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3. Red Dirt

Hayes placed the Hedland sand equivalent to a School Land sand below the Wade sand and above the Medrano sand . . .

Louise Jordan, from *Subsurface Stratigraphic Names of Oklahoma*

Medical records indicate that my aunt Helen probably began having a series of small strokes soon after the death of her dog, Sugar, who, years earlier had followed her home from the post office. Having grown up in a household where stray animals were welcome, Helen took her in, but also checked with local vets and the humane society in an attempt to find Sugar's rightful owner. Nothing came of this effort, however, so Helen and Sugar became lifelong companions in their small frame house on NW 12th Street in Oklahoma City. Sugar received her name not for being particularly sweet of disposition, but from being snow white except for her nearly black eyes and, of course, after she'd been in the back yard, red stains on her feet and belly from the dirt under Helen's clothesline.

My stepfather, Sam Bristow, shared one trait with Helen, namely an unyielding kindness toward animals, a kindness that extended to almost any living organism in trouble, and Helen without Sugar was very much in trouble. When Sam found Helen she was dehydrated, unable to get up from her couch and, according to her doctor, within hours of death. We got the telephone call in late June, and within a few days we were once again traversing that blistering signature landscape across Kansas, to a rendezvous with family history in Oklahoma. After the requisite visit to the hospital, we went to Helen's house. Biologists are always biologists; we cannot ever keep from analyzing living organisms, even when they're our own sole-surviving paternal relatives. No matter how elegant, dignified, fastidious, or beloved a human being has been for her first 90 years, when in that 91st year her dog dies and she's alone and unable to take care of herself, nature begins to reclaim the premises. The small frame house on NW 12th Street was an entomological disaster. I wondered what had happened to Sugar's body. Helen was not strong enough to dig a grave through that red clay, but I stepped outside through the kitchen door anyway just to satisfy my curiosity. It was 104°F in the back yard; heat reflected off the garage wall, searing the side of my face. Sugar was nowhere to be found, and there was no mound of freshly turned dirt, but there among the pieces of a small rock garden, assembled by my aunt from items my grandfather had collected, was a large calcite crystal. Like the dog, this crystal was pure white, except, of course, for red stains on the bottom where it had been in contact with Oklahoma.

Out of curiosity I wander into the back room of Helen's garage. As a child, visiting my grandfather's house at 531 SW 11th, I'd held an almost obsessive fascination with a "back room," essentially an add-on storage shed, whose shadowy contents were barely visible through a window covered with dust and a dirty screen. Helen's back room had a similar character, although with Sugar dead and her mistress in the hospital there were no unspoken taboos about entry, so I push hard on a reluctant door until it swings open, banging against shelves stacked with empty boxes. A squirrel explodes from an open barrel of sunflower seeds, shoots up into the rafters and disappears through a hole somewhere in the roof. Helen had to have her bird feeders;

they were hanging, now empty, from several places in the yard. I wonder how that barrel of bird and squirrel food came into being in that particular time and place. Helen never learned to drive; she could not have weighed more than a hundred pounds. Someone had to have delivered both the barrel and its contents and put them where enterprising squirrels could follow their noses through some crack, into dark and forbidden territory where was laid out, as free for the taking as if in Squirrel Heaven, more black oil sunflower seeds than any of them could expect to see in one place in a lifetime. Similarly, but following my curiosity instead of my nose, I start searching for something interesting, something the mental equivalent of seeds. There, at the back of a workbench along the north wall, are rocks—barite crystals, or rose rocks as they are called, almost affectionately, by Oklahomans, fossil clams, a 200 million year old rugose coral, a piece of an ammonite. After my grandfather died, Helen sold the house on SW 11th and moved to NW 12th. I'm sure she paid cash for the latter. I have no idea who moved her. Someone, however, had made sure that my grandfather's rocks, or at least a representative sample of them, also made the trip across town.

