IN MEMORY OF ROBERT LOUIS FOLK

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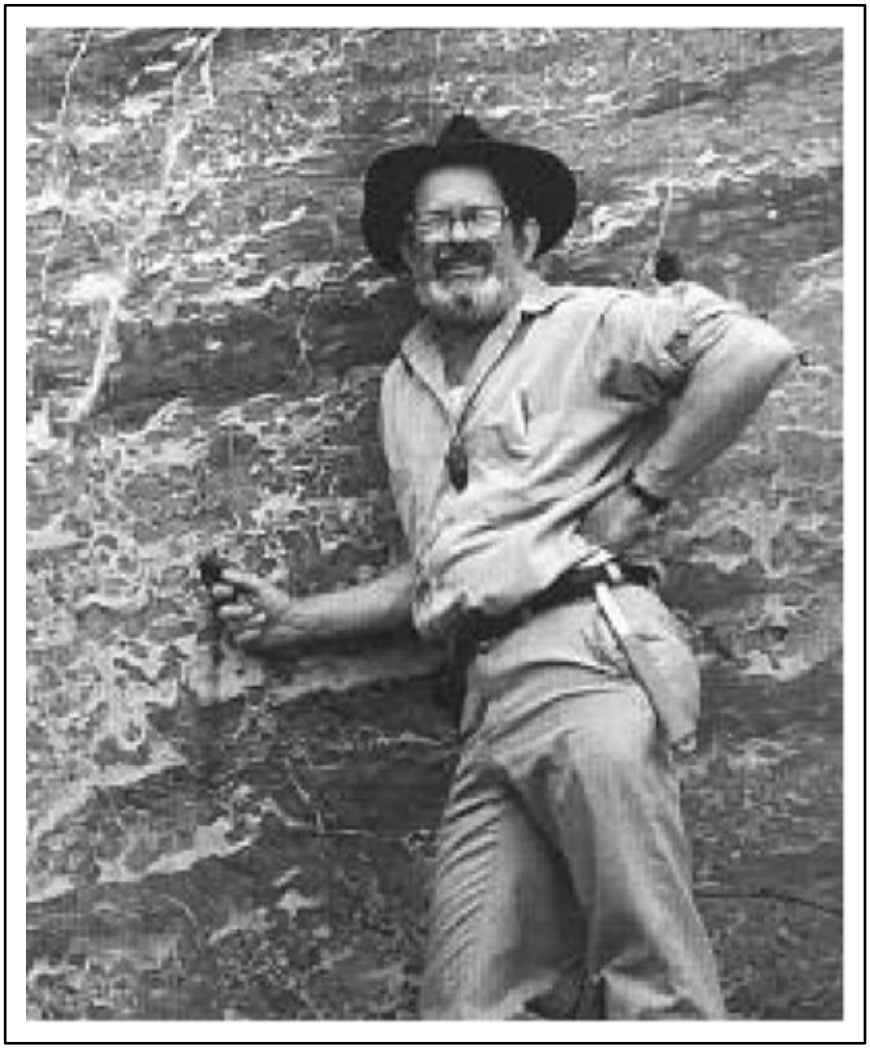

Robert Folk in a marble quarry in Lipari, Italy.

IN MEMORY OF ROBERT LOUIS FOLK

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Produced by Joe Holmes, Research Planning, Inc.

Murray Felsher, Ph.D. 1971

FOLKLORE – FIRST CONTACT

Having never met him, I knew Robert L. Folk only by reputation. I had left Amherst MA and the University of Massachusetts, where I had undertaken my M.S. work. It was August 1961, and I was married two months earlier. I had spent the summer as a Carnegie College Teaching Intern teaching an Introductory Geology class at CCNY, where I had earned my B.S. As a native New Yorker, I rarely traveled west of the Hudson, and had never been west of the Mississippi. Gathering meager funds and overloading our VW Beetle with all our belongings, we were to be strangers in a strange land, wherein lived strange people who spoke a strangely attractive version of English. I had earlier applied to only two schools for my Ph.D. --- the Massachusetts Institute of Technology and the University of Texas at Austin, and was accepted by both. When I approached H.T.U. Smith --- chairman of the UMass Geology Department, for whom I served as a Graduate Teaching Assistant during my years there --- for his advice on where I should pursue my doctorate, he unhesitatingly said "Texas. Bob Folk is there. Without question, Texas." But I did have a question or two, and H.T.U. spent some time with me telling me what he knew about Texas and especially what he knew (and had heard) about Robert L. Folk. The range of fact and anecdotal hearsay described a man who was both brilliantly eccentric and eccentrically brilliant. H.T.U.'s most positive point was that Folk's successful Ph.D.s, though numerically few, were sought after and would have no trouble securing positions in academe. As I was certain then that I was destined to spend a lifetime as a professor in some small Liberal Arts college, his words were encouraging --- albeit, my view of my own future was just about as wrong as could be. H.T.U.'s most negative point was that Folk's Ph.D. students tended to "linger" a bit. It was not clear whether their long "apprenticeships" were a result of his Ph.D. students' reluctance to "leave the nest," or whether Folk actually kept them chained to Austin. (Please note above, the year when my Ph.D. was awarded).

So I went to Texas. I was going to get my Ph.D. under Folk – simple as that.

What I didn't know (actually there was a mountain of things that I didn't know) was that the decision to study under Folk does not come from the prospective Ph.D. student. You don't pick him. He picks you. And as it turned out, I was pretty certain after my first couple of days in Austin, that those were to be my last couple of days in Austin.

Newly arrived UT graduate students were subjected to a full-day of formal "acquaintanceship" lectures, tours, and activities, and it wasn't until my second day in Austin that I actually visited the Geology Building, wherein dwelt the Department of Geology and its denizens – the faculty, the undergraduate majors, and the graduate students. We were informed that the faculty all were present in the building, and were eager to meet the incoming newbies. I took this as a direct invitation to look up Dr. Folk, my Ph.D. advisor (Hah!). He was not difficult to find. He occupied a rather large office that might once have been a small classroom. I stepped into the room, and stopped. Nearly every horizontal surface was covered with books, journals, magazines, mounds of loose pages, and sediment samples and rocks of all sizes, colors, and types. He seemed not to favor sedimentary rocks, as I would have expected, as I recognized a host of igneous and metamorphic rocks piled here and there, as well a number of specimens whose names and origins eluded me completely. A binocular microscope dating from the late 1930s shared a small desk with a brass petrographic microscope that might very well have been used by Antonie van Leeuwenhoek himself --- had the Dutchman ever deigned to cross a Nichol prism. The small desk also carried a typewriter. Not a (then) fancy Selectric-1, introduced by IBM that very year, but rather an ancient standard manual Underwood typewriter that he pounded on to the day he died. And the blackboards --- the blackboards were all filled with layers of barely legible chalk scrawlings (white and colored). Words, sketches, graphs piled one upon the other. Stratigraphically, each Folkian scrawl was superimposed upon another below. Thus, each effectively eradicated whatever previous note, or idea, or comment that might once have been uppermost in his thoughts. It was as if his mind constantly raced far ahead, while his chalk-bearing fingers were not capable of keeping pace. Earlier descriptions of his stature (short), build (wiry), dress (shabby), voice (loud), pitch (high), and demeanor (confident), were spot-on.

He was surrounded by students, and I could not tell which might be an undergraduate major, or which might be a current M.S. student, or which might be a current Ph.D. student, or which might be, like myself, a terrified and confused newbie. He seemed to be carrying on several conversations at once. I don't know how long I stood, transfixed, just inside the door, letting this --- vision --- engulf me. What brought my attention back directly to him was the sudden and complete silence that enveloped the room. He had evidently spotted this outlier --- this

outlander standing there, blocking his doorway. He wagged an index finger, motioning me to step forward, ostensibly to explain my uninvited entrance into the gaggle of familiarity with which he surrounded himself. In somewhat of a daze, I stepped forward and introduced myself. Not the original "small-talker," Dr. Folk immediately asked me what the subject of my M.S. thesis was. His body language told me that he was not necessarily interested, but merely being polite. Mind you, he wasn't nasty at all, and I gathered that the faculty *en masse* had been instructed to be nice to the strangers wandering through the halls that day. I told him that it was a series of beach studies on the Outer Beaches of Cape Cod, Massachusetts. I could see immediately that I had gotten his interest --- just a bit, anyway. "What kind of beach studies," he asked. "It was a statistical study," I said. He visibly perked up. "What do you know about statistics?" he asked. "Relatively little," I said, and added, "But though I did major in Geology as an undergrad I did minor in math." I felt the ice melting in the room. "Do any grain size analyses, did you?" "Yes," I said. "What sieve procedures did you incorporate," he asked. (Ah, I thought, "I have you now.") "No sir," I said proudly (and somewhat smugly). " I was lucky enough to have spent a few weeks at Woods Hole Oceanographic Institution on the Cape, and used their new WHOI Rapid Sediment Analyzer." Three or four seconds of an uncomfortably silent glare was followed by a loud, "Hmmpphh," and then a very loud, "BAH." This sequence of response turned out to be his initial standard comeback to what he perceived as utter rubbish and/or nonsense being tossed his way (by anybody). Then followed a long (it seemed never-ending) discourse on the inaccuracy and imprecision of any sediment grain size analysis based on sediment falling through a column of water housed in a glass cylinder. He breathlessly covered the problems, such as those associated with particle response to wall friction of the settling tube, and agglomeration of smaller individual particles, and on and on. And his commentary was laced with publication citations (including his own). He then asked me to either "justify" my dismal choice of sediment grain size analysis tool and/or specify the errors entailed within his own sieve methodologies. Figuring that my career in Texas was near its end, I decided to go for the "and" option and proceeded to defend the settling tube *and* bash the sieves. Surely, and without question, I was convinced that The Man Who Would Be My Ph.D. Advisor (Hah!) ---- Was *Not* Going To Be My Ph.D. Advisor. I was done for, right out of the starting gate.

His final comment was that in Nature, sediments do not settle through the water column via "tubes." By this time, I was so shattered that I found myself saying, (*it* was *myself saying it --- though I couldn't believe it afterwards,)* "Yes, Dr. Folk, I do agree, but in Nature nor do sediments settle through the water column via nested metal sieves." I turned around, and as the startled crowd in his office made

way for me, I headed for the door. Before I reached it, he shouted, “I’ll see you here tomorrow at 10 am.” So that was that. The axe was to fall at 10 am the next day. I wasn’t sure what to do next. I didn’t know anyone at all --- at the University, in Austin, in the whole State of Texas. I’d “sassed” and impugned my future mentor (Hah!). I drove across North Lamar to the small apartment we’d just rented on 12th Street. Dismayed and disappointed I reported to Natalie the gist of what just had occurred, and advised her to stop unpacking the boxes we had brought up from the car the day before.

His office door was closed when I got there exactly at 10 am the next day. I knocked on the door; Dr. Folk bade me enter. Although there was no hostility in his voice, I was certain that the “interview” to follow would be short and to the point. It was both. Before I could even start the *mea culpa* speech I had composed, had memorized, and had practiced for hours the sleepless night before, he greeted me as an old friend and insisted that he had thoroughly enjoyed our "repartee" the previous day. (What?) And as it seemed that I might be a particular, if not an unusual challenge to him, he was looking forward to seeing me in his graduate sedimentation and petrology courses the coming year. Further, he insisted that I audit any undergraduate courses he might be teaching that year. He nodded. That was it. Thinking that I had been given the signal to leave, I thanked him and started to turn. At which point he abruptly asked, “Are you a baseball fan?” I said, “Yes.” He asked “What team?” I said, “Yankees,” I’d been born and raised in The Bronx, not far from Yankee Stadium. Stare, Hmmpphh. (No, “Bah,” though.) He said, “Come back this afternoon at 3. I’ve got a baseball game I want to teach you to play. “ I left, stunned. Things were happening too fast. It was an appropriate preview to the (many) years that were to come.

Miles O. Hayes, Ph.D. 1965

What an honor it is to write a story about the best teacher and best scientist I ever knew, the one and only Robert L. Folk. I am calling this story “The Early Years.”

I grew up a country bumpkin of Scotch/Irish heritage in the mountains of western North Carolina. After high school, I attended Berea College in eastern Kentucky, the “School Where Everybody Works” (i.e., the students), as an **agriculture** major on a work scholarship.

After shoveling cow manure for two years (Everybody Works – remember?), I changed my major from agriculture to **geology**.

From Berea, I attended the Washington University in St. Louis for two years, working on an M.S. degree in Geology. While there, I did an M.S. thesis on some sandstones in western Missouri that I interpreted to be tidal flat deposits. The supervisor of that thesis, Dr. James C. Brice, was also a great teacher, who taught me much about sedimentology and geomorphology. That thesis work inspired me to consider doing Ph.D. studies emphasizing the subject of sedimentology. I asked Dr. Brice for advice on what Graduate School to apply to for admission, and he said – "Apply to Univ. Texas, Bob Folk is there. He is the best sedimentologist there is anywhere. Go there!"

