



Dick's father, Bob Elgin, as a USGS rodman at Green Bay Terrace Quadrangle, Lake of the Ozarks, Missouri, in the summer of 1934.

Infected *with* Surveying

Dick Elgin comes by his surveying “roots” honestly. Raised in his late parents’ “Mom and Pop” surveying business, as with so many of us, surveying got into his blood early in life and has yet to leave. This rare combination of surveying practitioner, researcher, educator, author and collector is the focus of this *American Surveyor* profile.

Born to the late Bob and Caroline Elgin, Dick was raised in the family surveying business in St. James, Missouri. “All through high school I worked for my father. I was a rodman, cut brush, ran prints, swept the floors, ran errands, dumped the trash, sharpened the brush hooks, learned how to throw a chain and how to tie a slip knot in a plumb bob string hanging under a K&E Paragon transit. As anyone knows who’s worked

on a survey crew, it is a tough, rough, too hot in the summer, too cold in the winter job. From surveying in these Ozark hills, one of my father’s legs was shorter than the other. Mine started to grow that way too,” Dick remembered.

“When I graduated from high school, I’d had enough of surveying. There was one thing I was *not* going to be, and that was a surveyor. I was going to the University of Missouri Rolla (UMR)

>> By Marc Cheves, LS



Elgin in the left seat of an iconic UH-1 Huey, 1969.

(now the Missouri University of Science and Technology) and become a civil engineer. No more surveying for me!”

In the Fall of 1966, Dick entered UMR as a freshman. He soon flunked out. Between calculus, physics, working too much, playing cards in the Student Union, enjoying his favorite “adult beverage,” and weekly social trips to a couple of nearby women’s colleges, Dick’s first encounter with UMR lasted only three semesters. The pink slip came late in 1967. “In those days UMR was a tough school. About 3800 engineering students, 99% male and a real sink or swim attitude. The unfocused, like myself, drowned quickly.”

But there was another governmental unit who welcomed him with open arms: The U.S. Army. It was 1967 and with Vietnam at its height, those young men who weren’t in college or did not have a deferment were likely to find themselves drafted into the military.

Rather than be drafted, Dick volunteered for U.S. Army Helicopter Flight School. Following Basic Training at Fort Polk, Louisiana, he entered flight school as a Warrant Officer Candidate at Fort Wolters, Texas. After Preflight, Primary Helicopter, Advanced Helicopter, Tactics, and one flight school crash due to a tail rotor failure, Dick’s late father, then a retired Commander in the U.S. Naval Reserve Civil Engineer Corps,



Taking a break on LZ (landing zone) Baldy, 196th Light Infantry Brigade HQ, 1969.

issued the oath to his son and pinned on a bar signifying Dick a U.S. Army Warrant Officer (WO1), then pinned on his Army Aviator Wings. It was a very proud day for both father and son.

Nineteen days later he was in Chu Lai, Vietnam, assigned to the Army’s Americal Division. He was 20 years old. Dick flew the Hughes Aircraft OH 6A or “LOH” (Light Observation Helicopter) and also the ubiquitous UH 1 “Huey.”

Huey with 11 SOBs (souls on board). That day I rolled up a Huey then spent some hours in the jungle yelling on an emergency radio hoping the good guys got there before the bad guys did. The good news is the good guys got their first.”

In addition to those mishaps, Dick was shot down once, had a complete hydraulics failure and had a transmission seizure (while hovering to take off). He survived them all. “Although I’ve

“Once ‘infected’ with surveying, there is no known cure. One continues in the surveying profession. There is no escape.”

Missions included combat assaults, resupply, throwing flares, “sniffer” missions, impromptu medivacs and a very unusual landing of his “LOH” on the U.S. Navy’s aircraft carrier USS Iwo Jima (LHD 7) which was cruising far off the Vietnam coast.

“I am probably one of the very few Army pilots who has survived two tail rotor failures. One in flight school and one in Vietnam while flying an overloaded

certainly paid the U.S. Treasury a lot of taxes, if they billed me for the helicopters I crashed, I’d still owe them.” Dick returned, decorated, from Vietnam with a hearing loss and spent the remainder of his Army obligation “flying a desk” at Fort Wolters, Texas, the Army’s Primary Helicopter Flight School.

Completing his military obligations, Dick returned to UMR. This time calculus, physics and even “diffy screw”



WO Dick Elgin at Tien Phouc Special Forces Camp (Americal Division, 196th LIB), 1969.

(differential equations) didn't flunk him out. He became an ASCE officer and student leader. He was the recipient of the Civil Engineering Outstanding Senior Award in 1974. He graduated with his BSCE on May 12, 1974 which was also Mother's Day and his birthday.