I put the piece of coral in my pocket. It was one I'd collected from a stream near Weeping Water, Nebraska, and sent to my grandfather decades earlier. He'd promptly cut off the upper end, making several slices, which he then polished until you could see their details—septal patterns by which some paleontologist could identify this one, perhaps to species, and fusulinid foraminiferans—amoebas with shells—packed into the coral's gastrovascular cavity. Two hundred million years ago, somewhere in warm shallow seas that would eventually become part of a landlocked, mid-continental Nearctic steppe, the digestive system of a single coral about the size of your thumb became home for hundreds of one-celled animals, each the size and shape of a rice grain. Then 200 million years later, some kid from Oklahoma, wading into a stream, finds this one coral polyp, now a rock, instantly recognizes that rock for what it is, puts it in his pocket, sends it to another kid in Oklahoma, who then cuts it into slices, polishes the cut faces so that you can see an ecological relationship now buried into the depths of time, and glues the slices onto a pair of cufflink blanks ordered from a hobby catalog. Both kids, however, are anything but children; one is a tenured college professor and the other is retired, even though he never, or at least rarely ever, held a formal job. It's just that that they still act like kids when given any opportunity, especially an opportunity having anything to do with fossils, crystals, or stones. Maybe I should say “acted” instead of “act,” because one of them—like Sugar—is dead. I close the garage back room door, pulling hard against the frame. The squirrels can have whatever they want; Helen will never again be in this room.

Back outside in the yard, I take a closer look at the rock garden, reconstructing my grandfather's decisions about what pieces of the landscape to pick up, and Helen's decision about which of those pieces to move, once the house she grew up in was sold. Months later, making sure the place is ready for an estate sale, Karen, my sister Teresa, cousin Ed, and I clean out everything of any potential sentimental value, putting old Christmas cards in boxes, smiling at what Helen had clipped from newspapers in the 1950s, and dividing up the leftovers from Grandpa Frank and Great Grandpa John—straight razors, sharpening stones of exceptional quality, wire-rimmed glasses, books, albums of photographs taken with various box cameras dating back into the early 20th Century—all revealing what these people held to be dear and of lasting value. I could understand the sharpening stones; I could appreciate the decision to buy a new straight razor and put the old one in a drawer, in which it would be discovered a half-century hence.

Among the indicators of personality long gone from Earth, however, none surpasses a thin paper-bound booklet entitled “Uranium in Oklahoma.” My grandfather, intrigued by the Cold War but manifesting that intrigue in his own particular way, bought a Geiger counter and went looking for uranium. He never found enough to pay for both his travels and his counter, much less to turn Oklahoma into a nuclear arsenal. What he did leave was a report of his travels and dozens of pictures, all of which Helen had faithfully saved, along with some of his rocks. What the Russians had delivered to my family in the 1950s was not a star-tipped missile warhead; it was a legitimate reason to get in your car, drive out in the country, and go dig around in red dirt.

The Russians delivered this reason to simply go exploring as best one could in a part of the world where exploration was a reason for being. Indeed, the very word “exploration” was co-opted by the petroleum industry to the extent that it became synonymous with digging. Out on any two-lane highway, passing through isolated towns with small drilling and oil well service companies, you inevitably see chain link fences with pickups, stacks of pipe, sometimes portable rigs, and other large equipment only the initiated know how, or better yet why, to use. The activity in these yards may have waxed and waned with the price of domestic crude, but tires, wheels, and lower door panels are always stained dirt red—just like Sugar and the calcite crystal; contact with the land makes a lasting change in the appearance even of heavy metal. Along the highway shoulder outside of town, beyond portable drilling rigs waiting for some human’s decision on where and when to dig, lie dead skunks, ‘possums, and raccoons, casualties of nighttime tavern traffic. Dead skunks’ white stripes are always stained red. If you stop and picked up a particularly fresh badger, thinking maybe the skin would make a nice addition to your collection of natural souvenirs, the belly will be stained red. Nothing, it seems, can live in this part of North America without showing evidence of having encountered Permian surface geology—soils laden with iron and derived from a period in Earth’s history when oxygen levels were high. My grandfather’s car was always dirty; red clay was always packed up under the wheel wells, splattered there along some muddy red road where he drove, like every wildcatter of the early oil boom days, convinced there lay a financial windfall of indescribable size and importance just beneath the next hill.

The windfall never comes. Instead, we have photographs. A group of men stands on a cut bank beneath a tarp rigged as a tent. To the far right is my grandfather. He’s smiling, squinting at the camera. We also have his notes on the back. “First commercial carnotite find at Cement Caddo Co. Found in School gymnasium yard. Sold to Lucius Pitkin Inc. Grants N. Mex. 13 tons ore, averaging 2.66 assay brought \$3417.00 and a \$2400 bonus by the Atomic Energy commission. Stringer, was 70ft long—averaged less than 3 ft wide and two feet thick. Had the deposit covered an acre, would have brought over \$400,000.00. Lister Brothers of Chickasha finders.” At the time—middle 1950s—\$400,000 would indeed have been a small fortune for these men. Whatever geological vagaries had conspired to deliver this \$6000 “70 ft” shallow stringer of carnotite to a schoolyard in southwestern Oklahoma had also conspired to tease this group of explorers with the same mineral bait that had snagged oil boomers a generation earlier and land boomers a generation before that. All six men in the Caddo County photograph could not have been full time prospectors. Five of them are young enough to need a day job. Only my grandfather looks carefree, standing there in a plaid shirt with his hand on his hip, a man beside a stringer.