So I did apply to UT, gaining "provisional" admission. I communicated with Folk and he said "Come on down." When I got to the Geology Department at UT, I was welcomed by a senior graduate student, Tom Freeman, and told him I wanted to work under Folk. He said he would call Folk telling him I was coming and gave me the location of his office. When I knocked on the door of Folk's office, the door was answered by a distinguished looking, relatively tall gentleman a bit older than me, who introduced himself as Dr. Folk. As we talked, in the background there was a thin, somewhat unkempt, black-haired guy working away with a mop. My new acquaintance, Dr. Folk, yelled at the guy with the mop a couple of times, telling him to do a better job.

Well, eventually, Dr. Folk admitted that he was not Dr. Folk, but that he was a graduate student named Gus Cotera, and that the guy with the mop was Dr. Folk. They both laughed and laughed, and I felt like a fool. Welcome to UT Geology!

Next, I and all of the other new incoming graduate students took the Geology Department's geology/couth entrance exam, and I did okay, so Folk accepted me as a graduate student under his supervision.

Without being a TA and having no scholarships, I was a little short on funds. So Robert L. recommended me for a job that he did at times, namely as a research scientist at the Defense Research Laboratory (DRL) in Austin. At DRL, I worked on a "classified" anti-submarine warfare project, in which I studied SECRET data on the shorelines of the whole World, working part time for several years. That project was probably the most significant learning experience of my life, as far as future research on coastal geomorphology was concerned. Through that work, I was able to see global trends in shoreline and continental shelf morphology and sedimentation. Especially noteworthy was the observation of the effect of tides on the morphology of depositional coasts. For that opportunity, I have to thank Robert L. Folk profusely.

When I arrived in Austin, Professor Folk was heavily engrossed in the study of grain-size characteristics of sediments collected from a number of sedimentary

environments, having himself invented some graphical statistical techniques for measuring grain-size parameters. I proposed to continue that type of work in the coastal zone of south Texas for my dissertation, which entailed sampling sediments from as far offshore as 120 feet water depths and onto the mainland into the dune fields of Kenedy County.

Folk, a smallish, wiry black-haired bundle of energy in his mid thirties with a flair for the dramatic in his teaching and research (as I noted earlier), was not only my dissertation supervisor, but he also invited me to work as his field assistant for two summers along the Mexican coast. Part of my job during the Mexican work was to keep a close eye on him, because he could not swim a lick, having the World's highest specific gravity among human beings. In other words, once in the water, he sunk like a rock. In the summer of 1960, we were part of a research project on Alacran Reef off the coast of the Yucatan Peninsula (see Figures 1, 2, and 3). One day while doing some sampling of the reef platform on the exposed part of the reef, Folk, who was wearing a life jacket at the time, slipped into one of the outlet channels and was swept out to sea by a strong ebb current that rushed him toward Cuba or Panama or beyond. I jumped into the channel and swam out to pull him out of the main current and back onto the reef front.

That summer, I did a brief study of an island on the backside of the reef that disappeared every winter (*Isla Desaparecida,* see Figure 3), and Folk published a paper on the grain size and composition of the sediments on the reef. In the acknowledgments of his paper (see that and others on that subject listed at the end of this discussion), which became something of a classic in its field, he gave special credit to "M. O. Hayes - lifesaver."

During the early part of the summer of 1961, I began sampling the bottom sediments on the inner continental shelf in the study area I had chosen for my dissertation work.

Later on that summer, my wife, Barbara Anne, and I joined Professor Folk and his wife Marge on a field excursion to a place called Isla Mujeres off the east coast of the Yucatan Peninsula in Mexico. That trip began with a long bus ride from Austin south to the border, along the coast of Mexico and across the Yucatan Peninsula, which entailed numerous ferry rides on the bus, dodging palm trees in the dirt road, and so on.

In the field, I was the grab sampler we used to collect bottom sediments in the channel between the island and the mainland. That is, I dove off the boat we had rented and collected the bottom samples by hand. Before we left the dock, the gentleman we rented the boat from looked me up and down and asked, "The boy is *muy practico*?" Well, anyway, we survived, even if I did think I might drown a

couple of times as the man with the World's highest specific gravity was poised above in the boat waiting to save me. We eventually worked our way to the southernmost end of Isla Mujeres (pictured in Figure 4).

One time we pulled the boat up on a mainland beach and went exploring in the semi-arid jungle behind the beach. As we worked our way through the heavy underbrush, we suddenly came upon the remains of a Mayan ruin. Located a long ways from any highway or human habitation, it was in a state of considerable disrepair.

As we poked around in the rubble, Folk lifted a piece of rock and shouted, "Look! It's CHAC's hand!

"What?"

"You know, the rain god, CHAC. This is his hand. Let's keep it!"

We debated at some length the ramifications of keeping (i.e., stealing) the hand, with me also questioning its authenticity. But Folk insisted it was the real thing. A man with unbounded intellectual curiosity and enthusiasm, he had studied the Mayan culture, and he was, in fact, fairly fluent in the Mayan language. All I knew about the Mayans was that they were mighty handsome, especially the women, and that, although only six-feet tall, I towered above them, feeling like a giant, as I walked along the crowded streets of Merida and the other towns. When we left for the long bus ride home, CHAC's hand was nestled snugly in the bag containing the sediment samples we had collected.

Toward the end of the summer, I returned to Port Aransas to continue the offshore sampling with Captain Herman and a field assistant named Wayne.

One day in September, as we were nearing completion of the offshore work far out to sea at the end of one of the transects, Captain Herman walked out on the deck and said, "Hey Hayes, guess what?"

"You have engine trouble again? Out of sardines? You're lost?"

"No, smart ass, there's a hurricane coming. A big one, called Hurricane *Carla*. We had better head on in."

When *Carla* made landfall in early September 1961, it generated a storm surge of 24 feet at Port Lavaca and elevated water levels all the way from the Rio Grande to the Mississippi River. The entire shoreline of Texas was subject to hurricane-force winds, which exceeded 200 mph in places. It was one of the largest hurricanes to ever cross the Texas coast. During the storm, part of the shore I had been studying was washed away as well as a large number of the samples I had

collected and other data. Eventually, the topic of my dissertation became focused on the impacts of the hurricane, a decision supported and encouraged by Folk.

Folk bought some land in the hills outside of Austin, and he asked Gus Cotera, another one of his graduate students you met earlier, and myself to help him build a primitive structure on the land that would be his escape hideaway where he could spend the weekend, work on his papers undisturbed, and so on. We completed the rickety structure and he was happy with it. That is, until *Carla.* The high winds generated by *Carla* blew the "hideaway" into smithereens. Folk blamed the incident on the "wrath of CHAC," because we had stolen his hand from the jungle in Yucatan. Folk kept the hand on his desk at school, and from then on, he always had it sandwiched between two bags of sugar, hoping to appease the angry god.

Dr. Folk had the following words posted on the wall outside his office:

1) "Believe not what the ancients and sages of the past have told you, believe only that which you have tested for yourself and found worthy." Gautama Buddha

2) "Poor indeed is the student who does not exceed his master." Confucius

Those were excellent words by which a young researcher should live.

Back at the University, I shared an office in a corner of the ground level of the Geology Department with two of Folk's other graduate students, a New Yorker named Murray Felsher, who was then and remains a good friend, and Peter B. Andrews, a New Zealander. We were a tight-knit group, and I have to give credit to Peter B. for his insistence that I focus my efforts on the changes *Carla* had made on the offshore bottom sediments, which is probably the part of my study that has received the most notoriety over the years. Also joining us in that crew was Dr. Rikii Shoji, a middle-aged professor from Tohoku University in Japan.

Dr. Shoji once told me - "Mr. Phase, Doctor Wholk's rimestone crassification is very famous in Yahpon." Thus, Mr. Phase became one of the many nicknames I have had over the years.

Some time around 1:00 p.m. on 22 November 1963, I was walking down the hall toward the office to meet up with Felsher and Peter B. I had made arrangements with Barbara Anne for us to go see President Kennedy's motorcade, which was scheduled to pass along the highway a few hundred feet down the hill from our office later on in the day. I was thinking about asking them to join us. As I walked into the office, they were huddled by the radio listening to a description of the shooting in Dallas. Many, but not all, of the graduate students in the Department were enamored by Kennedy's charisma and inspirational leadership. Count Felsher and me among them. We were both speechless, looking at each

other in disbelief. We felt totally disenfranchised to be in Texas at that juncture, feeling sadness, disgust, and frustration all at the same time.

After about half an hour of listening in, Peter B. said, “I’ll see you fellows tomorrow. This is not a good place for me to be right now.” Then he left.

I hung around the office until 4:30 p.m., at which time I made notes in my journal about how quiet the campus was and that the stillness, unlike any I had seen there before, was overwhelming.

Now, time to wrap this up. The last time I saw Professor Folk (and his wife Marge) was on 14 January 2013 at a meeting of the Houston Geological Society during which Folk was honored as one of the Legends of Sedimentology. In accepting that honor, naturally he had to give a talk. He did, a great one. He left us all laughing at his jokes, as expected.

Publications on the sediments along the shores (and reefs) of the Yucatan Peninsula area:

Folk, R.L. 1962. Sorting in some carbonate beaches of Mexico: Trans. N.Y. Acad. Sci., Ser. 2, 25: 222-244.

---------- 1966. A review of grain-size parameters. Sedimentology. 6: 73-93.

---------- 1967. Sand cays of Alacran Reef, Yucatan, Mexico: Morphology. Jour. Geol. 75: 412-437.

Folk, R.L. and Robles, R. 1964. Carbonate sands of Isla Perez, Alacran Reef complex. Jour. Geol. 72: 255-292.

Folk, R.L., Hayes, M. 0. and Shoji, R. 1962. Carbonate sediments of Isla Mujeres, Quintana Roo and vicinity. New Orleans Geol. Soc.

Guidebook, Field Trip to Yucatan Peninsula, 85-100.

Folk, R.L., and A. S. Cotera. 1971. Carbonate sand cays of Alacran Reef, Yucatan, Mexico: Sediments. *Atoll Research Bulletin* no.137. 35 pp.

View looking northeast at Isla Perez on the southeast margin of Alacran Reef, Yucatan, Mexico in late fall of 1961. This reef is located out in the Gulf of Mexico 71 miles (114 km) to the north of the town of Progresso on the shore of the Yucatan Peninsula. A lighthouse was located near the middle of the island. Several people, including the lighthouse keeper, were living on the island at that time.

Folk on a sea turtle captured by the people living on the island pictured in the previous photo.

Isla Desaparecida, an island on Alacran Reef, Mexico, that disappeared every winter in the early 1960s, and was the subject of a research project by me in the mid-summer of 1960, at which time this photographs was taken. Skip Hoskin, who did a dissertation study on Alacran Reef, poses in front of the eroding scarp on the southeast side of the island.

Walking out to the south end of Isla Mujeres (Punta Sur) in mid-summer of 1961. Note the Mayan temple at the end of the island. Arrow points to Folk leading the excursion.

Peter B. Andrews, Ph.D. 1966

I arrived at The University of Texas, Austin, towards the end of August, 1962, as a PhD aspirant. I was on leave from New Zealand Geological Survey, having a mere 18 months experience as a working geologist specializing in sedimentary rocks. I had been fortunate to gain entry, helped by a Fulbright Travel Only Fellowship, keen to study under Professor Folk, who my investigations had shown to be a major and acclaimed researcher in all aspects of sedimentary rocks. I was green-as-grass and this was the big time!! The next four years were some of the most profitable in my life and at the end I returned to NZGS, PhD in hand and a more worldly-wise specimen in many respects. Although my dissertation was ultimately on Gulf Coast modern sediments, supervised very ably by the late Prof Alan Scott, Bob Folk played a major, major part in my learning.

Bob was idiosyncratic, to say the least. From the moment of first contact he made it his job to unsettle any graduate before him, to test and probe, on any

matter, mostly sedimentological, but just as easily on royalty, or some such. Never harsh, never unfair, this small and unremarkable man was the most unsettling, but stimulating teacher that I had ever come across. He appeared not to have much in the way of social skills. As far as I saw he did not easily spend a lot of time in the company of his peers, but he certainly delighted in his graduate students. In their company he was animated, probing, always trying to flummox, always teaching, if subtly. Outside the academic arena he was also competitive. One of his favorites was outdoor badminton at the family crib out in the scrub west of Austin. Two of us grads, David Horn, a Canadian and I, would occasionally go out there to help mark a heap of undergraduate tests. With that done we would play using Bob's gear. He beat us every time and though I had played quite a lot of competitive badminton indoors in New Zealand neither of us ever figured out to beat him. He didn't give an inch.

Bob's courses in "Sedimentation", "Sandstone Petrology", and "Carbonate Petrology" were comprehensive and intensive. He taught by enquiry and by illustration as much as by instruction. He taught skills (petrography especially). His classes were a joy. He determined which student should be tested next by rolling dice, in his case a numbered 8-sided (?) pencil. There was hardly a peaceful moment. But you certainly learnt.

Bob cultivated the idiosyncratic in all aspects of his life, not just his teaching nor his hand-drawn illustrations in his published works. Every day of the teaching week he rested and recuperated for an hour (1-2 pm) in a hammock slung in his office. On the outside of his door and over his printed timetable was hung the notice "Invisible"; lo-betide if you disturbed him.

