mechanic's place, where he put it in a heated hanger to thaw out.

Another place I often flew with Betsy was to the Northfield Airport, which was the major glider base in the area. We ate lunch on the grass and watched the sailplanes. Sal and I also went to occasional "Fly ins", where those who flew in had special privileges, and we would watch aerobatics and look at all the other planes, including many antiques.

A memorable flight Sal and I made was to Red Cedar Lodge in Wisconsin about 80 miles east of our airport. We booked a weekend at the lodge, loaded the plane with fine cheeses, crackers and good dark miniature rye bread, a selection of good wines, a large number of new paperbacks and landed next to the lodge, walked to the building and never came out of the room except for dinner.

I also flew to Silver Lake, near Tomahawk Wisconsin to see again the cabin and lake where we had two summer vacations before WWII. It looked just as I had remembered.

In preparation for my flight to Togwotee Pass and the work with Malcolm, I took a Sunday off at the Park City Field Camp and drove down to Heber, Utah. There I took a half hour of sailplane dual instruction in the Wasatch mountains to really learn about mountain flying. In many ways that was one of the most useful flights I ever made, ever after I flew the Champ more precisely, adding 5 miles per hour to my cruise speed by using soaring techniques.

A spectacular flight was a long one from August 21st 1970 to September 3rd to near Togwotee Pass, near Jackson Hole, Wyoming. Sal and I outfitted the plane with an oxygen bottle for that flight on which we landed and took off at Dubois, Wyoming at over 9000 feet elevation. We left out 10 gallons of gas and carried 80 pounds of baggage and ourselves and were perfectly within the weight and balance limits for the airplane. We camped in Mocassin Basin and prospected with my good friend Malcolm C. McKenna from the American Museum of Natural History in New York and his wife Priscilla. On the way out we landed at Casper. There were three fixed base operators trying to make a living selling gas. We took the one with the statuesque blond driving a purple convertible as the "follow Me " car. She and her husband were just making a bare living out of it. They loaned us a car so we could drive to town to get some geology field trip guidebooks. From Casper we flew to Riverton, landed and filled and climbed to 9000', heading northwest. We immediately saw our airport at Dubois at our elevation some 50 miles ahead of us. We flew straight to it, and the ground rose to meet the plane, the airport runway was in direct line with our course so we had a 50 mile final approach!

Malcolm and I spent lots of time looking at Paleocene and Eocene fossil localities in his brand new Ford 4 X4 Ford Pickup with winch, Clint Eastwood's movie "Kelly's Heroes" was current so we called the truck the "Tiger Tank", it was the most powerful 4X4 I had been in to date. The best locality and the most difficult to reach was way up a wild valley in the Pinyon Conglomerate.

On the way home it was very hot at Casper, and the density altitude was very high. The hotter the temperature the slower the plane climbs. We took a long trip down the runway building up all the speed we could before lifting off. Climb out was very slow at about 100 feet per minute, we had interesting conversation with the tower about how slowly we were climbing and leaving the pattern. Finally we had enough altitude to turn and fly over a sunlit hillside. That gave us a rising air current or thermal which brought us up to cooler air and improved the flying characteristics. We flew down the front range over Cheyenne in thunderstorms and high winds, the winds were blowing so hard we were pointed 45° from the direction we were going. The winds were calmer when we landed at Longmount, Colorado, where we were met by Malcolm and Priscilla and stayed at their spectacular mountain home near Nederland overlooking Rocky Mountain Park.

I had always been fascinated by loops, and carefully read a number of texts on aerobatics, with all the critical speeds well in hand went out and did about 7 loops, an absolutely unbelievable feeling! Needless to say I did it in uncontrolled airspace at 3000 feet of altitude, so in that plane I was perfectly safe.

My last long flight was to Fort Worth-Dallas Texas from November 12th to 18th, 1973 to a convention of the Society of Vertebrate Paleontology at Southern Methodist University in Dallas. That flight was with my doctoral student Richard Holtzman who later wound up a dean at the University of Wisconsin, Oshkosh. We had very strong 60 mile per hour headwinds going and the

same strong winds from the same direction returning, so it took about 13 hours to go and about 6 hours to return. I ran into a problem that flight, we were flying at a high altitude to reduce the effect of the headwind, the wind is at different directions at different altitudes. We were caught on top of an unbroken layer of clouds. I was not instrument rated, but had been given some training in instrument flying to get out of just such troubles. So in open uncontrolled airspace, not on an airway, I reduced power and dropped through the clouds on an absolutely straight course. We broke through and then had to fight the head winds for the rest of the flight. This was mildly illegal, but it was the only way out of a bad situation.

I had a minor medical problem that made it not worthwhile to even bother getting a third class medical certificate, so we sold the plane in 1974, and the condition promptly cleared up. I have missed Funnyface ever since.

COMPUTERS

We were always well in the range of early adopters of Personal Computers (PC's). Sal became the resource teacher in Math and Computers at the Minneapolis School Board central office at 807 Broadway in 1974. As such she ran a network consisting of a Hewlett-Packard 3000 minicomputer, a phone bank with 32 ports, and a large fleet of teletype machines in schools in a very early implementation of computer-assisted education. The same year the first PC was developed and sold as the Altair using an Intel processor chip, the 8080, whose instruction set (and limitations) still prevail in Intel based computers. By 1977, the Commodore Pet and the Radio Shack TRS-80 PC's came out. Sal had been on a close friend basis with Edwina (Eddie) Slaven of Hewlett-Packard. Eddie sold us on getting a used HP system consisting of a 2647A smart graphic terminal, a thermal dot matrix printer and an 8 1/2" x 11" plotter. It had an 8080 processor, we could load basic into the machine, and then had access to primitive graphics, a text editor and some basic games. It cost us $3000, which was a great discount, and did yeoman work for about seven years.

Minneapolis had a few Apple IIs and TRS-80s (often called Trash-80s), but in 1984, Apple Computers brought out a new computer, the Macintosh. By modern standards it was woefully weak, but it was a great advance over all the other computers. It was touted as extremely easy to learn and very forgiving, yet powerful. Sal was put out at still another computer to learn, each was different at the time. It had memory of 128k, one 400 k disk drive, and came with two bits of software, Macwrite and Macpaint. A second external disk drive could be plugged in. It was indeed very powerful and really useful work could be done with it. Sal kept one of the Macs at home, upgrading to the 512k, and then in 1985 to the Plus with 1024k of built in memory.

In preparation for my trip to China, I applied for a grant including money for an HP Portable Plus with external disk drive and printer, all battery powered, weighing about 45 pounds total. The grant came through, and I bought them in the fall of 1985 for $3000. I used this system steadily through 1988, adding several auxiliary items and software to the system. I finally sold it after several years of neglect for $500 in 1992. Computer hardware has a long life but because of the advances in technology, the worth goes down rapidly with time. They will still do all they did at first.

Then in the fall of 1986, Sal was transferred to Edison High School and lost her loaned Mac. She was in withdrawal, so I bought her a Macintosh Plus and an Imagewriter II printer for about $2000. The next year to stop the proliferation of back-up disks we bought a Rodime 140 plus 140 megabyte hard disk for $1200, a truly great price for the time. This was our main computer for many years.

In January 1992 we bought Sal a new computer, a Mac SE30, the finest of the compact macs, with 8 megs of memory and a 40 meg hard disk. It had been discontinued 6 months earlier, but we bought a used one from an employee of Computerland for $2200, already a discount. I also bought her an HP deskwriter inkjet printer. The old Plus and Imagewriter printer went to Betsy, where they still work on, slow by modern standards but steady. In preparation for her annual trip to Switzerland I bought her a Mac Powerbook 170, at the time the finest of the portable macs.

HYPERCARD

In 1988 the University announced a competitive program sponsored by Apple to write educational software for the Macintosh. It was called Minnemac. I entered a proposal to write a program for identification software on trilobites based on the program Hypercard. I had seen a review of similar software for bird identification in one of the Mac magazines, it was highly valued as an example of what could be done by those with no programming skills whatsoever using Hypercard. Hypercard is a Mac specific program written in 1985 by Bill Atkinson, one of the originators of the Mac software and writer of the very small tightly written first Mac program, MacPaint. Bill Atkinson did a beautiful job, nothing like it is yet available for the DOS world. Anyhow not only did I submit a proposal, but I submitted a small working version of what I proposed to do! Needless to say, I got the grant. It consisted of an SE Macintosh, an Imagewriter II printer and half the worth of an Apple Scanner, the department picked up the rest of the cost of the scanner. The grant also included the aid of a programming assistant who tightened up my stacks, writing scripts that did some neat professional effects. I was off and running, the first stack was on *Ordovician trilobites*, since I had all the data, It was followed rapidly by stacks on *Cambrian Trilobites*, *Agnostid Trilobites* and *Silurian to Permian Trilobites*. These were distributed freely and internationally to many kudos (and a few brickbats which were corrected). They all fit on a total of three 800 K disks and would run on any Macintosh, Plus or above.

These were followed by a new 1989 grant application for a stack on Plate tectonics as exemplified by the "*Appalachian Mountains*" which won me an SE 30 with 5 megs of Ram and a 40 meg hard disk. On this I wrote a stack on "*Dinosaur Evolution*" which covered about 300 genera of dinosaurs and another on *"The Origin of Mammals"*, which covered in great detail the best known sequence of transitional fossils from one class to another. Both were based on work I had prepared for courses, the origin of mammals was essentially my 1983 anti-creationist paper and my 1985 GSA abstract on rapid evolution of therapsids organised and illustrated. Version 1 of the trilobite stacks was distributed at the 1989 Northcentral GSA meeting in Notre Dame. Current versions of all stacks were distributed at the 1989 SVP convention, Austin TX, and the National GSA Convention in St Louis and the 1990 Northcentral GSA in Macomb Illinois. They were also made freely available through the Computer Oriented Geological Society and their network. I used these stacks in a proposal for the computerization of the Treatise of Invertebrate Paleontology, and as teaching tools at all levels. Several have been useful even at preschool and grade school level. I have purposely kept them at the level of early Hypercard(1.2.5), so that schools that have antique Macintoshes without hard drives can still use them. Upgrading them to later sophisticated versions of Hypercard with color would defeat their (and my) purpose of providing cheap but accurate digital paleontology.

In 1990 I wrote the "*Evolution of the Multituberculata"* and the same year applied for a new grant to write *"Mineral Identification"* which netted me a Macintosh color IIci with 5 megs of Ram and 40 meg hard disk. I was also given a grant of 5 Macintosh Classic computers and another Imagewriter II for undergraduate classroom use so my software could be put to use. In 1992 I

wrote *"The Evolution of Horses"*; in 1993 *"The Evolution of the Animal Phyla";* and in 1995 *"the Evolution of the Ray-Finned Fishes"*, based on a handout I had been using in class for 10 years. That year I was given a Power Mac 6100-60 with a 160 M hard disk. In 1996 I wrote a master stack on *Paleontology* to tie all the others together into a Hypercard course. The stacks are a great way of organizing my teaching notes and making them available. They have also kept me in up to date Computers. The total amount of Apple computer equipment given to the Department of Geology on these grants now is $15,000!

RESEARCH

CAMPING AND FIELD GEOLOGY

Over the years I have spent a great deal of time camping, I once calculated I had spent more than four years under canvas. My first independent camping trip was in 1948 with Don Lande, a mutual friend of ours, and our friend's 1937 LaSalle coupe. We drove to the Cave of the Mounds, in Silurian and Ordovician rocks about 15 miles west of Madison Wisconsin. We used that trip as a special credit report for our Introductory Geology class. My Field Geology class was a shortened two week affair to the region of Baraboo and Devils Lake. J Harlan Bretz had taught it for many years, the rolls of the classes painted on the inside walls of the mess tent. He was now retired, and the department hired Jack Hough of the University of Illinois to do the honors, my old friend Jerry Olson who had been my TA in introductory Geology was the TA for this course. Each years class got a name and a roster painted on the inside of the mess tent, ours was "Hough's Puffers". It covered all the usual field camp exercises, mapping, glacial geology, structure and stratigraphy. The most special was when we were taken a mile or two from our camp on the south end of devils Lake, dropped off on a ridge of till, told it was the Wisconsinian terminal moraine, pointed away from camp and told to map it! We worried a little about how we were to return to camp, but Jerry only smiled and told us to map it. We traced the moraine around two Quartzite knobs that had held back the last glacier, and ultimately traced it back to the north end of Devils Lake, two miles by railroad track from our camp. Over the years many schools have used this area for field geology classes, and the Wisconsin Geological Survey finally published a report on the area with most of the answers we had worked so hard to find.

In the spring of 1951 several of us went to north central Texas with Ole to collect Early Permian fossil vertebrates. Ole always went to Texas in the Spring because summers in North Central Texas are entirely too hot for effective field work. Konizeski, Bader and I rode down in my newly rebuilt 1935 Ford coupe, which developed a bad connecting rod bearing in the original 1935 engine while on the trip. We fixed it in central Illinois, but the trouble recurred in Texas. Ole paid for both of the repairs, but it took a lot out of his field budget. We were joined there by Neil Tappen, a graduate student anthropologist. We collected fossils in the Badlands or "Breaks" of the Vale and San Angelo Formations of Baylor, Knox, Foard and Wilbarger counties, near the towns of Seymour, Vera and Gilliland. We spent six weeks camping in tents next to cattle tanks, which was where we got our water. There were two sorts of water in this part of Texas, clear water and "red" water with mud in it. The clear water was clear only because it had a lot of the mineral gypsum in it, closely related chemically to Epsom salts, which had exactly the same cathartic effect on the digestive tract. The red muddy water on the other hand was safe. This semidesert part of Texas had few rains, but when they came it was a corker. It was called a "Blue Norther" and was a major cold

front, with a 30° temperature drop in 15 minutes and winds over 70 miles per hour. Turns out to be an occupational hazard for a vertebrate paleontologist, when it came through we lost our tent. About four weeks into the trip Bryan Patterson ("Pat") and his crew came up from their collecting near Fredericksburg in the Early Cretaceous Trinity Formation where they had been collecting extremely rare early fossil mammals, only the second place in the world at that time where mammals of that age had been found. When Pat showed up we all celebrated by taking our first bath in several weeks, in the very cold stock tank both we and the cattle used for drinking. We all joked about Brass Monkeys.

Our standard field lunches were Mrs. Baird's Bread, peanut butter and grape jam. The virtue of Mrs. Baird's bread was that it never grew stale or moldy, just hard. We had one loaf lost in the back of the model A for two weeks, and was still edible. Breakfasts were dry cereal with canned peaches including the juice poured over the top and powdered skim milk, it tasted better than it sounds. Suppers were hot cooked over a Coleman stove from cans.

We were driving Ole's 1929 four door Model A Ford and my coupe over the country side to get to our areas of prospecting. This was an area of prickly pear cactus and mesquite, both of which would go right through tires. I had been warned and came prepared with a little device called an "Enginair tire pump". This was a little air compressor that screwed into a sparkplug hole and was actuated by the cylinder compression, although it did not take the air-fuel mixture out of the engine cylinder directly. It had a hose and gauge on it and would reach all four wheels. We were forever fixing flats, our record was 5 flats repaired in 15 minutes. We went through several cans of "Monkey Grip" cold innertube patches. We got tired of it, and one day we parked the coupe on top of a mesa so we could see if we had a flat while we were walking back. figuring if we could see the car tilted, we wouldn't hurry back. All looked well, but when we got back to the car, both front wheels were flat! Oh well.

We never had compasses with us, and one day while prospecting in some rough country over near Gilliland, I got separated from the rest of the crew and got completely turned around. It was an overcast day, and when I realized I was lost, I stuck a pencil in the ground and watched for its shadow for 5 minutes until I saw enough shadow to figure out which way was north. Once I knew that, I then went rapidly over the hills until I got back to the cars. Ever after I taught my students how to use the sun and a watch as a compass.

On May 7th, while on this trip, Konizeski, Bader and I took a side day trip 100 miles southeast to Palo Pinto County to try collecting invertebrate fossils in the Pennsylvanian rocks. I knew of these localities from my studies on *Glabrocingulum*, this turned out to be the reconnaissance trip for my Ph.D. field work done in the next two summers. That day I made my first four thesis collections.

From September 9th to 17th 1951 and September 1st to 14th 1952 I drove from Chicago down to Palo Pinto County and Possum Kingdom Lake to make my thesis collections. The thesis topic was: "Paleoecology of the Pennsylvanian marine shales of Palo Pinto County, Texas", an idea I had dreamed up from Emerson's course, a diagram in a paper by Maxim K. Elias (which showed a spectrum of faunas varying in percent of molluscs and brachiopods with depth), Lowenstam's course and my earlier recon trip. I noticed that the more eastern (shallow water) localities in a single shale had more clams and snails, while the more western ones of exactly the same age had more corals, crinoids and brachiopods, the object of the thesis was to prove this out as a way of interpreting depth of deposition of various localities. It worked. This work was done solo, I

couldn't afford any help, and no one volunteered. In 1951 I drove the '35 coupe down, by this time with the big '48 Mercury engine. I had tinkered up a special Stromberg 97 carburator with adjustable jets and had modified the exhaust system into dual exhaust by using the tail pipe and muffler from the old '36 Ford family sedan. Just that change alone increased the gas mileage by 1 mile per gallon! I also added a vacuum gauge to improve the economy of my driving. There was no gas gauge, so I always filled the tank and recorded the mileage, calculated the miles per gallon and used my speedometer and a circular slide rule to calculate just when I had to refill. Worked just fine, never ran out unexpectedly. In 1951 I got stuck on a mud road near Wewoka, Oklahoma where I was checking out a classic fossil locality. I had to be pulled out with a tractor. I used the old Balloon cloth umbrella tent the family had bought, and cooked my meals on the engine block as I had learned in the Guard. Lunch was bread, peanut butter, Grape jam, milk, cookies, and a block of longhorn cheddar cheese. Dinner was surplus C-rations warmed up on the engine while I took a dip in the lake to cool off. In 1952 I used Albert, the green 1939 Ford Coupe and drove the 1100 miles from Chicago to Possum Kingdom in 22 hours straight at 22 miles per gallon, got there at night in a driving rain and took a shower in the rain then slept in the car, until morning. The highways were the old depression era federal highways of concrete 16' wide and rough. The shoulders were often smoother than the road.

In those two summers I collected several thousand fossils from about 40 localities in four counties and covering the last two thirds of the Pennsylvanian Period. They are now in the collections of Minnesota. I drove all the roads in the counties looking for the fossil localities described in Fred Plummer's Texas Geological Survey bulletin on the county, as well as looking for more. When I found a good outcrop I would spend most of a day carefully gleaning all the fossils I could find from the surface. I picked the shales because they provided the maximum number of fossils in the minimum time, but also because they also provided a full spectrum of depths of deposition and the biggest range of faunas. The second summer was similar to the first except I used the green '39 Ford coupe with a dead battery. I could get one cold start in the morning, but ever after had to park on a slope to jump start the car.

That summer Sal and her folks invited me to drive down to the Dixie Dude Ranch near Bandera, near San Antonio, some 225 miles south. I left my thesis area on September 5th. They had been going there for vacations for several years. I went and survived the horseback riding (first I had ever done) and in return I invited them up to my camp at Possum Kingdom, getting back there on the 10th. Charlie enjoyed it very much, Sal's mother (also a Sally) did not like it as well. I cooked chili over a gas stove for them. On the way to Dixie Dude I stopped in Austin and visited Ernie Lundelius at his folk's farm. There we hunted, and Ernie gave me skulls from a gray fox and a possum. I have used those for many years in my classes.

After I went to work for the University of Minnesota, I taught the two week field geology course (#115) in Southeastern Minnesota in 1954, 1956, 1958 and 1959. At first the course was very similar to Charley's version but it gradually transformed as I learned more about these rocks, in the last two years I spent several days having my students map about a quarter of a 15 minute topographic quadrangle. The first week was on Cambrian rocks of the St Croix river area, the second week was in Fillmore County on Ordovician rocks. There we stayed in the old Park Hotel in Preston, where we got a special rate for the students of $1 a night, sleeping on cots in the attic.

My first research in Minnesota was on the Cretaceous rocks of the state, no one had ever written a summary of them. I found out why: there were only about 150 exposures in the state, no two alike, and of every possible sedimentary facies. It took several years of work to make sense of

them, and was finally reached only when I reconstructed the paleotopography, There was a deep layer of weathering beneath the Cretaceous, which varied in results depending on what the local bedrock was. George Melvin Schwartz, the director of the Minnesota Geological Survey funded my research. While I enjoyed Thiel as department head, I really felt close to Dr. Schwartz, he had served in the horse artillery in WWI, while I was in artillery in the guard. Richard L. Pierce was my field assistant, and was collecting Cretaceous pollen samples for his Ph.D. under John Hall of Botany and I. Poor Rick sat in the back seat of the station wagon, Sal was in front with me, and our collie King rode in back and drooled over him! King loved Dairy Queens, and could spot the signs as we drove by and would get excited. King got his ice cream in a cup, that long nose would clean the cup completely.

Starting in 1954, shortly after I arrived Thiel and Schwartz decided to host the national GSA convention in the Fall of 1956. They had held one in 1939, and as a major institution were expected to periodically host one. They told me that I was responsible for a southeast Minnesota Paleozoic field trip. All the recent work had been done by Charley Bell's students and they were estranged from the department since he left. They thought he had left under a cloud and were distressed that he had left rather than Fred. I managed to convince them I had nothing to do with Charley's leaving, and to cooperate. I organized the trip, and wrote a guidebook. Dr. Schwartz did a little more editing and got the publication as editor. It was a success.

In 1953, the Dakota Rose Granite Quarry of Milbank, South Dakota was opening some new area for their quarry and blasted off the Cretaceous overburden. The Cretaceous rocks were a boulder beach conglomerate made of boulders from the underlying Precambrian granite, cemented together by a mixture of chalk and clay, with many fossil fish bones and sharks teeth, and occasionally a whole fish. They set off a charge very close to a fossil three foot long sea turtle. Dr. Elden Johnson, the state archeologist was visiting a bar in Ortonville, and was given a chunk of rock with some bones in it. It turned out to be the neck and the front part of the shell. The rest of the turtle had been collected by my colleagues at the South Dakota School of Mines, Rapid City. I found out about it, after I asked for it, they shipped me the rest of the pieces and I had a 3 dimensional jigsaw puzzle with about 30% missing. I visited the quarry on November 1st and 8th that year and was given some of the three-dimensional fish, but found no more scraps of turtle. For about 3 years I had a 3 foot long sand table filled with turtle pieces in my office, slowly piecing broken parts together. My old teacher and friend, Rainer Zangerl of the Field Museum was the only turtle expert in North America, so I finally consulted him. We jointly finished the job and published it. It turned out to be the second known and most complete specimen of the oldest member of the modern Sea Turtle family. We deposited it in the Field Museum.

In 1957 J. Campbell Craddock and I were assigned by Thiel to teach the four week Black Hills field geology course. We had about 20 students and did all the usual projects, the mandatory trip to the Badlands early on the way out with a stop in Wall Drugs for all the stuff the kids forgot. I had my 15 year old brother Jimmy along at the request of my folks, he was a real pain. Nothing like an active teenager with delusions of being bullet proof in the field. He would not listen to any cautions and was really wild in the field. He found a complete skeleton of *Merycoidodon culbertsoni*, the most common oreodon, and later it was mounted at the St. Paul Science Museum. We did section measuring on Whitewood Peak, plane table mapping on Bear Butte, an Eocene Intrusive, a trip underground to the 7000 foot level in the Homestake Gold Mine (we were below sea level in the Black Hills). We headquartered in Lead at a boarding house for most of the trip, with Cam leading a

wild drive south to the Custer-Keystone area for the Cretaceous section and the pegmatites. I followed the tail end of the caravan and had to drive at 70 miles an hour to keep him in sight.

While attending a dinner meeting of Sigma Xi, the national scientific fraternity, I was sitting next to another officer, neither of us was interested in the speech, and we looked to see what we might have in common. Bob Jenness was a milk biochemist, and I was interested in fossil mammals and their evolution. So on the spot we hatched a research project on Comparative Biochemistry of Milk, and were funded at a low level by the U of M graduate school. It turned out that little was known on milk chemistry other than humans, cow, sheep, goat and camel. By the end of the project we had written 7 papers, had more than tripled the total information on milk of non-domestic species, up to about 70 species, and had no end of stories to regale friends at parties. We milked a buffalo cow in a squeeze chute, milked Patsy the lioness and a kangaroo (she required 6 of us to hold her and milk her) at the local zoo in Como Park, had a dairy herd of possums. several species of mice, ferrets, armadillos, (one faculty member in the Biochemistry Department who shall remain nameless, asked Jenness "How are you gong to milk a reptile?") and milked all sorts of pets including Rinky, our poodle. We were finally able to make a quite complete analysis of milk from as little as 1 cc. The first of these papers came out in 1961.

About 1961, when Bob Jenness and I were involved in the milk research project, we began a major discussion group in evolutionary studies. This was a evening group that rotated from house to house of the participants. The object was to introduce us to advances in other fields than our own. Others in the group were Elmer Birney, Phil Regal, Dwain Warner, Harrison "Bud" Tordoff, and occasionally Frank McKinney, all curators of the Bell Musem, and a variety of others from various St Paul Departments. In conjunction with the milk project, Bob and I went to Colby College in New Hampshire for a summer Gordon Conference on Milk. Bob talked about our recent biochemistry work while I talked about the origin and evolution of mammals. We stayed in dorms, no publication ever resulted directly, because the idea of a Gordon conference was a free flowing discussion of ideas. The last meal was a party on Friday night, with great tables heaped high with small lobsters, it was eat all you could! From there Sal and I went south to North Carver, near Plymouth, Massachusetts, where we spent the whole day riding the 2 foot gauge Edaville Railroad, the tattered remains of the Maine two foot railroads rescued and restored to run on the plantation of Ellis D. Atwood, owner of Ocean Spray cranberries. It was railfan's day, and many steam specials were running around the 4 mile loop of track. Edaville is of course a contraction of Atwood's initials. The joking motto is "Through the Cranberry Bogs, not around them!" They had a model T converted to run on the track, but it was not running. We asked if it would be possible to get a ride in it, we were told, only if it were full, and people paid $10 each. We asked out loud and several other railfans leaped at the chance. The model T speeder was running between steam trains for the rest of the day.

GEOLOGY OF SOUTHEASTERN MINNESOTA

George Thiel assigned me the area of Southeastern Minnesota as my special field of research when I was hired. When I was his assistant, Charley Bell warned me that I should not take Stauffer's measured sections in the classic 1941 Bulletin 29 of the Minnesota Geological Survey, "*Paleozoic and Related Rocks of Southern Minnesota*" too seriously, saying they were put together with plane table. Thiel had used the 1932 *Geologic map of Minnesota* with Paleozoic rocks mapped by Stauffer for the maps in his 1944 Bulletin 31 on "*Ground water in Southern Minnesota*". I started my work using Bulletins 29 and 31 as my bibles, but rapidly began to find so many errors that I came to distrust most statements in

them. I could count on the sedimentology by Thiel, and most of his interpretation of well logs, but most of Stauffer's work was suspect.

The geologic contacts of the 1932 map were accurate along US highway 52, and were off by a township or two elsewhere, in one case by 4 townships (24 miles)! In the summer of 1959 I started seriously mapping in the Rochester area, mapping six 15 minute quadrangles. In 1959 and 1960 I used the students in Geology 115, the southeastern Minnesota field course to map a pair of quadrangles, and added six more in Winona and Houston Counties area. I received some sniping criticism from some members of the department, saying that should be easy to map, since the rocks are all flat. The problem was they were not, the regional dip was about 10 feet per mile to the southwest, but there were many dip reversals of as much as 200 feet per mile due to undiscovered basement faults, so nothing could be counted on. All contacts had to be measured in. Much of it was done with a precision altimeter, running altimeter traverses and frequently closing loops in the traverses, returning to old altimeter sites. In some area I had to map on aerial photos plotting on a county highway base. Thankfully Mac Weiss had done Fillmore County in a most thorough way and I didn't have to redo that. I drove almost all the back roads in the area, wearing out 3 station wagons in about 8 years in the process. I am convinced that I was the first geologist into some townships since Winchell's original survey. In general I found the original Winchell county survey maps far superior to the 1932 map. The survey could not afford to publish these maps at 1 inch to the mile, so in 1966 I had my preliminary drawings reduced to 1/4 inch scale, scribed them onto a mylar base made from the USGS 1:250,000 scale maps, and ultimately they were published as the St Paul Sheet in 1966.