Dick went to work for a consulting engineering firm in Kansas City, Missouri. No more surveying, he was off on his career in engineering. However, when the firm discovered his surveying background, he was soon running its surveying division. A year later the company sent him back to UMR where he received his MSCE. With his Missouri Land Surveyor license, he taught the two required surveying courses at UMR while pursuing his MS. With his MS, he was back running the engineering firm's surveying division. Surveying was in his blood. Engineering as a career didn't last very long. As so many of us have experienced, surveying is a very hard habit to break. Once "infected" with surveying, there is no known cure. One continues in the surveying profession. There is no escape.

During these years (the mid to late 1970s), Dick started writing questions for the national surveying exam and sending them to NCEES. His questions caught the eye of the late Dr. Ben Buckner who at that time was the Surveying Exam Consultant to NCEES, responsible for producing the national surveying exam.



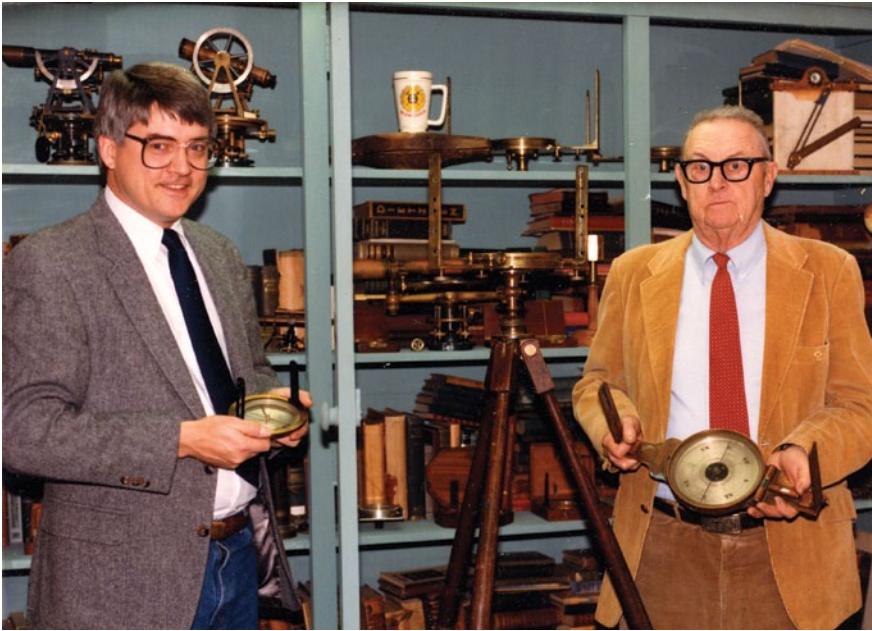
Elgin presents a sun observation seminar at Rock Hill, South Carolina in 1987.

"One day I got a phone call from Dr. Buckner. I was so excited. He asked if I would come to Columbus, Ohio (Ben was on the Ohio State faculty at the time) to join a workshop and write questions for the exam. As a young surveyor, it was a real thrill to be asked and an even bigger thrill to attend the workshop and be surrounded by the leading surveying educators and practitioners of the day, writing questions for the national surveying exam!" Thus began Dick's long association with NCEES as a "subject matter expert," as they

designate question writers. "My association with NCEES went from 1977 until about 1998 when I went off the Missouri Board for Architects, Professional Engineers and Land Surveyors." For two exams while NCEES was "between" Surveying Exam Consultants, Dick was the Exam Editor, responsible for producing the national exams.

"In about 1979, I decided that academia and teaching surveying back "home" in Rolla at UMR would be something I'd enjoy. I only needed a PhD and I could return to UMR as an Assistant Professor." At that time, the University of Arkansas (Fayetteville) had an established, very successful two year Associate Degree in Surveying program. Dr. David Knowles directed the program and a young Jim Crossfield (among others) was an instructor. Dick joined the program as a PhD candidate and a Graduate Teaching Associate. "I'd known David Knowles from some State Surveyor Association work. In addition to directing the Surveying program at Arkansas, David fly fished, drove an Austin Healey 3000, and sipped Wild Turkey. When seeking a PhD advisor, those are important factors. David became my PhD advisor. It was a great decision. David and I have been friends, traveling companions, business partners, coauthors and collaborators ever since."