All his monetary transactions were conducted in silver dollars; wherever he went he took his battered briefcase loaded with cash. One of our contemporaries, Bill Craig I think, yet to fetch-up at UT, had Bob pointed out to him at a regional (?) AAPG meeting. Here was this undistinguished man, standing by himself, leaning heavily to one side, apparently loaded down by his dollar-filled briefcase. Bill couldn't believe that this was the famous Professor Robert L Folk. Though a naturally generous man, in lots of different ways, Bob liked to save a dollar. We students were introduced to eating outlets that even few students would use, like the "Pit-Roast Beef" shack on the SE side of town or the rough, walk-up café run and frequented by Mexicans in East Texas - all tasty food, cheap-as. Then, in his view, out-of-town accommodation should provide the necessities, for as little as possible. On one occasion 4 of us grads got together and drove in Miles Hayes' car to Toronto for the annual AAPG meeting. After arrival, we walked to the conference centre to register. Partway there we were hailed from above and across the street. It was Bob, 3-stories up, alerting us to his accommodation; next he yells

“what do you think of my safety arrangements”, with which he threw one end of a heavy rope out his window!!

You had to love this guy.

Feather Wilson

I was a Folk graduate student.
Dr. Folk owed me $32 for sieve work at 85 cents/hour.
He could not find his checkbook one day.
He went over to the trashcan and pulled out a discarded quiz.
He turned it over and drew a check on it.
I was really worried because that was a month’s rent.
I took it to the bank and they cashed it without question.
He was a God to me.

I went over to Dr. Folk's house one evening to review my thesis.
I knocked on the door and barely heard him say, "It's open."
As I walked in he was squatted in front of the fireplace staring at a brand new guitar.
He was holding on to the small end of the guitar while the rest burned in the fireplace.
I asked, "Why are you burning that guitar?"
He replied as if he was in a daze, "I just wanted to hear the music burn".
He never looked away from the fire until it all was consumed by the flames.

Dianne Pavlicek-Mesa

Folk was a very important mentor, but also a tormentor. I will only comment on the mentor! Here’s a flashback to the *Folk Tale* that I submitted for his 90th Birthday Party at UT. Please include in the “Memorial”, if possible.

In 1987, I had the opportunity to do my thesis on the Upper Triassic Portoro Limestone in the northern Apennine Mountains with Folk which included a six week venture to Italy. Folk informed me that he would require that I be able to speak Italian before departure. So with a full load of graduate courses and a part-time job at the U. S. Geological Survey in Austin, I also took on the first semester of Italian.

I now thank him for requiring that I speak Italian as I recall having to repeat this statement several times while in Italy: *Non sono Tedesca, sono Americana!* [I am not German, I am American!] The Italians love Americans. Actually I am 50% German Texan!

I also want to thank him for expanding my view of the world and instilling a continued love of all things Italian and a continued love of carbonate rocks.

Arrivederci!

With karst!

Pete Rose, Ph.D. 1969

Bob Folk was, without question, the most influential and inspiring professor/mentor in my long geological career. He arrived at UT in 1952(?). My time at UT (Austin) was 1953-1957 (BS) and 1957-1959 MA), when I graduated and joined Shell in Houston (I was in Coral Gables in 1962 with the Ginsburg group).

Counseled by knowledgeable grad students, I took every course Bob Folk offered – Sedimentation as a Junior, Sedimentary Petrography and Carbonate Petrography as a Senior; all three courses were joint graduate- and upperclass-level courses. I "aced" all three. Moreover, Bob and I became friends, linked by country music, baseball, and games, in addition to geology. He was on my Master's thesis committee.

When I returned to UT Austin in 1966 for my Ph. D, with a wife and three kids and the wolf at the door, I already had identified my dissertation topic (regional stratigraphy of the Edwards Group). Moreover, I knew that I needed to complete the degree quickly, before our money ran out. Bob Folk was well-known for his lack of sympathy for his grad students' needs for timely thesis completion, so they could enter into the salaried world of professional employment, so I did not include him on my Committee. Besides, by then I had been exposed to Ginsburg, Ball, Stockman, and Dunham through Shell. But we resumed our earlier friendship, during the two and a half years of my Austin tenure.

Of course I ran into Luigi from time to time after departing with my Ph. D, on return visits to Austin, or national meetings, but by then we were working in ever-separating fields, and he was notorious for his low opinion of petroleum geology (and petroleum geologists).

My success applying statistics to petroleum exploration, combining statistics,

geology, economics, and management strategy – loosely known as "Petroleum Exploration Risk Analysis", depended on the pragmatic understanding of applied statistics to geology, culminating in the founding of Rose and Associates, LLP, in 1998. Bob Folk was the source of that early foundation – he was the best statistics instructor I ever had!

When I retired in 2005, I interacted with UT geology professors once again, including Bob, from time to time, often through our geological "LunchBunch", and we resumed our occasional discussions, which were unfailingly stimulating and diverse. Last year, I heard through the grapevine that he had read my 2012 history of the Texas Hill-country frontier, *The Reckoning: the Triumph of Order on the Texas Outlaw Frontier*. I did not realize that he had also read my 2017 GCAGS paper on the geological unroofing of the Edwards Plateau during the Late Cretaceous and Tertiary.

One day last summer, I got an unexpected telephone call from Bob, the gist of which was his effusive compliments about both – the book as well as the paper. I stammered my thanks for his kind words. When I hung up the telephone, I wept.

Bob Folk, to me, was the epitome of the inspiring, creative professor, and I am profoundly grateful for the opportunity to be his student and friend. I shall never forget him.

Also from Pete Rose:

The following essay was written in September, 2002, and published in the monthly bulletin of the Austin Geological Society:

HOLLERS -- MUSICAL TRADITIONS IN UT GEOSCIENCE, 1954-1968

I guess it was Don Winston who coined the term "Hollers," back in about 1954, for periodic weekend events that were combination musical stampedes and student blowouts. At first, attendance was limited to graduate students and upperclassmen who could pick and/or sing, and who also enjoyed an occasional social blast. Later on, a few courageous or unconventional -- usually more junior -- faculty began showing up, even going so far as to sponsor an occasional holler. That had to be a considered and infrequent undertaking, because cleaning up afterward was an all-day job that no knowing faculty wife would ever volunteer for.

A certain semi-official cachet was bestowed in 1956, when Professor Sam Ellison asked the main ringleaders to perform at an annual dinner of the Advisory Council. In retrospect, I don't know who was more shocked -- the conservative, prosperous, and respectable folks of the AC, or the "Holler Band" (at our own

chutzpah). But Sam just beamed; maybe that was because we left him speechless. By the time I finally departed UT for the second time, in the summer of 1968, hollers had become almost institutionalized (and certainly more sanitized), and musical takeoffs had become the backbone of "Final Bedlam", the annual concluding event of Professor DeFord's twice-weekly Graduate Seminar.

The hard-core participants during the formative years were Winston and his officemate, Dick Grant, who together occupied a series of marginal rent-houses in the more disreputable neighborhoods of north and south Austin, where they routinely generated and bottled cases of mediocre home brew. A lot of those bottling sessions just naturally evolved into hollers. Other grad students who joined in included enthusiastic singers such as Page Twiss, Charley Mankin, Jim Underwood, and Dave Amsbury. A few hangers-on also showed up just to marvel, hum, and drink along.

My first holler was in 1955 -- even though an upperclassman, I was included only because I came from a family of genuine (if marginally talented) country musicians. After 1957, Tom Freeman was a regular, playing banjo ("banjer"), and singing his deep-rooted Ozark country songs. A lot of UT grad students and faculty had eastern cultural roots; they thought our music was rustic, ethnic or socially significant, but Tom and I were just singing our native stuff. Winston and Grant didn't discriminate -- they just joined in to whatever was going down. So did neighborhood dogs and awakened children. Austin policemen showed up once or twice to settle things down.

Our first faculty regular was Professor Bob Folk, who came to play banjo and sing, not to drink. His favorite singer was Kitty Wells, and we could all look forward to Bob getting choked up at least once a night, in the middle of one of his tragic Kitty Wells numbers. Later on, Professor John Snyder took part, singing so intensely that his face would turn purple and break out in beads of sweat, making us afraid he was going to have a stroke.

The original "Holler Band" that played for the Advisory Council included Winston (guitar), Grant (mandolin), Twiss (washtub-bass), Folk (banjo), and Rose (guitar and harmonica). I don't recall now what songs we played -- three or four fast-moving country songs, delivered with enthusiastic but undisciplined harmony and overpowering rhythm. But we always concluded with Merle Travis' "Down in the Mine," a Kentucky coal-mining ballad. Each chorus ended with a mournful, high-pitched, drawn-out "way down innnnn the mine." The structure of the chorus naturally lent itself to a sequenced, tiered-harmony conclusion that built on the three main tones of the subdominant chord, yielding finally to an ending tonic chord. On the final chorus, we learned to string this out, and bring in a final fourth

high tenor voice a full octave above the first-tier fifth. That high voice was always Bob Folk's. As a concluding act, it never failed to bring down the house.

Grant left for the U.S. National Museum in 1958. Page and Charley and Jim had departed for Kansas and Oklahoma about a year earlier. I joined Shell in summer, 1959. Winston stayed on, working on his dissertation, until he finally departed Austin for Missoula in about 1963.

When I came back for a Ph.D in early 1966, the focus of grad-school music had shifted from weekend blasts to less rambunctious get-togethers. But capable guitar-pickers, such as Jim Stitt and Will Reid, were always ready to holler, and they were kind to welcome an older, but kindred spirit like me back into the tradition. Things were a bit more civilized now, and only a little less lively. However, reworked lyrics set to well-known melodies, taking off on prominent departmental events and incidents, as well as susceptible faculty personalities, now became the framework of Final Bedlam. Charley Bell, Bill Muehlberger, and Ronald DeFord were favorite targets. Most of the newer and younger faculty remained puzzled about the whole thing. Even so, "Down in the Mine" continued as our favorite anthem.

When Bob Folk elected to retire in 1989, we got the old holler band together again in San Antonio -- Don, Dick, Page and myself -- and, of course, the honoree himself, Bob Folk. We played several of our old numbers for the new crowd of grad students and faculty who had gathered to honor Bob. But it just wasn't the same -- they didn't identify with our selection of songs, our rough harmonies and undisciplined rhythms. We were playing for a different and uncomprehending generation. And maybe we needed more practice.

A lot of those old pickers and singers -- and their sponsors -- are gone now, God rest their souls: Dick Grant, Dave Amsbury, Charley Bell, Ronald DeFord, Sam Ellison, Jim Stitt, and Will Reid. But every once in a while, a few of the old hard-core UT hollerers will get together, roll into "Down in the Mine," and I can feel the spirits of those departed joining in, then collapsing in laughter as Bob Folk or his counterpart adds that unforgettable fourth-tier high tenor part to the final chorus.

Gus Cotera, Ph.D. 1962

I met Dr. Folk in Fall of 1954 soon after he joined the Geology faculty. He was an inspiring teacher and I completed both my M.A. and Ph.D. under his supervision. He was a very open individual with no time for pretensions – he insisted that I address him as "Bob." While at UT, I took courses from almost all

the professors in the Department. All of them, now including Bob, have ventured forth on that last major field trip to the great unknown. I miss every one of them as they were an outstanding group of teachers. Throughout my career, I profited from their teaching and knowledge and shall always be grateful to each and every one.

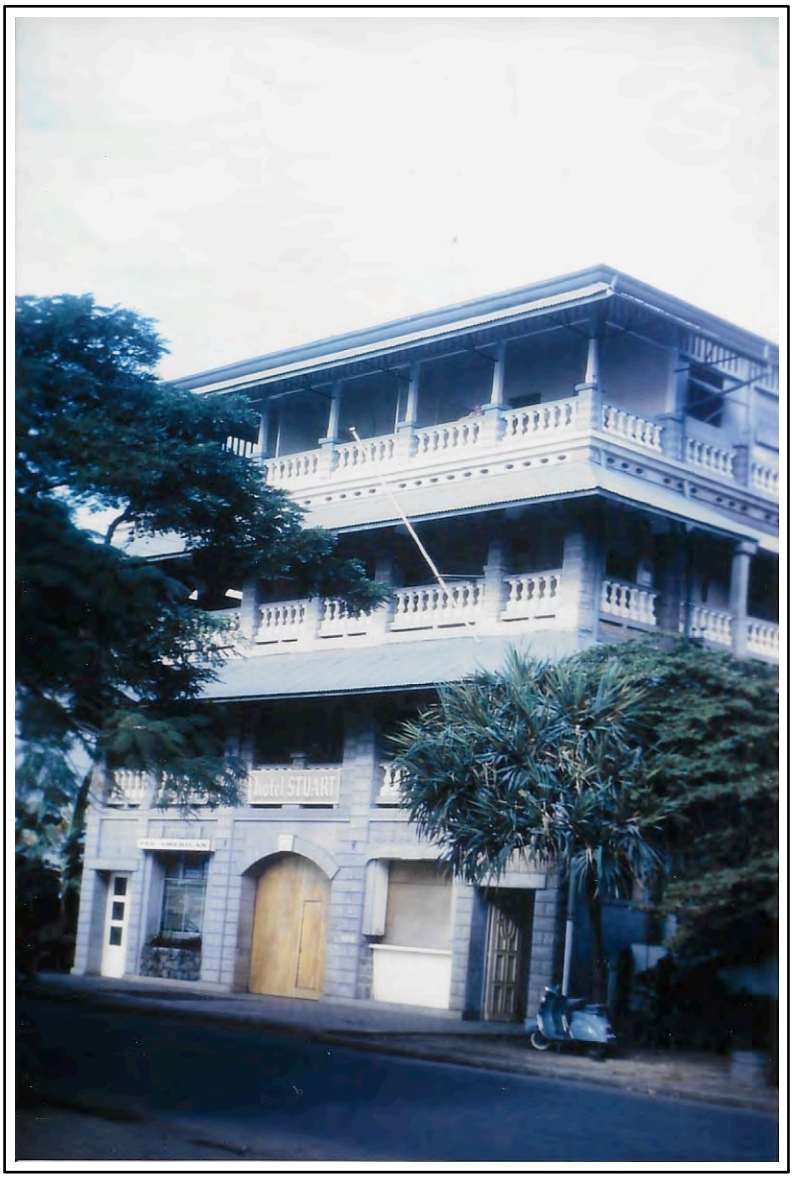
To me however, Bob was more than a great teacher of Geology, he was a great teacher of the vital aspects of our humanity – honesty, integrity, respect, compassion, goodness, and all the other qualities that instill greatness in all his students. As the great 20th century philosopher, Alfred North Whitehead so elegantly wrote: "To Become Educated Is To Become More Fully Human." Bob Folk contributed much to helping his students "Become More Fully Human."