SOUTHEASTERN MINNESOTA AND CONODONTS

In the late '50's and early '60's I directed a series of theses on Conodonts. Conodonts are microscopic fossils that look like teeth and are made of the same mineral as vertebrate teeth. At the time there was great discussion about what group these fossils pertained to, vertebrate paleontologist said they were invertebrates, while invertebrate paleontologists usually said they were vertebrates. They recently have been shown to be very primitive fish, usually about 2 inches long but almost always only known from the teeth. Each kind of conodont animal had up to seven or eight different types of teeth in the mouth, but since they are usually isolated, it was difficult to decide which teeth occurred in the same animal. At that time, most conodont studies were on a few specimens, and each type of tooth was given a different name, illegal under the rules of zoological nomenclature.

Fred Swain had a leave and was replaced by one of Charley Bell's students, Allison R. "Pete" Palmer, Cambrian trilobite specialist with the USGS. Pete had great luck dissolving limestones in Formic Acid for acid insoluble fossils. He introduced me to massive acid etching. At that time a few conodont workers were beginning to etch limestones for them. I decided on the basis of my studies on statistics, and a few preliminary analyses, that on the basis of very large collections from many different beds it should be possible to figure out which teeth came from the same animal, which would be a great advance. Conodonts were used primarily for correlation purposes, and few paleontologists ever considered tham as parts of real animals with real properties. It was very clear to me that an evolutionary study of the changes in assemblages would lead to far more useful information that the standard way conodont workers examined them.

The first of these conodont theses was by Willis H. Thompson in l959 on conodonts from the Platteville Limestone, and was immediately followed the same year by Henry W. "Bud"

Anderson Jr. on conodonts from the immediately younger Decorah Shale. The other theses were by Gerald F. Webers in 1961 on Dubuque and Maquoketa conodonts, a Ph.D. by George A. Seddon, 1965. on Middle Paleozoic Conodonts from the Llano Uplift, Texas, and Jerry Webers 1966 Ph.D. thesis on Middle and Upper Ordovician Conodonts from the Glenwood to the Maquoketa Formations, about 16 million years worth of rocks in Minnesota. This last was the one in which we finally demonstrated that you could figure out the composition of single species in terms of multi elements. At first this proved to be highly unpopular, since it meant that all the previous work on conodonts going back a full century had to reevaluated! But at exactly the same time Walter C. Sweet of Ohio State and Thomas Schopf of New York, working on rocks of exactly the same age came up with exactly the same conclusions. Tom and Jerry were absolutely petrified, since Ph.D. dissertations have to be completely original research, both had visions of their degrees going down the tube and having to do still another complete thesis! Then they realized that far from being ruined, this was three independent tests of the hypothesis with the same result, and should satisfy all the critics. Ultimately it did, but things were sufficiently hot for Jerry that he was forced out of the field and it took about 5 years for most to catch up and realize we were right. By that time Jerry had gone on to do his important Antarctic research. Jerry is one of my life long friends, he went on to Macalester College, where for many years he headed the Geology Department.

In 1961, I was checking out all of Clinton Stauffer's work on the geology of Minnesota because I had found most of what he had published was very wrong. He was a decent paleontologist but a terrible stratigrapher and geologic mapper. He got one contact 40 miles north of where it really was, and had the geology correct on the 1935 state geologic map only along Highway 52. This despite the fact that N.H. Winchell and his crew had made better maps from 1872 to 1892. They had been ignored. I stopped along the Minnesota River near Belle Plain to check on an outcrop of "St. Lawrence Dolomite" he had reported. It turned out to be Shakopee Dolomite instead, about 25 million years younger and about 300 feet higher than it was supposed to be. This meant that there was a major fault cutting across the river valley. Z. Frank Danes was visiting us that year while Hal Mooney was on sabbatical, I convinced Frank that a simple gravity survey along the C&NW railroad tracks in the valley would be easy to do and might prove interesting. It was, for a distance of three miles we got an increase in the value of the acceleration of gravity of 1 milligal every three telephone poles, for a total of 100 milligals. Normally an increase of a tenth of a millligal is big, this was part of the edge of the Keweenawan rift, the biggest single gravity anomaly in North America. Ever since I have been telling students "If you want to lose weight, move to Wayzata or Hudson", you would lose about half an ounce simply because you would move away from this gravity high, centered on the Twin Cities.

In 1960 both Schwartz and Thiel retired, Sam Goldich resigned inm 1959, and John Gruner, the mineralogist had retired in 1959. This was a major change in a (by that time) 10 man department. Preston Cloud, a paleontologist from the U.S. Geological Survey was hired to replace Thiel as head. Pres was an extremely bright, pugnacious, short, bald man who shaved his head, and to say the least did not suffer fools gladly or any other way. Like many such men he had a chip on his shoulder all the time, and was never patient with those who disagreed with him. The Cloudian Era in our departmental history was chaotic. Pres had great ideas, but had few people skills. I had been given tenure in 1959, but not promoted from Assistant Professor. The department was very pleased with my teaching but not pleased with my research productivity. I had writer's block in a serious way while working on the Cretaceous of Minnesota, and had also had my paper turned back from the survey for rewriting several times. I had many publications in progress, having done Paleozoic field work in Southeast Minnesota every summer since about 1955, my Cretaceous paper

was well advanced, and I had been mapping SE Minnesota to bring Stauffer's poor 1935 map up to date, but none of it was published for lack of money. It was made very plain to me by Cloud that SE Minnesota was a geologic backwater, and I had better do some more earthshaking research if I wanted promotion to Associate Professor. In fact, Cloud told me to go looking elsewhere for a job, I was not good enough for Minnesota. He wanted me to resign.

I gave considerable thought to what might be the most doable and exciting research I could think of. The end of the Cretaceous Period, the extinction of dinosaurs and the radiation of placental mammals was what I decided on. Having read all the literature on the extinction, and all the relevant stratigraphy I was struck by the solemn nonsense that was all there was in print. I could find no funds to do this, so I got together with my old student Bruce Erickson of The St Paul Science Museum. (I had seen him through a bachelor's in Zoology when he couldn't pass the calculus for a Geology degree, I had also gotten him a position at the Field Museum working with Orville Gilpin "Gillie", so he was a shoe-in for the position at the SPSM.) We decided to go to eastern Montana, in particular Hell Creek north of Jordan, because Barnum Brown had found 200 *Triceratops* skulls there in 1902, and no one had collected there since the '30's. Bruce needed a dinosaur for display, I needed access to carefully collected fossils of all sorts with detailed stratigraphy to see what the ecological changes were across the boundary.

From June 13th to 23rd, 1960 Bruce and I --together with Delwyn Olsen (Bruce's soon to be brother in law) and a zoology graduate student Paul Lukens-- were given $600 for a two-week expedition to Jordan. John Hall, his students Norman Norton and Bob Melchior, paleobotanists joined us. (Paul, Norman and Bob Melchior all later became professors.) We camped on a friendly rancher's (John Trumbo) pasture near Brownie Butte in the Hell Creek drainage. Within 5 minutes of setting up the tents, Paul went up the nearest coulee with a folding shovel and a roll of toilet paper. He came running back and shouted "I found a *Triceratops* Skull!!" It was as easy as that. We spent the next week and a half excavating the skull, about 8 feet long and 5 feet high. Norman Norton collected his pollen samples for his PhD degree. Poor Norman made every mistake possible in the field. He stepped on a timber rattler, but wasn't bitten. Put his hand down on a scorpion and was stung, did get his samples but never again did any field work. We met a recent Minnesota grad Gerald E. Anderson, who was party chief for a USGS Conservation Division party mapping coals in Garfield County, including the area around Brownie Butte, and gave me a tour of the county and its geology.

The next year, 1961, we had a grant from the Hill Family Foundation to get a complete mountable *Triceratops* and to work on my paleoecology. The crew was Bruce and I, Del Olsen, Charles Johnson an artist from the Science museum, Jim Nelson and Phil Fitzpatrick from my Boy Scout troop, and Margaret Twentyman, and Anne "Holly" Edwards. John Hall, my Botany partner in all these researches sent out two of his his students, Bob Melchior and Bob Shoemaker. We left on June 15th in the Big Pig, the Dodge 4X4 Power wagon discussed elsewhere. We worked a quarry about 7 miles north east of the Trumbo ranch house. We excavated 2/3rds of a Triceratops in 1961. Having proved that the first specimen had been quarried out, Bruce found another nearby skeleton to fill out the mount in one day.

In the meantime, I took Melchior and Shoes to visit the Crazy Mountain Field where Gidley and Simpson had done such spectacular Middle Paleocene collecting, some 300 miles west. There on the West Dome of the Shawmut anticline, we measured a 13,000 foot section with Brunton compass and Jacob Staff and collected the Pollen for Melchior's thesis from the Lower Cretaceous up to the middle Paleocene. While in that neck of the woods we also visited Jepsen's section at

Polecat Bench to see Mantua Quarry. When we returned, we measured several sections including 7 Blackfoot Coulee for Don Oltz and Melchior for more paleoecological information. I also found my first Mesozoic mammals. Robert Folinsbee of the University of Alberta visited us to collect volcanic ash beds for K/Ar dating, including a sample from the Z coal bed, the K/T boundary. When we submitted the data, including the paleontology, stratigraphy and dating, to Science for publication, the reviewer recommended rejection of the paper on the grounds that we already knew the age of the K/T boundary! It was not published. We left for home on August 3rd. The excavation of the *Triceratops* skeleton was completed in 1962, and finally put on exhibit after Bruce had worked on the bones for 3 years. Orville Gilpin from the Field Museum came up to assist him in mounting the skeleton in the Lobby of the Science Museum. I reported on the fossils at the convention of the Society of Vertebrate Paleontology in Denver that fall.

After the meeting Leigh Van Valen of the American Museum of Natural History in New York wrote me and asked if he could come along the next year and work with us in the county to the east, McCone Co. It seems that in 1935 an amateur paleontologist named Darwin Harbicht working as a civilian for the Corps of Engineers, had collected some fossil mammals for the museum. Walter Granger of the Museum had gone out to see the locality, but died on the way back. The Museum had the specimens, a photograph of the locality, information that the locality was a mile from Dr. Case's dinosaur, and about 16 miles south of the Losee Ferry. But no one knew exactly where it had been collected, the ferry was under water, and no one at the University of Michigan knew where Dr. Case had collected his dinosaur, a complete skeleton of *Anatosaurus*, in 1935. The mammal specimens themselves were very interesting, a mixture of latest Cretaceous fossils and some from the earliest Paleocene, but all from the same bed. So on June 19th 1962, we drove our convoy to Jordan, and William F. "Bill" Nelson -- one of my zoology students -- met us in Jordan in his Rambler two-door sedan. The crew was Bruce and I, Charles Johnson, Charles Boggs, Jim Nelson, and Rod Merrick; Leigh joined us by bus and the mail car from Miles City to Jordan.

Leigh, Bill and I left Jordan early in the trip on June 20th, and drove 150 miles to get 40 miles east of our old locality, where we camped at Rock Creek State Park on the east side of the Big Dry Arm of the Fort Peck reservoir. We had to go south 30 miles to Jordan, then east 65 miles to Circle and Brockway, then northwest 50 miles through Weldon, to Rock Creek Park on a horrible dirt road that was very muddy when it rained. Until Highway 24 was built in about 1965, that was the only way to get to the Fort Peck Fossil Field.

We knew the Harbicht fossils had been collected in a school section. Sections 16 and 36 of each regular township are called school sections because the proceeds from the use of these sections were reserved for the expenses of the local school. So we asked some locals where Dr. Case had collected, and we looked closely at rocks near the K/T boundary, the top of dinosaur distribution. On June 23rd, along the South Fork of Rock Creek, Leigh was climbing buttes, and there he found a canine tooth of a mammal about the size of a big setter at a hill notable for a timber rattler found on it. Ultimately we named it Purgatory Hill, about a four-way bad pun, based on its horizon just above Hell Creek, its steepness, its scarcity of mammal teeth, and the outrageous amount of work necessary to increase the production of fossils to respectable levels.

We were very excited and went to town 40 miles away to celebrate. While there we met Don Beckman, of the Corps of Engineers, the chief engineer of the Fort Peck Dam, who had written us just after we left about some fossils he had found along Bug Creek. Newall Joiner, a scientist with the B.L.M. had been working at the Dam, cleaning up the local museum collections,

and went out fossil collecting with Don, his wife Marjory, daughter Donna, Richard Erickson and Eugene Kusczmaul, both of the local Corps. There on Bug Creek they found many fossils including a few mammals, normally very rare. On June 26th, Don, Dick and Gene took us back to Bug Creek that evening to show us the locality, but could only give us about 15 minutes before they had to head back to town for a party. When we got to the locality, all I could see besides the cattle tracks where they had found fossils were three great big ant hills of *Pogonomyrmex*, the harvester ant. Harvester anthills are 6 feet across and a foot high! They collect all sorts of fine gravel from a radius of 50 feet around the hill to produce a rain shedding anthill, they also clean out all the vegetation for about a 10 foot circle and their hills can be seen from 10,000 feet high. If there are any small fossils they collect them. These ants are still closely related to their wasp ancestry, and have big jaws and a stinger in the tail. Paleontologists have been raiding these harvester anthills for mammal teeth since 1893.

When I saw the anthills I immediately realized here was the first place to look. Most anthills I had looked at had a tooth or two, if any, but these were absolutely spectacular! So Bill, Leigh and I each took an anthill, plugged the openings, and started using tweezers to collect Cretaceous mammal teeth off the top of our anthills. About fifteen minutes later we were dragged off the anthills, kicking and screaming, to go back to camp. Our hosts had to go back to town for a party. At camp we sorted our ill gotten gains by the light of a Coleman Lantern and found we had 33 mammal teeth with a third of them Placental mammals! This was more Cretaceous mammals than in the whole American Museum of Natural History, the biggest collection in the world! We were at an all-time high, we had no beer, but we celebrated by drinking pickle juice, I have no idea just how long we stayed awake, periodically breaking out into ejaculations about our good fortune. Leigh is always a bit reticent, but we allwere grinning from ear to ear and even he would grin and burst into happy anticipation of what would result! We went back the next day and collected 300 mammal teeth in 7 hours, the horizon was clearly Cretaceous and extremely rich!

Don also introduced us to another locality a mile away that we called Bug Creek West, very slightly younger than Bug Creek Anthills and with 3 ungulate (primitive hoofed mammals) mammals instead of the single one at Bug Creek Anthills, and to the nearby Fig Patch, Roland Brown's locality for fossil figs.

Later that summer while in Fort Peck, Richard Erickson showed us a manuscript fossil map pasted to linen, drawn in the late 30's by a Doctor Watts at the damsite, that showed a locality called Mammal Hill about a mile away from another called Dr. Case's Dinosaur. This was a buried treasure map! When we drove there in Don's Jeep, we matched the old photograph of Harbicht's locality, and matched the mystery fossils, even finding a screen the hired boys had used to screen the sand for the fossils. It was black painted galvanized steel screen tacked to a cane chair bottom. We left it there, and it was still on the hill when I last visited it in 1990. This locality was named Harbicht Hill, and was very slightly higher than Bug Creek West and had 5 species of hoofed mammals! With the addition of Purgatory Hill we knew had a very great amount of detail and it was obvious that mammal evolution had been proceeding very rapidly as the dinosaurs were going extinct. So to the extinction story which was developing, we also added firm data on changing rates of evolution.

While this was going on we had the first of a series of cold fronts that passed through about every 10 days. The first one had a peak wind speed of over 85 miles per hour, because the anemometer at the Fort Peck dam hit that speed (which was the stop pin on the meter), stayed there for over an hour, and finally blew the anemometer away! 10 days later we had another, the anemometer had been fixed, this storm peaked at 115 miles per hour but wasn't as strong as the first

one! Our brand new US Army small Wall tent with pipe frames was torn up, setting a pattern for the next 30 years. We moved into the park house, a building at the Rock Creek park. The poles became benchmarks for surveying. Those winds blew all but a very few types of tents to pieces, then we would illegally move into the park house to last out the rest of the 6-week trip.

Bill and Leigh never did get back to Hell Creek that summer, leaving on July 3rd. Sal and Char Merrick, Rod's mother showed up that day by prearrangement and we took a vacation trip to Glacier Park and Lake Louise at Banff, returning to Jordan and the base camp to continue working there on July 9th. While crossing northern Montana, Sal saw a baby moose, Char and I teased her about it being a mangy coyote instead. That has been a running gag for 35 years. I collected some mammals from a locality near Brownie Butte, originally discovered by Albert Silberling, and also worked by Jack Dorr of the University of Michigan. This was very close to Bruce's second *Triceratops* quarry.

We were camped on the north side of Hell Creek and normally drove to town across a dry ford. On the afternoon of July 13th we were almost out of groceries and were planning to go to Jordan (where we raised the population by 5% while shopping). It started to rain and rained 7 inches in 25 hours without break. We had only Spaghetti and Peanut Butter, and no salt to eat for the next three days. The first day after the rain we couldn't walk, and we couldn't drive the jeep and the Dodge 4-wheel drive Power Wagon (the Big Pig) for three days. When we could finally drive to town, the road had developed ruts so deep that we could drop the huge 9 x 16 tires of the Power Wagon into the ruts and not have them touch bottom. Finally on July 15th I could stay on the hillside of what I called Mammal Hill near the camp and collect a few more mammals. On July 18th I went with Melchior and Shoemaker to collect more pollen from 7 Blackfoot Coulee, where there was a complete section from the Bearpaw to the Tullock. Then Shoes and I returned to Rock Creek in a rented University Station wagon where we collected the Fig Patch, an old Roland Brown locality on Bug Creek near Bug Creek West where fossils of *Ficus ceratops*, a fossil fig could be found. We managed to get bogged down on that horrible road from Circle to Rock Creek, and spent the night in the car, getting a rancher to pull us out in the morning. At Rock Creek we made a collection of fossil leaves which was published as Shoes' master's thesis, and provided more paleoecological information.

Word of what we had found spread throughout the profession, and we had many visitors that summer and went visiting ourselves. Returning to Jordan on July 24th, we met John Hall, we were also to meet William Clemens of the University of Kansas, instead we met Elwyn Simons of Yale with a crew of seven. We all stayed that night in a truly dismal hotel in Jordan. The next day I showed Elwyn the Dorr mammal locality at Brownie Butte. Bill Clemens finally showed up and we went to see Mammal Hill, near our camp. John and his students went on and Bill drove me back to Rock Creek, Elwyn and his crew came along in their truck. There Bill collected 8 gunny sacks of matrix from Bug Creek Anthills for underwater screen washing for fossils, an old technique of Hatcher's and Barnum Brown's that Bill introduced me to. Elwyn came up and asked me with a smirk, "Uncle Bob, I found an anthill, can I keep it?" Yale got its Bug Creek collection then and there.

Bill and I drove back to Jordan, south to Miles City, on to Alzada Montana, and south along the west side of the Black Hills to his thesis area, the classic Lance Creek region of Wyoming where Marsh collected so many *Triceratops* and Hatcher found the first Late Cretaceous mammals in 1893. There he washed out his 8 sacks of Bug Creek Anthills. We drove on to Lusk, Wyoming, where there was a gathering of the clan of Wyoming paleontologists in a roadhouse. Those present

included Malcolm and Priscilla McKenna, and George Whittaker of the AMNH, Mary Dawson and Craig Black of the Carnegie Museum and Peter Robinson. I remember it was drunk out that night and I was telling folks, "you could blow up the outcrop with dynamite and catch the fossils with catchers mitts and still get a fauna!" The next day Bill and I drove to Malcolm's Campanian-Judithian Mesaverde locality that produced the Ervay fauna and examined it. The following day Bill showed me around his area, Lance Creek, showing me the quarry from which Hatcher collected *Sterrolophus flabellatus*, one of the *Triceratops* synonyms, and gave me an 8-sack sample from his richest locality, Bushy tail Blowout. That sample had several rare jaws that Bill borrowed for his thesis. Malcolm called us at one of the neighboring ranchers and asked if Jepsen could have permission to collect a sample at Bug Creek. I gave it to him with the proviso that I could describe them. Of course he didn't get anything we didn't already have better material of. Much later I learned why Jepsen was so meek and mild, The previous summer Jep had Don Baird and a crew in the valley of Bug Creek looking for mammal sites. Jep became impatient and jerked his crew out prematurely, only to have us scoop him later! I finally arrived home on August 1st after a very hectic and busy summer.

Our discoveries that first year among others, included what we called *Protungulatum donnae*, the oldest ungulate or hoofed mammal, the common ancestor of horses, tapirs, rhinos, pigs, sheep, deer, cattle, elephants, sea cows, and whales, among others. Some close relatives had been found earlier but this was from a million years before the end of the dinosaurs. We now have specimens in museums that go directly with no breaks to all these animals and more. Don Rasmussen, a student at the University of Montana, Missoula was working as an assistant for Craig Bentley of the USGS, who was continuing the coal mapping project. They visited Bug Creek and Don found the finest jaw of that species ever found. Ultimately he gave the jaw to me, and it is catalogued as the type in the Science Museum of MInnesota.

That fall at the end of October, I made my first presentation on Bug Creek at the SVP convention in Austin and following that went to the GSA convention in Houston. The news was received with excitement!

The next summer, 1963, we had no trouble getting a 2-year $18,000 research grant from the National Science Foundation to work on the problem of "Terrestrial community changes in Late Cretaceous and Paleocene rocks, Montana." It also made possible my promotion to Associate Professor in 1963. I had several research assistants, the chief one was Robert Bell, who was one of my staff teaching Historical Geology. His thesis topic was "Stratigraphy and sedimentation of the Hell Creek Formation, Montana" completed in 1964. Bob had just married Sue Smith, one of the department secretaries, just before we left for our summer trip. Sue, being a kind and loving person, sent her new bridegroom a box of chocolate chip cookies, carefully packed in popcorn so they wouldn't break in the mail. Each cookie had a colored gumdrop on the top center. Bob shared the cookies around, and no one let on anything was wrong until every one found out for himself. The "gumdrops" were really absolutely clean fossils from the Decorah Shale, dipped in food coloring!

The 1963 Bug Creek expedition was from June 17 to Aug. 3, Bill Nelson came back, others on the crew were Bob Bell, Warren Petritsch, whose dad worked with Sal's dad at Commonwealth Edison in Chicago, Robert "Shoes" Shoemaker was there as well working on his MS thesis on leaves and pollen, Nevin Nolder, and Rod Merrick, son of a family friend. Poor Rod was in the early stages of a mental disorder, and in addition suffered an attack of appendicitis in the field. The first week we a major cold fron move in , the temperature dropped 30° in 15 minutes and all the tents

blew down in the all night storm. My 35 year old balloon cloth umbrella tent finally bit the dust and was used to patch jeans. The anemometer at the Fort Peck Dam read the stop pin velocity, 87 miles per hour for a half hour until the bearings froze and the anemometer blew away. Ten days later we had a similar but slightly weaker storm. The anemometer had been replaced and read a peak veolcity of 100 miles per hour.

The crew wanted the top off the Scout so they could bail out if it started to tip over. It never did, the Scout was far superior to its ancestor the Jeep, had a wider tread and a similar short wheelbase. We drove to town and got rained in, with 4 inches of rain in the bottom of the Scout. We spent the night at a cheap hotel. We routinely listened to the Twins ball games on the Wolf Point Montana radio station which was part of the Twins radio network. Each year at Bug Creek we had a series of popular songs that we became attached to. Most were apropos. One was Allan Sherman's Camp Granada, "they say we'll have some fun when it stops raining!", another was "Give me 40 acres and I'll turn this rig around", apropos of the trailer. Another was "Tie Me Kangaroo down, mate".

I was still smoking and from 1963 to 1965, I took several boxes of Rum Soaked Crook Cigars to Montana, every one on the crew would smoke them, occasionally stubbing one out against our ants when they were particularly irritating. Also in 1963 or 1964 Alfred Aeppli of the Department of Mathematics stopped by in camp. He had lost his check book while on a family vacation and needed to float a loan to get home. We helped him.

We had very poor maps. There was no county highway map. We did have the 1937 geologic map of McCone County done by Collier and Knechtel and we had blowups of the 1/4" to the mile Army Map Service quadrangle. To do the geologic mapping Bob Bell had to map on Soil Conservation Service air photos and then make a base map. We did plane table mapping of Bug Creek, and Bob had to locate all the section corners (mostly stones) on the photos to make his own base map. While we were doing that Montana was pushing highway 24 south from the spillway towards Montana 200 at what became known as Flowing Wells. We got the layout maps from the Highway Department to get the precise location of the highway which ran through many of our localities. For over 10 years Bob's map was the only detailed map of the region. I gave copies of the map and locations of our stash of screens to many of my colleagues so they could get their own Bug Creek Sample. I can no longer remember all who took me up on it, but the fossils are widespread in collections.

Visitors included Rosendo Pascual of the Museo de la Plata, Argentina, who was very surprised to see the senior researcher (me) actively working with the peons. The McKenna's, Malcolm, Priscilla and son Douglas visited us and brought with them their students Len Radinsky and Fred Szalay, both of whom went on to spectacular careers. Leigh couldn't be with us, because he had developed skin cancer on his forehead. We collected many tons of concentrate from several localities, washing them down in underwater screens to concentrate the fossils. Bob Shoemaker (Shoes) and I took a week long vacation off to the Judith River country to measure his stratigraphic sections and collect pollen samples for his PhD. Thesis on the Judith River Formation. In the process we found a fossil mammal locality, 10 million years older than the Hell Creek localities, and the first new locality and fossil mammal since John Bell Hatcher had found one in about 1899.

[Bug Creek Map and formation chart removed]

After the 1962 field season and up until 1972 I made trips to eastern museums, staying with Leigh or Malcolm McKenna in New York while at the AMNH, and at the Princeton Club while

visiting Jepsen at Princeton. I also visited the U.S.N.M. in Washington to see the Paleocene collections that Lew Gazin controlled. Jepsen had a terrible reputation among students and professionals. He kept the finest specimens in a safe in his office and emotionally abused all those around him. Your status was determined by what Jep showed you. Jep had all those specimens he had collected at what was up till then the oldest set of ungulates from his 1930 discovery, Mantua Quarry just a little younger than Bug Creek and Harbicht Hill. This included full skulls and jaws of *Protungulatum*. Few had seen these since he was very cautious and not really certain of being able to describe them adequately. He had a complete multituberculate skull, and of course the famous complete bat from the Green River Formation of Fossil Wyoming . I was able to photograph the skulls, was given a cast of the Bat at about the time of publication, and was allowed to see all the Mantua specimens including the usually hidden skulls. In 1972 I was loaned the multi skull to illustrate and describe it in a joint paper . I flew back to Minnesota in Funnyface with the carefully wrapped skull in my shirt pocket.

One of the neighboring ranchers was William "Windy" Twitchell, who as a very small boy, in 1906 had been given a Buggy Ride by Barnum Brown, the first paleontologist in the area. That year Barnum collected the skeleton of *Tyrannosaurus* on display at the American Museum. This specimen AMNH 5027 was the "bug" of Bug Creek, and how the creek got its name. ("Bug is a common name for fossils of all sorts). I spent much of my career chasing Walter Granger and Barnum Brown about the west. My all important copy of Matthew's monograph on the Paleocene of the San Juan Basin was originally Barnum's, he had been given it as a courtesy when it was published in 1907, but had never read it, the pages had never been cut.