Impressed by the late Curtis Brown's *Boundary Control and Legal Principles* (the Second Edition, blue cover), from which he taught a "Legal Aspects" course, Dick thought, "Why not write such a book for a single state?" He and David discussed the idea and they decided Dick's dissertation would be legal principles for Arkansas, based on a study of Arkansas decisions ("Brown" for Arkansas). The dissertation topic was approved by his PhD committee. "It took some persuading," Dick remembered. "My PhD committee was a group of engineers. They thought writing that dissertation was a law topic, not engineering. We had the Law School's real property law professor on the committee. He spoke to the committee and essentially said that no lawyer will ever write such a boundary location treatise. They don't have the interest or the background and, there's no money in it. With his urging, my PhD committee approved the work and I began doing research and writing the dissertation."



Father and son showcase the office exhibit of old surveying equipment in Rolla, 1989.

Dick's dissertation "Legal Principles of Boundary Location for Arkansas" became a book of the same title, coauthored by David Knowles. The book is a synthesis of about 1400 decisions of the Arkansas Supreme Court relative to the boundaries of rights in real property. With ten chapters (Introduction; Descriptions; Resurveys on the U.S. Public Land System; The County Surveyor; Riparian Boundaries; Common Law Dedication; Highways, Streets and Alleys; Prescription; Establishment of Boundaries by Parol Agreement and Acquiescence; and Adverse Possession), the book is the "Arkansas Bible" relative to legal aspects of boundary location for that state. It was published by the late Roy Minnick's Landmark Enterprises in 1984. The book's foreword was written by Curtis Brown. Now long out of print, it remains required reading for aspiring Arkansas land surveyors. The Arkansas Land Survey continues to sell the book (pdf format on CD) with the permission of Drs. Elgin and Knowles. Dick and David are currently working on the book's revision.

With his PhD from Arkansas, Dick became an Assistant Professor of Civil Engineering at the University of Missouri Rolla, near where he was raised and in the same town where his parents were still in the surveying business. At UMR, Dick principally taught

the required and elective surveying courses. He researched Missouri legal principles of boundary locations, was active in state and national surveying associations, taught surveying seminars and courses through Extension, and continued to be involved as a question writer for NCEES.

During the early 1980s Dick, along with David Knowles and Dr. Joe Senne, the Chair of the Department of Civil Engineering at UMR worked together on Sun and Polaris celestial observations for azimuth by the Hour Angle Method. Seeing an opportunity they formed Elgin,

Knowles & Senne, Inc. and developed methods, ephemeris data and software for this method (which would replace the Altitude Method). In 1984, Dick, David and Joe approached the Lietz Company about publishing the "Lietz Ephemeris" which would use the Hour Angle Method exclusively and would include program code for the HP 41 calculator which would reduce the calculation burden to practically nothing (using an "internal ephemeris"). It would compete with the "K&E" ephemeris which had been published for years. In the Fall of 1984, the *1985 Lietz Celestial Observation Handbook and Ephemeris* was introduced to the world. It was a tremendous hit, and, unknown to the authors, 1984 was the last K&E ephemeris. Their Lietz ephemeris was the only game in town. The Hour Angle Method's time had come. The three partners and collaborators brought us celestial observation software (remember ASTRO*ROM for the HP 41, ASTRO*CARD for the HP 48 and ASTRO*DISK for the PC), technical articles, an instructional videotape and seminars. They were recognized by ACSM for their work in celestial observations when, in 1990, they received the President's Award. 2008 was the last year for the "Sokkia Ephemeris." With the development, maturity and application of GPS, the need for celestial observations for azimuth had waned. "David, Joe and I put a lot of time and energy into celestial observations: method development, the ephemeris, software, articles and our seminars. It is very rewarding to know you've advanced a



Bob and Dick displayed some of their instrument collection at the 1992 ACSM convention in Albuquerque, New Mexico.



She's a beauty—the restored 1964 Morgan.

technical subject in your profession. And, the best part is we met some wonderful people during the adventure.”

In 1984, the lure of the family surveying business was too much. He left the University to purchase the business his parents founded in 1962 and that he'd worked in on and off since then. His parents retired and Dick took the reigns of a small surveying business in Rolla. For the next 24 years, until he sold Elgin Surveying & Engineering, Inc. in 2008, Dick continued the business. Thanks to great employees, many long hours, tenacity, the same “first in and last out” policy of his father, and application of his surveying education, the company grew from a handful of employees to a staff of 24 licensed surveyors, engineers, technicians and administrative personnel. Their clients included the usual for a small surveying and engineering company, governmental units, developers, realtors, individuals, and attorneys. “And, being located in Rolla, we are next door to Fort Leonard Wood which has seen a huge development over the past 20 years or so. We've been fortunate to have done a lot of work at the Fort.” When asked what was the key to his firm's success he answered, “Tenacity.”