During all the years since 1954 until this present year, Bob and I maintained a close association and friendship. There is no doubt in my mind that Bob was the most intelligent and learned man I ever met. He knew a lot about everything. His range of knowledge had no boundaries. All of us who knew him are the better for that association. And yes, I will miss our monthly chats but the memories that I have of him will be with me, until I also depart this magnificent Earth of ours.

Jim Dobkins: Memories About Dr. Folk in 1966-1968, M.S. 1968

Even after 50 years, I continue to have such great memories of the time spent with my thesis supervisor, Dr. Robert L. Folk. I called him Dr. Folk, and still think of him by that name, since I had too much respect for him to ever call him "Bob". He was the most brilliant and intellectually inquisitive professor that I have ever known – with a personality to match. There was never a dull moment being with him in the field or in the classroom!

Dr. Folk and I had the unique opportunity to go to Tahiti in the South Pacific in the summer of 1967 to study beach and river pebbles for my master's thesis. The two of us stayed in the run-down Stuart Hotel downtown on the waterfront. We were almost next door to the famous Quinn's Bar. We shared one room that had curtains for doors and a restroom down the hall used by all the second-floor occupants. At night it was quite noisy with all the inebriated one-night "guests" enjoying themselves, and even occasionally running through our room.



Hotel Stuart on the waterfront in downtown Papeete, Tahiti.

Quinn's Bar, Papeete, Tahiti.

Dinner time was always an interesting experience. We would alternate choosing where to eat our nightly meal. Dr. Folk's choices were always chosen by chance – not what he was hungry for. Since he did not have dice with him, he put pin holes on the six sides of a wooden pencil to create the numbers of one to six. When we would step out the front door of the hotel, he would spin the pencil in his hand to determine which way to go. If an "odd" number we would go to the right, and if an "even" number it would be to the left. The process would be continued till we would get close to a place to eat. Dr. Folk was quite independent. Even though he did not speak French, he would order from the French menu and eat whatever came. On one occasion it turned out to be a raw ground beef patty with a raw egg on top! The waiter had tried to ask if he wanted it cooked, but we could not understand that at the time. So he ate it anyway.

We collected and studied basalt beach and river pebbles from the dual volcanic core on Tahiti-Nui. I can still hear the thundering sound of disk-shaped pebbles being moved by the surf on exposed high energy beaches. Collecting pebbles on these beaches could be treacherous and painful. We would take turns running out into the waves while twirling a long stick overhead. We would then randomly thrust the stick down to the pebble beach in order to select a pebble to measure. This had to be done quickly between incoming waves or our legs would be

pounded by the moving pebbles. We both became quite bruised by this process! It must have been quite a site seeing grown men collecting beach pebbles and cobbles in this manner!

More of an audience would observe us collecting pebbles in the river beds. Many huts and shacks were located by the rivers to take advantage of running water. One of the photos shows children watching Dr. Folk take some of the measurements. It was difficult trying to explain just what we were doing in English to children that spoke Polynesian. It was not unusual to take a siesta during the heat of the day.

Dr. Folk taking pebble measurements at the Tipaerin River – children observing.

Dr. Folk taking a well-deserved siesta.

There were also black basalt sand beaches protected by reefs. On one occasion we were covered by this sand on Pt. Venus beach after we had collected small coin-sized, disk-shaped pebbles.

Dr. Folk covered in black basalt sand at Pt. Venus Beach.

Geology and the University of Texas at Austin have lost a one-of-a-kind scientist, professor and friend. To this day I still treasure my master's thesis, *Pebble Shape Development on Tahiti-Nui*, approved in 1968 by Dr. Folk. He signed it with his ubiquitous quill pen with black India ink. On our fireplace hearth I still have a large glass jar containing a sample of pebbles we collected. So I see them every day and fondly think of my Tahiti experiences with my professor and friend, Dr. Folk.

Donald H. Campbell

Seldom is seen a teacher with the capability of Bob Folk. His extensive insight into the mega-scopic and microscopic processes involved in sedimentary rocks places him in the top category of our profession. His mastery of observation and communication, and his interpretations of a plausible sequence of sedimentary events are unsurpassed. He serves as an enduring guide for us all. Knowing and working with him has been an honor.

Donald H. Campbell – Second Contribution

Folk and I, with four other investigators, traveled to Cairo in 1990 to evaluate the proposal of Dr. Joseph Davidovits and Margie Morris (1987) that the pyramid blocks were cast-in-place, like concrete. The binder was said to be "geopolymer," a hydrated sodium-alumino-silicate.

Our trip was supported by the Epigraphic Society and Explorers Club, a San Diego group specializing in ancient languages. Our research was strengthened by a sample of a casing stone from the Great Pyramid (Khufu), graciously given to us by personnel at the British Museum in London.

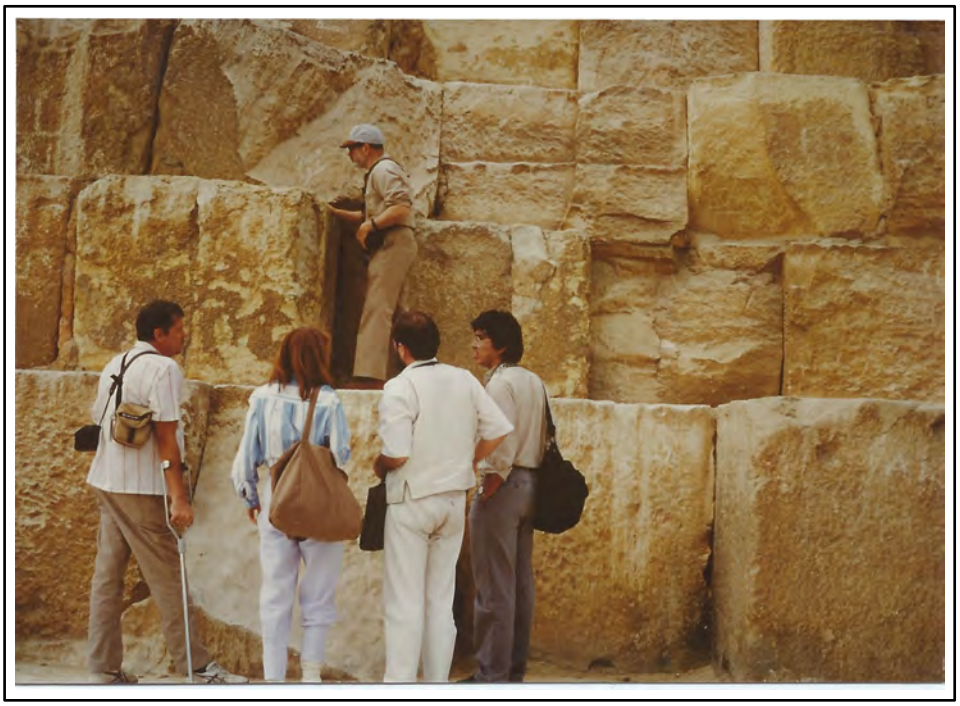
We believed that such a cast-in-place theory proposed by Davidovits and Morris would be evidenced by the field and laboratory data. None could be found. The proposal, in our view, should be stored in the dust bin.

Folk and I authored several publications countering the cast-in-place argument, ending with that in the Journal of Geological Education, 1992, v. 40, p. 25-34, in which our evidence was spelled out, and a formal rebuttal to Davidovits and Morris was made, again.

I have a photograph of Folk on the second tier of blocks of the Great Pyramid in Cairo, as the members of the expedition look on. On-lookers, left to right, are Marshall Payn, Margie Morris, Buff Parry, and Bob Smallboy. I held the camera.

The intensities of our discussions were memorable, a normal event in Folk's professional activities.

I submit this photo to be used in the Folk Memorial.



Folk at the Great Pyramid of Giza, Egypt 1990.

Gerry Middleton

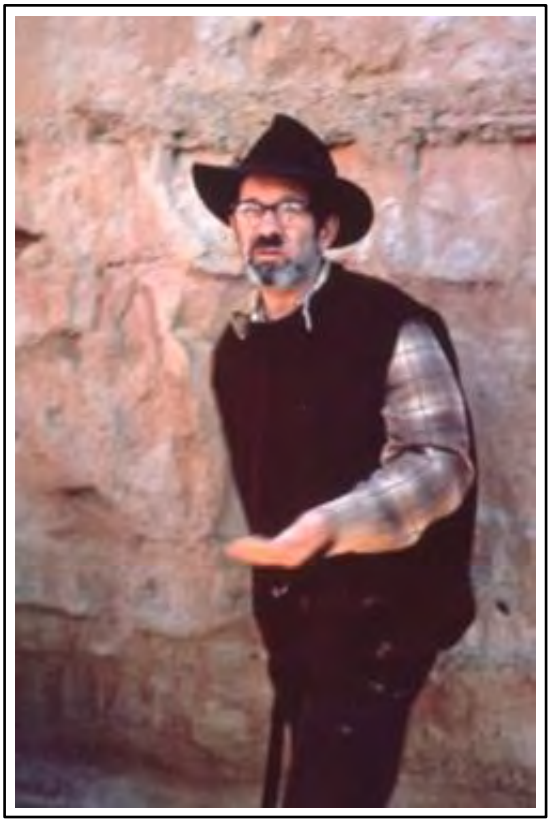
I first met Bob in Mexico City at the IGC in 1956. We had many interest in common -- I had spent the summer working in the Rockies on carbonates and had just started teaching. He very generously sent me drafts of his classification, before publication and I taught it to students. Later our interests diverged but I read all his papers, though there were some ideas I disagreed with. My opinion was and is that he was one of the greats in our profession.

Lisa Orr

I was one of Luigi's grad students starting in 1976 and finally wrapping up my masters in January 1981. I still recount to friends what an experience it was to be one of his "oafs" in the classroom – from the flying chalk and erasers, to the Laura Antonelli statistical curves, the prodding wooden snake, the infuriatingly illegible test questions written on the chalk board, and the incredibly creative but crazily frustrating 30-hour exam!

After quitting grad school at the beginning of my second semester (I walked out in the middle of his first Carbonates lecture, saying to myself, "I just don't want to know that much about carbonates!"), I did odd jobs for Luigi including staining his cabin, painting his kitchen, and the like. After Grad School, we stayed in touch yearly and I toured Italy with him, Marge, and Steve and Martha Cather in 2000 (I think).

Out in the field in the 70's he would wear this huge brown sleeveless sweater that made him look rather like a bum (would you give a handout to this guy?):



Luigi, ~1976?

At some point one of us must have said "You could put 3 people in that sweater!" So we did. This is Ellen Niemen (sp?) on the left, and me in the middle:

Ellen Niemen, Lisa Orr, Luigi, ~ 1976?

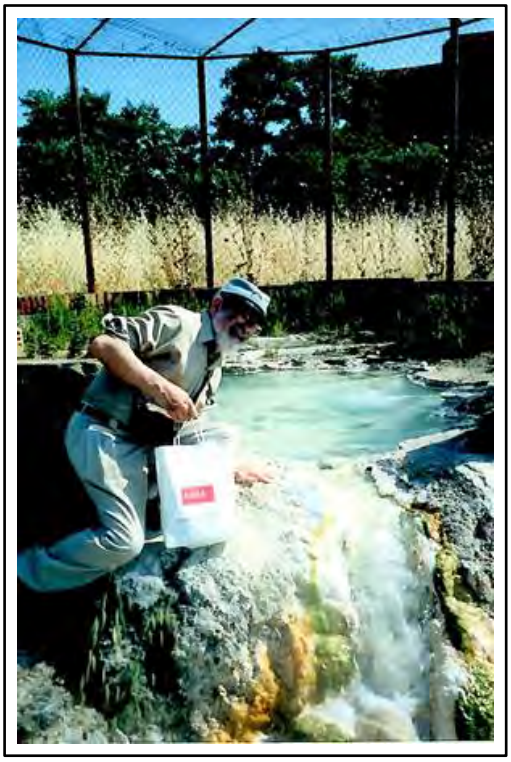
He came to visit me and my family in Quogue, Long Island on his return trip from Australia in 1979 as I was doing my field work for my thesis near Montauk Point. Here he is after we finished a picnic on the cliffs. This was about the moment when he took the last picture with his ancient camera. It might have been a photo of me -- it never worked again!