Pearl Daniels (Windy Twitchell's mother in law) was mad at the world. Some hunters had shot up some bottles she had left out in the sun to turn purple from the Ultraviolet rays. Because of this she had excluded us from driving to Bug Creek the easy way across her property. So we had to take a weird detour through the badlands to get to the place. Early in the season while moving up the last slope to Bug Creek Anthills, we twisted off the right rear wheel of the Scout (the axle steel the first year of production of the Scout was weak). We stripped the parts off, put them in a gunny sack, and hiked a mile or so to Windy Twitchell's ranch. Then we got a ride back to camp, took Bill Nelson's Rambler to town, bought replacement parts and drove back to the wreck. Pearl relented and let us use the road over her property. We had the Scout all back together and the brakes bled by 5 that evening. Ever after we drove over Pearl's land. We visited the Crazy Mountain Field, that Simpson had made so famous so that Bob Melchior could collect his pollen samples for his thesis. We also visited Jim Jensen near Hell Creek State Park where he had found the world's record *Triceratops* with skull 8 1/2 feet long and too wide to fit his pickup. He had to blast some rock off to collect it. He showed me how to make a pricker to poke a hole for the fuse in a dynamite stick and fit a blasting cap and fuse to dynamite sticks, a skill I was to use later. When he finally got his skull home to Brigham Young University it was too large to go through the museum doors, they had to widen the doors.

We worked Purgatory Hill hard that year(1963). The name comes from the miserable aspect of the locality. In the first place it is just above the Hell Creek Formation, and in Dante's Inferno, Purgatory is just above Hell. The slope is 50°, is covered with sharp angular chips of siderite, you have to chop steps in the clay to climb up. The locality produces 1 fossil mammal tooth for every 6 man days of working. To get more fossils out of it you have to carry tons of sand and clam shells off the hill and down that steep slope. We finally carried 10 tons of sand off that hill to collect 600 mammal teeth. After the sand was down we then washed it in the Fort Peck reservoir, and let it dry

in the screens. That got rid off most of the sand, but left the shells, and siderite chips behind, the collection of mammal teeth was now up to one tooth per day. We dry-screened the stuff in the screen with a 1/4 inch mesh and searched the coarse stuff for bone and a few teeth. Then we sacked up the fine concentrate, 600 pounds of it, to take back. There in Pillsbury Hall we etched away the ground up clam and snail shells in a Gus Cooper type etching tank the size of a bathtub, dried it, sieved it into size ranges, and ran it through the Frantz Electromagnetic separator, this put teeth and bones in one bucket and all the junk in another, since they were different minerals. At that point we could find 12 teeth per day in sorting the concentrate. That was much better! We wound up with 600 useful mammal teeth out of the original 10 tons.

Why did we do it? Because it was only the 5th locality in North America and the World for the first million years after the extinction of the dinosaurs. It was the only one that was suitable for washing and was bound to produce many new tiny fossils at a very early stage in the radiation of mammals to replace the extinct dinosaurs. The first consequence was the discovery of the oldest primate. Primates is the order that includes lemurs, monkeys, apes and people. Simpson (and earlier Gidley) had described the then oldest primates from the quarries in the Crazy Mountain Field in western Montana just outside of Yellowstone. Simpson had described these particularly well, I had pored over his pictures getting the shapes firmly in my mind, and figuring out what the common ancestor of these 8 primates would look like. Purgatory is about 2 million years older than the Crazy Mountain localities and could be expected to have the ancestors of them. Knowing exactly what to look for, I rejoiced when I found them and they looked just as I had supposed. Leigh and I described them as *Purgatorius unio*, no one has yet found any older primates. All of us are ultimately descended from this little chipmunk-sized lemur from Montana, 64 million years ago.

That fall (1963) I gave an hour long report on Bug Creek, the related faunas and Cretaceous - Tertiary boundary changes in Community structures to the SVP at the American Museum of Natural History. Most reports were only 15 or 20 minutes, but mine was so interesting no one called time! I was twitted about it later, and was so embarrassed afterward I have never since over run my time at a meeting. (Classes are another story, I have often talked past the end of a class particularly in the late afternoon.) A day later, Friday November 22, while we were all in the big lecture room at the museum, Bryan Patterson came in and announced that President John F. Kennedy had been shot in Dallas. (Everyone remembers just where they were when they heard the news of the assassination.)

The 1964 Bug Creek expedition ran from June 16 to Aug. 10. Bob Bell was my crew chief, Ashok Sahni, Ken Montgomery, Noel Waechter were the crew, Giles MacIntyre, a very senior graduate student at Columbia and the AMNH came out for part of the season. Ashok was the son and nephew of famous Indian paleontologists and was of course a Hindu. He came to Minnesota because of Cloud's reputation, but chose to work with me. I loved him dearly and am very proud of him. Al Romer asked if he could send a Harvard crew out to get a Bug Creek sample, so Arnie Lewis and several helpers came out and joined us helping us out on Purgatory and making some 20 additional screens of the large style designed by Bryan Patterson. These screens were man killers because there was a great temptation of fill them at which point they weighed twice as much as the usual screen.

We went to Circle, the county seat about 40 miles away at the request of several people who wanted to hear what we were doing. About 200 did, and at the conclusion of the talk, a local lady, Polly Wischman, a nurse told me about a fossil locality about 3 miles out of town. We were interested, and went there, to find what we called the Circle locality on the Glen Waller ranch. Another thesis for one of my students. Ken Montgomery was interested, and we collected some

that year and for many years later. Unfortunately Ken couldn't do it, he didn't pass his prelims, so ultimately it was described by Don Wolberg in his PhD thesis. This kind of popular interest was always present wherever I worked.

At the end of each week we would drive to Fort Peck, do laundry and drop in at a roadside restaurant the Gateway Inn run by Adolf Kuszmaul (brother of Gene K.) for a steak dinner and some beer. This was always a relief from the usual camp cooking. Poor Ashok didn't have a chance. He ate beef and drank beer with the rest of us. I remember standing very still with Bob Bell, and "Whistling" up a pair of pronghorns, standing very still and whistling every so often, and depending on their natural curiosity to draw them from a distance of half a mile up to 20 feet away from us, Another time we were driving the Scout to Fort Peck when we came up to a Pronghorn. It ran parallel to the road for a half mile or so, keeping up with the Scout at 55 miles per hour. When it came to a fence, it simply dropped to its knees, slid under the fence and came up running, keeping up with the Scout!

Ashok needed a PhD. Thesis, I had suggested the Judith River Fauna. So we left for Judith River on July 17th, showed him the locality that Shoes and I had found the previous year and told him to find a better one. We gave Ashok the gas cards and $600 for grub and turned him loose, he did a spectacular job. Almost all the fossils were new. He has been a great paleontologist in India ever since he finished, I am very proud of him. While Ashok and the rest of the crew made his collections. Bob and I returned to Rock Creek with Sue Bell, Shoes, and Bob Melchior in my old Studebaker, which by this time had a rusting floor and a total mileage of 93000. We came back on US Highway 2 late at night, all the gas stations were closed so we depended on the gas economy of the Studebaker, nursing over 35 miles per gallon on the trip. There we finished working on Bob's master's thesis.

Ever since the first year when so many tents were torn up we had depended on three hexagonal lightweight single pole squad tents from the Korean war. They each had 12 guy ropes and would always stand up to the strong winds we had at Rock Creek Park. Why did we keep going back to Rock Creek most years from 1962 to 1990? Because it was the best place to wash fossils. We used as many as 200 18" square screen made of wood with ordinary brass window screen tacked in to make 2 sides and the bottom. Bob Bell and I got careless, and didn't keep repairing the guy ropes as we should have. We got one of the usual storms, and in a particularly bad gust, it came under the back of the tent, ripped all the remaining guy ropes loose, and the tent flew off downwind hanging from the last rope over the door. Bob and his cot went sailing downwind, rolling off the cot three feet past where the door had been, I was heavier so I stayed put, all the books and papers got wet, many blew downwind, and we had an interesting night rescuing stuff and of course moving into the parkhouse. That was the only time in 28 years one of those tents blew away, the three we had did yeoman service.

Unexpected features of the 1964 and 65 trips were the constant presence of pelicans in the badlands, there was a rookery on the Missouri River about 60 miles upstream from the dam, as well as great aluminum clouds. The aluminum clouds were B-52 bombers of the Strategic Air Command, based at Glasgow, that ran on what was called an "Oil Burner Route", practicing evading radar by flying over sparsely populated areas at an elevation of 200 feet, skipping over buttes and dropping down into valleys!

The 1965 Bug Creek expedition ran from June 16 to early August. The crew was Terry Booth (a budding anthropologist), Richard Koch, and John Folk (Botany), Ashok and Bill Nelson

were returnees. We located and surveyed a Petrified Forest, Ashok found a complete articulated soft shelled turtle near Harbicht Hill. We moved the camp to Judith River on my birthday, July 17. Bill Clemens of Berkeley visited us there. During the previous year, Ashok had found a spectacularly rich locality, Clam Bank, but it was a 4" bed covered with 6 feet of really sticky clay that was very hard to dig, and so the locality needed some improvement. We decided to blast. We found some ditching dynamite and fuse one of the neighboring ranchers had had for some 7 years, and bought it from him. The word got out and all the ranchers gathered around for the fireworks. Sal and a friend of ours, Barantha Hansen had reached the area and were trying to find us. Everyone knew where we were that day! We drilled five 5' deep holes in the clay over Ashok's locality with a Soil Auger, and set 2 sticks in each end hole, and 3 sticks in the middle hole with a 5 minute long fuse. I carved a pricker, poked (gently) a hole in the top stick, crimped the blasting cap to the fuse using a big pump pliers with leather glove for insulation, and Jon Folk and I set the fuse. John and I left promptly and spent the 5 minutes talking about inanities. The hill blew up satisfactorily on July 22. The sticky clay dried out and Ashok made a great collection. Sal and I attended a regional high power rifle match at Butte on July 24 and 25, We had kept out two sticks of dynamite, two caps and some spare fuse in case the first blast was not satisfactory, and had set them next to a sage brush. We decided that it was not worth the risk of moving them again, so when we came back, Bill Nelson and I sat on a hill 100 yards away from the box with the dynamite and alternated shots at it with Bill's 22 Ruger Bearcat pistol. After 13 shots at the last 2 sticks of dynamite it blew up spectacularly. It was the most impressive .22 shot I ever made.

Sal and Brandy went on and I went to Wyoming to visit Malcolm, driving with Malcolm's secretary, Marilyn Galusha , daughter of Ted Galusha of the Frick Collection. While there I visited several major localities, Twin Buttes at Fossil Wyoming, Shotgun, and Badwater, as well as Malcolm's Judith River equivalent, the Ervay Locality in the Mesa Verde Formation. I drove back to Gidley Quarry in the Crazy Mountain Field with Malcolm. While at the Judith River locality, we found several Teepee rings, and some old Henry .44 Rimfire cartridge cases. The crew also found a Buffalo Jump. which Bill and Terry, our budding anthropologist were very interested in.

By late 1964 Leigh and I had put together our preliminary paper on Bug Creek and related localities. It was titled "Cretaceous mammals from Montana." We submitted it to *Science*, but did not hear from the editors for some time. Later it turned out that Lew Gazin of the USNM and possibly others were making noises to the effect that we young whippersnappers should not be doing such important work, it should really be done by a mature scientist, and were agitating for the rejection of the paper. In fact he had tried to make sure that we did not get a collecting permit. Al Romer was president of AAAS that year, and leaned on the editor to make sure our paper was published. While this was going on I did the work to find the primate specimens at Purgatory Hill, found them and Leigh and I wrote the second paper, "the Earliest Primate". Both were published in 1965, the first in the Spring and the second in the Fall.

One of my major award winning papers was written in the fall of 1965 under very trying circumstances. Sal and I were in the midst of difficulties mostly due to our eldest child and her problems. I could not write at home, because of the conflicts, nor could I get away from students at the office. So I wrote much of it in a glassed-in target shack on the Minneapolis Rifle Club Range north of the cities near Johnsville. Stuart Landry had written a paper saying that Jepsen's idea of competitive exclusion as a reason for the extinction of Multituberculates and the replacement by Rodents was hogwash. It was an exceedingly bad paper. So I wrote a paper, and included drafts of the illustrations that I thought were necessary and mailed them to my partner Leigh Van Valen at

the AMNH in New York. In it we described just why Competitive Exclusion really was the case, described the evolutionary history of Cretaceous and Early Tertiary multituberculates, described in detail the precise correlation of all known Paleocene faunas in North America, and described the changing faunal composition of these faunas. All in all it was killing a mouse with a sledgehammer. No one seriously argued against it again. Leigh improved the paper and had the illustrations drafted. and it was published as Van Valen, L. and Sloan, R.E., 1966. "The extinction of multituberculates" in the journal *Systematic Zoology*. In 1984 it was selected as one of 22 Benchmark Papers in Vertebrate Paleontology, The others were published by such authors as Cuvier, Marsh, Cope, Ameghino, Gregory, Dart and Olson. We are in mighty fine company.

The total volume of Bug Creek material collected is very large, and rich. The early collections were richer than the later ones, but all are very rich. The main collections are at the U of Minnesota, where we have concentrate from about 30 tons. We sent the Field Museum a collection from about 10 tons , the Harvard Collection made in 1964 was about 10 tons, and the Notre Dame collection is about 23 tons. The concentrates are reduced about 90% in weight and volume from the original sand.

Sal and I were having family difficulties in large part due to our disruptive elder child, and it became obvious that I could not go on being absent from the family for 3 months every summer. So I was looking for ways to keep the family together while I earned summer pay. Our old field camp tradition of the short northern Minnesota or southern Minnesota camp and the 4-week Black Hills camp were not working. The Black Hills had become totally congested and it was getting difficult to get access to the critical outcrops. So I started a program of looking for a new place to hold field camp. Enrollments were down as a result of the cyclic boom and bust nature of the Petroleum industry, and many of us thought that a cooperative approach with several other schools would provide economies of scale. A committee on field geology was formed under the auspices of the CIC, Committee on Institutional Cooperation, the Big 10 plus Chicago, in 1966. From June 16th to July 8th, 1966, Roger Hooke of the department and I went to the Little Belt Mountains 50 miles south of Great Falls, Montana and stayed for two weeks in the little town of Neihart. The mountains had all that was needed for a field camp, but due to its northern climate, snow was still on the ground in July.

The CIC committee rejected Neihart, and ultimately decided to go with Bob Bright's suggestion of Park City, a little mining town just across the Wasatch mountains from Salt Lake. We set up our field camp in a struggling Ski Lodge in Park City, the Chateau Apres. They were just about to go bankrupt in June of 1967, when about 60 students and several faculty members from Purdue, U of M Duluth, U of M TC, U of Iowa, all showed up with our rental for the six weeks. They heaved a big sigh of relief and ran to the bank with the check. That first year the faculty was Bob Bright and I of the U of M, William Mellhorn of Purdue, George McCormick and Richard Hoppin of the U of Iowa, and Richard Ojakangas of the UMD. We had a variety of vehicles. We had exercises on a variety of problems, trying to make sure that field teams were mixed from several schools. The cooperative camp still exists, although the U of M TC moved to a separate camp later. I taught at the Park City camp in 1967, 1969 and 1970. Sal and the girls never did more than visit there.

In 1969 there was a major panic in Park City. One of the smelters needed some quartzite as a flux, so they quarried a large amount of Early Cambrian Tintic Quartzite from the east bank of Park Creek just above town. That would not have been so bad, but the dip on that side was toward the creek. Just before we arrived, during the spring thaw with the slope disturbed, there was

a major landslide which dammed the creek and produced a lake half a mile long just above town. The entire town was built along the creek, on steep hillsides, so they were very worried that the dam would collapse and wash the entire town away. They quickly cut a drain through the dam to alleviate the problem. The students got a special lesson in geologic hazards. After camp that year on the way home I drove the Scout cross country to a major middle Eocene locality, Tabernacle Butte. I knew where it was, could see it on the horizon and just drove to it. The students were impressed.

Park City was a Gentile Catholic mining town in a Mormon community, I have only been made to feel an alien in two places in North America, in Salt Lake City and in Montreal. One year one of the students found a 3' timber rattler in the hills east of Coalville where we had a structural mapping area with some complexity. He killed it of course, rattlers had no chance when students were around. Someone got the rattles, the skin was stretched on a board for a hat band, and we ate the snake, although the cook wouldn't let us in the kitchen with it, we had to fry it in butter over a gas stove in the parking lot. About a dozen of us tried rattler, the verdict was it was good and tasted like chicken. But the snake was not yet used up. We had driven out in a 12 seat rented yellow school bus van. One of the crew got some tempera paint, painted a rattlesnake down the full length of the van, propped the hood open and added paper cones for fangs. They entered it in the Fourth of July Parade, it was first prize which was a keg of beer. It did not last long during the afternoon baseball game. That was a well used snake!

That first year we drove around to the west side of Salt Lake to look at the Lakeside Range, and 50 miles from nowhere the UMD International Travelall had a problem. The gas tank was just behind the right front wheel, and the gas line was not well protected. The fitting cracked from a thrown stone, and there on a dirt road the gas was pouring out rapidly. I was chewing Beeman's Pepsin Chewing gum then, having taken up gum when I quit smoking. I passed out gum to several people, found a roll of the old cloth friction tape in the back of one of the vans, and a rag. I took several wads of gum and shoved them into the crack, that slowed the leak but the gas was dissolving the gum. I then wrapped the fitting and gum with the friction tape, but again the gas was seeping out, though still more slowly than after the gum. The last step was to tie strips of the rag around the tape as a mechanical bandage. That stopped it. They never did repair my temporary fix, the Duluth truck was still running with the patch 8 years later!

I found some Early Cretaceous dinosaur eggshells at the Coalville exercise area and gave them to Jim Jensen of Brigham Young who was the resident eggshell expert in the country. There were also some small bones at the same spot and I backpacked out about 80 pounds of sand for washing for mammal teeth. We were unsuccessful.

Another year I had to stay behind one day because one of the students had overdosed on drugs. I had to take him to the local hospital to be washed out and for observation. The only consolation was that he chose me to come to for help. He survived and went on to a university professorship.

The faculty would gather in the local pool hall evenings for games of 8-ball. Liquor was hard to find in Utah, I remember buying a bottle of wine for the staff table in a state licensed liquor store, it was truly awful rotgut. It was so bad not even the undergraduates would drink it!

Virgil Carmichael, a geologist with the Northern Pacific Railroad had found a fossil locality near the Olive Post Office in southeastern Montana and had given me the specimens. So from September 10th to 18th in 1969, a student and I drove to southeastern Montana in the 1965 Ford wagon to Broadus where we met Bob McCurdy, local pilot and collected a Cretaceous locality near

Broadus, the Olive locality and other miscellaneous fossils. We washed our sacks of matrix in the Powder River (drains most of eastern Wyoming, and is called "too thin to plow and too thick to drink"). Here it was 3" deep and 3 feet wide! By the time we got home the 1965 Ford had 90,355 miles on it.

Also in 1969 I was promoted to full Professor. That required an international reputation as a research scholar. By this time I had no trouble. I had John Ostrom of Yale, then the president of SVP, write one of my external review letters.

That November I collected many stratigraphically controlled samples of Late Cambrian Franconia Greensand for Randall Cormier, who was planning to date them with K-Ar techniques. Unfortunately nothing came of them. We still have no really satisfactory dates for most of the Cambrian.

In 1971 Sal and I went to Washington DC for the GSA and SVP conventions, while there we got a message that her father had died, we had to return to Chicago unexpectedly. We knew he was ill, but had not been told just how serious the problem was. He died of Pleural cancer, we have always suspected it was the result of an industrial accident in which he had a bad blow on his back from a falling pipe..

From 1972 to 1990 I developed a tradition of taking the spring Vertebrate Paleontology class out to Montana during exam week, camping at the usual site in Rock Creek State Park. The weather could be anything from 32° to 120°, we had snow some years but in the same week it would be very hot. We would leave on Friday, the last class day after the last class was over and return on the following Saturday or Sunday. Most years we used the departmental 15 seat Maxivans by Dodge that we bought in 1972, and took out a middle seat to provide room. The hard luggage, cook box and tools were packed on the floor in the back of the van, with tents, baggage on top and finally covered up with sleeping pads and sleeping bags. After all was loaded, we drove out on 694, stopping at Lund's for groceries. The class would be divided into two person teams, each team had to prepare at least one evening meal, and wash dishes, so a regular rotation was established. We planned the meals before we went, we could only have fresh meat the first night because of the lack of refrigeration. The shopping at Lunds was always wild, with each team having its own cart as they looked for the cans they needed for their meals. I took care of staples for breakfast, and lunch. Breakfasts were cereals with canned fruit and powdered skim milk. For lunch we had the large cans of fruit juice, usual lots of unsweetened grapefruit , but also orange and a few others for variety. Peanut butter, and grape jam (learned from Ole in Texas long ago), with salty Kippered herrings, sardines and smoked oysters also lunch staples. I always made my camp chili recipe the first night, I took my turn with everyone else. I also usually made Sam Arnold's "Bowl of the Wife of Kit Carson" hearty soup one evening. (the recipe is a bouillon stock, 1 canned chicken, 3 cans of garbanzo beans, a bottle of salsa, monterey jack cheese and minute rice, an avocado is nice). For a rainy day I would make toast over the gas stove, and mix cans of tomato soup and cheddar cheese soup in a pot, and fry up Danish canned bacon. Lay the strips of bacon on the toast and cover with the soup, it is called Mock Rarebit and really tasted good on those cold wet rainy days. The bill at Lunds usually came to $300, but that was spread over the whole class and was almost the only expense. We always stopped at St. Johns Abbey at Collegeville for the good bread they bake.

We would drive 18 hours to cover the 800 miles, stopping every 2 hours to switch drivers, and sending the old driver to the back for a nap. We stopped at several cafes on the way for coffee and pie. Breakfast was always at dawn at a really good truck stop restaurant in Beach, North

Dakota just before entering Montana. Arriving at Rock Creek about 9 AM, we set up camp with a he tent and a she tent and a small boss tent. We would depend on Lyle Nelson and Darlene Dascher for succor and water, occasional towing and overflights in Lyle's Cessna 172. During the week, we collected Bug Creek Anthills, Purgatory Hill, Harbicht Hill, prospected for scrap dinosaur bone one place or another, visited a prairie dog town, and the Fort Peck dam, power house and museum. The power house was always spectacular. Evenings were party time or often the oral final reports from the VP classes term papers. It was a very educational experience. The students learned field paleontology, and how to be comfortable in camping under extreme conditions. We also indulged in "buffalo chip" (actually dried cow pies) campfires, they were hot enough to melt beer bottles. We always had at least one afternoon of rock skipping in the reservoir, the Fox Hills Sandstone cropped out at the park and made the very best skipping stones I have ever seen.

The first of the class field trips ran from May 14 to May 20 1972, immediately after the "Police Riot" and went to Bug Creek and also to the Judson locality near Mandan, North Dakota. We used two cars that year, since the vans were not yet ready. Judson and other North Dakota localities were to become Dick Holtzman's PhD thesis. Judson had been found by Steven P. Lund while he was still a high school student and used for a science fair project. He eventually came to the U of M, but took his degree in geophysics under Subir Banerjee. Participants were Fred and Sue Grady (Fred was to become a preparator at the USNM), Nathan "Nate" Flesness (went on to a PhD in Biochemistry), Richard Holtzman, and Don Wolberg, who became my PhDs. We were met in North Dakota by Eddie B. Robertson and Wibosono Soerrodikoesoemo who were working on Paleocene pollen in the same area. As became usual, all were trained in collecting techniques and the specimens became part of Dick's thesis. While washing fossils in the reservoir, I stepped on a broken bottle and cut my big toe, that crimped my style for the rest of the trip.

On June 12 1972 Sal and I attended Lee's graduation from Elk Grove High School in Desplaines Illinois. Then Sal and I flew to Denver, transferring to Frontier for the flight to Durango, where we rented a Hertz Mercury sedan. We met John and June Warren and their daughters Mindy and Rita. I sampled various outcrops of San Juan volcanics for possible dating, and we drove the complete route of the Rio Grande Southern Railroad, We drove to Red Mountain town and measured the old Red Mountain Jail, made of stacked and spiked 2 by 6's with two cells, and an iron barred windiow with no glass in each cell. There was no sign of a stove. A night in this pokey at 10,910 feet above sea level could kill you!, On June 17 we rode the Silverton train from Durango to Silverton and back, The we finished off the trip with a visit to the Kirtland & Fruitland Formations in the San Juan Basin, saw the old Mason Pocket fossil locality, and drove to Gato where we collected a Roland Brown fossil leaf locality, We returned to Durango and flew home. The results of the field work were published in my 1987 paper on the Paleocene.

1972 SUMMER TROUBLES

In 1972 I was all set to give Historical Geology during the second summer session, when at the first day of class they cancelled the class for lack of two more students. This was an utter financial catastrophe for the family since we had planned the summer depending on that salary. This meant instead of just having to cope with no salary in September as usual, we suddenly had no salary for the last half of July and all of August as well! We stretched our bank loans to the limit, ran on low or no payments on credit cards and looked for all the kinds of free entertainment we could find. We found a store in downtown St. Paul, Eisenberg's, that dealt in damaged goods, torn and resealed bags of sugar and flour, dented cans, over ripe fruit and so on. We got a whole case of overripe Prune plums and made many jars of plum jam. We visited the zoo and conservatory, and

did many things together. I returned to model railroading courtesy of an old student Garrie Tufford, who introduced me to Narrow Gauge modeling. I built a layout with hand laid track, and cars from scratch, hand painting them under the microscope. I have been in Narrow Gauge modeling ever since.

I had no classs trip in 1973, instead on Tuesday, July 10 1973 I flew our plane N2555 F (Funnyface) from Crystal Airport in the Twin Cities to Jordan, Montana and met Bill Clemens, Harley Garbani, Dave Archibald and a couple of other students at the airport. The next day Bill showed me his *Tyrannosaurus* locality and his various washing fossil localities north of Jordan. On Thursday the 12th I flew Bill and others over all the Garfield county localities for photographs of them, and flew on to Lyle Nelson's ranch on Rock Creek. Bill's crew met us and we got a Bug Creek Sample for Berkeley Afterward I gave the whole crew rides over Bug Creek, Purgatory, and Harbicht Hill. I parked the plane at Lyle's airstrip that night, returning home on Friday the 13th. Total flying time for the trip was 19 hours and 20 minutes.

The 1974 Bug Creek trip ran from May 8 to May 14, The crew was Lance Grande, Joe Hartman, Lynn Angle, and Dawn Matter.

Late in the Summer of 1977, from 27 Aug to 12 September, Joe Hartmann and I took a working vacation to Colorado and New Mexico to try out the by now rebuilt Scout on its break in journey starting at mileage 75500. We spent our time looking up rock exposures we had read about but not seen, collecting fossils, and playing tourist, as long as the tourism didn't get too much in the way of the Geology. We drove into Silverton by way of Ouray, driving into the ghost town of Red Mountain early afternoon on Labor Day. We met a family from Farmington, that had driven their slushomatic Buick and 30' house trailer down the steep grade into the town, He had been trying to pull the trailer back out all day, but could get no traction. His wife and 6 year old daughter were sitting by the side of the road making very nasty comments as he fussed and fumed. When we showed up with the Scout , he immediately asked if we could help him. I tried hitching the Scout to the trailer, but we couldn't get enough traction to pull it up the short stretch of 10% grade. So I had him put the caster wheel under the hitch so the trailer was on 3 wheels, then paid out 150 feet of 3/8 " winch cable and winched the trailer out. We charged him a six pack of beer to go with our late lunch, and sent him on his way.