Dick owns one of the largest private collections of early American surveying equipment in the United States. “I come by my collecting genes honestly. Both my parents were life long collectors and pack rats. As small kids, my brother, sister and I had to collect something. That was a family requirement. In addition to surveying equipment, my father collected and used woodworking tools. My mother collected souvenir spoons



After a vacation spent pedaling across Iowa, Elgin raises a “Victory Lift” on banks of the Mississippi River.

and Majolica. My brother and sister are still collecting, just as I am.” Dick started seriously collecting surveying equipment in the late 1970s. Now combined with his late father's instruments, his collection numbers about 700 items. “These aren't all large, important items, but it is a pretty good pile of stuff. I've collected sort of generally, collecting anything. Then for several years I concentrated on the St. Louis makers. But, the collection extends from solar compasses to alidades to slide rules and early handheld calculators.” Many years ago Dick got interested in the Chandlee family of clock and instrument makers, spurred by owning a very rare vernier compass by one of early America's leading makers, Goldsmith Chandlee. He since has collected other Chandlee compasses, researched and written about Goldsmith Chandlee (see www.surveyhistory.org/goldsmith_chandlee1.htm) and has even visited his

grave (at Hopewell Centre Meeting graveyard north of Winchester, Virginia). Dick coauthored “The St. Louis Makers of Surveying Equipment Since 1830” which summarizes his research on the St. Louis makers (see www.surveyhistory.org/st_louis_instrument_makers1.htm). Dick often exhibits portions of his collection at state surveyor conventions, and has conducted his “Instrument Road Show” at such conventions (modeled after PBS's “Antique Road Show”), commenting on and valuing instruments brought in by surveyors attending the convention. “A previously unknown David Rittenhouse compass hasn't shown up, but I have pleasantly surprised several surveyors when they learn what they have is relatively rare and valuable.”

A few years after leaving UMR to purchase the family business, the Civil Engineering Department “came knocking.” Might he come back as an Adjunct

Professor and teach the required surveying course? Yes, of course. Since the fall semester of 1988 and every semester since Dick has taught the required surveying course at UMR. "That's 21 years of teaching surveying, 42 semesters' worth, about 2500 students. I now have students who remind me I also had their parents in this class 20 years or so ago. That's how old I am!" Active in Missouri University of Science and Technology (formerly UMR) alumni affairs, Dick serves as the Assistant Treasurer of the Alumni Association, and has received several honors for his assistance to MST.

"I've had some fun along the way," Dick said. He is a three-time Outward Bound alumni, has ridden his bicycle all over the world (literally), including Canada, Ireland, Europe, Costa Rica, New Zealand and the U.S. What's his dream bicycle trip? "Well, in 2010 I am going back to Vietnam on a bicycle trip, and, my big dream trip is to ride across the United States. I'll do that trip someday." As a "car guy," Dick has dabbled in British and German sports cars all his

adult life. "To help finance my PhD I sold my baby, a 1967 Mini Cooper "S." What a mistake! Not really, I've since bought one and had it restored. I own several other British sports cars, but my favorite is my 1964 Morgan Plus Four. I owned a Morgan while I was in college and loved it. In a weak moment, I traded for a 912 Porsche and missed the Morgan ever since. Several years ago I had the chance to buy another Morgan, so I had to."

And what's in Dick's future? "Well, being semi-retired and a newlywed changes everything. I now have more time for travel and someone with whom to share those adventures. Becky and I bought an RV and we plan to drive America. If you're a surveyor with a driveway more than 40 feet long and have a handy 110V plug in, you may hear from us. Overseas we have been to China, and we are planning a trip to Vietnam." Professionally Dick plans to teach some seminars and continue teaching at Missouri S&T. With David Knowles' help, he is revising their 1984 "Legal Principles of Boundary Location

for Arkansas." This will require reviewing all the Arkansas reported decisions relative to boundary location, then revising the book's ten chapters. "I'll do this while Becky drives the RV," quipped Dick.

Dick Elgin is a rare surveyor. From humble beginnings being raised in his parent's small surveying business, to serving our country in Vietnam, to obtaining a BSCE then MSCE then PhD, each with a few years of surveying experience in between, to becoming Assistant Professor of Civil Engineering, as well as a legal aspects and celestial observation researcher, author, State Association President, researcher and collector of early American surveying equipment, small business owner, registration Board member, community leader, raising two children (both grown and in medicine), world traveler and bicycle rider, his life has been anything but 'usual'! *The American Surveyor* is proud to profile such a notable and accomplished member of the land surveying profession. **A**

Marc Cheves is Editor of the magazine.

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