Luigi near Montauk Point, Long Island, 1979

He looked like he'd come right out of the Australian Outback and I chuckled as

we walked down the streets of posh East Hampton, him in his field clothes and big brimmed hat, and all the Hamptonites staring suspiciously and wondering of what to make of him.

In Italy, you could hardly go into a coffee shop, restaurant, or hotel without the staff heartily welcoming him back with huge smiles, unless of course our restaurant was chosen by the role of the dice. Here he is in Viterbo taking some samples where he discovered nanobacteria in Viterbo:



Luigi taking samples at Viterbo, Italy where he discovered nanobacteria.

A memorable moment was when we were on the upstairs patio of a hotel on one of the Aeolian Islands off Sicily. He was putting on his socks, and the first sock he put on had a huge hole in the heal. Then he took a second sock which also had a huge hole in the heal and put it on the same foot but upside down. He did the same with his other foot. I looked aghast… "What?" he said, "These are perfectly good socks!" The next Christmas, I gathered up all my old orphan socks with no mates and sent them to him. He wrote me a thank you note saying he was putting them to good use. On his 90th birthday, I sent him a nice new pair of wool hiking socks and told him it was about time he had a decent pair and that I expected him to wear them out.

My last visit with him and Marge was at their cabin in 2015 (I could only find

the driveway again after 3 back-and-forths when I finally saw the drab rag hanging from a branch indicating the entrance to a very overgrown road up the hill). Things were a bit haphazard inside and out as appliances, etc., were the same as they were back in 1977. He cooked a pasta dish for lunch, of course. I was trying to help out and wash up in the kitchen and clean the mini-fridge, as there was quite a lot of evidence of critters, but there wasn't a shred of soap nor any cleaning supplies. He met my inquiry with incredulity; "No, no, no, we don't use any soap here!"

Luigi and Marge at their cabin, March 2015

Luigi with Lisa Orr, March 2015

Tonight I discovered this missed email reply from last June after I sent him photos of halite crystal impressions in 2.6 billion year old paving stones. Guess I need to go to "Firenbze"!

Subject: RE: Ripple marks and more from Drakensburg escarpment in South Africa

Wunderbar! {tjhat means "meraviglioso!} McBride & I have a never-cited paper on sandstone impressions form a German war cemetery bin Firenze, Italia. [wswhy have youmvnever gone to Firenbze? I thought youm likes Art…Luigi

What worlds of inquiry, discovery, agitation, humor, and quirkiness he opened up for so many. I'll continue to love this eccentric, brilliant and very special genius of geology.

Robert Murray

In 1983, citing irreconcilable differences, my first advisor and I parted ways and I went in search of anyone I could work with to finish my degree. A dear friend suggested that I approach Luigi, who promptly said that he would be happy to supervise my thesis. We discussed possible topics until, with a twinkle in his eye, he scrounged around his office and handed me a specimen of conglomerate. He explained that in 1951 he had been on a field trip in North Texas with S. P. Ellison himself and where he, Luigi, had found this rock. He said he had thought it unusual, had always wondered if there was more of it, and, if so, so what?

Armed with that much and some maps and reports from The Bureau (then still upstairs in the Geology Building), I set off to conquer the Travis Peak Formation. The conglomerate itself was 98 percent silica, chert and quartz pebbles with silica cements, a thin, anomalous layer between the Pennsylvanian and the overlying Cretaceous. Among the sequence of cements were patchwork layers of fibrous silica that baffled us at first. Luigi said call it "Checkerboard Chalcedony" and sent me off to the Department's scanning electron microscope.

The alternating patches of length-slow and length-fast chalcedony fibers turned out to be stacks of micron-scale quartz crystals jumbled together without obvious rhyme or reason. But with no evidence of an evaporite precursor and good reason to believe these "wet t-shirt" overgrowths had precipitated in saturated sediments, I was flying in the face of two of his pet theories. And this was part of the genius of the man, he prodded us to explore, to think, to question, to go where the science took us. Or, as he was fond of saying, "if you want to make eggs, you gotta break omelettes."

For all this and more, I am eternally indebted to the man who introduced himself by saying, "I'm Luigi, I just cutta the rocks." I think of him, even now, on some sunny piazza with a glass of wine (alcohol content told by taste), holding out a rock, and asking the eternal question, "So What?"

Molte grazie, Luigi

Doug Melius, M.A. 1982, Robin Melius, survivor of Geo. 401

How do you memorialize the genius and holy fool that was Bob Folk? I met him in 1979 as one of the bloom of new grad students. More experienced people on the fourth floor recommended not to work for Folk as, "His people never got their thesis done."

Self-aware, Folk told me up front, "I am not your mother." He turned out, however, to be a wonderful midwife for my thesis. Over the next two years, Bob always had time for me and brought all he had to bear on most every issue I brought to him.

Folk's office and appearance leaned into the Mad Scientist realm. One year I was asked for our annual Final Bedlam performance to play Bob. To help the character I "borrowed" one of his ever present props, confident the disorder of his office would cause him to not miss it. On the other hand I never considered that Folk could later use his thesis advisor power over me for punishment. Looking back it really was disrespectful, but he took it with good grace.

Bob's seniority and reputation meant he didn't have to teach any undergrad classes. However, he insisted on teaching introductory Geology class each year. My spouse was at UT as an undergrad. This is her take on Luigi.

The Sand Box

In 1980 I was in Bob Folk's Introductory Geology class. My husband was working on his Master's Thesis and Professor Folk was his advisor. I took this class not only to fulfill a science credit – but also to be better able to understand the language of Doug's chosen career.

Folk was an energetic lecturer in his wild and crazy way and I enjoyed his class. That does not mean that I understood everything, but I did try. In particular, it was in the lab, taught by a teaching assistant where my frustration grew. Topographic maps had me in tears.

Then one day our TA led us all outside to a large sand box in the back of the Geology building. That was something new and different. She explained in a rather derogatory way that this was Folk's big idea as a teaching aid and she was required to do it. Then she turned on a garden hose in sand that was piled into mounds and lo and behold – rivers formed and there were deltas and alluvial fans!

I think I shouted out – "Oh wow – now I get it. It's so much clearer." The TA was not particularly happy with my response but I distinctly remember that I

thought Folk was the best teacher ever to think of different methods of bringing Geology to life.

The fact that he personally led a field trip (a very long field trip) for an introductory class tells you that he loved teaching. I feel so privileged to have known him and to have been taught by him.

Ellen R. Graber

I was a transplanted "New York Yankee" from an "effete Ivy League school" when I found myself in Austin to pursue a second degree in Geology. I had not even completed a first degree in Geology; my major at Cornell University had been History. You can imagine that finding myself in Austin Texas, surrounded by big people in even bigger hats, was disorienting.

Having completed only a few undergraduate courses in Geology before starting my M.Sc. studies meant that I was very ignorant about most things in geology, including the names of important and famous geologists. I have to confess that I also didn't know what a Longhorn was…

Just 3 nights after arriving in Austin, I attended the departmental orientation party for new graduate students. Some of the professors required their permission to sign up for their courses, and among them was one Professor Robert L. Folk, who had to give his OK to take his carbonate petrology course. Thus, at some point, I asked the person I was talking with to direct me to Prof. Folk. She pointed to the other side of the large room, towards a small man in scruffy khaki-colored clothes and a hat. I made my way across the room to him, and in my best New York Polite, asked him, "Excuse me, are you Prof. Folk?" I guess he thought I was one of the adoring young graduate students awestruck by meeting Prof. Folk of the Folk classifications for carbonates and sedimentary rocks. Actually, at the time, I had never heard of that. I just wanted permission to sign up for his course. After I asked if he was Prof. Folk, he looked at me a moment and then responded: "*No no no, I justa Luigi, I justa cleana da floorsa*". I gawked at him a split second, spun around to look back at the woman across the room who had directed me to him, traced the path I had taken to Luigi with my eyes, and turning back to him, broke into my widest and happiest grin of my 3 days in this foreign place called Texas. I looked at him with great joy in my heart and all over my face, and announced to him: "You're going to be my advisor."

And so it was.

Thank you Luigi, for the clean floors and for everything else.

Chuck Caughey

A truly remarkable man, innovative to the extreme in research, a gifted teacher, and sometimes just plain strange. One day in sedimentology lab he was writing on the board (yes, we had those back then) in different colors with both hands. On a sediment description test, one of the samples circulated was gold bearing sand – I think from the skeleton coast of Namibia. I was a good student and almost never late to class, despite a crushing load (for me) of 18 credit hours. The one time I did try to sneak late into lab, Folk immediately called me to the front of the class to "write on the board." I then heard a very loud "WHOOSH" and my world turned white. The white haze slowly cleared, and I was facing a laughing Dr. Folk, pointing a fire extinguisher at me. "You should have seen how high you jumped!" he exclaimed, to an appreciative class.

Steve Cather, Ph.D. 1986

In the summer of 1977 I arrived in Austin to begin a sojourn as a graduate student that would ultimately encompass nine years and two degrees. I would never have guessed it at the time. Fresh from a less-than-wonderful experience in the uranium industry, I had begun to question whether geology was a career choice that would work for me. I envisioned the master's program at UT as a tipping point: I would either find my footing in geology, or head back to New Mexico and explore other options. To that end, I enrolled in classes in both geology and art my first semester.

That's when I met Bob Folk. My first encounter was outside the geoscience office. He glanced briefly at my long hair, raised one hand and said, "How!" Hollywood-Indian style, then scuttled off down the hall. I enrolled in one of his petrography classes (sandstones, I think) and was immediately swept up in his lively, interactive teaching style. The name Folk to me was already somewhat legendary—his was probably the first geologist's name I had learned vicariously, strictly by repeated exposure during undergraduate lectures. So I had assumed he would be a hyper-busy, self-important type. I was right about the first part, but dead wrong about the last.

I eventually approached him to supervise my master's thesis. He informed me he had no money to support students—he wasn't into mammon—but I might get a bit of help from the department, and Richard Morales could make me a great set of

thin sections. But other than that and my TA support, I was on my own. Thankfully due to my connections with Chuck Chapin at the New Mexico Bureau of Geology (where I now work), field support was not an issue.

Folk was a proponent of science on a shoestring, that you could be a more productive scientist doing research on the cheap than by pursuing research grants. Given the amount of time some my colleagues spend writing and rewriting grant proposals, I have to agree. Folk often said he could get more research done if he could sell shoes during the day rather than teach.

One day during my first year at UT, I brought my class schedule to Folk for his signature. He noticed my art classes and gave me a quizzical look. I said I was hedging my bets, as I was not convinced science offered enough of a creative outlet. He said, "You're crazy! Science can be endlessly creative. Just look at me!" The conversation that followed was a tipping point in my life. I decided to go all-in on geology from that time forward.

Perhaps the greatest indulgence of being a Folk student was the endless time he was willing to spend with you. Pretty much any time he wasn't teaching class, you could walk into his office with a box of thin sections and pick the mind of one of the world's greatest petrographers. I remember long hours of staring down his 1924 brass-tube Zeiss microscope, asking endless questions and responding to "So what? Speak!" when he found a grain that was particularly instructive. And the wooden file cabinet full of thousands of hand-written 3x5 cards for nearly every paper he'd ever read. And the blackboard covered with the unreadable, fossilized scribbles.

Despite his many honors and awards, Bob Folk never let fame go to his head. He was engaging, funny, big-hearted, and always interested in promoting good will among the graduate students. His mandatory "field trips" to the Broken Spoke dance hall were legendary. As I set out for summer field work during my master's study of Eocene red beds in New Mexico, he threw me a reprint of his work on the red sands of the Simpson Desert and said, "See if you can tear this up." I ended up agreeing with most of his findings, but he would not have been offended if I hadn't.

Flash forward to the nineties, when my wife (also a Folk student—Martha Cast Cather) and I had the great good fortune to make three trips to Italy with Folk. What a time! Luigi (as he was known by then) was quite fluent in Italian, so we were able to travel, dine, and find lodging without the usual language-barrier issues. We were studying travertines throughout Italy—a crappy job but somebody had to do it. I was impressed by how Luigi, who was no spring chicken by then, could each morning navigate the complex Italian railway system to the next hot-

spring deposit, sample it, go visit the local museum or cathedral, then, after a short *pisolino*, find the best restaurant in town to wine and dine.

In his later years I would call him every six months or so at his home. Each time we would pick up where we had left off. I think his memory for past conversations was better than mine. I spoke with him after his beloved wife Marge passed in 2016. He held no bitterness or remorse, only thankfulness for 70 great years of marriage. He was sure he would see her again soon.

John D. Pigott, Ph.D.