Then we went on to Silverton visited with the Boys from Sundance Ltd, the publishers of my book, they had their offices in the Silverton Depot at the time. Then we decided to drive from 9300' Silverton to Creede the short way. Today the normal route is south 45 miles to Durango, east 62 miles to Pagosa Junction, northeast 42 miles over Wolf Creek Pass to South Fork and northwest 231 miles to Creede. We were going to go the old Stony Pass route over the continental divide at 12,590 feet due east about for about 70 miles. We started by going north up the Rio De Los Animas Perdidas (River of Lost Souls) a few miles then dropping down to the riverside and driving the roadbed of the Silverton Northern Railroad to Eureka, then up to Animas Forks, the site of what was once facetiously called the Highest Court in the land (11,300 feet), photographing everything in sight as we went. Joe fell in the river between Eureka and Animas Forks, and soaked his camera, ruining it. Mine was also a Minolta, so we shared lenses for the rest of the trip. We stopped in the middle of the Animas Forks ghost town at 11,300 feet, so Joe could change his pants. No one was in sight till Joe got his pants off, then suddenly Jeeps drove into town from all four directions. Joe survived the embarrassment. We dropped back down to Howardsville, and then drove the old branchline roadbed up to the Old Hundred Mill and then on to the Green Mountain Mill at a steady 3.5% grade, then along the Stony Pass trail, finally reaching Stony Pass at an elevation of 12,588 feet.

Then things rapidly deteriorated, the next 13 miles took us about 4 hours, over 1 foot boulders in the middle of the ruts of the old wagon road, tight turns so steep that the frame of the Scout twisted and actually shut off the fuel flow. We didn't pull into Creede until early evening! In Creede we collected some Oligocene fossil fly larvae preserved in volcanic ash in lake beds in an old volcanic caldera, and now in my back yard. We went back to Durango the long way.

From Durango we went south into the San Juan Basin in New Mexico, looking at several fossil sites, at Shiprock on the Navajo Reservation, and some neat scenery. We decided to spend the night in Farmington, there were no campgrounds. There were signs saying no camping in the park, but when we asked a policeman, he told us we could anyway, so we set up our tent on the only patch of green grass we had seen in town, and went to bed. At 2 in the morning the sprinklers went on under the tent! Now we knew why the grass was green! A great night was had by all. The next morning, Joe drove over to a nearby Navajo coal mine to collect some fossils while I washed and dried all our clothes and sleeping bags. Then it was time to go home. we finished at mileage 79769.

The 1978 class trip to Bug Creek lasted from May 12 to May 21st. The crew was David DesAutels, Barbara Eikum, Deb Porter, Elizabeth Mancz, Jeff Schultz, Bernhardt Saini-Eidukat, Deb Maertens, Dannie BoBrow, and Ken Cliffer. Our vehicle was 1972 Dodge Maxivan Van #1, one of the "Banana's", so called for the color which was labeled under the hood as "Super Banana Yellow". Bernhardt was a child prodigy, only 13 or 14 at the time but very mature for his age. He is now a professor at North Dakota.

My major 1979 Summer project was a special case of paleontological salvage on two Bureau of Land Management projects. My former paleobotanical student Eddie B. Robertson, after working for Phillips Petroleum had moved on to Robertson Research. The BLM had two projects they needed a little bit of paleontological salvage and a lot of mapping. The two were the Red Fleet project (involving Triassic to mid Cretaceous rocks in an area of simple folds where they were building Tyzack Dam) near Vernal, Utah and Dinosaur National Monument, and the West Divide project (involving a real boondoggle of an irrigation project near Rifle and Newcastle, Colorado). The successful bidder had to do both of them. Eddie and I made a trip to Salt Lake to the BLM office there to show our credentials. We wrote a bid including a lot of library research done by our crew, Joe Hartman, Laurie Dempsey, and Martha Jordan. We won the bid over some others as well qualified but without the detailed library work. We planned to use the Scout, a new trailer, a new kitchen, tents, and all other field gear, all of which were covered in our bid.

Jim Stout had used the Bug Creek kitchen cook box and cook gear at the field camp near Gunnison in 1978, and had not put it away when he returned. It was stolen out of Pillsbury Hall. I was furious. Not only was the cook box gone but so were all the silver, plates, cups and pots for my student trips. The Petrology crew had purchased a new X-ray machine which was delivered from Japan in a most magnificent mahogany 3/8" thick plywood crate. I appropriated it, we carefully took it apart, and Stan Duff made a new even better cook box than the old one, we varnished it in clear varnish and it was beautiful. We made the box the exact size of the cook gear we were going to use, with compartments for everything.

Laurie and I left Pillsbury in the Scout and new trailer on July 20, Joe and Martha drove out in his pickup. We started near Vernal Utah on July 22. We first camped at and examined the spectacular section at Split Mountain in Dinosaur National Monument, and what was available at the Utah Field House, the museum in Vernal. We then moved to the Steinacker Lake Campground north of Vernal, near the damsite. We had to map the paleontological aspects of the area to be

covered by the reservoir, and salvage what we could. We found fossils of importance in the Morrison Formation, we salvaged a brontosaur pelvis and deposited it at the Utah Field House. We found many fish fossils in the Aspen Formation, the Fish Scale Shale, including one whole fish. Laurie was going to study these for her thesis. We found a spectacular case of preservation of a marine community in the Carmel Limestone, in which the shells were replaced by orange chert in a most unusual way. This became Martha's thesis. Eddie did all the pollen analysis. Eddie's wife Sylvia and their kids stayed in town.

Our cooking went as well as usual, with the whole crew rotating chores. But one day we had Bill Collins, the local BLM geologist over for supper. It was Laurie's night to cook. She fiddled around in the kitchen for about 3 hours and finally served a salad and not much else. Somehow although I knew she was thin to the point of emaciation I didn't realize she was anorexic. The poor woman couldn't stand to be around food.

On Friday August 10th we took a holiday and all of us, including Sylvia and the kids took a one day River trip on an inflatable WWII bridge pontoon. We drove to Vernal where we met the outfitter, Hatch River Trips. . He drove us on a bus with the pontoon on the roof to Rainbow Park upstream of Dinosaur Monument on the Green River, we put in there and floated down the river 9 miles to Split Mountain Campground in Dinosaur Monument. Dinner was a boxed chicken lunch on a sand bar in peace and quiet on the river. There were a few mild rapids and we did get splashed but the biggest hazard was sunburn. The view in the middle of Split Mountain Anticline was worth the whole trip. A real busman's holiday!

We finished the area on August 12th, and packed to leave for Rifle, Colorado. We packed 3 wooden crates and 7 liquor boxes of fossils for shipment back to Pillsbury Hall.

Near Rifle we camped at the Newcastle KOA campground. We worked in a series of Early Eocene beds of terrestrial river deposits belonging to the Wasatch Formation and in the overlying lake deposits of the Green River Formation which included the Parachute Creek Member and the Evacuation Creek member (the latter the result of some deskbound bureaucrat, having decided years before that even though the locals had named a certain creek Shit Creek, it would never do on maps!) The plan of this irrigation project was to lift water 700 feet above the Colorado River and irrigate a region of plateau about 20 by 30 miles in area.. As an irrigation project it would never pay for itself in crops, and was a total boondoggle. None the less we had to find out just what fossils would be covered by the canal system. We collected samples from many localities in the area. including *Eohippus* and contemporaries. In the process I was able to examine the localities where my mentor Bryan Patterson had described his Paleocene Plateau Valley Fauna. We finished off the field work on August 24th, Joe and Martha left and I drove Laurie to the Bus station in Rifle after drafting the map of the final report, I then left Rifle for the Gunnison Colorado airport where I met Sal coming back directly from Europe. The trip was a long one, about 185 miles and as I neared Gunnison I saw her plane land. Gunnison doesn't have many planes per day. Of course I was late. We then piled in the Scout and drove west to Montrose where we bought some spectacular tree **[disk error occurred and part of contents missing**] foot ghost town Animas Forks, then west to Hurricane Pass, and over the Hill to Ouray. Just west of Animas Forks, we met a jeepload of people who were peering at a map, trying to orient themselves. I stopped to help. Their map was the one from the back of the Rainbow Route. I helped them, and when they asked how I knew so much about the area, I told them I wrote the book. They were very impressed and of course I had to autograph their copy. Closer to Hurricane Pass, the exhaust system that I had just had repaired came off, breaking the clamps. I had to get out and collect some barbed wire from an old mine

dump near the pass to wire things back in place. We stopped near a mountain stream on the way north to Ouray and ate my usual field lunch, dark bread, peanut butter and grape jelly with the last pair of those magnificent peaches. We saw a marmot and thought he was dead. but he was just sunning himself, spread out on his back on a rock with his pot belly pointing up and legs stretched out. From Ouray, we went back to Silverton, picked up the trailer and then went on to Durango, dropping Sal at the airport for her ride home.

I went on east to Chama, New Mexico to fulfill a long time yen to ride the Cumbres & Toltec Scenic Railroad to Alamosa, taking the bus back to Chama. I then drove on home, dragging my little trailer behind me. At the end of the trip, the Scout was very tired, with over 90,000 very hard miles but since it had earned more than $10,000 for me over salary that summer, I treated it to a rebuilt engine.

The two reports on the BLM projects were :

Sloan, R.E., Robertson, E.B., Hartman, J.H., Jordan, M.E., and Dempsey, L., 1979. Paleontology of the Red Fleet Reservoir, Utah, 99 pp. Unpublished report to the U.S. Bureau of Land Management, Robertson Research Co., Houston, TX.

Sloan, R.E., Robertson, E.B., Hartman, J.H., Jordan, M.E., and Dempsey, L., 1979. Paleontology of the West Divide Project, Colorado, 45 pp. Unpublished report to the U.S. Bureau of Reclamation, Robertson Research Co., Houston, TX.

The 1980 Bug Creek class trip was from May 17 to 25 and done with Van #2, one of the original 1972 Dodge 15 seat Maxivans, the "Banana". Ron Mjos, the departmental paleocurator, had just installed a used low mileage replacement engine, it still had its original manual transmission, and so was a better field vehicle than those with automatic transmissions.. The students were Martha Jordan, Millard "Skip" Haley Jr,, James Ohman, Catherine A. Forster, John Brandenberg, and Doug McDonald, all but Doug went on to careers in geology or paleontology. The van had all new tires, but on the trip out we blew out a tire. We went in to Glasgow on the 18th to replace the tire, and while we were there, we heard on the radio that Mount Saint Helens had exploded, the Burlington Northern was shutting down all across Montana to avoid destroying their engines and travel was not recommended. We were 800 miles downwind from the volcano. We had about an hour to make the 45 miles back to camp so we all scurried around, collecting beer, pop, chips, and so on for an extended period of boredom. Jim Ohman picked up a brand new deck of plastic coated playing cards. We beat it back to camp, arriving a few minutes before the visibility dropped to zero. We set up in the park house and had a long day of playing hearts. Martha wanted to go out and play frisbee in the ash fall, I vetoed it since I didn't want anyone to come down with silicosis. By the next day the brand new deck of cards had all the finish worn off them and looked like the old decks you find in vacation cabins! The total ashfall where we were was only about 1/8 ", we were not quite directly downwind. The ash could not be seen the next year. John Brandenburg developed his thesis out of the collections that year.

Later that summer I taught Geology Field Camp for the last time. In 1979 Jim Stout had had a relationship with an undergraduate woman at field camp, and the undergraduates were up in arms figuring she had special treatment. Peter Hudleston called me in and was anxious for me to teach the field camp that year to defuse the situation. So I spent Spring Quarter preparing to teach Field camp in an area where I had no detailed experience. Tom Johnson was also there for part of the course. We left for Gunnison on June 15, I was again driving the oldest van # 2 the reengined

Banana, and pulling my old trailer. We camped at the Big Badlands of South Dakota and visited Wall Drugs, a very convenient place to get new stuff for students who had forgotten equipment. We visited the big I-70 roadcut near Denver which displays most of the Cretaceous section, and continued over the continental divide into Gunnison, where we stayed for 4 weeks in the dorms of Western State College. I was able to pass the other vans going up the east side of the Rockies even though I was pulling the trailer full of goods. While there, we did the usual sort of projects. We visited the Lake City caldera and the nearby Slumgullion slide, where a rockslide 6 miles long has dammed the lake. We had a snowball fight on the continental divide near there on July 4th. We spent two weeks at the South Lottis Creek Campground, near Jack's Cabin. We had made several Jacobs staffs to measure sections, one of them was broken and when a rock rolled over the foot of Yukiko Maeda, a student, I shortened it for a cane for her. At the end of camp I took the cane home and finished it with a proper handle. I have used it ever since as a measuring stick for photographs. On my 51st birthday, July 17, I climbed the 1200' west face of Park Cone near the campground. While in Gunnison I did do some narrow gauge railroading on my off hours. I drove the van to the west portal of Alpine Tunnel on the old Denver South Park and Pacific, measured and drew plans for the Crested Butte depot, and measured and drew Sargents Depot and the tender for D&RGW locomotive 268, both in the Pioneer Park in Gunnison. The field course ended July 26, I became ill on the way home in Rapid City with a 103° fever, finally reaching home on July 29.

The 1982 class trip was from May 14 to 23, in old Van #2, and had Dr. Ivan Suszman (Anatomy), Atheen Wilson, and her friend Fern Schwartz, Kay Ryerson (reporter) Jon Wildung, Wade Steig, Jane Everson, and my soon-to-be-partner, J. Keith Rigby Jr. of the BLM. It was a cold and wet year, a storm took down the new umbrella tent from the 1979 West Divide- Red Fleet trip. Ivan is the only person who has been to both Sterkfontein in South Africa where the first Australopithecines were found and to Purgatory Hill where the oldest primate was found!

The 1983 class trip ran from May 13 to May 22, using both old reliable van #2, and the Scout. Students were Ron Mjos, the curator of fossils,, Ron Spinosa, Dugan Buffington, Eric Hedblom. Cathy Forster, by this time working on her graduate degrees on dinosaurs with Peter Dodson of the University of Philadelphia, Ann Morey, Brent Slettengren, and Charles Dutcher. There had been a 2' blizzard two days before we left but it was mostly gone when we arrived. We found a *Triceratops* skull for Roger Larson of the Jordan School. The only other notable thing was Charles was arrested for fishing without a license. I loaned him the money to pay his fine.

My 1985 Bug Creek trip was from July 26 to Aug 17, the Scout and I visited my partner Keith Rigby Jr. to work on problems that Jan Smit and David Fastovsky had produced by mismapping the geology of the area. I took no students. At the end of the trip Keith's student Ray Ernst and I took a side trip to Drumheller, Alberta and the soon-to-be-famous Royal Tyrrell Museum. It came close to freezing in western Montana, and I had to buy a sweater in an gun store, it of course was an Orlon camouflage sweater, but easy to take care of. We had the plug in coffee pot going and made cocoa while driving down the road. Ah, What luxury! Near Drumheller we examined the classic exposures along the Red Deer Valley, the Canadian Dinosaur Park and the Belly River- Edmonton group As usual I was following in the footsteps of Barnum Brown. I had a chance to photograph the dinosaurs in the Tyrrell the week before the museum opened. I returned home with 5300 miles for the trip on the Scout.

The 1986 class trip was done with the Scout, a students car, and a 1985 White Dodge Maxivan. The students were Ann Brereton, Pat Wales, Dick Benson, Chris Cunningham, James

Thornton, Dave Jenkin, Dawn Addy, Eric Hedblom, Dave Caldwell, Ellen Qualy, Sue Martin, Kimberly Enebo & her little brother. Wade Steig and Jon Wildung joined us, living in their trailer at Rock Creek. I got a chance to fly a 1966 Bonanza model 35, back from Glasgow to Lyle's ranch. We all aided in the branding at Lyle's; I actually branded some of the calves. We arrived home on June 21.

The 1987 trip was done from June 5 to June 13, students were Dawn Addy, Ann Brereton, Dick Benson, Jan Decker, Margie Tyler, Bob Christianson, Roberta Kollodge, Anna Pidgeon (a vegetarian, which posed interesting problems in cooking) Vehicles were a red 1982 Ford van and my 1987 Plymouth Turismo. The Scout was getting a 4 speed transmission, but was not ready in time. As a substitute for a report, Dawn videotaped the area and my lectures on community changes and extinction, the outtakes are very funny. I had a pair of writers, Jeannie Hanson of the U of M Press service, and Kathryn Laskey Knight show up at the end of the trip, working on a kids book by Kathryn, and so I managed to miss the wedding of my niece Romeyn Beth in Mason City, Iowa.

The 1988 class trip ran from June 5 to 11th, using Van 1 and my Turismo, The students were Ginger Strom, Walt Jones, Rose Brotzler, Tracy Nielsen, Linda Murtfeldt, Phil Meyer, Chris Nice and David Jones. The total cost per student was $60.78 for food and gasoline which was about average for our week long trips. The class collected amber samples to measure the composition of Cretaceous and Paleocene air in the bubbles in the amber. Collecting amber was new, we sat down on a coal bed and dug with pocket knifes until we had collected enough blebs to half-fill a film can. Those samples became an important part of the Pele Hypothesis.

From September 12 to September 17, 1988 Betsy and I flew to Tampa and St Petersburg to get Aunt Betty's 1978 Cadillac. On the return trip we collected trilobites in the Shenandoah Valley of Virginia. By that time her first marriage had soured and we had a long good time together on the trip.

On the last class trip in 1990, the students were George Johnson, Joseph A. Cain, Corwin (Cory) Benedict, Tim Bartle, and Jennifer Swanson. We visited Jack Horner's *Tyrannosaurus* site on McGuire Creek 15 miles south of Bug Creek, to aid in stripping overburden. This was a particularly good tyrannosaur, 80 percent of it was there, and it included the only known complete front leg and hand. National Geographic filmed the rest of the Montana State excavation the rest of the summer for a TV special, but we weren't there. As a result of my worsening leg, I had a very hard time with the hills and decided to stop trying to do it. That was my final trip to Montana for field work.

I finally gave away all my camping gear to a Hmong Boy Scout Troop in St. Paul in 1994. They put it to good use. When my nephew Daniel Sloan came home from the Navy about 1992, without a nickel in his jeans, I gave him the Scout as his sport truck and transportation. He still has it.

MULTITUBERCULATES

When I started to work on Paleocene faunas to figure out what I had at Purgatory. I found many undescribed species of small mouse-sized multituberculate mammals in museums wherever I went. These were not described in Simpson's work or in Jepsen's 1940 big monograph. On looking at them I found that Simpson had made many errors in identification of his Crazy Mountain multis, far more than anyone would have suspected. He had been trapped by a poor microscope and his fascination with statistics into lumping all 8 species of small multituberculates into a single species. Statistics is never a substitute for close observation. They were far more complex that he had realized and he never went back to revise them after Jepsen pointed out some of his errors.

Then as I read all of the Paleocene papers of these two men I realized that each one was written in sniping style directed at the other. I am sure that some of Jep's insecurity and cruelty to those inferior to him came from feeling inferior to Simpson. After his 1940 major paper, what he wrote had important observations, based on his new and very important specimens, but they were all hidden in semi-popular papers written in a "cute" style.

While doing these multi obsrvations at museums, I found my first case of the traditional case of gradual evolution, and was mightily proud. It was the first time I had ever looked at a whole series of related animals. In my experience the Punctuated Equilibrium- Gradual Evolution debate has multiple answers, some groups are commonly gradual, others are commonly punctuated. I expanded the known species of Neoplagiaulacids from about 8 to about 60, based on newer methods of collecting and analysis.

CHINA

In August 1984 I went to China for a two week paleontological trip organized by Spencer Lucas. I had a $1000 grant from the Graduate School to go on it. Spencer had been there before, and wanted to get back. He had been approached by the China Tourist Bureau to lead a trip, and was told if he had a certain number, his trip would be free. I wanted to go because I had read a number of very interesting papers about the Paleocene of China, and really wanted to see some of the specimens, to check their relationships to those of North America. Following Matthew and Simpson, I have always been interested in intercontinental migrations. The participants were Spencer, his wife and mother, Mort Turner of the US Antarctic program, Bob Sullivan (who worked on lizards), my roommate Jack Macintosh (a sauropod specialist), Niall Mateer, and a few others. Instead of business cards, I took a bunch of cheap advertising ball point pens, personalized by having my name and address on the barrel. They were a great success. Everyone liked them and I had something for the inevitable little boys who begged anything from rich foreigners. When they asked, I would bow to the boy and present him with a pen with a big grin, he always answered the same way, giggling. It was not demeaning at all.

We flew from Los Angeles to Hong Kong, then China Air to Beijing. At Beijing we visited the Institute of Vertebrate Paleontology and Palaeoanthropology for several days, saw the Great Wall, visited Zhoukoudian, where *"Sinanthropus" = Homo erectus* came from, saw the Palace and Tianenman square, and had many banquets. Then we flew to Xian to see the great Pottery Army and an emperor's tomb, took a spectacular train ride and long bus ride to Zigong where the Chinese version of Dinosaur Monument was being constructed, and finished off with a flight to Guangzhou (Canton) from which we flew back to Hong Kong. The least populated area I saw in China was a 10,000 foot mountain pass on this trip that was fully farmed and had a population density of 1 family per acre! China has a quarter of the world's people in an area the size of the US east of the Mississippi River. On the 6 hour bus ride from Chengdu to Zigong, I came down with a case of Diarrhea. The bus driver stopped at a farm house and I asked to use the privy. It was a hole in the floor of a shed, when done I threw a bucket of water to wash down the hole. The Privy drained directly into the duck pond.

We were not permitted to photograph specimens in Zigong, so I drew a complete sauropod skull for Jack that he later published in the sauropod chapter in Weishample, Dodson and Osmolska's major review of all dinosaurs. We did plunder every Chinese bookstore for paleontology books, and found good new publications in the strangest places. All were cheap by western standards. Most useful of all was a beautiful 4 color atlas of China with all names in both

Pinyin (latin alphabet) and Hanshu charcters, it cost less than $3 ! The trip was clearly designed to separate westerners from as much money as possible in the shortest time.

We usually ate a fried egg or two and toast and jam for breakfast, lunch was varied, we always had bottled orange crush, or beer to drink as well as tea. In the evenings dinner was always an 8 to 12 course banquet, with a variety of dishes continually coming. I trained the crew into eating with chopsticks, a skill I had developed while Sal and I were eating chinese dishes near the U of Chicago. I also took advantage of my famous lecture early in my vertebrate paleontology course on "How to filet a fish" because one of the main courses would always be a whole baked fish or two. It was amazing to me just how many people don't know how to take a fish apart quickly and easily removing the bones. They will just pick at it with a fork and give up because they don't know where the bones are so as to avoid them.

It was very hot in Guangdong, and I became thirsty, so I bought several glasses of a local "Koolaid" equivalent from a street vendor. The inevitable happened, another case of Diarrhea. As always a Lomotil pill took care of it quickly, that is an absolute necessity to have along in China.

When we checked into our hotel in Hong Kong we were back in western hotels. The first thing Jack and I did was to swill down 3 cans each of regular western style tomato juice from the room ice box, and then joined Bob Sullivan to go find a McDonalds in the third basement of one of the department stores. After two weeks of nothing but full eight course or bigger Chinese Banquets, that Quarter Pounder with Cheese, Fries and Strawberry Shake tasted spectacular!

My second trip to China came in January to March 1986. It of course grew out of the earlier trip. The season was picked because I wanted to see the Cretaceous and Paleocene rocks of Nanxiong County, Guangdong Province, and at that low latitude the summer was out of the question. Winter temperatures ranged from 50° to 70° down south. I received a grant of $7500 from the Committee on Scholarly Communication with the Peoples Republic of China, a part of the National Academy of Sciences for the trip and made sure I got an HP Portable computer that was battery powered to store all my data (and incidentally play games, I made it all the way to the end of ZORK). I flew to Tokyo, and on to Hongkong, except that I missed my connection to Hongkong due to an engine failure in the Northwest 747 halfway between Anchorage and Tokyo. We flew back to Anchorage and I had my first view of Alaska in the Captain Cooks Hotel. We got into Hongkong a day late. That put me a whole day late in arriving in Beijing. Never the less I was met by Mrs. Ting Su-Yin, my paleontological friend I had met on the previous trip. I stayed in Beijing at the Friendship Hotel, an inexpensive hotel for foreigners originally built by the Russians in about 1950. I had my Swiss Army Knife and a light weight Estwing chisel edged hammer, both were essential in living there. The menu was very complete in its listing, but there were usually only a few things actually there, some nights the pickings were thin. There was a constant reminder that China is always on the ragged edge of famine. China's population measures are understandable in that light.

In Beijing I worked at the IVPP, staying in the office of Chow Min Chen, who had a PhD from Princeton and was the head of the group. During the Cultural Revolution the IVPP had been kept from many of the major upsets because CC Young, the founder of the IVPP, was friendly with Chairman Mao, who was convinced the IVPP was needed to find oil. Chinese paleontologists were generally a westernized bunch, since the invertebrate paleontologist had mostly been trained by Grabau, after he emigrated to China post WWI. The vertebrate paleontologists had close ties to the US as well. I worked on dinosaurs especially those of late Cretaceous age, on Paleocene mammals and a strange lizard. It was a very different trip than the first one because I set the schedule, we were

not forced to drop something because of transportation schedules. I aided Dong Zhiming, the foremost dinosaur expert in China with an English translation of a book describing Chinese dinosaurs, and Dong in turn lead me around the town. I wound up giving Dong a small 220 to 110 volt transformer which his wife used to run a HP calculator for her anthropological research. Dong took me to Chinese movies, no subtitles, and several places shopping. Again I visited many bookstores. Lunches were at a more modern tourist hotel a block away from the IVPP. Dong took me to Laiyang Province, just across the Yellow Sea from Korea where we looked at stratigraphy and I found a 2" footprint of a small dinosaur standing in lake sediments in which 6 inch fish were common, it clearly was standing in shallow water like a crane waiting for lunch to swim by. We took trains most places. The trains were like those of the US, but with some types of equipment that had been ruled obsolete since the '20's in the US. The steam locos were like those of the last days of steam in the US, and were still being made. They were magnificent. There is a great deal of coal in China, so steam locomotives made sense.

SuYin and I took a two week trip to Nanxiong County in Guangdong Province in south China. We flew to Guangzhou, and rode the train north to Nanxiong town where there were very interesting fossils, bearing on the question of how dinosaurs became extinct at the end of the Cretaceous. We examined the rocks over the entire county and I found more books and papers to examine. I learned to decipher Chinese characters with the aid of a dictionary and maps so I could figure out what my Chinese colleagues had discovered. While there I gave a lecture to the local folks on the paleontology of the area, using a blackboard. Su Yin translated for me and all of us had a good time. Dinosaur egg shells were everywhere. We had a Toyota minivan assigned to us, the driver was an 18 year old girl. One day she did not pick us up, it turned out she was dallying with a boyfiend, and one of my local hosts had to quickly find a place for the great foreigner to wait while she was found. I spent the next half hour in a small village composed entirely of families named Li. The Li's I visited had a small refrigerator, a new brick and tile house, 220 volt electricity, TV and a tape recorder. They gave me some puffed rice cakes which were very good. This whole backwater rural county had the Chinese equivalent of the US REA (Rural Electrification Agency), and things were much advanced over the amenities I had seen on the 1984 trip.

On return I visited Xian staying in a dorm at XeiBei (Northwest) University. There I worked with Madame Xei Xiang Xue and lectured in English to the Geology Department, Madame Xue who was a professor of Geology translated for me as Su Yin had done in Nanxiong. I examined many of Madame Xue's fossils. On leaving Xian I went on to Shanghai where I spent a day sketching fossils (no cameras allowed). After some shopping I returned to Beijing. The gifts I got included carved stone seals and ink pads, silk material by the meter, a red silk padded baby coat for my friend Arnie Kwong's new son Thomas, buttons for Betsy, a carved jade tiger pendant for Sal, and other knickknacks.

I have described the scientific aspects of this trip in my 1987 GSA Special Paper article.

RETURN TO THE ORDOVICIAN

In the early spring of 1985 Peter Hudleston, the head of the department called me into his office. He told me he had bid on the annual meeting of the North Central Section of the Geological Society of America meeting for 1987, and he wanted me to be the program chair and vice chair of the meeting. That was the number two position, he was to be the chair. I had been talking to Dennis Kolata of the Illinois Geological Survey at NC meetings for several years suggesting we pool

our various Ordovician studies and hold a symposium. At the same time we would make a really good guidebook and hold field trips. The Guidebook would give us an opportunity to get several unpublished theses published. When I told Dennis, he agreed this would be a good opportunity.

I knew that the campus would not be a good place to hold a meeting, there were no conference facilities. The average size of the annual meeting was between 500 and 700, since we were a major university, our meeting would be closer to the higher figure (it was). The Minneapolis Convention center was too big and did not have enough meeting rooms: we needed eight at every hour. The St. Paul Campus was no better. So I thought of the Hotel St. Paul and the Landmark Center, the old Federal Courthouse, just across the corner from the hotel in downtown St. Paul. Both were available. We chose to have the meeting close to the end of the usual period to make sure the weather was satisfactory. The dates we chose were Thursday and Friday, April 30-May 1, 1987, with field trips before and after. We signed an agreement with the hotel in which they agreed to give us the meeting rooms in return for a minimum number of rooms rented. We signed up several other hotels all of which were cheaper. Unfortunately not enough people rented rooms at the St. Paul Hotel, so we had a $3000 meeting room charge, and as our departmental bookkeeper did not keep us appraised of the running balance, we seriously overran our budget, and the NC section took a loss despite about 750 attendees. It took several years before the section made it up. None the less it has always been thought of as a great meeting.

I wound up writing the 1st and 2nd announcements, the program, the guidebook, editing lots of publications, including a major publication, Minnesota Geological Survey Report of Investigations. No. 35 "Middle and late Ordovician lithostratigraphy and biostratigraphy of the Upper Mississippi Valley". 238 pages. This volume had 20 chapters, of which I wrote all or part of 9, I edited the balance of the volume.

Walt Sweet of Ohio State by this time had converted Jerry Webers', Tom Schopf's and Walt's studies on Ordovician conodonts and many others into a Composite Standard Section of 3/4th of the Ordovican rocks of the United States. This was a major advance in correlation. Dennis had been working with Warren Huff of the U. of Cincinnati on bentonite correlation and there were some first rate dates on a pair of them, the Deicke and the Millbrig, that were particularly important. I had been working for years on bed tracing in these rocks, having been able to trace the same 4" thick beds from St. Paul to Dubuque. We had a precise lithologic correlation network, a precise chronology in the making, and many unpublished theses worth saving. The theses were unpublished for the usual reason: the student having gotten his degree, dropped it like a hot potato, and had no real interest in the profession to make sure the work was published. None the less, these were good works certified by good professors and needed to be published. Most students don't realize just how much a professor puts into the development of their students theses.

Dennis told me of Larry DeMott's Harvard PhD thesis on trilobites from the Platteville and Decorah Formations, done under the dean of trilobite researchers, Harry B. Whittington. He sent me a xerox of the Illinois Geological Survey copy of it, I was amazed at how good it was, even unpublished, there were over 20 citations to it since it was completed in 1963. The field work was done from 1952 to 1955, but Larry dilly-dallied about writing it, losing a position at Oberlin because it wasn't done, finally finished the degree in 1963, got a new job at Knox College, and then let it lie permanently. When I called him in May 1985 he was happy to turn it over to me for publication, but never got to see it, dying a year before the meeting. I rewrote and shortened the stratigraphy, Fred Shaw and Ron Tripp rewrote and modernized the systematic section, fortunately Larry had sent me the original plates of photographs of the trilobites.

Similarly Fred Swain had a paper on Decorah ostracods that fit, a summary of several theses. I had Bill Rice's recent study on Decorah Brachiopods, there was a thesis from UMDuluth on trace fossils, I rescued Dave Des Autels' thesis on a catastrophic kill, and so on. Several experts in different groups of fossils revised the lists of all fossils from these rocks level by level, so that too was up-to-date. I wrote an introduction and the section on Minnesota stratigraphy, Dennis and Warren summarized their bentonite work, I summarized the very detailed work of a pair of Iowa Amateurs, Cal Levorson of Riceville and Art Gerk of Mason City, and Brian Witzke of Iowa wrote a fine summary of those rocks. We started to edit this seriously about October, we had asked contributors to submit both paper copies and disk versions of their papers. The disks came in for most of the papers, in both DOS and Mac versions, in 3 1/2" and 5 1/4" sizes, and in every possible word processor. I typed those that needed to be retyped. Nancy Balaban of the MGS and I edited the paper copies, made the changes on the disks and sent all the disks off to Hazel White of the University Print Shop who set them in type and sent us the galleys for final correction and pasteup. The last paper arrived in February, but still the book came out on May 1st during the convention. It is now a major reference for the Ordovician.

The meeting came off very well, we had 85 on the Wednesday field trip to the Brickyard where fossils could be easily collected and to the local sections of the St. Peter and the Shadow Falls Platteville stop. and as many on the two day trip to Sogn near Cannon Falls, to Cummingsville and Rifle Hill, and Spring Grove underpass in Minnesota; the second day we went to Decorah, Postville and Guttenberg, Iowa. In addition to all the other technical sessions on plate tectonics, structure, glaciers etc. we had four 4 hour sessions on one or another aspect of the Ordovician, attended by about 100. It turned out to be an unofficial meeting of the International Symposium on the Ordovician System. On Friday (May Day), we received the first printed copies of RI 35, and every one was delighted with it.

TRILOBITES

Having rescued DeMott's thesis from oblivion, I began to realize that there were few trilobite specialists left, and that this would be an interesting subject for research that would not be as taxing to my legs as collecting dinosaurs and mammals in Montana had become. I knew that there were many undescribed trilobites and that the stratigraphic levels of the described ones were poorly known. As an afterthought in RI 35 I had converted Walt Sweet's CSS into an absolute time scale for the Ordovician. I realized that while Walt's CSS was based on conodonts, there were trilobites in the same rocks, and that we also had absolute ages on all the trilobites if only I would organize the data. Bill Rice, Dick Benson, and a couple of other students prevailed on me to offer Advanced Invertebrate Paleontology for the first time in years. So the students in this class and I copied and read all the North American Ordovician trilobite literature. It came to about 6 shelf feet of which we read and analysed every page.

We started plotting the first-oldest-lowest; and latest-highest-last occurrences of every genus of trilobite in North America, and plotting them on a graphic time scale. We sorted them out by families and put ancestors next to their descendants. As we read more of the literature we redid the plots always looking for the first and last occurrences. Things stabilized rapidly, more rapidly than I had thought, and ultimately I had the gist of a paper which I gave in August 1988 in the Fifth International Symposium on the Ordovician System, held in St. Johns, Newfoundland.

By this time I had found out that Cal Levorson, Art Gerk, Glenn Crossman and Brian Gossman, all amateur collectors in Iowa, had hundreds of trilobites with good stratigraphic and

geographic data available. I borrowed these and made rubber molds, plaster casts and returned the specimens to them. I convinced Art and Cal to present their specimens to the University of Iowa for permanent storage, I have never kept any fossils for my own except for those with absolutely no scientific usage, if important fossils are not stored in a permanent repository, they are absolutely worthless! Anyway, I rapidly found that there were two episodes of extinction in the Upper Mississippi Valley, the first at the Deicke ash bed near the top of the Platteville Limestone, and another in the Rifle Hill member of the Stewartville Formation of the Galena Group., After each extinction, critters took their time returning to the area. As a teenager, my friend Dennis Kolata had made large collections near his home in Rockford Illinois, they were at the Burpee Museum there and added still more to my knowledge of these Upper Mississippi Valley Trilobites.

As a result of work by other trilobite workers there are a series of depth facies of trilobites that are well inown. It was now possible to have still one more way of estimating the depth of deposition of these Minnesota rocks.

At present I am writing a revision of these Upper Mississippi Valley Trilobites, describing their distribution and evolution, including several new species. One of the more interesting is *Ectenaspis beckeri*, from the Maquoketa. It was poorly known from 2 specimens before, now it is known from a dozen including an immature complete specimen. It was always known to be peculiar, with eyes on long staks, it now is very peculiar, with great long genal spines rising to the level of the tip of the eye stalks. I have distributed many casts of this very pecuiliar trilobite to professional and amateur students of trilobites.

TEXTBOOKS

Starting in about 1972 at the behest of my old friend Bob Heller, the head of the Geology Department of UM Duluth, I began writing a *Textbook of Paleontology* for McGraw Hill. It was to cover all of the subject: invertebrate, vertebrate, and micropaleontology. I planned to use most of the Moore Lalicker and Fischer illustrations and took the vertebrate illustrations from the original literature. I struggled with the text for 10 years, producing a complete manuscript, but it had unfavorable reviews. Reviewers would heavily criticize what I had written and my writing was clumsy and awkward. The main reason is I tried to cover too much, and wound up with a book that did not fill anyone's needs. It was a most depressing experience. The one positive aspect is it improved my writing, and I was able to salvage some of the text which had been entered into computer form for my next text effort. It was while writing this book that I wrote the *The Rainbow Route*, published in the fall of 1974, but with a 1975 copyright. In 1983-84 I took a sabbatical leave to work on the textbook, and was given a Busch Fellowship in Undergraduate Education. After McGraw Hill rejected the book I tried salvaging it by shifting to John Wiley and Sons, but the book fared no better.

Earlier in 1972, Prem Saint and I wrote a laboratory manual : *Historical Geology Investigations* published by Burgess Publishing Co. of Edina. The paleontology section was published separately as: *Introduction to Paleontology Exercises*.

In 1990 or so, Kent C. Condie of New Mexico Tech in Socorro, New Mexico approached me about becoming a co-author on a historical Geology text he had been working on since 1983. He had a coauthor previously but that person had not been able to write satisfactory sections on paleontology. J. Keith Rigby Sr., had become familiar with the wide range of my work from my work with his son J. Keith Rigby Jr. So Rigby Sr. recommended me to Kent as a replacement author for this book. He started with Burgess Publishing, but it was switched to Prentice Hall later.

Kent is a Plate Tectonician. His original co-author was a paleontologist, and had not produced much other than an outline. The title is *Origin and Evolution of the Earth.* Kent had old 5 1/4" disks from an obsolete word processor for his part of the text. I translated them to 3 1/2" Mac disks, and quickly roughed out my half of the text. I reused some of the debris from my old Paleo text, particularly the Evolution and Paleoecology parts. We had a first draft in a month. We went through 12 versions, swapping disks back and forth through the mail, modifying it to meet the critic's objections, before turning it over to production about November 1 1995. In the meantime, the book has had 5 changes of editors in 5 years. I am much happier about this book, the biggest problem is that the book is designed for majors, and may be too much for liberal arts students. I don't think so from the standpoint of one who has taught the subject for 42 years, but I won't be the person who decides on adoption by all those schools out there. It will have to compete in the market place.

The problem with textbooks at any level is one of keeping pace with the advance of the science. With the global population increase there has been a corresponding increase in the number of scientists and a consequent increase in the amount of material that really needs to be covered. The courses I teach have never been the same from year to year, andf have undergone a continuous change. The life expectancy of a text is about 7 years, and selection of a text usually has involved compromise, to find the least disagreeable text that is at the same time close to state of the art.

HOW I PLANNED MY RESEARCH

I planned my research carefully, designing the topic and strategy of research.

1) First I recognized the problem, it had to be one which provided an illustration of basic paleontological priinciples, but which had been ignored.

2) I did library research to find out what was known, (the library at the U of M was and still is extremely good)

3) I schemed the best questions, and schemed a way of answering the questions, with the available resources,

4) finally I did the research, wrote it up, found a publisher and modified the format to fit the publisher.

To develop hypotheses for further research I considered the following:

1) Follow the Food Chain, it will suggest what should be there in the way of abundances, if not there, find out why.

2) Work out a detailed chronology to the highest order of precision possible

3) Work out evolving species lineages and ancestor- descendant relationships. Express this data in taxonomic form.

4) describe the changing form and metrical statistics in terms of rates of change.

5) Strive for completeness, fill in any gaps by new collecting.

6) Then try to describe it all.

What successes I have had have all come from new hypotheses based on these principles, many academic paleontologists can only find time to do the simple alpha level taxonomy of describing new species. . Anyone can find a "new" species, the trick is in demonstrating it really is

new and how important it is. That requires reading all the literature and not just those from the same basin, or continent!

THE FUTURE OF PALEONTOLOGY

Paleontologists do three different things:

1) They date rocks, especially sedimentary rocks.

2) They provide the best possible information on the rate of evolution, and the course of evolution.

3) They provide a history of the major ecological changes of the Earth's history, which can provide guidance on what ecological changes will occur in the foreseeable future.

Many geologists are convinced that there is an accurate *numerical* time scale, even those who should know better. There is one and it has steadily improved, but it is still a very long way from being as dependable as the fossil record. They also think that a numerical age is superior to a fossil correlation because they can refer to the latest version of the numerical time scale. In fact the precision of correlation in the fossil record is usually within plus or minus 2 million years and when particularly great care is taken as in determining the stratigraphic ranges of fossils near a period or stage boundary, during a radiation, the precision of correlation can be much greater, involving times as short as plus or minus 100,000 years. For instance there are six conodont zones in the interval between the two candidate horizons for the Cambrian-Ordovician boundary. These two boundaries differ by about 3 million years in age based on Sweet's Composite Standard Section when it is converted by reasonable assumptions into a numerical time scale. The average duration of these zones is about 500,000 years., they have been recognized in a large number of sections around the world. There are no stratigraphically well controlled dates of high quality between the beginning of the Cambrian and the middle Ordovician! The 21-year history of research on this problem by the Cambrian-Ordovician boundary commission has been one of arguing about just which of these zones would make the most useful systemic boundary.

This is not an isolated occurrence. While there are many dates of high quality in the Cretaceous and Cenozoic, mainly because of the abundant volcanic ash beds in the western interior sea due to the close proximity of the subducting Pacific plate and the well developed magnetochronology, there are few earlier dates that satisfy all conditions of precise association with a single fossil zone and a high precision numerical date. Most dates are based on the law of cross-cutting relationships, and give an approximation that is useful for many purposes, but not for such problems as varying rates of rock accumulation. A standard practice in constructing time scales often explicitly stated is to assume that all fossil zones between two dates are of equal duration. For example in Harland, et al. 1989, the Silurian is divided into the standard four series, of which the earliest the Llandovery with 10 or 12 graptolite zones is assigned 9 million years, the Wenlockian with 9 graptolite zones is assigned 6 million years, the Ludlovian with 6 graptolite zones is assigned 13 million years, and the latest series, the Pridoli with only 2 graptolite zones is assigned 2 million years. In fact, the durations of the series are exactly opposite in duration, the Llandovery is during the time of the recovery from the terminal Ordovician extinction and represents only a third of the Silurian. The Wenlockian and Ludlovian combined represent another third, rates of evolution have decreased and durations of zones increased compared to the Llandovery, and the Pridoli represents a time in which the fauna has now completely recovered from the Terminal Ordovician extinction. Based on thicknesses of sediment and a Silurian Composite Standard section created by Mark Kleffner (1989, 1995), the Pridoli represents over a third of the duration of the Silurian despite having only 2 zones.

The same problem exists for the Scythian, or Early Triassic and all the intervals immediately after a major extinction in the time scale.

The same kind of assumption of constant rates of evolution gives rise to most of the differences between times of phyletic divergence calculated from DNA or protein analyses and those from the fossil record. Paleontology can be supplemented by such analyses, but it remains the major way in which the path and rate of evolution can be understood.

A problem in paleontology is that most academic paleontologists have had restricted goals. The pressures of teaching have lead many to continue excessive work on trivial and minor alpha taxonomy problems that lead to many short papers satisfying the short term "publish or perish" syndrome, but do little to advance the science. One of the duties of major advisors should be to point out the necessity to diversify, and discuss all the more theoretical aspects of a problem. A pleasant modern approach to be emulated is Metapaleontology, the analysis of the reasons behind the data of beta-level paleontology, typified by Sepkowski's studies. Still another is the need for rapid update of higher level classification as typified by the *Treatise.* The *Treatise* needs to be machine readable, either by CD-ROM or on-line, and needs to be done at a more frequent rate of update. Instead of waiting for completion of an entire volume, the existing treatise needs to be updated order by order, and rapidly modified. A single tardy author can hold a volume back for decades, stifling access to major advances in much of the class. The *Treatise* is the primary textbook for the profession, and needs to be regarded as such.

Paleoecology remains the portion of paleontology least often investigated, and an area that will be most fruitful. The separation of Paleontology into paleobotany, invertebrate paleontology , micropaleontology and vertebrate paleontology has lead us to abreakup of ancient communities that is highly artificial and has stifled progress. Graduate students need to be trained in a broader outlook. A maxim I have followed for years is the paleontological equivalent of the accountant's plan "Follow the money", it is "follow the food chain". It has led to my most influential papers, and I think it should be more widely adopted. We need a new textbook in paleoecology for graduate students, sort of a cross between Ager's book, with a dash of Odum's 1963 *Ecology* text for ecological theory, and examples of the best modern work drawn from the likes of Bottjer, Ausich, Droser and others.

CRETACEOUS SEA LEVEL CHANGES

From 1954 to 1959 or so I investigated the stratigraphic sections of the western US, starting with W. H. Emmons' classic *Petroleum Geology*, a copy of which was left in my office by Charley Bell. This grew out of the attempt to find a rational explanation for the bizarre set of Cretaceous sediments in Minnesota as a result of sea level changes, prompted by Speiker's work in Utah. It became apparent that there were several episodes of Transgression and Regression that had taken place in the last third of the Cretaceous, and could be recognized from Alberta to Mexico. I prepared many cross sections but finally did nothing with them thinking this was too obvious and everyone knew of them. That was a serious mistake, I should have published them. Robert Weimer of Colorado did publish them in 1960 precisely as I had figured them out, and made his reputation as a professor on that paper! I learned a lesson, no matter how obvious, Publish It! Just because it is obvious to me does not make it obvious to everyone else.

THE ECOLOGY OF THE CRETACEOUS - TERTIARY TRANSITION

Dinosaur extinction is a problem I have been working on for over 36 years. A lot of solemn nonsense has been written about it; basically it is an ecological catastrophe. No one had actually worked on getting data to solve the problem. I had noticed that on reading the literature that there was always an barren interval between the highest or latest dinosaur fossils and the immediately overlying lowest fossil mammals. The age of the lowest fossil mammals found varied but was usually late Paleocene in terms of the chronology normally used. The mammals associated with dinosaurs were in general not the ancestors of most of the Paleocene mammals. But at the same time there was no evidence of a physical unconformity between the dinosaur bearing rocks and the mammal bearing rocks. One thing I had learned from Simpson's *Tempo and Mode* was that evolutionary rates varied widely and a little thought elaboration suggested that a major community shift like the one from dinosaur communities to mammal communities should result in very rapid evolution. In connection with the conodont work, I had already observed instances of very rapid evolution following an extinction. George Seddon's thesis showed me an example of the extremely fast elaboration and radiation of the genus *Polygnathus* during the Devonian.

The three parts of the Paleocene land mammal stages were based on a few faunas from western North America, they were divided by about equal amounts of evolutionary changes. There were only a few examples of faunas known, because collecting was poor and difficult. Not many people had worked on these rocks. The stages were the Puercan, early Paleocene, the Torrejonian, middle Paleocene, and the Tiffanian, the late Paleocene. In each about the same amount of physical change had occurred. Every vertebrate paleontologist who had worked on them had thought as a result of the simplest possible hypothesis that they were of equal duration. They varied greatly in thickness, within a single area and from area to area. None of the paleontologists who had worked on them had ever considered the possibilities of varying rates of evolution or rates of sedimentation. All of them had been only morphologists aware of anatomy, but not of the tectonic impications of sediments, nor of more sophisticated forms of stratigraphy. Even Simpson, who had worked extensively on varying rates of evolution did not put his ideas into practice on revising the Paleocene time scale. When I looked at them in the same fashion as oil well stratigraphic paleontologists, I found that there were very great differences in the thicknesses of the mammal stages. In any given area the Puercan was about ten percent the total thickness of the Paleocene, the Torrejonian was about twenty percent, and the Late Paleocene - the Tiffanian plus part of the overlying Clarkforkian- was very thick, the other seventy percent. I was piecing this data together during the late 1950's, after my abortive foray into Cretaceous strand line migrations. This meant that the rates of evolution really were highly variable but in a very predictable way.

These results suggested to me that perhaps all of Paleocene time was indeed represented by rock throughout the Great Plains and the Rocky Mountains, and the supposedly missing Puercan or Torrejonian strata between the dinosaurs and the late Paleocene was really just poorly fossiliferous. Also such evidence as could be found in the literature suggested that there were far more types of dinosaurs in the Judith River and the overlying Edmonton than in the latest dinosaur-bearing rocks, the Hell Creek and Lance Formations.

A research strategy immediately suggested itself. Go to an area where dinosaur bearing rocks were succeeded by Paleocene rocks, locate the horizons of all the fossils that had been collected, and carefully collect the missing interval. Then the problem could be attacked on purely ecological grounds. This lead to early research proposals, which of course were turned down. They were from an invertebrate paleontologist and did not have anything except theoretical speculation to guide them. This is why I worked with Bruce Erickson to collect a mountable *Triceratops*. It gave me the

opportunity to get into the field in a way that would let me make the observations I needed. Pres Cloud was very upset that I was spending all the time necessary to rebuild the Dodge 4X4 truck we needed, instead of working on more specifically paleontological problems. With no funds, sweat equity was called for!

That research strategy worked. The result of the field work was the sequence of Bug Creek Faunas, the review of multituberculate mammals, and the information of changing ecologies. None of it would have happened without the literature review considering old data in a new way different from that of all the previous paleontologists. The details are in my 1969 paper "Cretaceous and Paleocene terrestrial communities of Western North America", and my 1987 paper "Paleocene and latest Cretaceous mammal ages, biozones, magnetozones, rates of sedimentation, and evolution".

DINOSAUR EXTINCTION

While dinosaurs were going extinct as soon as they appeared, there were two major extinctions. The first was in the Late Jurassic and Early Cretaceous when stegosaurs and most sauropods went extinct as a result of the change in world vegetation from very tall conifers and cycads to the much shorter primitive flowering plants such as magnolias. They were replaced with new groups of herbivorous dinosaurs that evolved to eat the new flowering plants: the ankylosaurs, horned dinosaurs, boneheads and duckbills. The second is the one that most people have been concerned with, that at the end of the Cretaceous. Every possible plausible reason (and many implausible ones) have been proposed for this extinction. Every one usually thinks the extinction of these great beasts must be due to some world-shaking calamity. Jepsen in 1964 wrote a humorous summary of proposed explanations. "Authors with varying competence have suggested that dinosaurs disappeared because the climate deteriorated (became suddenly or slowly too hot or cold or wet or dry), or that the diet did (with too much food or not enough of such substances as fern oil; from poisons in water or plants or ingested minerals; by bankruptcy of calcium or other necessary elements). Other writers have put the blame on disease, parasites, wars, anatomical or metabolic disorders (slipped vertebral discs, malfunction or imbalance of hormone and endocrine systems, dwindling brain and consequent stupidity , heat sterilization, effects of being warm-blooded in the Mesozoic world), racial old age, evolutionary drift into senescent overspecialization, changes in the pressure or composition of the atmosphere, poison gases, volcanic dust, excessive oxygen from plants, meteorites, comets, gene pool drainage by little mammalian egg eaters, overkill by predators, fluctuation of gravitational constants, entropy, cosmic radiation, shift of the Earth's rotational poles, floods, continental drift, extraction of the moon from the Pacific basin, drainage of swamp and lake environments, sunspots, God's will, mountain building, raids by little green hunters in flying saucers, lack of even standing room in Noah's Ark, and paleoweltschmerz." In other words, anything that might kill *one* dinosaur has been proposed as the major reason for the extinction of the whole group.

Can the question be phrased in answerable form? Extinction is not a rare event, it is the rule rather than the exception. We must look at the temporal duration of the extinction, that will automatically rule out many of the proposals. Over what period of time did the extinction take place, what were the major ecological variables during that time? Did all these types of dinosaurs die for the same reason at the same time, or did some die for one reason and others for different reasons? The number of dinosaur genera known from Montana, Alberta and northern Wyoming in various parts of the last 10 million years of the Cretaceous and the first 200,000 years of the Tertiary shows a steady decline. Other dinosaurs lived elsewhere at this time, but this is the biggest volume of

data on one place, with over 3000 individual museum specimens of dinosaurs involved. The first extinction, from 30 genera in the upper Judith River Formation of Judithian age to only 23 genera in the lower Horseshoe Canyon Formation of Edmontonian age is clearly the result of a rise in sea level that reduced the area east of the Rockies and west of the interior sea to less than 10 percent of what it had been. As measured by oxygen 16/18 ratios in marine fossils there was a steady global drop of temperature of about 10 degrees Celsius during the last 10 million years of the Cretaceous. This had two effects, one direct on the dinosaurs and their distribution, and secondarily on the distribution and diversity of land plants. Plant diversity dropped 50 percent in the last 2 million years of the Cretaceous. After a slow but steady drop in sea level in the last 5 million years of the Cretaceous, there was an abrupt drop of about 200 feet about 1 million years before the end of the era. This made summer temperatures warmer, but winter temperatures colder, and further disrupted the plant communities. It also permitted several Asiatic and South American animals to migrate to North America. These included *Leptoceratops* from Asia, and *Alamosaurus* from South America among dinosaurs, and *Catopsalis, Procerberus* and *Protungulatum* among Asiatic mammals. The mammals in particular competed with herbivorous dinosaurs for the steadily reducing plant community. As the descendants of *Protungulatum* underwent an adaptive radiation in North America, they went from a single species the size of a small skunk to 32 species ranging up to the size of a sheep within the first million years of the Tertiary (the end of the Puercan stage). A dozen genera of dinosaurs were still around at the end of the Cretaceous, there is an inverse relationship between number of dinosaur species and the number of ungulate (hoofed) mammal species in the bottom 50 feet of the Paleocene rocks in eastern Montana.

The pollen studies of the many students John Hall and I shared (Norton, Shoemaker, Melchior, and Oltz) helped set my early views on these changes, there were significant climatological changes during the final phases of dinosaur extinction and into the Tertiary.

In the late 1970's Walter Alvarez was investigating a sequence of limestones near Gubbio, Italy and found a strange clay layer about 25 mm thick precisely at the horizon of final extinction of Cretaceous foraminifera and below the first Paleocene foraminifera. The samples were analysed by Helen Michel and Frank Asaro, which showed them to be greatly enriched in Iridium, an extremely rare terrestrial element, but common in some classes of meteorites. A search found more layers such as this all over the world near the K/T boundary. The upshot was that Walter Alvarez, a nobel prize winning physicist joined the group and they proposed in 1980 in a paper in Science, *Extraterrestrial cause for the Cretaceous-Tertiary extinction* that the entire extinction was catastrophic and due to the collision of a 14 km asteroid with Earth. The extinction problem was immediately divided into two camps of partisans, a catastrophic group and a gradualistic group. The catastrophic hypothesis was seized upon as inherently simpler by a large number of non paleontologists. The effects of the collision were likened to the nuclear winter proposed as a result of future nuclear war, and those in favor of the more gradual hypothesis were publicly accused of being in favor of nuclear war and nuclear winter! It did not help that the editors of Science published every paper submitted by the catastrophists, and rejected almost uniformly gradualistic papers.

Vertebrate paleontologists as a rule were not impressed with the need for a catastrophic extinction of dinosaurs, the marine micropaleontologist were and have remained firmly on both sides of the question, each group questioning the statistical veracity of the others conclusions. The Iriidium layer has become the standard defining feature of the K/T boundary. There is no doubt that the asteroid hit, but its biological consequences are still being studied.