Luigi, you were never 'scifoso' to us…

You were, however, a hand lens fashionista, early riser, color chalk thrower, dice roller, illegible hand-writer, water gun assassin, ping pong athlete, Pi-Sheng referencer, statistical verifier, Poisson perpetrator, Baseball game fanatic, Public transportation fan, office hammocker, invisible office hour holder, library fanatic, sand pile player, north window user, old microscope afficianodo, Sorby-Krynine apostle, Italian fanatic, Laura Antonelli admirer, mischievous corn starch slapper, premier carbonophile, oil painter, Monroe discoverer, chattermark investigator, chicken wired shallow water radiolarian arguer, heuristic modeler, God-fearer, Sunday school teacher, Mahjong master, nanobacterial discoverer, life changer, Marjorie-lover, and a gadfly of an infectious professor who taught us to question everything. Luigi, you were never 'scifoso' to us, instead you were a Genius that we were most privileged to have touched our lives…all too briefly.

Luigi,

A metà della mia vita
mi hai aiutato a trovare la strada
nell'oscurità mi hai dato la luce
per questo sono per sempre grato
per questo sono diventato un professore
ora devo viaggiare da solo
fino a quando non ci incontreremo di sicuro
Arrivederci,
-Giovanni

R.L. Folk, 1977

Jack Sanders, B.S. 1957

I sadly learned of Bob Folk's death in the Sept/Oct 2018 Alcade. It's good that you and your colleague are preparing some memory material – Thanks.
I attended his sedimentology and field courses sometime in 1955-57. Bob Folk's unique dedication to his craft and his students was remarkable. As a result, I became enamored with sediments. A couple of recollections that come to mind are:

1. His repeated throwing of dice and hand-recording of results for his baseball game and probability study while students were working on assignments in classrooms at UT.
2. When being a co-leader with geology professor Jack Wilson at a field course housed in a gymnasium at Smithville, Texas, Bob Folk would sometimes take local rock specimens to bed with him (if his guitar didn't get in the way). He thus demonstrated the need for students to really get to know the rocks.

Gregor Paul Eberli

So sad indeed. I always enjoyed his enthusiasm for geology and his out-of-the-box thinking. He was such (a good) character. I will never forget when Lynton gave a presentation for him about nano grains - only a really good friend would have been able to do this in the way Lynton did.

Charles Kreitler

Luigi lived a good life. No, an extraordinary life. He and his wit and perspective on life will be missed, but he most definitely left his mark on the world.

Eugene Shinn

I was thinking about him just yesterday. He is in the piece I have been asked to write about Bob Ginsburg's passing. Mike Lloyd and I use to drive over to Austin quite often to visit with Bob. I have been writing about a meeting Ginsburg organized in Bermuda about marine cementation. We did a field trip to look at the Boiler reefs we had blasted. I found a small pile of strange brass objects which I

collected. I thought they were some kind of boat hardware. (like rings to hold the sail to the boom.) Bob Folk recognized them from postage stamps. They were slave bracelets used by slavers to buy slaves. Everyone got one for a souvenir of the meeting. I still have a few. Bob was the only one who knew what they were.

On reading Pete Rose's comments, Gene responded: I remember many conversations about Bob Folk I had with Walt Bloxsom (It included the time he broke off a piece of the Great Pyramid in Egypt to prove it was not made of portland cement as some French dude had claimed)...and as you probably knew if you got a sketch of an upside down dead bird on your test you had failed. And another. He once converted his salary into quarters that he painted red so he could do the statistics on how many in circulation came back to him. I think I got that one right.

Daniel Bernouli

With his passing, another person who was very important for my scientific and intellectual growing-up is disappearing. Although we did not meet many times, our meetings and the discussions were always very intense and so was our correspondence about the many problems we disagreed. Because of him, in 1972, I undertook a self-guided tour to the Marathon Basin to look at the Caballos Novaculite, that influenced our discussions on the bathymetry of the radiolarites (this excursion confirmed my prejudices interpreting the succession of Maravillas–Caballos–Flysch as that of sinking passive margin turning into an active one, as in the Apennines). Later we had very different opinions about the ophicalcites of Liguria. However, although we disagreed in many points, all the discussions were fair and I like to remember them because they were carried out with respect and a quite good sense of humour from both parts. After all they tought me to sharpen my arguments and to think in a clearer way. I admire also his capability to produce together with Earle, despite of very different interpretations, such beautiful papers as the ones on the Caballos or the Ligurian and Tuscan sediments. This is a type of intellectual style that, unfortunately, is disappearing, and such papers are rarely written today.

I also shared Luigi's love for Italy. I guess that the Italian chaotic way of life corresponded very well with the subversive, unconventional side of his intellect. Unfortunately, as you state, history is lost in our science and most of Luigi's Italian friends have disappeared.

Aaron Land

I absolutely remember him playing his dice game, it was fascinating. I think my favorite was when we discovered he always turns left out of a station. Followed by tricking the students into drinking strong drinks.

Dave Budd

I emailed a number of people internationally, and the only response so far is from Tony Dickson. He wrote:

The end of an era! I was directed to his little orange backed book only last week but I brought it in a second hand bookshop on Charing Cross Road when I was a student in London in 1960. I only met Bob "face to face" once. I first visited Austin in 1993 and was told "it's unlikely you will be able to use the SEM as the search for nannobacteria is all consuming". On looking into the lab there indeed was Luigi enthusiastically extolling the beauty of little blobs on the screen to whoever would listen.

– Tony Dickson

Bob Folk was one of the founding fathers of sedimentary geology, arguably the founding father of sedimentary petrography.

I met Bob Folk only once, to thank him for a set of reprints he had sent me years before when I was an office clerk working to raise enough money to do a PhD. I still have all those signed reprints as they meant so much to me then and still do. I used to show them to my graduate students. That set of reprints had a huge impact on how I understood carbonates and his work provided an enormous stimulus to me at a critical stage in my career.

– Paul Wright, Ph.D. D.Sc. FGS

Judy McKenzie

Thank you for your message about Bob Folk's passing. Bob was a special person for myself and my colleague, Crisogono Vasconcelos. In fact, it was Bob who first proposed to us that some of the features we observed in our SEM studies of modern & experimental dolomite may be related to microbes. Bob was much

appreciated by many geologists around the globe. Who can forget meeting “Luigi”, always with his hand lens ready to look at any rock you wanted to show him for his opinion? Crisogono and I recently participated in the Brazilian Petroleum Conference in Rio de Janiero in mid-June, and there were several references to Bob and his impact in presentations given at the conference, and in conversations among the more sedimentology-oriented participants.

We would have our own Bob stories to tell, but, maybe better yet, we had invited Bob to give a special colloquium at the ETH back in June 1997. The title of his talk was “Nannobacteria (dwarf forms) in carbonates, clay minerals and outer space.” We made a videocassette of his talk because we thought it might be useful for teaching. We have not viewed it recently but are now definitely planning to have this video transferred into a digital format. If the transfer proves to work well, we will send you a copy to view. In any case, Crisogono and I would be happy to contribute our thoughts and remembrances of Bob for any documentation that you are planning. Please keep us informed.

With best wishes,
Judith & Crisogono

Art & Peggy Palmer

Time has obliterated the grand early days of sedimentary geology when adventure was in the air, and one could concoct titles such as “Black Phytokarst from Hell.” And now “Luigi” is gone. No more scattered notes banged out on a manual typewriter with faded ribbon and uneven lines. Science is more rigorous today, and undoubtedly better, but it’s lost much of its sense of crazy adventure. Bob’s time had passed long before he did, and perhaps as a result we miss him all the more.

Comments on Luigi submitted to the Weed-Corley-Fish Funeral Home website, presented here with the approval of the funeral home and Jenny Folk Mann and Steve Mann.

I just learned of Dr. Folk's passing when I read the JSG newsletter. I was at UT from 1974 to 1978 where I did my PhD studies under Dr. Clabaugh on metamorphic rocks in Mason County, Texas. Despite my "hard rock" background I took his Sandstone and Carbonates courses in '76 and '77 and greatly enjoyed them; one of my fondest memories was the timed tests he gave where he had this loud

"gong" to signal when it was time to switch samples. He would usually sound it behind the student that was concentrating the hardest on his thin section. I have a daughter who is at UT now (art major), and when she was visiting the art department last year I toured the JSG building and knocked on his office door, but unfortunately he was not there. I am semi-retired doing core testing for Baker Hughes in Houston; today I was sent a carbonate rock core, and I remember Dr. Folk's classification, it is an "intrasparite" I think. Thank you for the knowledge and memories, Dr. Folk. "present with the Lord" 2 Cor 5:8. Jack Droddy PhD (1978).

– Jack Droddy, Student, Spring, TX

I did not meet Bob Folk until I was a Research Scientist at the U.T., Austin, Bureau of Economic Geology during 1962, although I was familiar with his work in sedimentology. I reminder chiding him for not publicizing his carbonate-rock classification before I did my M.S. thesis at the University of Kansas--it would have made my work much more significant. I had the pleasure of getting to know him during the 2 years that I spent at UT. He was an inspiration for many years later, and my sedimentology classes at Bowling Green State University and two other universities, although I think that the occasional student did not enjoy hearing about him so often! When I started to tell them personal stories and experiences that I had with him, most of them changed their minds.

– Donald Owen, Coworker, Beaumont, TX

Dr. Folk's Physical Geology course was my favorite class at UT. He inspired me and many others to change our major to Geology with his gorgeous slides, his "down-to-earth" explanations, and lots of laughter. My sympathy to his family for the loss of a Legend.

– Anne Miller, Austin, TX

My passion for sedimentary rocks when I used to be a young Geology student in Mexico City was inspired in part by the Folk's orange book. Goodbye to a universal teacher

– Mario Alberto Guzmán Vega, Significant Other, Bucaramanga, Colombia

I first met Dr. Folk -Luigi- in the Fall of 1978 when I started graduate school at The University of Texas at Austin. I took his course "Petrography of Sedimentary Rocks" and loved it. He was so different from any professor I'd ever met. Luigi was engaged in wonderful dialogues with his students, prompting us all to think and analyze and explore. He was the best professor I've ever had- and he left a lasting impression on me. I re-connected with Luigi and Dr. Earle McBride about 8-10 years ago and have been corresponding with them both over the years. I've even

sent Luigi several copies of books I've written on American history, including my latest titled "Hemingway, Cuba and the Great Blue River", which he said he loved. I am blessed to have had him as my professor- and honored to have been his friend. Luigi- you made a very positive difference in my life. You'll always be part of me... Rest in peace, my good friend... I miss you already... but I know you're at peace now, exploring rock outcrops up in Heaven and finding new proof of the existence of nanobacteria. May you be blessed in God's light in Heaven forever. Sincerely, your former graduate student and friend, Gene Pisasale

– Gene Pisasale, Student, Kennett Square, PA

Dr. Folk was my God. After taking almost every course that U.T. had to offer and three degrees, Folk was the most inspiring Professor I ever had. It was an honor to have been one of his graduate students and I appreciate his legacy every day as a geologist and will as long as I live.

– Feather Wilson, Student, Bandera, TX

We had an unforgettable trip looking at the Messinian Gypsum evaporites of the Vena del Gesso in Romagna, Italy, crossing the Santerno River in Borgo Tossignano, together with my student Stefano Marabini in early sommer 1974. He was fascinated by some special schizoid features of those evaporites and spent a lot of time looking at the rocks with its legendary field microscope.

Looking for his agreement on my interpretation of filamentous algal mats growing concurrently with selenite crystal growth, we were surprised by his immediate field definition of a "spaghetti-like texture" still in use since. He loved Italy, Italian food, Italian field geology, Italian flowers, in spite of suffering visibly for asthma. I am most indebted to Bob "Luigi."

God bless him in the asthma-free fields

– Gian Battista Vai, Friend, Bologna, Italy

I was never lucky enough to meet Bob Folk, but his work was a primary inspiration to a young sedimentologist starting out in the late seventies, and remained with me for most of my professional career. It was, and will remain, work for The Ages. RIP Professor Folk.

– Kevin Schofield, Student, Beacon, NY

When I began my employment in Geological Sciences, I was befriended by Bob and came to know him as a marvelous person: quick witted, super intelligent, down-to-earth, and a prankster! Such a good man, and always friendly and helpful

to everyone. The likes of Bob Folk only walk the Earth occasionally and I'm happy that I had the pleasure of knowing and working with him.

– Bill Woods, Coworker, Austin, TX

As a UT library school student in the mid- to late 90s, I looked forward to my shifts at the Walter Geology Library and was especially glad when they included (as they so often did) a drop-in visit from Dr. Folk. More intellect, wit, enthusiasm, energy, charm, and sense of mischief than a body has a right to have, punctuated by an impish grin that I can see even now, 20 years after I left.

– Camille Cooper, Clemson, SC

Dr. Folk enjoyed life. He was interested in everything. He was a giant in his field, but had insights in many other areas that caught his interest. His contributions to science were huge. The international recognition that he received was huge. He was the smartest person in the room, but his hat size stayed small.

He was my professor at U.T., but interacted with me on a personal level with joking, political bets, stamp collecting, and just talking about stuff. I don't remember a time that he wasn't in a good mood. Of all of the people that I have known, Dr. Folk was the most interesting, inspiring, and entertaining.