I will give the following current summary of K/T events. At the end of the Cretaceous a large asteroid, about 14 kilometers in diameter struck Earth. It apparently broke up and parts landed in several places. These produced several large craters and a cloud of dust that took about 6 months to settle out of the atmosphere. The cloud was sufficiently dense to block sunlight and stop green plant photosynthesis for that time. The dust layer is global, and precisely correlates with the marine extinction at the end of the Cretaceous. The clay layer that resulted from the dust fall is enriched a billion-fold in Iridium and Osmium over normal Earth rocks, and can be found wherever there is no unconformity between the Cretaceous and Tertiary. There is a crater in the Caribbean coast of Yucatan called Chicxulub that produced a 100-meter high tsunami (tidal wave) that came ashore and created havoc (and sediments known as tempestites) at least from Corpus Christi to New Jersey. This asteroid impact surely did not help dinosaurs, but the same 12 dinosaurs occur after the dust layer as before in eastern Montana in river deposits that are not the result of reworking of Cretaceous fossils. Other earliest Tertiary dinosaurs are known from India, Argentina and New Mexico, none survived more than a million years into the Tertiary, the latest dinosaurs are closest to the equator. The age of the impact has been measured at several places, the average age is 66.7 million years, that is precisely the Cretaceous /Tertiary (K/T) boundary.

Gary P. Landis, U.S. Geological Survey, J. Keith Rigby, Jr., of Notre Dame, Richard Hengst of Purdue University, and I proposed the Pele Hypothesis based on measures of the composition of fossil air in amber grains from the Cretaceous and Tertiary. We found that during the gradual phase of dinosaur extinction the oxygen in the atmosphere dropped from 35% to 28%, and later even lower to the present 21%. There is a relationship between episodic increases in deep mantle degassing with superplumes, atmospheric CO_2 buildup, accelerated net photosynthesis from an expanded biosphere, and significant increase in atmospheric O_2. The increased rate of crustal production directly caused marine transgression, elevated CO_2 and the Cretaceous greenhouse climate. The termination of the superplumes in the Late Cretaceous reversed these changes in atmosphere but only after irreversable changes in the biosphere. On the basis of physiology, both the Early Cretaceous and terminal Cretaceous dinosaur extinctions and ecological shifts between major groups of plants and animals were apparently caused by differential adaptations to varied amounts of O_2 and CO_2 in the atmosphere and ultimately were mantle controlled. The poor dinosaurs literally ran out of gas! To be specific Oxygen.

To summarize, dinosaur extinction was gradual, not catastrophic. Plausible major causes of extinction known to have been existence are 1) Sea level changes, 2) temperature changes, 3) increased seasonality, 4) changes in plant distribution and extinction, 5) increased competition with mammals, 6) the drop in oxygen, and 7) the asteroid collision. A joking statement not far from the truth is that this was a time when Murphy (referring to Murphy's Law) was an optimist. Things got bad and then they got worse.

PROFESSIONAL SOCIETY MEMBERSHIPS

The first professional society I joined was the Society of Economic Paleontologists and Mineralogists. I joined in 1951 at the behest of Marvin Weller. At that time both SEPM and PS jointly published the Journal of Paleontology. In 1952 I joined the Society for the Study of Evolution and Sigma Xi. I joined the Geological Society of America next in 1954 when Thiel told us we were going to host the 1956 annual meeting. I also joined the Society of Vertebrate Paleontology that year. I belonged to Sigma Xi, the national scientific fraternity for a few years, but

dropped it for the usual financial reasons. I joined the Society for the Study of Evolution in its 4th year, later I added the first 3 years to my file of journals since Charley Bell had belonged, and given his copies to the Winchell Library, they were surplus so I was given them. I dropped my membership when the journal *"Evolution"* became wholly a genetics journal in the early '70's. About 1963 the journal *"Systematic Zoology"* became interesting, it was publishing studies that were concerned with the methods of systematics,as well as evolutiobnary studies. It was published by the Society of Systematic Zoology, so I joined. The journal *"Science"* was publishing exciting geology about 1960, so I joined the American Association for the Advancement of Science, dropping it in the mid '80's when it was taken over by the molecular biologists and biochemists. About 1970, Tom Schopf, an officer of PS made a plea for members of SEPM to join the Paleontological Society also, so I did. It, SVP, GSA and SEPM are my main societies today. When I dropped *Science*, I picked up the journal *"Nature"* as a substitute, it was far more interesting to me. Throughout my career I read all my journals from cover to cover as they came out.

When Joe Cain appeared in 1989 as a graduate student interested in the History of Paleontology and Evolution, we had many long talks on the period of the New Synthesis of Evolutionary Theory, since I had been around for the end of that period. I started giving him my old runs of journals and disposing of miscellaneous historical materials I had accumulated over the years, I have always been of historical bent, and I have always been a packrat. It was a great pleasure to see this material put to use and not lost forever. In March of 1996 we did over 10 hours of taped interviews, which he will deposit in the U of Minnesota archives, along with a copy of this document.

TEACHING FUNCTIONS

CONTINUING EDUCATION AND EXTENSION

Evening School classes:

Historical Geology, Origin and Evolution of Life, and Physical Geology

Fall 1953 to date, once or twice a year

I estimate I have taught Historical Geology some 40 times to an average of 75 students per class, to some 3000 students

Origin and Evolution of life was taught for some 7 years to an average of 50 students, for 350 students.

I estimate I taught Physical Geology once a year in evening school for some 20 years to some 75 students per class, to some 1500 students

Total estimated evening class enrollment 4850 students

1001s Physical Geology (TV)

5051s Physical Geology for Teachers (TV)

Summer Session classes

Physical Geology, Historical Geology, and Field Geology

Summer1954 to date, most years

Field Geology :

Geology of Southeastern Minnesota (two weeks)

Four times 1954 to 1960

Geology of the Black Hills (four weeks) 1956

Field Geology of the Park City Utah area (six weeks) three times, 1966-1969

Field Geology of the Gunnison Colorado Area, (six weeks) 1979

Average University of Minnesota enrollment 20 for a total of 180 students

Physical Geology (first summer session)

about 20 times to an average enrollment of about 50 students, or 1000 total

Historical Geology (second summer session)

about 10 times to an average enrollment of about 30 students or 300 total

Total Summer session enrollment 1480 students

Independent Study Courses

Physical Geology, Historical Geology, and Paleontology courses

1. Study Guides for Correspondence Courses in Geology, Department of Independent Study, Continuing Education and Extension

a. Physical Geology 1001, revised 1957, revised 1969, rewritten 1974, 120 pp. rewritten 1990

b. Historical Geology 1002, 1953, rewritten 1955, rewritten 1970, 60 to 100 pp. rewritten 1990

c. Paleontology 5151, 1970, 120 pp.

3. Sloan, R.E. and Alexander, E.C., March 1985, Study Guide for Geology 1001, Physical Geology (for use with the PBS TV series “The Earth Explored”), Department of Independent Study, Continuing Education and Extension.

Summer 1953 to date, total enrollment about 1650 students

Compleat Scholar courses, Rochester Center lectures, Macphail center lectures

About 20 short courses or single lectures, with an average attendance of about 30 for 600 students.

Total Extension students: 8580 students

Number of students in extension who received graduate degrees from this department

Paul Weiblen PhD

Clarence Nelson MS

Douglas Jones MS

Bernard Saini-Eidukat PhD

Courses Taught

The courses I have taught on a regular basis over the years are:

1001, Physical Geology, usually during the 1st Summer Session, 1002, Historical Geology, which I have taught perhaps a hundred times, 3112 the major's version of Historical called Earth History, 5151 fall quarter, Introduction to Paleontology, occasionally 5152 Advanced Invertebrate paleontology, 5154 and 5155, Vertebrate Paleontology I and II, winter and spring, 5156 Zooarcheology for about 5 times in alternate years. For many years I have also taught in the evening to supplement my salary. The main Courses were 1002, Historical Geology and 5052, Historical Geology for Teachers. When I first came in the summer of 1953 Charley Bell had a corresponding course in Physical Geology that he ran, Actually Charley paid Bob Berg one of his PhD students to write it and Charley graded the lessons. It used of course the old Minnesota text, Emmons Thiel, Stouffer and Allison. I took it over and immediately wrote a companion Historical Geology course. I used the writing that fall to organize my course, since I had never taken a Historical Geology course. I revised both courses about every 5 to 6 years to keep up with changing texts and the advancing field. I revised the Physical Geology course in 1957, 1969, and rewrote it in 1974, and 1990. I wrote the Historical Geology course in 1953, revised it in 1955, rewrote it in 1970, and 1990 In 1985, Calvin Alexander and I wrote a TV course for use with the PBS TV series "The Earth Explored"

From 1981 to 1995 I gave from 3 to 6 talks annually to elementary to high school classes on dinosaurs and or fossils. These were well received, I could keep second graders quiet for 2 hours talking about dinosaurs.

Supervised Theses Completed

Doctoral

Seddon, G.A., 1965. Middle Paleozoic Conodonts from Llano Uplift, Texas.

Bayer, T., l965. Paleoecology of Maquoketa Fm.

Webers, G.F., 1966. Mid and Upper Ordovician Conodonts.

Sahni, A., 1967. Judith River Mammals.

Pierce, R.L., 1957. Theses on Cretaceous

Norton, N., 1963. and Paleocene

Oltz, D., 1965. Paleobotany supervised jointly with

Melchior, R., 1966 Dr. John Hall

Shoemaker, R., 1969. of the Botany

Robinson, E., 1976. Department

Holtzman, R., 1976. Paleocene Mammals of North Dakota.

Wolberg, D.L., 1978. The late Paleocene Olive and Circle Faunas, Montana.

Hartman, J.H., 1983. Systematics, Biostratigraphy, and Biogeography of Latest Cretaceous and Early Tertiary Viviparidae (Mollusca, Gastropoda) of Southern Saskatchewan, Western North Dakota, Eastern Montana, and Northern Wyoming.

Masters

McGill, G., 1955. Cretaceous of Judson and Elburn Mines, North Minnesota.

Ford, G.R., 1958. Platteville Formation.

Crane, W., 1959. Redwing Quadrangle.

Thompson, W.H., l959. Platteville Conodonts.

Anderson, H.W., Jr., l959. Decorah Conodonts.

Nelson, C.W., 1959. Plan B.

Webers, G.F., 1961. Maquoketa Conodonts.

Snyder, H., l963. Structure of southern Minnesota.

Bell, R., 1964. Stratigraphy and sedimentation of Hell Creek Formation, Montana

Hartman, J., l976. Cretaceous and Paleocene Fresh Water Mollusca.

DesAutels, D., l977. Fauna of Galena Fm. Goodhue Co., Minn.

Grande, R.L., 1979. Fauna of the Green River Formation.

Brandenburg, J.L., 1983. Late Cretaceous Vertebrate Faunas from the Upper Hell Creek Formation of Montana and North Dakota.

Rice, W.F., 1985. The Systematics and Biostratigraphy of the Brachiopoda of the Decorah Shale at St. Paul, Minnesota

Jordan, M.J.E., 1987. The Middle Jurassic Carmel Fm. of Utah

Jenkin, D. 1990, Maastrichtian and Paleocene sediments, NE Montana

Pfaff, Kurt 1992, The Trout Cave Local Fauna

PUBLIC SERVICE

For many years I judged the Minnesota and/or Twin City Region Science Fair. I have given lectures on Dinosaur extinction to many venues among them are: U of M, Duluth Geology Department in 1984, NASA Goddard Space Flight Center Greenbelt, Maryland and the University of Wisconsin Oshkosh Sigma Xi in 1987, the University of Wisconsin, River Falls in 1988, and the Geology Department of Winona State University in 1991, and 1993

In 1979 we had a major creationist scare in which certain members of the legislature were threatening to require all science teachers to teach the Scientific Theory of the Creation, I served on an ad hoc committee to testify to the House Committee on Education about that bill. We were able to sink it. I had two articles I wrote for the Minnesota Science Teachers association that year answering certain points that the creationists always misstated about the fossil record. Later in 1983 there was a national effort made by the creationists to produce such a bill and I again wrote a simple paper, published in a book mostly by U of M authors, summarizing the real situation on transition between reptiles and mammals, a case for which they had always stated there was no evidence. I demonstrated that the evidence was overwhelming, they have not used that particular argument since

EUROPEAN TRIPS

Our first European trip was in 1974 at the behest of George "Rip" Rapp, one of the mineralogists in the department. He made a career shift from mineralogy to Archeological Geology. Rip along with William McDonald of the U of M's Classics had been conducting a 7-year archeological dig at Nichoria, Greece, in the Peloponese. They had accumulated a massive amount of animal bones that needed to be identified. Several students had attempted to identify them, with little chance of keeping up with the excavation. With the excavation drawing to a close Rip needed identifications as quickly as possible. He wanted me to go to Greece and do it. So I held him up for airfare to Greece for both Sal and I, for a Britrail and a Eurail pass for each of us. Sal did the data analysis while I did the identifications. So I worked on 3000 years of Greek garbage.

We left Minneapolis on Icelandair on July 21, 1974, had a major stopover at Keflavik airport in Iceland, and landed at Heathrow. We toured England and Wales, leaving England on July 28th for Hoek van Holland. On August 1st we arrived in Greece, staying there until August 20th.

Living conditions were not primitive. We lived in the two story concrete dig house, which would become a hotel when the dig was over. I worked on a bamboo slat roofed porch, while a crew of graduate students washed and cleaned bones I needed. We had a stereo playing, hibiscus growing on the left side of the porch, a view of the Mediterranean 500 yards away out the front of

the porch, and ripe figs growing on the right side of the porch. The resulting publication was Sloan and Mary Ann Duncan, 1978. "Analysis of zooarcheological materials from Nichoria, Greece".

We did many other things besides work. This was during a particularly bad upset in Greece-US relations, Turkey had just invaded Cypress, and we were shilly-shallying about what to do. Americans were not always welcome in areas away from Nichoria and the dig. I tried to take pictures of narrow gauge trains, and was warned off by armed soldiers. We did visit Kalamata (where the figs come from). There we visited a convent where we saw very primitive weaving and spinning being done in silk. We always had granola for breakfast, it was a special recipe involving a mixture of nuts, cereals and, honey, we took the recipe home, but it is too rich for us to make any more. Sal loved the fresh figs, and the little girls of the village would bring us a cone of fresh figs every day, all dressed up in their communion dresses. I needed a cow's skull for comparison purposes with the garbage fossils of cows, so we bought a cow's head and boiled it in the village in a tub. The whole village ate the flesh from the head, including the brain and eyes with gusto. Meat was perhaps a once-a-week meal.

After completing a stratified sample of all the periods of the excavation, I made some interesting conclusions. You could watch the progressive deterioration of the ecology of this worn out area. First the Greeks exterminated the Red Deer, almost as large as a elk, then they wiped out the wild boars during the Trojan wars, boars tusk helmets would stop a bronze sword. Then they wiped out the roe deer, a little deer about the size of a goat, and were working on the rabbits when the Ottoman empire destroyed all the vegetation and allowed all the soil to wash away. They started off as sheep and goat herders, but just after the Trojan War they became gauchos, raising only cattle for meat not cheese.

After the 3 weeks to gather data, we flew to Rome, and activated the Eurail pass, going to Switzerland, where we stayed in Zermatt, at the Hotel Garni Biner. We chose that out of a guidebook and became very good friends with the Biners. Sal eventually went back for some 19 summers. From there we went to England and Wales for the first time. We stayed at Castle Ruthin in Wales, a vintage 14th century castle with peacocks in the formal gardens. There we had a medieval banquet and slept in the Baron's own bedroom. The room is a 33 foot diameter octagon with a 14 feet high ceiling, windows on three adjoining walls facing out on the lawn, with private bath, an anteroom separating us from the hall, a very large bed and a carved wooden fireplace dated 1666.

From there we rode some of the Great Little trains of Wales, the Festiniog, Tallyllyn, and Vale of Rheidol, staying at the old great hotel at Portmerion, where the TV series "The Prisoner" was filmed. Portmerion was built by Sir William Clough-Elles, who was an architect specializing in restoration of manor houses. As a hobby he went to where old manor houses were being wrecked and would buy walls and rooms and odd bits, sending them home to a 300 acre family plot on the seacoast where he had a pair of workmen who took this flotsam and jetsam, and built them into buildings, often with walls from 4 different sources. It is a hodge podge, a colossal monument to colossal bad taste, but became a very special seaside resort. It was ideally suited to the weird program the Prisoner.

We returned as we went on Icelandair, with a one-hour stopover in Iceland, mandatory so passengers could buy spectacularly cheap luxury goods at the duty free shop. Our Waterford collection started there, and of course we got Icelandic wools.

We went back in 1976, for a trip to England. We had met Colin Leakey as a guest speaker at the meeting of the Minnesota Orchid Society, Colin was the eldest son of Louis Leakey by his first wife. He was a professor of Horticulture, specializing in beans. He needed a place to stay, and we volunteered. He was a very pleasant guest and offered to meet us in England. We flew in to London, rented a car and drove west to Gloucester and Wales. There we chased down our Wiggal ancestry in Gloucestershire and adjacent Wales. Again we rode the Welsh narrow gauge trains, staying at Portmerion and again at Ruthin for the banquet and accompanying play. Their waitpersons were chosen for their voices, most had won in the Eisteddfodd. Again we had room 33, the Baron's bedroom, later the Prince of Wales room at Ruthin. The next morning Colin arrived, we had him shown up to the room so he could have breakfast with us in front of the fireplace. As part of the room the hotel had provided us with a breakfast big enough for all of us.

After breakfast Colin lead us across England on byroads looking at medieval churches, finishing up at Ely Cathedral. Then we stayed a couple of days at his house in Cambridge. Sal and I went in to Cambridge to meet Rex Parrington a retired professor of Paleontology who had bought Walter George Kuhne's first collections from the Bristol Channel.

In September 1939 Kuhne was a German graduate student, who spoke no or little English and was tramping around Gloucestershire with maps and binoculars. He was looking for Rhaetic fissure fills in the Mississippian Limestones from which Pleininger had found Latest Triassic mammal teeth in the last century. Just as he found a rich fill, war was declared and he was immediately interned. He wrote David Meridith Sears Watson of the British Museum about his plight and Watson saw to it he was given a microscope and a couple of barrels of the mammal bearing clay to work on in his internment camp. He had an interesting fellowship! Kuhne sold his first collection to Parrington, who wrote the first paper on new Triassic mammal teeth since the 1890's.

I had taken a couple of collections of representative Bug Creek mammal teeth with me, and presented one of them to Parrington. He took us to lunch at his club and presented us with a collection of teeth and an edentulous jaw of *Eozostrodon*, now more usually known by the slightly later name *Morganucodon*. We went on to the British Museum, where we deposited another collection of Bug Creek and examined the Mesozoic mammal specimens that Simpson redescribed in his monograph. We were given casts of the types of *Hyracotherium*.

On one of our trips we pulled in to London, ate at the famous Savoy Grille after a long sleepless night, and then went to see a production of Kismet. I barely stayed awake through it. Then we went back to the Savoy, where we had a very disappointing room with a window on a small airshaft.

In 1977 we rented a Mini in London and drove the west country from Cornwall north to Wales. We were following a guidebook called *the Best of British Pubs* and a spectacular atlas (*The AA New Book of the Road*) at 1/250,000 scale with all the back roads and tourist sites listed. We found some great highly recommended Pubs far off the beaten track. At one of the more out of the way pubs, we were asked by the proprietors how we found the place. There we had Gammon (Ham) and Peas for dinner, played darts, and stayed at a neighbor's house. In Devonshire, near the center of the county, near Barnstable, it was a very cold and rainy day, Sal was overtired and very chilled, and was appropriately cranky. I stopped the car at a pull off, pulled out my Primus stove and a small camp kettle, and brewed up a pot of tea for her. Things go better then. We cooked in a few places using the same kettle and stove.

Again we went to Ruthin, this time we served as the Baron and Baroness at the banquet. From there we drove through Cumbria, looking up my Pennington ancestry, photographing the ruins of an ancestral castle now a cowyard, riding the Ravensglass and Eskdale Narrow Gauge railroad, and staying at the Pennington Arms. I fell ill to a fever, but Sal tells me the beer was great and so was the local sausage. She asked the bartender for a pint, and folks looked askance, but one of the men saved the day by telling the bartender "The lady asked for a half pint", saying aside to her, "you can have a second half you know" It was not ladylike to have a pint. From there we drove north to Scotland, where we stayed in a Bed and Breakfast in Ayr, where I found out there were many Sloans, it was a very common name. It was where the family clan got started.

Betsy joined us in Carlile, standing there sound asleep at the railroad station with an orchid flower in her hand that had bloomed just before she left. We visited the Isle of Skye, went on to Edinburgh, where we saw the castle and stayed at the George Hotel (spectacular breakfast) and came back to England. Sal and Betsy flew on to Switzerland while I flew back home. They had gotten all sorts of souvenirs on the trip, and I carried them home. I had purchased a set of castings for a small live steam locomotive, and a model airplane engine and had them as well as a great Welsh blanket, Primus stove and cook gear in my big rucksack. But I drew the line at carrying 2 pounds of stone ground oatmeal and said so. They were packing my bag, and at the last minute found that the oatmeal would fit inside my field boots. So they packed it anyway, and we have always joked about it! So I got paid back for the much earlier outrageous statement "I am the Majority".

In the summer of 1982, Sal was already in Switzerland, had been to Zermatt, and moved on to Lucerne where she was due to stay at our favorite hotel there, the Chateau Gutsch. Her large purse was snatched off her baggage cart near the railroad station, losing $3000 in travelers checks, her passport, credit cards and all her jewelry. She called Zurich where the embassy is located, they were of little help, saying she would have to go to Zurich to replace the passport and bring someone who could attest she was who she said she was. BankAmericard would not quickly replace the travelers checks, despite their ads. On the other hand, American Express was most helpful indeed replacing her card, (apologizing profusely for not being able to give her a new gold card, just the normal green card!), supplying cash and comfort. She called me and since I was coming anyway we postponed the trip to Zurich until I got there. The embassy was still not very helpful, but we did get the new passport. I had to swear I knew this lady! The passport was reissued July 19. We replaced her jewelry, binoculars and camera in Lucerne and in Interlachen, riding trains, and going on to Zermatt.

I had xeroxed an Internation Union of Geological Sciences guidegbook to Switzerland, in preparation for the trip and used that and Rudolf Trumpy's major review paper on the Alps to give myself a guided tour to the Alps. That greatly added to my knowledgwe of mountain building.

After Switzerland Sal and I went on to Great Britain. We rented a 1976 or so MGB roadster from Sportshire of London and immediately drove it to Wales, where we toured and visited our usual haunts, the narrow gauge trains, Castle Ruthin where we had the mediaeval banquet, and Portmeirion where we stayed in the Watchtower (you may have seen it in the weird TV series "The Prisoner") Sal paced the Welshpool and Llanfair train, taking pictures while I rode the train.

In 1983 we took the Venice-Simplon Orient Express train from London to Folkestowe, crossed the channel on a ferry, and picked the train again at Boulogne, rode through Paris to

Switzerland, went under the Alps through the Simplon tunnel, and got off at Domodossola, Italy and took a local train back to Brig, where we went on to Zermatt.

In 1993, we returned to Switzerland for our 40th anniversary celebration, spending a little time in Lucerne, and going on to Zermatt as usual, staying at the Biner's. We did make a special point of riding the Glacier Express riding the Rhaetic bahn to and from St. Moritz (1775 meters), picking up the next road, the Furka-Oberalp in Reichenau near Chur (604 meters), riding that under the Oberalp Pass (2033 meters) through a long tunnel to Brig (671 meters) where we switched to the third road, the Brig-Visp-Zermatt to Zermatt (1604 meters). We rode the same car all the way. This is spectacular electric narrow gauge mountain railroading. Parts of this route we had ridden on earlier trips but this was the first time for the Rhaetic Bahn. The route follows the headwaters of the Rhine, across a divide or rather under it (Oberalp pass) to the Rhone and down the Rhone to Visp and up the Matter valley to the Matterhorn. There as usual we rode the Gornergrat Railroad up to the top of the Gornergrat at 3135 meters (9720 feet). We spent the days walking the many kilometers of trails in Zermatt. Our friends the Biners again gave us a Raklet picnic (toasted cheese, boiled potatoes, and pickles) at a spot Herr Ivo Biner had made into a park near some potholes on the side of the Riffleberg. Locally they are called the Glacier Gardens.

1990 ALASKA TRIP

In 1990 Sal gave Pre-School workshops for secondary mathematics teachers on the application of cognitive science to the teaching of Algebra in the Anchorage School District, Alaska, 1990. I went along since it only added my airfare cost. We took Northwest to Anchorage, I did an extra workshop in which I gave them my hypercard stacks, toured around Anchorage including a boat trip in Prince William Sound, where we saw many eagles and sea otters, viewed glaciers, then flew to Juneau on Alaska Air. There we rented space on a Piper Cherokee 6 commuter plane and flew to Skagway. We stayed at "Sergeant Preston's Motel" clearly named for the old radio program Sal and I had heard as kids, and the next day finally got to ride one of my "long term most desirable" railroads, the narrow gauge Whitepass and Yukon, the 22 miles from the coast up to the continental divide and the boundary with British Columbia, then back down. Skagway is a great tourist town from the Gold Rush days of 1898.

CONVENTIONS & FIELD TRIPS

Between the 1956 GSA convention in Minneapolis and 1980 I attended only the SVP conventions. While I gave talks, there is no record, because Simpson and especiall Romer insisted that SVP conventions be held following their original practice of obligate informality, in an attempt to get away from the stultifying read papers of the Paleo Society. No lists of speakers were kept unless they appear in teh SVP New Letter. There never was any monetary support for trips to conventions, I had to pay for them on my own. At least the were tax-deductable.

In 1980 I was on the board of the Paleontological Society and became the organizer of a major Paleontological Society Symposium on The Late Cenozoic Caribbean Bridge and Barrier, presented at the Annual Convention of the Geological Society of America. I did this because most paleontologists were insular in their outlook, looking only at marine or non-marine fossils and never had all tha varied groups gotten together to talk about their common problems in a holistic way. The collision of Panama with Columbia provided the well known land bridge that Simpson wrote about so well and often, at the same time it cause the final separation of Cribbean and East Pacific mariine faunas. Eventually Dave Webb and Frances E brought out a book with advanced ideas developed out of the symposium.

In 1983, the only convention I attended was the that Society of Vertebrate Paleontology, in Mexico City. The papers presented were as usual interesting, the only trip I went on was to see the pyramids of Tenochitlan. At my hotel, I found the hearty soup that I first met at Sam Arnold's Bent's Fort in Morrison, Colorado, as "the Bowl of the Wife of Kit Carson", except here it was called "Tlalalpan Chicken". I suspect it originated here and migrated north to the Santa Fe trail and the Arkansas River where the original Bent's Fort was located. This is one of my regular camp recipes. I brought home a very special alabaster backgammon board we have used ever since.

In 1984 I attended the Rocky Mountain Section GSA conventions in Durango, Colorado. There I went on two convention field trips. The first was before the convention to the San Juan Basin of New Mexico. It was lead by James R. Fassett of the USGS, who was very interested in the problems of the Cretaceous-Tertiary boundary, which falls somewhere near the Ojo Alamo Sandstone, either at the top or the bottom. There is a major paleontological gap here between the Kirtland-Fruitland Formations of age about 10 million years before the boundary, and below the Ojo Alamo; and the Nacimiento Formation of Early and Middle Paleocene age just above the Ojo Alamo. Several different sandstones have had the name Ojo Alamo applied to them. Thus there had been much confusion.

The results of this field trip were published in my 1987 paper "Paleocene and latest Cretaceous mammal ages, biozones, magnetozones, rates of sedimentation, and evolution." After the convention, on May Day, there was a special run of the Durango and Silverton train chartered for the convention. This was the 3rd time I rode the Silverton, and was the earliest in the year I had ever gone. The track was still covered with an overnight snow slide near Silverton, and we had to wait while a Pettibone machine cleared the track. A good time was had by all.

Later in the fall of 1984, I attended the Geological Society of America convention in Reno, Nevada. It was the biggest GSA convention to that time at 7000 attendees. I stayed in the MGM Grand Hotel, the room was a honeymoon suite sold at the cheap convention rate. It was a room 20' by 60' with a round bed 8 feet in diameter, raised on a dais, with a wrought iron fence and a mirror on the ceiling, the bathroom had mirrors everywhere except right behind the toilet. I never saw so much of myself! A paper was being given by someone else on Bug Creek, I bought a Polaroid 35 mm film processor and some instant slide film from the Polaroid exhibitor, drew a slide on some placemats, photographed it using my wife's Minox 35, and showed it the next day in a rebuttal. Since then that processor has made many convention slides. There were slot machines everywhere. in the washrooms, in the airport and in cafes. I resisted. I don't gamble so I only noted all the one-armed-bandits.

In 1985 I attended the North Central Section GSA Convention in DeKalb, Illinois, where I was elected vice chair of the 1987 meeting. I also attended the Rocky Mountain Section GSA, in Boise, Idaho, the Society of Vertebrate Paleontology, Rapid City, South Dakota and the Geological Society of America, in Orlando, Florida where I presented "Periodic extinctions and radiations of Permian terrestrial faunas and the rapid mammalization of therapsids", an important paper on reasons for the terminal Permian extinction, a paper I must someday return to. The abstract has often been referred to in the literature, and the material is included in my hypercard stack on the Origin of Mammals.

In November, 1986 I attended the North Central Section GSA Convention at Kent, Ohio, and the Society of Vertebrate Paleontology, at the Academy of Natural Sciences in Philadelphia,

where I photographed many dinosaur skeletons for my growing collection of lecture slides. I gave a paper on Paleocene Dinosaurs and mammal zonation of South China.

In 1987, I ran the North Central Section GSA convention in St Paul described elsewhere, and in the fall attended the Society of Vertebrate Paleontology Convention in Tucson, Arizona and the Geological Society of America, shortly thereafter in Phoenix.

In 1988 I attended the North Central Section GSA, Convention in Akron, Ohio. During June I attended the Vth International Symposium on the Ordovician System, St. Johns, Newfoundland, Canada, where I presented my paper on North American trilobite ranges. There was much favorable comment on the Ordovician meetings and field trips n St. Paul and RI 35 the previous year. Later that summer I attended the Second Snowbird conference on Impacts, Volcanism and Mass Mortality at Snowbird Ski Resort, near Salt lake where I gave a paper on "Biostratigraphic Case Studies of Six Major Extinctions. Global Catastrophes in Earth History". The paper was rejected by the editors for the Symposium volume, heavily biased in favor of catastrophy. I also attended the Centennial celebration convention of the Geological Society of American, in Denver, Colorado, where I gave a paper on "A Precise Ordovician Time Scale and the absence of Cyclic Extinction".

In 1989 I attended the North Central Section GSA, Convention in Notre Dame, Indiana. One of the features of this convention was a field trip to the famous Kentland Indiana quarries about 60 miles south of Chicago . This place is where an Early Cretaceous Asteroid hit and blasted a 16-mile diameter crater. There was much caving and deeply buried rocks were brought to the surface. I finally got a chance to see the devastation of an asteroid strike, and collect the shatter cones that resulted from it. I also attended the Society of Vertebrate Paleontology, in Austin, Texas, and the Geological Society of America, in St. Louis, Missouri.

In 1990 I attended the North Central Section GSA, Convention in Macomb, Illinois where I spoke on "A New Genus of Asaphid Trilobite", and the Geological Society of America national convention in Dallas, Texas

In 1991 I attended the North Central Section GSA convention in Toledo Ohio where I presented "Trilobite Biostratigraphy of the Middle and Late Ordovician of the Upper Mississippi Valley region". I also attended the Geological Society of America, National Meeting

In 1992 I attended the North Central Section GSA convention in Iowa City where I presented "The Evolution of *Ectenaspis*", instead of my usual handouts of illustrations I passed out some 90 copies of casts of *Ectenaspis beckeri* and a well preserved *Isotelus iowensis*. They disappeared like hot cakes. At the Geological Society of America national convention in Cincinnati Ohio, I was invited to speak on "The Deicke K-Bentonite and the repopulation of the Trenton Sea".

In 1993 I attended the North Central Section GSA Convention in Rolla, Missouri, where I presented "Trilobite fauna of the Middle Ordovician Lebanon Limestone, central Tennessee basin". Later that year I went to the Boston meeting of the Geological Society of America, where Gary Landis, J. Keith Rigby Jr., Richard Hengst, and I presented the important. "Pele Hypothesis: A Unified Model for Ancient Atmospheres and Biotic Crisis." It created quite a stir as a viable alternative to the ruling asteroid impact theory. No catastrophists were in the audience!

In 1994 the only convention I attended was the North Central Section GSA, at Kalamazoo, Michigan, where I presented "Pele III, Plate Tectonics, Atmospheric and Biotic Evolution", a paper in which I showed that the mammalization of the Mammal-like-Reptiles and much of their

extinctions were the result of a rapid drop in the amount of Oxygen in the atmosphere from 35% in the late Pennsylvanian to 15% At the end of the Permian. The only surviving cynodonts were those with all the mammal adaptations to forced lung ventilation. Again the material is included in my hypercard stack on the Origin of Mammals. I was heavily involved in packing for the move from North Oaks all year and could not plan a paper or attend the national GSA or SVP meetings.

In 1995 I attended the spring North Central Section GSA, Convention in Lincoln, Nebraska, where I went on the special post meeting field trip to Ashfall State Park in northeastern Nebraska, where a heavy Clarendonian Miocene ashfall of about 2 feet killed all the animals in the area. The little animals died immediately, horses and camels died in a week or two and the herd of the rhinoceros *Teleoceras* took about 4 weeks to die of a lung disease. In June I attended the VII International Symposium on the Ordovician System, in Las Vegas, where I was updated on the latest advances in the Ordovician. I attended the Geological Society of America convention in early November in New Orleans, where I saw my daughter Adrian.

THE UNIVERSITY OF MINNESOTA

PRESIDENTS OF THE UNIVERSITY OF MINNESOTA

When I came to the university the president was James Morrill. He was replaced by O. Meredith Wilson, a historian who had written his PhD. thesis on the organization of one of my favorite railroads, the Denver and Rio Grande. Both Morrill and Wilson were exemplary presidents, managing the university well, with no scandals and most academic affairs going well. Wilson was replaced by Malcolm Moos, who was a different type of president. During Moos's administration we began to have serious problems with the legislature. There are apocryphal stories of Moos appearing falling-down drunk in committee hearings on the University budget. C. Peter McGrath (pronounced McGraw), replaced Moos, but was no better. He was generally poorly regarded by both the legislature and the faculty. He left under a cloud, going from here to the University of Missouri where he continued his poor administration, according to some colleagues of mine from Columbia, Missouri. Kenneth Keller succeeded McGrath. He was a brilliant scholar with few people skills. He was brought low by a scandal over the cost of renovating Heathcliff, the president's mansion, given to the University but not kept in good repair. Nils Hasselmo, whom I first knew as a member of the Scandinavian department on some CLA committees and later as a Vice President, went away to Arizona, but was brought back to replace Keller after a nationwide search. The faculty heaved a collective sigh of relief when he was appointed, except for some rhubarbs with individual members of the Board of Regents, he has run a good ship. Most of his problems have been brought about by the Medical School. We have not done better than Nils in the past 42 years.

THE DEPARTMENT OF GEOLOGY

Departments have a cyclic history. Under Thiel the department stagnated, in large part due to the poor idea of needs of the sciences by the then Dean of the College of Science, Literature and the Arts, [**disk error occurred; some material missing or deleted**] Math department would not have anything to do with the IT Math department, on the grounds they were not really mathematicians but engineers and of a practical bent. It ultimately took a decision by the University President to force the merger of the two departments and physical removal of both departments to the same building to get them to merge. Feelings ran high for many years later.

During the reign of Pres Cloud as Chair and Hal James as head of the M G Survey and Economic geology Professor, the department started its growth from 10 faculty to 20 or so. Again under Cloud, retired USN Captain William Dickey hired as Administrative aide, threw away all the old department records, including our alumni files. This later made it very difficult to tap our alumns for money. Donald Wallace was hired as the Curator of the fossil collection in about 1963. He taught me to make latex rubber molds and cast plaster replicas of fossils, which were very useful teaching aids.

As part of a national trend, under Cloud there was increased emphasis on Grantsmanship, promotion and tenure was increasingly being determined by success in getting grants. Previously only J. W. Gruner had large grants, from the US Army Signal Corps for synthetic quartz crystals in the WWII and from the Atomic Energy Commission for Uranium mineralogy post war.

This growth was continued when Pres was replaced by Thane McCullogh, who took the job, but did not appear in the Fall, instead resigning. Tibor Zoltai then took over on very short notice. Tibor was the consummate politician and rapidly expanded the department by first funding positions on soft (Grant) money, then firming them up with tenure contracts later. Under his headship, the department shifted from a balanced one to one very strong on Mineralogy and Igneous-metamorphic Petrology. Tibor was a firm follower of Descartes, and often expressed the philosophy that if you knew all the first causes all else could be deciphered, so there really was no need for such soft sciences as Paleo and Biology. This was strange since as a crystallographer, he was firmly aware of the Heisenberg principle of indeterminism. His views suffered a change when there was an attempted coup by Walter Parham and William Phinney, who were if anything were worse. Departmental meetings had to be run with each of us carrying our own personal copies of Robert's Rules of Order! Fred was upset with the trend of the department under Tibor, and semi-retired to Delaware where he worked with his former student John C. Chris Kraft.

John Hall of the Botany Department was a paleobotanist, he had originally worked on Pennsylvanian paleobotany but switched to Cretaceous paleobotany when I moved to work in Montana. Our students all took all the courses the other professor taught, and in effect were joint advisees. Paleobotany students that worked in a major way with me were Richard (Rick) L. Pierce, 1957, Norman Norton, 1963, Donald Oltz, 1965, Robert. Melchior, 1966, Robert Shoemaker,1969, and Eddie B. Robinson, 1976. My undergraduate students who went on to become professional paleontologists are David Lazaruz (ETH Zurich), James Ohman (Kent State), Cathy Forster (Stony Brook) Brent Slettengren, Gerald Schultz, (West Texas at Canyon).

With the shift of Hal Mooney from Physics to Geology, the name of the department shifted from Geology and Mineralogy to Geology and Geophysics. The sedimentology position was held respectively by Thiel, William Normark (who after 6 years of glowing appraisals, did not get tenure) Tom Johnson, who ultimately left us for Duluth and Duke in North Carolina, only to come back to Duluth later, Anita Crews, and finally by Karen Kleinspehn, and Chris Paola.

Tibor became ill with a very debilitating neck stiffness, and was replaced by V. Rama Murthy, who smoothed everyone's ruffled feathers and got us working together again. Ultimately Peter Hudleston succeeded Rama, continuing the fine job Rama had begun, for a ten year term. Bill Seyfried succeeded Peter in 1994.

As of fall 1995, I had been in Pillsbury Hall for 39% of its history, in the department for 34 % of its history, and 31% of the history of the University.

As the department grew, the secretarial staff was augmented with student help. Some were very good, and then there were others. I gave up using the secretarial staff about 1975 and taught myself to type using all ten fingers because I needed to have one paper retyped three times. Each time the student corrected the previous errors but introduced an equal number of new errors. At first, I used an inexpensive Brother's electric typewriter, but by about 1977 or so we bought a used Hewlett Packard 2647A smart graphic terminal and a dot matrix printer, which served as a personal computer. Sal as Computer Coordinator in the Minneapolis Public Schools brought home several early models of personal computers, but the best was the first Macintosh of 1984. In planning for my China trip of January to May of 1986, I purchased a Hewlett-Packard Portable Plus (early laptop computer), with battery powered disk drive and printer, weighing about 20 pounds. This worked well in China, I did not lose any data to the frequent brownouts or blackouts. But by the fall of 1986 the Plus version of the Mac came out and we bought one at the University discount. Sal used that, I continued to use the portable and produced all the copy for the 1987 North Central Convention in St Paul on that. It got less and less used, and was finally sold off for a tenth its original cost, long after it was obsolete.

THE REMODELING OF PILLSBURY

With the coming of Preston Cloud in 1961, it was very apparent that Pillsbury Hall needed great remodeling to make it suitable for a modern science department. Pillsbury was originally built in 1887 at the cost of $250,000 by a grant from John S. Pillsbury, founder of the milling firm and former governor. It was the 3rd building on campus, and still is the second oldest building. Only Eddy Hall is older. Originally it housed Journalism, Botany , Zoology and Geology, part of the time it also had Public Health. All left but Geology. When Pres came we filled the building but very loosely. There was no structural steel anywhere in the building, there were cast iron pillars supporting the long spans, beams were large pine timbers, the ceilings were all the classic galvanized stamped metal panels nailed to the underside of the joists. there was one wrought iron I-beam holding up the tower. Collections were in a terrible mix of wooden cabinets falling apart, and the basement floors were full of strange anticlines and synclines. Floors were not suitable for the heavy research equipment we were bringing in, let alone firm.

We had to strip the basement level totally away and install new reinforced concrete floors, this took 2 or 3 years since it could not all be done at once. It meant that all the smaller rooms in the basement not separated by load bearing walls were redone. Old Room 2 which had been a 250 seat auditorium disappeared to become 8 different labs with concrete floors. There had been a faculty john in Room 8, that disappeared. We found a sealed in but still in service gas meter under the floor of the women's rest room, that had not been read since before WWII! John Gruner had a small shop in Room 5 near the steam pipes with a drill press and a few hand tools. I planned and supervised the construction of the departmental machine shop in Room 10, with the solid Birch tops and a 6" metal turning lathe, a new drill press, and table saw, grinders etc. We installed new thin section machinery, Rotaps and rock crushing equipment in Room 8. Floor hatches were put in the concrete floor to get at the subbasement. We gathered all the fossils into room 30 at the east end of the basement, the fossils had been in 7 rooms in many different styles of decrepit wood cabinets. We standardized on one type of rock cabinet for everything.

The Museum on the first floor, occupying the entire east end of the floor, became broken up unto 8 rooms, including 121, the new seminar room [**disk error occurred here; some material deleted or missing**.] of those Ward's casts still survive on the walls of Pillsbury, they include an *Ichthyosaurus*, a *Plesiosaurus*, a *Nothosaurus*, and a marine crocodile.

After the Arabian Oil Embargo in 1972, the University finally decided to redo the windows of Pillsbury to reduce the heat loss. When they replaced the windows in my office, I knew they were original because of the rippley glass. Knowing that glass is a liquid, I wanted to measure the flow. I had them save a 42" tall pane from the windows. I went down to the shop to borrow a micrometer to see how much it had flowed over 86 years. I didn't need a micrometer, I only needed a ruler, it was 5 mm thick at the bottom of the pane and 2.5 mm thick at the top of the same pane!

TEST SCAMS

Over the years I have found many different ways that students have used to try to get a better grade without studying. To paraphrase an old saying of unknown origin (It must go back to the Middle Ages at least): Teaching is a race between teachers, who strive to produce idiot (or cheat) proof tests, and the Universe which strives to produce bigger idiots (cheaters). (So far the Universe is winning). Once when I was giving a final to 500 students in Owre hall, I had passed out the finals, and there were TA's several places in the room as roving monitors. When no one was close, a student on the back row leaped up, and ran out of class with an examination. We tried to catch him but he had planned well and got away. Another time a student went into my office 15 minutes before the final, opened the package of freshly printed tests, and took one. I was very upset, and made all the students in Pillsbury 110 for the final place their books , purses, bags and whatnot in room 105 till after the exam. They were a cowed bunch!

DEPARTMENT HISTORY

When I first came to the department, it was recognized as one of the top ten in the US. All of us taught our specialty coursdes and most of us taught an introductory course as well. Only John Gruner had a research empire based on Atomic Energy grant to study Uranium minerals. He had as research assistants Abe Rosensweig and Deane Smith. The rest of us did our research on Minnesota Geology using the Survey as funding, that got a lot of Minnesota Geology done on little money. When Cloud appeared, Minnesota Geology was passe, provincial and Hick! The department moved into a high research role and mode, and the problems to be solved were supposed to be at the cutting edge of research. This still left us with the undergraduate teaching role, but it was definitely looked down on as second rate science. Several instructors were hired to fill that role so that the researchers could do research without the pain of meeting large classes of freshmen and sophomores. This trend was exacerbated by University policies that favored large grants as a way of paying for graduate student support. By those standards the current department is very succcessful, placing at the highest per faculty research grants of the entire CIC, big 10 plus Chicago and Penn State.

This was part of a national trend instituted by NSF which had grown out of the Navy's discovery of just how little they really knew about the oceans during WWII. They had been forced to fight Pacific campaigns on the basis of 17th Century hand drawn maps of Pacific Islands. After the war, the Navy founded the Office of Naval Research to get Ocenanography in the broadest sense developed and organized, offering ships, surplus electronics and money for anyone willing to do any research concerning the oceans. This turned out to be such a great idea that the National Science Foundation was formed to do the same thing for the rest of the Physical Sciences. This resulted in the present grant system of funding science and a great expansion of science departments in American Universities. In many respects it has been a good thing for science, faculty and universities, forcing a rapid expansion and growth, but it also changed the whole milieu of science,

and turned it into a money game. Promotions and merit pay increases were determined by the value of grants brought in to the University and the departments, quality of undergraduate teaching was given lip service in determining worth and merit pay increases. The sole benefit of my being named an IT Distinguished Teacher was a cash award of $500 and a diploma. No note of it was made at that or later merit pay raises.

When I first came to the department in 1953, there was a long term tradition of the graduate students givng a skit at the annual departmental banquet, and presenting a spoof journal, "The Geology Club Journal" to all there. This was usually in good fun. In about 1957 or so we had the banquet in some restaurant on Hennepin Avenue. Some students asked me if I would appear in the skit, not saying anything about what the skit was. I agreed, with a little bit of nervousness. I was told I was to represent myself as an ordinary faculty member. So I sat at the front to the room, and one by one graduate student wives came up to me and asked "What could I do to improve my Grade?" I answered with many variations on the theme of "Go back and study your notes." Finally one lady that I didn't recognize showed up, and asked the usual question. When I gave the usual answer, she asked "will this help me improve my grade?" and started to strip. Cy Gallick, one of the graduate students was supposed to rush up and lead her off, saying "I'll help you with your grade!" While he was running up he tripped on a chair, fell and cut his head open. When she wasn't stopped, she continued, and got down to very silly bra and panties before someone else pulled her off the stage. She was a stripper from Augie's Bar, one of the more seedy Hennepin Avenue joints. Thiel was absolutely livid. The journal was always full of comments on the year's happenings and should be examined by anyone interested in departmental history. During the Cloud and early Zoltai years it got particularly vicious, a sign of great discontent among the students, and it stopped totally about two or three years before Peter Hudleston took over.

Earlier there had been a cartoon of me in the Journal wearing a stylized bone in place of my usual bow tie. The next day I went to class wearing a cleaned chicken bone from a drumstick mounted with Scotch tape to a old clip-on bow tie frame. It took the students the entire class hour before they noticed it.

For many years there was a 4 foot globe in room 110 Pillsbury. These globes had been made during WWII by Alex Oja, an artist at the Science Museum of the St Paul Institute under a defense Department contract. Alex had been hired for the Museum during the depression under the WPA, and continued clear into the mid 1960's. When I first went over to the Museum in the late '50's I saw the molds for these globes, the special templates for smoothing the plaster, and the templates for painting the coastlines of the continents in place. Each globe was hand made and had a surface of chalkboard paint. The base for the globe had a lever that permitted two different modes of rotation of the globe so any part of it would be visible. For many years I used them in class to show how seismologists could locate an earthquake.

Don Wallace and I made several hall exhibits that have been useful. We were told by central administration that our department would be responsible for the university exhibit at the State Fair that year. Don and I borrowed a series of plaster horse skulls from Morris Skinner of the American Museum of Natural History in New York, and from my old friend Bill Turnbull at the Field Museum in Chicago. We made a series of molds and half casts of those skulls, painted a time scale background, and assembled a very nice looking exhibit on "The Evolution of Horses". This has been a very useful teaching device. To provide some action, Stan Duff, the departmental machinist and I cooked up a working model of a geyser, that ran on a 5 minute cycle. Both exhibits were highly successful at the fair.

On review of the department history I found to my great surprise that I had personally known all but 11 of the 82 faculty that have been in the departmant during its 123 year history. So I decided to write a paragraph or two of my personal recollections of these professors. I will not write anything on those faculty that have not retired, but I will write my comments on those retired, but still living.

In terms of years of service to the department the list is as follows:

Sloan, 42 years and counting.

Schwartz 42 years.

Grout, Thiel and Wright, 41 years.

Mooney, 40 years (not all in this department).

Winchell and Gruner, 39 years.

Hall 36 years.

Emmons, 33 years.

Hooke, Murthy, Morey, and Weiblen, 32 years and counting, Zoltai, 32 years.

Stauffer 30 years.

George Alfred Thiel was the head of the department when I was hired. He was one of the three new hires after World War I, his career lasted from 1920 to 1961, 41 years, covering all ranks from Instructor to Full Professor. When Emmons retired, Thiel was made chair, over George Schwartz who had a year more seniority, being hired in 1919. Schwartz was also Theil's graduate advisor, this always grated a little on Schwartz, but they remained good friends. Schwartz instead became the head of the Minnesota Geological Survey. Thiel was a gentleman, and his wife was the lady of the manor. She always tried to indoctrinate the wives of faculty in lady-like behavior, with formal teas. Thiel had great difficulty convincing the Dean of the college of Science, Literature and the Arts of the greater financial needs of the sciences over the humanities. His major publication after I came was Minnesota's Rocks and Waters with Schwartz, he stopped real research shortly after I came. He was a gifted teacher and taught large sections of Physical Geology up until his retiremant. He was a pioneer in heavy mineral analysis and other traditional forms of analysis of sedimentary rocks. After the retirement of Emmons in 1944, Thiel took over the revisions of the classic Minnesota *Physical Geology* text by Emmons, Thiel, Stauffer and Allison, which was regularly used at Minnesota, until the new Minnesota text by Chase, Sawkins, Rapp and Darby appeared.

In Thiel's term as chair, the departmental social affairs were teetotal, probably as a reaction to Emmons having been a lush, even drinking in his office. We had monthly faculty lunches at the Campus Club on the fourth floor of the Coffman Union at which the departmental affairs were discussed. These lunches went by the boards when Thiel retired. Cloud had no interest in business lunches. The poor old Campus Club is now moribund and not expected to last many more years.

In 1935, for the 9th annual Kansas Geological Society guidebook, a monumental tome of midwestern geology fully 2 inches thick, Professor A.C. Trowbridge of the University of Iowa and state geologist of Iowa prepared a structural contour map of the Upper Mississippi Valley area. By picking wells for the map that were poorly spaced he managed to miss the Twin Cities Basin, the most important structural feature in southeastern Minnesota. In 1936 at the GSA meeting Schwartz presented an abstract on the "Structure of the Minneapolis-St. Paul metropolitan area". Again in the

fall of 1939, Thiel and Schwartz presented a paper at the national GSA convention in Minneapolis in which they pointedly corrected the errors of Trowbridge, with a new structural contour map, based on the old Winchell survey as well as Schwartz's new data published in 1936 as "*Geology of the Minneapolis-St. Paul metropolitan area*", Minnesota Geological Survey Bulletin 27. The paper was published in 1941. Ever after until all participants had retired, there was a cool relationship between Minnesota and Iowa, at the time it was jokingly referred to as "an agreement to disagree".

George Melvin Schwartz, was the first of the three post WWI new hires. He served all ranks from 1919 to 1961, 42 years. He had a masters degree in geology from Wisconsin when he came, and completed his PhD thesis under Grout in 1923, the same year he was Thiel's advisor for his PhD. I liked Thiel, I loved Schwartz. We had both served in the Artillery, he gave me his 45 from WWI, and a WWII shotgun. He supported my summers for many years, and always had kind words and advice for me. When he retired in 1961 he had to be replaced by two professors, Hal James and Paul Sims!

John W. Gruner was the third of the post WWI new hires, rising from Instructor to Professor from 1920 to 1959, for 39 years. He received his PhD degree from Emmons in 1922

Frank Fitch Grout had retired in 1948, but still spent much time in the department until his death in 1958.

Samuel S. Goldich was hired as a Professor in 1948 and remained in the department until 1959. He had gotten his PhD from Grout in 1936 for a very spectacular thesis on rock weathering that has always been the classic study. When he was hired he took over the management of the Rock Analysis Laboratory, which was begun by Ruben B. Elestad and continued by Grout until his retirement. This was a wet chemistry lab, [**disk error occurred here; some material missing or deleted.]** in demanding quality performance from faculty or students. He moved every year while he was here, and got a new car every year as well. He never married. He was responsible for modernizing the study of the Precambrian rocks of Minnesota. With Alfred O.C. Nier of Physics, he developed Potassium-Argon dating techniques> Nier measured the Argon in a mass spectrometer, while Sam analysed the Potassium by wet chemistry. The result was the dating of most critical igneous and metamorphic rocks in the Precambrian of Minnesota. In addition to the techniques papers, he was the prime author of aBulletin of the MGS on the Precambrian of Minnesota. He was a great petrologist and trained many students.

Harold M. Mooney was originally a Geophysics professor in the Physics departmentstarting in 1950. In1963 or so he was transferred to the to newly renamed Depatment of Geology and Geophysics. Hal was a gentle quiet man with a fine sense of humor, he was often chosen to be the Acting head of the department when the head was away. He was the first faculty member to type his own letters and papers, many of the rest of us learned as the secretarial staff increasingly became composed of part-time students, of widely varying quality. Hal died in harness of a cancer in1986, officially retiring a couple of months before his death.

Robert L. Heller was an Ordovician paleontologist from Missouri who was hired by the Duluth department a little earlier than when I was hired. He was single handedly responsible for raising the quality and reputation of the Geology Department at Duluth, and ultimately rose to be the Provost of the campus. He turned Duluth from a small teacher's college into a jewel of a school. We were always close, he was the single person who convinced me to write my abortive paleontology text book.

Clarence A. Allen was hired in 1954 as a new PhD from Cal Tech, to teach Physical and Structural Geology. Previously Herb had taught structure. He did very well, but was hired back by Cal Tech and left in the spring of 1956.

John Campbell Craddock was hired as a replacement for Clarence Allen in 1956. He also taught field geology. In 1959 he received an NSF grant for work in Antarctica and spent winter quarter most years thereafter doing research there in the Austral summer. It was a very successful research program and trained many graduate students. Tibor was very unhappy with Cam, and wrote the Dean that Cam was not a very good scientist, and spent too much time away from the University. Jerry Webers' wife Kaye was the dean's secretary and read the letter, Jerry told Cam and Cam immediately went to Wisconsin where he was hired as a full Professor in 1967.

Paul W. Gast was a theoretical geochemist and served here from 1958 to 1965.

William C. Phinney was hired to replace Sam Goldich as the Petrologist in 1959. He and his wife Colleen were assets to the department. About 1970 he lead an attempted coup against Tibor Zoltai and his management of the department. The department was completely devastated by the conflict and were carrying personal copies of Robert's Rules of Order to all faculty meetings, it was not a happy place to be in those times. He resigned to go to NASA to work on the moon rocks program in 1971.

Tibor Zoltai was a Hungarian crystallographer, a student of Martin Buerger at MIT when he was hired to replace Gruner as the mineralogist in1959. Tibor was a unique person. He had been a prisoner of war on both sides of WWII. He and Olga came to the US as displaced persons. Outwardly friendly, he was capable of duplicitous behavior in private. He was made Chair when Cloud resigned as chair in 1963. Thane McCullogh had been hired as chair on Cloud's resignation, but McCullogh never showed up , resigning before Fall quarter began. Tibor was then appointed Chair, serving in that capacity until 1971. He retired early in 1991 after 32 years of service, mostly as a result of his increasing neck problems.