– Steve McLean, Student, Austin, TX

It is a great loss for those who love to learn Sedimentology. He will be remembered for the decades to come for his significant contributions in the field of Sedimentology and Natural Science. May his great soul rest in peace.

– Prabir Dasgupta, Kolkata, India

Dr. Folk was the best teacher I ever had. If you dozed off in his class, he would throw chalk at you. My favorite memory of his teaching style, was when he threw talcum power on everyone in the first few rows of the auditorium in a GEO 401 class. As we all coughed and tried to brush it off, he said "see how hard it is to remove, that is because it is a sheet structure silicate and plates just slide past each other."

– Fred Becker, Student, from the 80's, TX

Dr. Folk was a true renaissance man. A master of many forms of science, an incredible teacher, a humorist, a philanthropist, and an inspiration to all who knew him. I took 3 courses from him. The last was in sandstone petrology. He was a hard, but fair grader, and graded on a curve, even in his graduate classes. He used to post our grades on his door in Eqyptian hieroglyphs to maintain identity protection, but he had given his classes the key to the hieroglyphic characters. When I realized I

had made an A- in sandstone petrography, it was the most satisfying moment of my academic years. When I went to work for Conoco after getting my M.A. degree, and later contacted Luigi, he quipped "how's Mammon?" Lastly I now live in and love Italy, and once again Dr. Folk's passion for the country and the people related by him fired my passion and interest. Rest in peace, amico. Your spirit lives on in the many students and friends you touched so softly.

– Tom Connally Connally, Friend, Reusa, Italy

Bob Folk was always a bright and delightful lecturer - even when he overwrote the blackboard in numerous colors of chalk, and when he challenged graduate students in the game of that year. His brilliance as a geoscientist will be missed, even by those of us of the Hard Rock Persuasion. His kindness and the intellectual challenges he promoted will remain with me as long as I live. Best regards.

– Bob Levich, MA, 1963; Las Vegas, NV

I am a sedimentologist and his book on the Petrology of Sedimentary Rocks still has pride of place on my bookshelf and I use his material every year in my teaching.

– Greg McNamara, Australia, Jun 07, 2018

Bob was an important influence to my early career. He was one of the keenest observers and inventive thinkers I've ever met. He will be missed. My condolences to his family. We've lost a world-class geologist.

– Sam Upchurch, Coworker, Tampa, FL

Thanks Mr. Folk for your legacy in the world of Geology and thanks for keeping it real to all us undergrads. Joel Coffman, BS Geology 84'

– Joel Coffman, Student, Vacaville, CA

Dr. Folk was my introduction to the study of geology. He inspired me to change my major to geology. He was such a great presenter and teacher --so much patience! I will miss him not being around the UT campus.

– Armando Garza, always a student, McAllen, Texas

He was the top of my list of geoheroes, the best teacher of all principles of geology, a fun guy to spend any time with, and it was on honor to have any nickname he might give you, thanks Dr Folk, I will always be the "Zero state of knowledge" guy. You are missed.

– Frank Cornish, Student, Austin, TX

Dr. Folk's unique teaching style had a profound influence on my whole family, having lasting influence in each of our lives. He was my father's (Feather Wilson's) thesis supervisor when I was born - no small influence on my geologic name (Clay Hill) - and if not for his ability to inflame curiosity and enthusiasm for geoscience, my brother Douglas and I may well have chosen different careers.

Upon hearing the sad news of his passing, my first thought was how much I wish people like him could stay with us for longer. Imagine all the great contributions of discovery he would continue to bring for so much longer. Come to think of it, I'm sure he will through his great influence on so many students. Thank you Doctor Folk. Your memory will not fade.

– Clayton Wilson, Student, Houston, TX

Strangely, I happened to glance through Luigi's 90th birthday publication just a couple of weeks ago and wondered how he was doing. And now this sad news. A pure intellect and inspiration to everyone who knew or had contact with him. He'll be missed and never replaced.

–Tom Clark, MA, 1972; MN

He was an advisor, mentor and inspiration to me. I'm blessed to have had him in my life.

– Howard Kiatta, Student, Houston, TX

I feel so lucky to have known Luigi. One of my best teachers, and what a joy to have benefited from his wit and wisdom in Austin and Metaponto. I'll always remember him smiling and holding a rock in his hand, like the photo Chris took in 1981. My sincerest condolences and prayers for his family.

– Deena Berg, Student, Austin, TX

Thank you Bob for your inspiring contributions to sedimentary geology from a long time fan.

– Tim Chiowns, Coworker, Carrollton, GA

Tony Walton

The following story (edited slightly) was sent to Chock Woodruff as part of other communications between the two ex-students following Luigi's death:

A story worth telling for the archive: Manually enhanced stereoscopic vision.

Science sometimes advances by systematic investigation, sometimes by serendipity and unexpected insight. Sometimes brigades of physicists attack the question of Higgs bosons; sometimes apples hit Newton on the head. The falling apples (or bird droppings) or hogs finding truffles (Folk's statement on Susie Pittman and length-slow chalcedony) were always one of the most appealing and compelling aspects of Bob Folk's science. A minor example.

Folk came to see me while I was doing fieldwork in the Sierra Vieja for my dissertation. It was the summer of 1970, and he was teaching field camp in Marathon, so it was an easy run to Marfa, then progressively less easy down Pinto Canyon to Ruidosa, up the Rio Grande to Candelaria, and another 15 miles up Capote Creek and a tributary to a 2-room white house on the Chambers Ranch where I was staying. He arrived in the late afternoon. We had some dinner and then went to a nearby outcrop. I made some interpretation, and he, of course, challenged it. I showed some weakness, and he looked for further advantage. But eventually we came to some resolution, but I realized I'd better be on my intellectual toes.

There were some Mexicans staying at the same place, in a trailer. They had a bulldozer and were building a road across ridges of Vieja Group to another ranch. The next day, Folk and I took the new road to an area where I had measured some sections and looked at the rocks. We used the International Carryall he had brought, instead of my '59 Chevy sedan, as it was not up to the local topography. I was in shape and Bob was less so, so when I had hiked him around for a couple of miles over hill and dale, he tired. Fortunately, he had his billy can, and he built a little fire to have some tea. That area looked at, we drove down the valley to another spot. When we were fording Capote Creek, he stopped and demanded that we rest a while, so we found a shade by the creek.

The West Texas sun is intense in mid-afternoon. We were looking at a blazing white outcrop of the upper part of the Capote Mountain Formation, the part where it had altered to zeolite, smectite, and opal, but had not taken the red stain as is common down the section. He was trying to cut down on the reflection. He shaded his eyes, and then made binoculars by curling his hands into tubes, the way little kids might do. "Look at this," he said. "What?" I said. "Hold your hands like this and tell me what you see." I tried it and somehow got what he wanted me to see, how vision is sharpened by shading the eyes and cutting out extraneous light. It is a little like closing down the f-stop on a camera or the substage diaphragm on a microscope.

That evening, Folk had me place pairs of objects so that they were adjacent to each other or one a short distance behind or in front of the other, while he peered at them with this hands curled into fake binoculars to see if his differential distance

perception was enhanced by his newly discovered device. We had some toilet paper or paper towel tubes, and he tried them as well. Somehow, a typewriter appeared; perhaps, I had brought it with me to write up notes and stuff. He wrote up a very short description and mailed it to GSA from the little Howard and Walker store in Candelaria the next day. Somewhat surprisingly, the little note was published (Folk, 1970). A discussion by Rosauer (1971) deals with the physics, physiology, and psychology of the effect.

I never called Bob Folk "Luigi", but at one point he started to refer to me by my middle name, Warrick. In return, I addressed him as Lew for a while, referring to his middle name. I have always been curious whether my Lew evolved into his Luigi as he entered his Italian phase. I have not visited with him much over the years, but will miss him nevertheless. God—or Satan—should be prepared for direct questions and challenging insights.

Folk, R.L., 1970, Greatly enhanced stereoscopic vision through the use of two hands: GSA Bulletin, v. 81, p. 3421.

Rosauer, E.A., 1971, Greatly enhanced stereoscopic vision through the use of two hands: Discussion: GSA Bulletin, v. 82, p. 2377-2378.

Chock Woodruff

MY FIELD DAY WITH DR. FOLK

I recall during the beginning of my second year in graduate school, when I had a field project defined, but not much else, RLF asked to accompany me to my field area. So we spent a day together, driving the back roads near Lake Travis and stopping frequently. He was not on my committee, but I think he wanted to check out what this new topic, "environmental geology," was all about. And, of course, he wanted to test me, which he did. It was like having an all-day oral exam in the field. He would grab things off the ground and hand whatever it was to me, and say, "What do you make of this?" Certainly the samples that I was tested on included other substances beside "rock." I had to deal with questions on soils, lots of caliche, various plant genera (lichens, mosses, and the like, all the way up to oak trees), and (foreshadowing a future interest) microbes that were visible to us. One such was a slimy sample of the cyanobacteria (genus Nostoc): the gelatinous mass commonly seen on rocky ground of the Hill Country. Having recently returned from a visit to Egypt (the Western Desert and possibly to the Sinai Peninsula as well), he told me that this slimy stuff "was believed" to have been the manna from heaven in the Book of Exodus. Without fanfare, he shoved the "sample" into my

mouth, saying, “Take. Eat.” It was not very palatable. Moreover, I later learned from a friend in the botany department that some species of Nostoc are poisonous!

It was a mentally taxing day but very educational. In the usual “Folk style,” he was teaching as well as testing. In sum, it was a rich experience that I look back on with great fondness.

Brenda L. Kirkland

THOUGHTS ON THE SIGNIFICANCE OF NANNOBACTERIA

As an undergraduate in Dr. Folk’s 401 class in 1978, it struck me that a guy who noticed that paint rolled on a smooth surface created patterns that looked just like longitudinal sand dunes, had a brilliant gift for observation. That same gift, combined with clever intellectual ability and the determination to push an old SEM to magnifications well beyond what it was engineered to image, found clusters of tiny spheroids 100 nm in diameter in samples from Italian hot springs. At that time, bacteria were formally defined as being larger than 200 nm, so he christened these tiny spheres “nannobacteria” (Folk, 1993; Folk, 1992). The biological community did not receive his initial definition well and the backlash that ensued included an entire meeting, to which Luigi was not invited, devoted to proving he was wrong (Knoll and Osborn, 1999). Luigi fought back with more and more images of nanometer-scale spheroids. In addition to being a brilliant observer, he also fearlessly ventured into the literature of other disciplines and he argued his case well. Luigi noted that the “minimal boundary for the size of ‘life’, was originally established by the resolution limits of light microscopes”. That, combined with the practical limits of 0.2-micron-filtration procedures, set the official definition of bacteria at the easily accessible and easily visible limit of 200 nm in diameter. Luigi, however, used his superior SEM skills to image spherical features of 50-200 nm in diameter and his observations were later confirmed with TEM images (Corley, 2009). Regarding nanobacteria in biofilm from hot springs near Viterbo, Italy he wrote, “we can see a complete transition from cells of ‘normal’ size with ribosomes, diminishing to objects with dense cell walls and less dense interiors down to 50 nm or even smaller. There is no ‘break’ at the 200 nm size which is commonly set as the ‘lower boundary of life’.” With these observations, he then entered into what he called “the realm of intelligent speculation” that the hot spring samples from Viterbo provided a “modern, studyiable example of the evolution of first ‘life’ from a currently extant analogue to the first ‘primordial soup’.” I, as his co-author tasked with online submissions, was never able to find a publishing

venue for these intelligent, but a little too creative for main stream scientists, speculations.

It strikes me now, that the enthusiastic rejection of nannobacteria has parallels to the initial reaction to heliocentrism, evolution, or plate tectonics. Luigi's hypotheses might have been a bit much for the scientific community to digest initially, but his fundamental observations, just like those of Copernicus, Darwin, or Wegener, were brilliant. In the end, the first nanometer-scale spheres he found in the hot springs of Viterbo Italy turned out to be genuine, tiny, 100-200 nm, perfectly spherical, coccoid bacteria. His initial observations were correct, and in the intervening years the biological community has changed its definition for the lower limit of life. The Google search I did today for "size of the smallest bacteria" hit first on *Pelagibacter ubique* with an average cell diameter of 0.12-0.20 μm, which converts to 120-200 nm, and falls neatly within the size range for "nannobacteria" (Folk, 1993).

As amazing, and now redeeming, as his work on the tiny bacteria in Viterbo was, the other nano-bumps that he found are potentially even more important. By routinely pushing that old SEM beyond its capabilities, Luigi found nanometer-scale spheroidal structures in a wide range of samples including: dolomite, meteorites, barite, soil, rust, illite/smectite, cataract, chert, chrysocolla, geyserite, goethite, gypsum, arterial calcification, calcite, aragonite, sulfur, ore minerals, kidney stones, bones, teeth, shells, and pipe-scale (Folk and Taylor, 1992; Folk, 1993; Folk, 1994; Folk, 2007; Folk and Lynch, 1997). It was his first GSA presentation on nannobacteria that inspired a NASA post doc to create those famous images of nanometer-scale spheroids from Martian meteorite ALH84001, providing what is now the most familiar evidence of extraterrestrial life (McKay, et al., 1996). The spectrum of samples from Martian carbonates to weird rocks and odd ball minerals at first glance seems like a crazy array, but it is important to note that these nanometer-scale spheroids are not everywhere. Twenty years later, I now realize that, once again, Luigi's innate brilliance was taking him down a very logical path. Many years of work and tremendous improvements in instrumentation have shown that the nanometer-scale structures in bones, teeth, and shells are the organic framework of biomineralization. The very tiny bumps in arterial calcification and in kidney stones are linked to inflammation that causes biomineralization in undesirable places. The sub-spheroidal nanometer-scale bumps in pipe scale, chert, and soils are relicts of the microbial communities that promoted their formation. We now understand that microbes in natural settings induce precipitation in multiple ways. They can create microenvironments that induce precipitation of protocrystals or precipitation can occur in association with individual bacteria, where precipitation initiates either in organic molecules in

mucilaginous coatings or in association with the organic molecules that make up cell walls (Riding, 2000). In each case organic molecules promote the initial precipitation of protocrystals before inorganic precipitation takes over. Using new SEM and TEM technology, we can now clearly and relatively easily see that both the organic molecules in these environments and the protocrystals that form there, make up the sub-spherical nanometer-scale bumps that Luigi described initially as nannobacteria by painstakingly pushing that very old SEM beyond its capabilities (Testa, 2017; Corley, 2009). The structure of clay minerals had long ago been linked to the origin of life (Paecht-Horowitz and Katchalsky, 1973). TEM technology now allows us to image clay minerals forming in the mucilage associated with microbes (Sumrall, 2012). In the case of dolomite and aragonite, which should not form at the pressures and temperatures of the Earth's surface, organic molecules overcome thermodynamic boundaries to form protocrystals and initiate crystal growth. Someday, similar processes may be harnessed and enhanced to capture carbon from the atmosphere. Nannobacteria didn't just promote ponderings about the origin of life or inspire the search for extraterrestrial life, they might just save the world. Luigi was the one who made us look.

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Postscript by E.F. McBride

John Young and Jan Martel (2010) did experiments and were able to generate Folkian nanobacteria abiotically. They contend that "claims for the tiniest of pathogens outpaced scientific validation until the [present] authors and other scientists showed that although the particles appeared alive, they were merely aberrant crystallizations of minerals and organic molecules. The mineral protein interactions that produce the nanoparticles nonetheless reveal details of the processes that can protect or undermine human health." [comment by the editors of: The rise and fall of nanobacteria: Scientific American, Jan. 2010, p. 52-59.

Kitty Milliken, Earle McBride, and Lynton Land

On June 4, 2018 the sedimentary geology community lost one of its heroes (www.jsg.utexas.edu/news/2018/06/remembering-bob-folk/). Robert Louis Folk's international reputation was founded on his classifications for limestones and sandstones but also on an ebullient personality that allowed him to build

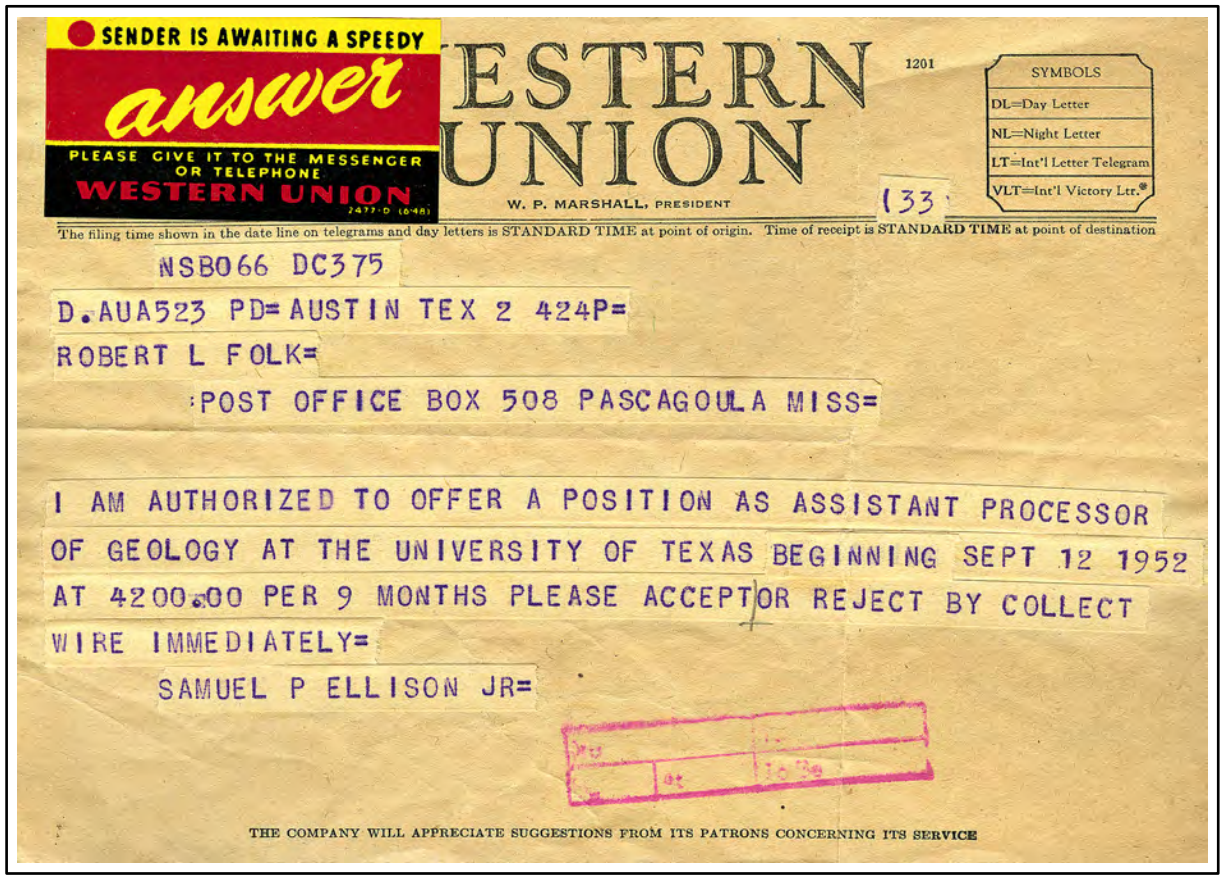
friendships and collaborations with colleagues all over the world. His entertaining presentation style always drew a happy crowd.

Bob authored over 100 research papers in international scientific journals and professional volumes. The value of his written and oral contributions earned him the W.H. Twenhofel Gold Medal from the SEPM (1979), the H.C. Sorby Medal from the IAS (1990), and the Penrose Gold Medal from the GSA (2000). In addition, he was awarded the Neil Miner Outstanding Teacher Award from the National Association of Geology Teachers (1989).

Bob Folk was born in 1925 in Cleveland, Ohio. His father, George Billmyer Folk, grew up on a farm in the Shenandoah Valley and became a lawyer in Cleveland. His mother, Marjorie Kinkead Folk of Columbus, Ohio, was an accomplished pianist and painter. Bob became interested in rocks and minerals around age 5 because of all the pretty pebbles in the moraines that had been carried down from the Canadian Shield. He became attracted to sedimentary rock classification because there existed exotic names for igneous rocks like andesite or gabbro, but sediments were just sandstone, limestone or shale; he thought there must be a better way. Later, he found the better way and his classification of sedimentary rocks is still the gold standard and established him as one of the founders of "Soft Rock Geology."

Bob entered Penn State as one of only three geology majors that year. The turning-point in his career was in 4th semester when he took hand specimen petrology under the incomparable Paul D. Krynine, a titan of sedimentology who instilled into students the need for detailed observation and classification, and showed them how to think critically. In college Bob was a long-time member of the Nittany Co-op, where 20 meals were $5.25 a week. In 1946, while waiting tables, Bob met, Marjorie Thomas of Kennett Square, Pennsylvania. They were engaged three weeks later and married in six months.

After getting a Ph.D. in 1952, Bob worked briefly for Gulf R&D Company in Houston, Texas and Pascagoula, Mississippi, examining marine sediments and river sands of the eastern Gulf Coast. At that time, textural analysis was thought to be the "key to finding oil fields". But Bob decided that his future lay in teaching, and in February, 1952, while driving through Austin, Texas, Bob walked in off the street to the Geology Department and asked if they had any jobs. Luckily, their sedimentologist was about to retire, so the department chair virtually hired him on the spot for $4,200 a year.



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The telegram Bob received offering him his first teaching job.

In those days, before the pressure of grant-driven science, the department allowed him to work on anything he pleased – dune sands, pebble shapes in Tahiti, modern carbonate sediments of Yucatan, the petrology of avian urine, the petrography of roofing tiles, enhanced stereo vision using two hands, black phytokarst from Hell, a unit of scuffle abrasion on stone steps, vitrified rat feces of aragonite, and a challenge to the concept that the pyramids of Egypt are made of epoxy-cemented crushed stone. He did this research without having to squander science-time writing proposals. Wherever he traveled Bob sought out the local culture and cuisine, using bits of languages he quickly acquired and applied with abandon. He was passably fluent in Czech and Italian, but never hesitated to make exclamations in Chinese. He liked to grade graduate student papers in Egyptian hieroglyphics, leaving it up to them to translate his marking system.

Teaching field camp in the Marathon Basin, Trans-Pecos Texas, Bob became involved in the problem of radiolarian/spicule cherts and the deep vs. shallow controversy he carried on with Earle McBride for over 3 decades. In 1973, at the invitation of Riccardo Assereto, Marge, Bob, and daughter Jenny spent six months at the University of Milano and fell in love with the Italian life style. As a result, in

1974-75, Bob and Earle expanded their interests in chert to Sicily, the Appenines, and the Alps. Thanks to the support from UT, Bob spent many summers working in bell' Italia, usually with a student (preferably a "schiava" rather than a "schiavo") or colleague in tow.

From the introductory course he taught for many years to well-established colleagues who revered him as a master, Bob's impact as a teacher was tremendous. "Transformative" and "life-changing" are common descriptions from students speaking of their time in his classes. Perhaps unthinkable in modern classrooms, flying chalk bits regularly punctuated his lectures. Woe to a student who's attention drifted! In graduate level lab sessions he went from microscope to microscope with his favorite wood-carved Australian snake stick; all of his students recall that poke in the ribs and the command to "Speak! What do you see?". He had a near-magical ability to make people see more. Stories collected from his students on the occasion of his 90th birthday give an impression of what it was like to study and do research with Bob Folk: http://www.jsg.utexas.edu/alumni/files/folktales_book.pdf

His *Petrology of Sedimentary Rocks*, known as the Orange Book, a soft-bound locally published semi-text that grew from his course notes, first appeared in 1957 and was revised periodically until 1980. It was used as a reference for his graduate petrography courses and sold for little more than production costs. The 1980 version is available in a searchable pdf format: http://hdl.handle.net/2152/22930. Although dated and lacking references, it remains a fundamental resource for sedimentary petrologists and enjoyable reading. This humble-looking book is held by libraries world-wide and is a treasured volume on the personal shelves of many geologists.

In 1979 Bob's career took an abrupt turn. Always looking for another excuse to continue field work in Italy, he hit on the idea of working on Roman travertines with his colleague Hank Chafetz. There he discovered that bacteria had played a major role in the formation of these carbonates. Bob retired from teaching in 1988 and that summer another scientific ("great leap forward, or catastrophic fiasco, your choice" – Bob's words) occurred when he and student Paula Noble studied the aragonite-forming hot springs at Viterbo, near Roma. Examining the samples with the SEM, Bob realized was seeing minute 0.1 micron ovoids that he interpreted as — NANNOBACTERIA! Few paid much attention to his 1992 GSA talk on this discovery, until four years later, a team from NASA shocked the world by their claim to have found nannobacteria of similar size and shape in a Martian meteorite. Bob wondered "Do you think I could have ever gotten funding for a grant entitled 'Search for extraterrestrial life starting with hot-water Italian travertines'? No way!" Forms resembling nannobacteria have since been found in

mammal blood, dental plaque, kidney stones, clogged human arteries and arthritic joints. L.S. Land (as well as nearly all biologists) thought this was a career-busting fiasco. Regardless of one's preferred interpretation it is, however, undeniable that at small scales, many crystals do not display the expected euhedral shapes, as you can see in Folk's 2005 contribution to *Journal of Earth System Science* (Proceedings. Earth and planetary sciences / Indian Academy of Sciences) (v. 114, no. 3, p. 369-374).

He had many hobbies, including a very complicated dice baseball game that he started in 1944 and maintained until last year. He enjoyed history, particularly about the Civil War (both great-grandfathers were in the war), non-realistic painting (several people have his acrylics), and collecting rocks, stamps and coins, as well as amateur astronomy.

Bob liked to dance with his wife and/or students at the iconic Austin bar and music hall the Broken Spoke, and loved country music as well as Grand Opera, symphony, and popular melodious music. Marge and he were members of the Wedding Ring class at First Methodist Church from 1954 on. They enjoyed almost every weekend at their log cabin overlooking Lake Travis. Bob was also an accomplished pasta chef (sauces only). The last item in his recipe for carbonara is "add a smattering of fireplace ashes."

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