Preston E. Cloud was hired as a distinguished US Geological Survey paleontologist and administrator to head and rebuild the department on Thiel's retirement in 1961 A short, bald, self-made man, he had a driving personality. As a new broom, he swept clean. The remodeling of Pillsbury began, and he brought with him two other USGS stars, Hal James to replace Schwartz as the Economic Geologist and Paul Sims to replace Schwartz as the head of the Minnesota Geological Survey. Pres went on to the U of California Santa Barbara in 1965

Harold L. James replaced Schwartz as the Economic Geologist in 1961 and served until 1965 when he had to retire for family reasons.

Paul K. Sims was hired as a full professor in 1961 as head of the MGS and did yeoman work in bringing it up to a high level of activity. He retired in 1973. He instituted a major geologic mapping program, and greatly increased the size of the survey staff.

John E. Stone was hired as an assistant Professor in 1962 to work on Pleistocene Geology, doing some work for the MGS. He did not receive tenure and left in 1967

Kenneth S. Deffeyes was hired as a sedimentary geologist in 1963 but chose to resign in 1965 despite all assurances that he would receive tenure.

Walter Parham was hired as an Associate Professor from the Illinois Geological Survey as a clay mineralogist in 1963 and served until 1976.

James A. Grant was hired as an Assistant Professor Petrologist in 1964 and served until 1968. He did not receive tenure despite great teaching and advising reviews, he then went to Duluth wher ehe was a great success.

Charles Matsch was hired as an Assistant Professor in 1964 to oversee and teach in the Introductory Geology Program. He served until 1970, when he left to go to Wisconsin to finish his dissertation. He then went to the Duluth department. For those years Charley was my closest friend and confidant in the department, when both the department and I were going through harrowing times.

James C. Savage was an assistant professor from 1964 to 1965. I don't remember much about him.

William Walton was a hydrogeologist in the department from1964 to 1972. He was not around much and did a lot of consulting. No one missed him when he retired.

Joseph Shapiro was hired as a limnologist in 1965 and served until he retired in 1995. He had a small car called an Amphicar, that he could drive into the water and then navigate across the lake in the fashion of the amphibious DUKW's of WWII, many of which survive at the Wisconsin Dells. Joe taught an introductory class in Oceanography and some graduate courses.

Eugene Perry was an assistant Professor petrologist from1965 to 1971. He did not get tenure and moved to Northern Illinois University at Dekalb.

George R. Rapp, Jr. was hired by Tibor in 1965 to take over much of the teaching of mineralogy during Tibor's chairmanship. Rip developed a close relationship with William McDonald of Classics and formed a new field of Geoarcheology, serving as Bill's number 2 on the 7 year long dig at Nichoria in the Peloponnese in Greece. Rip resigned in 1975 to go to Duluth where he started formal course work in Geoarcheology, and eventually became the Dean of Arts and Sciences. In 1996 he became the first Regents Professor at Duluth.

Istavros "Steve" Papadopulos was hired to replace Ken Deffeyes as the sedimentary geologist in 1966 but left of his own volition owing to the department troubles in 1967.

Henry T. Hall was hired as an Associate Professor in1966 as part of Tibor's program to make the department grow. A theoretical petrologist, he was part of the vast growth of that field in our department. He resigned in 1976, leaving geology.

David Braslau was an Assistant Professor of Geophysics from 1967 to 1971, he did not receive tenure, and went into consulting in the Twin Cities.

Robert C. Bright came to the University as a graduate student in Paleontology from Brigham Young University. He did not work with me, instead taking a degree in Pleistocene Geology from Herb in 1963. He became an Associate Professor in1967 and served to 1971, after which he was an adjunct professor with us and hired in the Ecology and Evolutionary biology department. He started the Park City Field Camp, and served as the Paleontologist at the Bell Museum. He died of cancer in 1995.

Robert F. Roy was a premier theoretical petrologist who served as a Associate Professor from 1968 to 1971

Frederick J. "Sam" Sawkins was the Economic Geologist from 1968 to 1992, replacing Hal James. Sam trained a whole school of isotope geologists of note, as well as hard rock economic

geologists. He was forever railing against Tibor's teaching of mineralogy which stressed Crystallography over mineral identification. He was one of the pioneers in using plate tectonics to predict ore deposits, and wrote an important text on the subject. He was one of the authors of the new Minnesota introductory geology text, one of the first to stress Plate Tectonics.

John P. Bradbury was a Pleistocene paleontologist who served in the department and the Limnological Research Center from 1970 to 1975. He did not get tenure and went to the USGS, where as J. Platt Bradbury he has done great work.

Strathmore R. B. Cooke had been a member of the School of Mines and Metallury for many years. When that school was abolished, he found a home with us for his last four years from 1970 to 1974. He taught Introductory Geology very well and was a good friend to me. His father had worked on the New Zealand railways. Strath gave me prints of his fathers photographs which I used in a magazine article .

William R. Normark was an oceanographer who was hired as the sedimentary geologist to replace Steve Pappadopolous in 1970. He developed an interest in Lake Superior and other Minnesota lakes doing oceanographic work from an easily transportable surfboard with fancy electronic gear. He had glowing reviews in each of his tenure evaluations but was refused tenure in his final year, going to the USGS in 1974, where his career has been examplary. I like Bill and DeeJay very much and have always been disturbed by the political situation in the department that threw him away.

Clement Chase was a geophysicist who worked on Plate Tectonics from 1971 to 1983. He was very good, had an international reputation, and was the senior author of the very good new Minnesota introductory text (Chase, Sawkins, Rapp and Darby) that had only a single edition. He was hired away and promoted to Full Professor by Arizona.

George Shaw was another of the petrology school who rose from Assistant Professor in 1974 to Full Professor in 1988, when he resigned to become the head of the department [**disk error occurred here; some material missing or deleted**.] 1985 to 1988, leaving when he did not get tenure because he could not bring any of his research to publication.

Matt Walton took over the MGS from Paul Sims in1974 and served to 1985.

Priscilla Grew took over the MGS from Matt in1986 and served to 1994, when she received a position of Vice President at another University. She let me bring out my major Ordovician publication in 1987.

The Instructors that I have known are as follows:

Clemens Nelson was a student of Charley Bell and was an instructor from 1946 to 1948. I did not know him as a student, but I met him when we ran the 1956 GSA Convention and I had to run the Paleozoic Field Trip. He had a distinguished career as a paleontologist at UCLA.

James Zumberge was a student of Herb Wright, and did his PhD thesis on the Lakes of Minnesota. This was published and went out of print rapidly. I could not get a copy when I came in 1953. He was an instructor from 1947 to 1949. He went on to be a dean and served as president of Grand Valley State College in Michigan, Chancellor of the Lincoln Campus of the University of Nebraska, ending his career as President of the University of Southern California. I provided some critical photographs for his introductory text.

Robert Berg was another major student of Charley Bell, and was an instructor from 1949 to 1951. He had a major career in the oil industry and finished his career as a Vice President of Texas Agricultural and Mechanical University.

Allan Schneider was a Pleistocene Geologist who took his PhD from Herb Wright. He served as an instructor from 1951 to1954, (so I worked with him) after which he spent several years at the Indiana Geological Survey, then went to the University of Wisconsin Parkside, where he recently retired. He is a perennial member of the board of the North Central GSA, where I see him several times a year.

James Zimmer was a master's student of Tibor's who never got his degree here. He served as Instructor in 1963-64. He had the worst case of examination jitters I have ever seen. He failed his final orals twice because of his worries, both times he drank himself into a stupor. Ultimately he did get his degree elsewhere, and is on the faculty of Mankato State University.

Rodney Bleifuss was an instructor from 1965-66, his thesis was on the Iron Ores of Southeastern Minnesota, he persisted in calling them Tertiary, ignoring the fossil evidence they were Cretaceous.

Richard Bartels was an instruvctor from 1965 to 1972, and taught Physical and Mineralogy.

Bill Bonnichsen was an economic geologist who served as an instructor from 1966 to 1967.

Noel Potter was a senior graduate student during the troubles in the department and served as an instructor in 1968 and 1969. He, like Charley Matsch was a good friend, and was the person I gave all my pipes and tobacco to when I quit smoking. He got his degree on Rock Glaciers from Herb and is now a faculty member at Lancaster College in Pennsylvania, I see him regularly at the annual meetings of GSA.

The curators of the paleontology collection have been me, at first, then by about 1962 or so, Don Wallace, who introduced me to making molds with liquid latex and casts in plaster as a teaching tool. When Don retired he was replaced by Ron Mjos, William Forrester "Bill" Rice replaced Ron spectacularly and proceeded to catalog the collection using the Macintosh and Filemaker Plus, When Bill retired in about 1990, Mary Beck replaced him.

From 1990 until he left town to work on his thesis in 1993, I spent many hours with Joseph A. Cain discussing the development of the New Synthesis of Evolution, which started in about 1937, and continued until about 1950. I was familiar with the end of this period, when I was a student. I was thinning out my journals, Joe received many of them and a large part of my files on the subject. Joe's thesis is on this period. He received his PhD in September 1995. Another graduate student I am close to is Richard Benson, who will complete his PhD in Ornithology soon, but is a paleoornithologist. Neither will officially be listed as my advisees.

In 1993 we attended a St. Paul Saints Baseball games on my birthday, in 1994 and 1995 we attended a Twins game. Each time I took along Betsy and Gerald, Sal, Arnie Kwong and his wife Lyn Lewis and their two kids Thomas and Katherine.

Over the years I have made an good impression on many students. I am continually meeting old students at the state fair, or other odd places and having them introduce themselves as having taken my introductory call and remembering me fondly. I have had several students who took the course on the advice of a parent, and one or two who took it because a grandparent recommended it! I was in a photocopy shop in Cedar Rapids Iowa, when a person recognized me, she had taken

my course some 15 years earlier. In November 1995 I attended a PhD preliminary oral exam only to find that two of the five committee members were former students!

My normal teaching schedule was 5151, Introduction to Paleontology in the Fall quarter, 5154, Vertebrate Paleontology I, Fish, Amphibians, Reptiles and Birds, in the Winter, and 5155 Vertebrate Paleontology II, Mammal-like-Reptiles and mammals in the Spring. These courses were always given from 2:30 to 3:30 in the afternoon. Intro was also the introduction to Invertebrate Paleontology, laboratory work was morphological and also served to introduce evolutionary studies, biostratigraphy and paleoecology. The final involved a student selecting 10 out of 18 questions on theoretical aspect of Paleo, another question in which they reported what they had learned on some small order of inverts, and a practical exam, to see what had stuck of the lab work.

The invertebrate course had a field trip with it, designed to instill the methods of Paleo in collecting fossils in a wide variety of rock types. The first stops were at Taylor's Falls where we looked at the Keweenawan basalts, the basal sea cliff deposits of the Mill Street Conglomerate, and split sandstone slabs for trilobites and occasional brachiopods in an outcrop 1/4 mile out to see from the conglomerate. We then went south to Stillwater, where we looked at the trace fossils in the Franconia formation 60 miles further out to sea. From there we went to Redwing where we examined the more offshore Franconia, as well as the Red Wing Fault. Some years we stopped at Afton where we examined the classic but now destroyed graptolite locality in the basal St. Lawrence Formation. From there we drove to Cannon Falls, stopping to examine the Shakopee at Vasa, to show the community of the Early Ordovician immediately after the terminal Cambrian extinction. At Cannon Falls we examined the rich Platteville faunas, both above and below the Deicke K-bentonite extinction. We would finish the trip at a high Decorah locality about 1 half mile down the road, where the collecting was extremely rich and easy. In later years I abandoned the St. Croix localities, and added a Prosser locality near Cannon Falls. These trips had collecting in sandstone, shale and limestone and emphasized the great difference in faunas between the Cambrian and the Ordovician.

The Vertebrate Paleontology courses had no written final, but instead followed Ole's lead of requiring an oral report on some problem or group of vertebrates, and a written report, both based on library research. Unfortunately about 25% of the students never finished the reports and took incompletes. None-the-less it was extremely useful for those who did.

Each quarter I also taught an introductory course, usually "Historical Geology", but also including "Origin and Evolution of Life", or "Earth History", the major's version of Historical. In about 1962 to 1968, I was forced to give Historical on closed circuit TV to as many as 700 students per quarter. Enrollment was up, I could not meet the demand even offering two sections of Historical per quarter. Lacking the all important feedback from interested students, I had to depend on props and trying to break up the cameramen. It was a solution to a problem, but not a good one. I had multiple laboratory sections, with a fleet of teaching assistants, Bob Bell was my chief TA for most of these years, and oversaw the others.

I used to give a pop quiz on the Geologic Time Scale in Historical, but gave it up one quarter when a student answered as follows: Precrambrain, Crambrain, Ordovicious, Slurrian, Devonion, Messippian, Pennslayanian, Premium, Terassic, Jerassic, Crustaceous, Territory and finished in the Quandary. That about described his behavior in the course.

THE 1972 POLICE RIOT

In early May of 1972 the University of Minnesota had a spontaneous demonstration by students against the Vietnam War. Some students built a barricade across Washington Avenue. During the afternoon, the Minneapolis police assembled a large strike force and then raided the campus, chasing students into buildings, with tear gas and arresting people indiscriminately. Those of us in Pillsbury stayed inside and for the only time in over 32 years we used the eyeball washing fountain in room 2H, the acid preparation room. We used it to wash tear gas out of the eyes of innocent students. It was truly a police riot.

HISTORY OF PALEONTOLOGY AT THE UNIVERSITY OF MINNESOTA

Middle and Late Ordovician rocks of the Upper Mississippi Valley have been studied since the 1850's. The history of development of the nomenclature of the Ordovician of the Upper Mississippi valley is summarized in Winchell and Ulrich 1897, Weiss 1957, Templeton and Willman 1963, Willman and Kolata 1978 and Sloan 1987.

Newton Horace Winchell was the first competent state geologist of Minnesota (two had been appointed earlier with unfortunate consequences), and the first to study all the Ordovician of Minnesota. Hired in 1872 for the Minnesota Geological and Natural History Survey, he began teaching at the University in 1873 and founded the Department of Geology in 1874. Ordovician rocks were described as part of a program of county reports with maps at a scale of 1/4-inch to the mile. I have found these maps commonly better in Ordovician geology than those published in the 1930's. Winchell was responsible for assembling the team of the amateur Wilbur H. Scofield and professionals Edward O. Ulrich, John M. Clarke, and Charles Schuchert, who wrote the magnificent monographs that appeared as Volume III part I (1895) and part II (1897) of the *Geology of Minnesota*. This major publication is the basis for much of our current paleontology on Ordovician snails, clams, brachiopods, bryozoans, trilobites, sponges, cephalopods and ostracods. Winchell, with Schuchert, described many of the Ordovician brachiopods. In addition to being the State Geologist, and a Professor at the University of Minnesota, Winchell founded the *American Geologist*, in which a number of critical papers on Minnesota geology and paleontology were published. On his death, it was sold to Charles Rollin Keyes of Des Moines, Iowa, and the name was changed to *Pan-American Geologist*. It was where Sardeson published most of his papers after 1914.

Edward Oscar Ulrich (1857-1944) was employed by Winchell from 1886 to 1897 as a paleontologist and wrote the monographs on sponges and corals, ostracods, bryozoa, and with Scofield, the snails, that appeared in Volume III, parts 1 (1895) and 2 (1897). Most of the writing was complete by 1891. Many of the type and figured specimens went to Washington with Ulrich, where he sold them to the U.S. National Museum. Charles Schuchert (1858-1942) was originally Ulrich's assistant, then was Winchell's aide and with Winchell was responsible for the brachiopod section of the Minnesota monographs. Many of the specimens went to the USGS or Yale collections when Schuchert left.

John M. Clarke (1857-1925) of the New York Survey and New York State Museum was hired by Winchell to write the monographs on trilobites and cephalopods.

Frederick W. Sardeson was a student at the University of Minnesota under C. W. Hall. He was hired by Winchell in 1889 to collect fossils for C.D. Walcott for the Minnesota Geological and Natural History Survey. He received his bachelors degree in 1891, Phi Beta Kappa, and a masters

degree in 1892. While an undergraduate he was prodded into looking for fossils in the St. Peter and found them. His masters degree was based on three published papers on the St. Peter fossils, the comparison of the Ordovician rocks of Wisconsin and Minnesota, and the zonation of the Minnesota Ordovician, including the description of 37 new species. These papers were issued on April 6, 1892. On April 1, 1892, Ulrich, Winchell, and Schuchert published a pair of papers in Winchell's journal, the *American Geologist*, scooping Sardeson on many of his new species by 5 days. Sardeson always maintained he had documentary proof that the date of authors' preprints had been advanced by Ulrich to gain priority, and he published the details in 1926. Malcolm P. Weiss has documented the shabby dealings that Ulrich and Winchell used to steal priority of Sardeson's names in a paper presented to the 1996 North American Paleontologivcal Convention in Washington.

Sardeson's zonation was taken over by Ulrich for the Minnesota strata, although many of the names were changed on the basis of the five day priority. Ulrich admitted in 1897 (footnote on page C, Final report, *Geology of Minnesota*, v. 3 pt. 2) that "it was not until the close of the field season of 1892 that they [the Ordovician subdivisions of Minnesota] were fully understood and characterized so as to be recognized at once by their fossils and lithological peculiarities." By that time they had had time to check out Sardeson's work. Little credit was given. Sardeson was appointed a graduate assistant at the University of Minnesota from 1892 to 1894, then went to Freiburg for a Ph.D. On returning to the University in 1895, he was appointed a Scholar in Paleontology, and an Instructor in 1889, rising to the rank of Assistant Professor in 1905. His work was extremely good by any standards; he published more than anyone else in the department. His teaching strategy was by Socratic questions, to develop thinking.

Under the new administration of the autocratic W. H. Emmons, Sardeson's contentious personality led him to be fired in 1913, effective 1914, having published 50 papers. He had left a very sizeable collection of labeled Ordovician fossils in the department, when Stauffer replaced him they were gone, a mystery . Mac Weiss and I think Emmons simply junked them, they were not donated to the National Museum. Sardeson then worked for the Minnesota State Securities Commission as a geologist making field investigations of mining and oil securities until 1934. He continued to study the Minnesota Ordovician as an amateur, publishing at least 95 more papers until 1940, mostly in the Pan-American Geologist. In my opinion, his work was superior to that of his successor: he was far more prolific and his work has lasted longer. He anticipated many of the conclusions of my 1987 report, in papers that the past two generations of paleontologists have ignored, I suspect mainly because they were published in Keyes' idiosyncratic journal.

Clinton R. Stauffer was hired to replace Sardeson in 1914 and remained until his retirement in 1944. He wrote nine papers on paleontology and stratigraphy in the 30 years while here, of which the only sizable and lasting contribution was "Paleozoic and Related Rocks," *Minnesota Geological Survey Bulletin* 29, written with George A. Thiel in 1941. Stauffer was responsible for most of the measured sections. These are difficult to use, and all too often he misidentified the formation at a locality sometimes by as much as 300 feet vertically! The effect on the 1932 geologic map of Minnesota was interesting, to say the least. Whenever he met what is now the Cummingsville Formation he would misidentify it, usually as the Prosser, sometimes as the Ion, occasionally as the Stewartville, and once as the Dubuque. Many of his sections were pieced together with a plane table, although no comment to that effect was ever made. They are always interesting to interpret. He assembled a species list of all taxa recorded for each formation in the state, and collected many choice fossils. He had a total of seven graduate students in 30 years, four of whom, including his niece, received Ph.D.s.

Frederick M. Swain was hired in 1946 to replace Stauffer, as a micropaleontologist-stratigrapher. Most of his work has been on ostracods from outside of Minnesota. His Ordovician work locally was supervising theses on the subsurface Ordovician of northwestern Minnesota by Thomas N. Bayer (1959), bryozoans by Olgerts Karklins (1966), and ostracoda by Donald Hansen (1951), James Cornell (1956), and John Burr (1958).

W. Charles Bell was the fourth paleontologist at the University of Minnesota. He was hired in 1946 with Swain, but left to go to the University of Texas in 1953. Most of his work was on the Minnesota Cambrian while he was at Minnesota. His students on the Minnesota Cambrian were in order: Oliver W. Feniak, MS, 1948, Vincent E. Kurtz, MS 1949, Clemens A Nelson, PhD 1949, Robert R. Berg, PhD 1951, and Richard E. Grant, MS 1953. Allison R. (Pete) Palmer PhD 1949, and Howard L. Ellinwood, PhD 1953 worked on the Cambrian of Texas, and Ralph L. Langenheim worked on the Permocarboniferous of Colorado.

Charley's main contributions to the study of the Minnesota Ordovician were advising Malcolm P. Weiss's Ph.D. thesis and Otto P. Majewske's 1953 master's thesis on the Platteville of the Twin Cities basin. He was also responsible for purchasing Frederick W. Sardeson's personal collection of fossils, including many of his type specimens, in 1947. This immediately doubled the size of the Ordovician collections at the University of Minnesota, and provided a wealth of very fine specimens with much more adequate horizon data than any of the Winchell or Stauffer collections.

Malcolm P. Weiss was a student of W. Charles Bell, and did his thesis field work in 1950 and 1951 as the first of Bell's planned campaign to redescribe the Minnesota Ordovician. He received his Ph.D. degree in 1953 with what was up to that time the largest thesis in the history of the department. The thesis was published as a series of five papers between 1954 and 1957; the unpublished part was the detailed description of most of his more than 60 measured sections and the precise locations and horizons of his fossils. These unpublished data are on file at the Minnesota Geological Survey and in the reading room of the Department of Geology and Geophysics, University of Minnesota, and should be consulted by any serious student of these rocks. The thesis remains one of the most important documents in Ordovician paleontology and stratigraphy. Weiss's map was the best geologic map that could be made in the absence of topographic maps, and he greatly improved on the old zonation of these rocks. He named two new units and formally defined the old stratigraphic names from the Winchell era. The culmination of these works was the 1956 GSA guidebook for Southeastern Minnesota and Iowa, assembled by Sloan, Weiss, Agnew, and Bell (Schwartz, 1956).

I was introduced to Minnesota geology by Charley. I was his teaching assistant in a field geology course in southeastern Minnesota for 1 week in the summer of 1953, just before I replaced him as the macroinvertebrate paleontologist. It was very apparent that little more needed to be done on the Cambrian of Minnesota, and that the most productive use of my time was to continue Charley's planned campaign on the Ordovician and to reinvestigate the Minnesota Cretaceous. After all I had been hired by Thiel to work on the stratigraphy and paleontology of Minnesota, these problems were what were left to be redone. Bell and Weiss had demonstrated the traceability of what are now called the Deicke and Millbrig K-bentonites. I observed that the limestone and shale interbeds between them could also be traced between St. Paul and McGregor, Iowa, and began work on the Platteville. Bell had pointed out the failings of Stauffer and Thiel (1941), so I began mapping in the Rochester region for the Minnesota Geological Survey. With no immediate money for publication, my mapping program expanded to all of southeastern Minnesota, and finally was published as the St. Paul Sheet (Sloan and Austin, 1966). Meanwhile, my graduate students worked

on Platteville bed tracing (Ford 1958; Hoeft 1959) the Maquoketa (Bayer 1965, 1966, 1967), and Ordovician conodonts (Thompson 1959; Anderson 1959; Webers 1961, 1966). The unpublished data were summarized by me in 1972, in a paper based on 75 sections measured in detail in Minnesota, at an average spacing of 5 km (3 miles). It demonstrated that all the beds of the Platteville could be traced over a distance of 300 km (200 miles) from St. Paul to McGregor, Iowa.

Preston Cloud joined the Department of Geology and Mineralogy in 1961 as professor and chair, but had little impact on the Ordovician collections or paleontology, spending all his time on administrative matters and Precambrian paleontology. He left in 1965.

Thomas N. Bayer described the subsurface Winnipeg and Red River Formations of northwestern Minnesota in 1959, and the unusual repetitive faunas of the Maquoketa in Minnesota in a 1965 Ph. D. dissertation, published in 1967. J. Keith Rigby Sr. and Thomas N. Bayer described some additional species of the unique Maquoketa sponge fauna in 1971. Early in his graduate career he taught at Macalester College, but in about 1963 or 1964 he went on to become a professor at Winona State University.

T. Donald Wallace was a retired Lieutenant of the St. Paul police department, and a knowledgeable commercial collector of fossils. He was hired by Cloud as curator of paleontology in 1963, and reorganized the University of Minnesota fossil collection to its present form. The collections had been housed in six separate locations in Pillsbury Hall in a variety of antiquated wooden cabinets; they are now housed together in modern bug and dust proof cabinets. He added greatly to the collections in the process of reorganizing them by donating rare and unusual specimens from his own collections. He retired in 1975.

MY CAREER IN PALEONTOLOGY

My career in Paleontology has hardly been ordinary. Few are trained as both vertebrate and invertebrate paleontologists, and even fewer have made significant contributions in both fields. Most of the problems I chose were carefully chosen to exemplify certain evolutionary principles. This is in great contrast to most academic or museum paleontologists. Most continue for their entire careers to work on the same group their thesis was on. For most academics it is a matter of trying to get a maximum number of citations in a minimum time, to assure promotion and tenure in an occupation where lack of time and money are endemic. Deans don't always understand differences in quality of thought but they can count. I early on settled on a Monday-Wednesday- Friday teaching schedule as much as possible in order to have Tuesday and Thursday for thought, reading and research without interruption by students. I have never felt guilty because I have always had a higher teaching load than anyone else in the department.

I have always had difficulty in getting research grants, in large part because invertebrate paleontologist reviewers considered me to be a vertebrate paleontologist, and at first the vertebrate peer reviewers considered me to be an invertebrate specialist. As a result I worked hard at funding my research in strange unusual ways. My students were usually supported by teaching assistantships. My own research was funded with my model railroad business. My bibliography is not as large as others because I did not write many potboilers, I spent my time for the most part on what I considered to be the most significant research problems I could find, and tended to write a few good papers on those and not rewrite them every year. In the early years my writing skills were not great, and it took a long time to hone a paper to finished level. My papers are all very tightly written with more conclusions per page than most. One of the disadvantages is that after I wrote a definitive paper on a subject and moved on to something more interesting; sometimes younger

paleontologists would go back over the same ground and rehash my arguments, ultimately coming to the same conclusion, but by the 3rd or 4th paper on a subject would cease citing me as the origin of the ideas. In several cases it took several years, in the case of the Cretaceous of Minnesota 20 years before others made good use of my work.

When I began a project, I would pick the group to work on depending on the evolutionary principle I wanted to work on. As I have often told students, if you know the principles of paleontology, shifting from one group to another involves only learning the local vocabulary and morphology and reading the pertinent literature. In the very simple words I have often used to students, "Critters are Critters", they all work alike. It only took me a quarter to shift into trilobites in the winter of 1988, and I immediately made a significant contribution (even though it was not published until 1991, preprints were made readily available at the talk). Another unconventional thing I have done since about 1965, is to supply preprints of my very best and most informative slides as handout materials at my talks. They have always been appreciated.

My Montana work was designed to investigate the extinction of dinosaurs, but as the other side of that coin it was also the adaptive radiation of mammals. That, in turn, lead to the quantitative stratigraphy of the Paleocene, and to the changing ecosystem due to these events. With the Ordovician trilobites I had a chance to work with an entire radiation of a single group in one continent, again it was instructive on radiations after an extinction, involving both "Tempo and Mode". The conodont work on which I broke my leg was important because it was not the usual "Conodonts of the Blank Formation in Blank County" type of paper which was generic at the time. It was designed to provide the longest possible complete succession of rocks then studied, and to solve the problem of conodont assemblages. It ultimately did both, and lead to far greater things than I had planned. Ah Serendipity! Jerry Webers benefited, and also benefited from my instant analysis of what became *Knightoconus,* the transitional fossil between Monoplacophora and Cephalopoda. When Pres Cloud left, he turned George Seddon over to me for my advisee. I had gained Cloud's respect. I took advantage of that to steer George in the same kind of broad research so it was not the ordinary thesis. It lead to his great later career.

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