I never saw my grandfather get close to a typewriter, so I have no idea who typed “Uranium in Oklahoma,” who actually put on paper what I’m sure my grandfather was thinking

about the “first commercial carnotite find” as this picture was taken. Maybe Helen did the secretarial work. The result, however, was quintessentially geologist Oklahoman:

“The reason for this success is the optimism of the American individual not bound by too much orthodox thinking and tradition. Some heretics even found Uranium where it was not supposed to be present.

“It took many years to develop the science of petroleum geology to what it is now. Today’s current petroleum literature on the technical and practical use of science has gone a long way from the original anticlinal [sic] theory, and the carbon ratio of rocks in locating oil fields. We are now about in the same comparative stage in our Uranium thinking as we were back in 1880 in petroleum geology.

“Fifty-five years ago the press and stage, and most of the Oklahoma public laughed at the crazy wildcatters. I know, because I was here. When the first reports on the Oklahoma City discovery reached Tulsa it was all a joke, and only propaganda among the smart boys in the hotel lobbies. I know, I was there, and I also remember the Anadarko Basin sneers.

“Don’t let the fundamentalists laugh you out of court. This generation doesn’t know these facts, and the old timers either forgot or are dead. These statements may not make me popular with some individuals, but as I don’t expect any reward, I should worry.

“If you are looking for ultra sound investments, with a certain profit, buy U. S. Bonds. But if you have some hidden yen for adventure, and feel a little reckless, you can go crazy with the rest of us ridgerunners. I guarantee you will have fun and maybeso make the first page.”

All this impending fun and potential fame rested firmly on yellow, non-fluorescent, rock of a gypsum-like 2 on the hardness scale—thus scratchable with a pocket knife, hardness 5.5, or even a fingernail, hardness 2.5—as opposed to diamonds which are at 10, i.e. the max, and therefore scratcher of all lesser minerals. Carnotite is hydrated potassium uranyl vanadate; its chemical formula is $K_2(UO_2)_2(VO_4)_2 \cdot 1-3H_2O$. It’s the “U for Uranium” portion that made the Atomic Energy Commission cough up a \$2400 bonus for the small vein in a Caddo County schoolyard, although the “V for Vanadium” is also a militarily important chemical element, being a component of high strength steel. K is for potassium, an essential participant in the cellular reactions that allow nerve impulses to flow from one’s brain to the fingers, or vice versa. O is for “oxygen,” the most widely recognized vocabulary word in the intellectual domain of chemistry. H is for hydrogen, or Hindenburg; we remember the latter primarily because of the former, which ignited in one of the most spectacular explosions of history, destroying in a few seconds the largest aircraft to ever fly anywhere, along with its passengers and consequently, at least for a short while, the concept of easy and glamorous transatlantic travel. H_2O , of course, is water, the universal solvent and thus the medium in which life on Earth—even human life, if one considers the small fraction of us that is hair, skin, and bone—is suspended. As is the case with all chemical compounds, it’s the combination of parentheses, dashes, and subscript numbers that make carnotite carnotite and not something else, in a manner no less determinative than the combination of choices, experiences, associations, and accoutrements made Sugar, the house on NW 12th Street, Helen, my grandfather, their memories, and, of course, their rocks, an essential component of one American family’s existence.

A line drawn on Oklahoma from north to south just east of the 99th Meridian starts at about where the Salt Fork of the Arkansas River crosses the Kansas state line northwest of Alva,

in Woods County, then proceeds over mostly red Permian-age dirt interrupted by Quaternary alluvial soils that support the cottonwoods and willows marking braided rivers and deeply cut creeks. Paleozoic outcrops lie north of the Ft. Sill Military Reservation and west of Chickasha—named, like so many Oklahoma towns, from a Native American word, in this case perhaps meaning “rebel,” or, alternatively a variant of “Chickasaw,” one of the “civilized tribes” displaced from the southeastern United States and moved along the Trail of Tears to what is now western Oklahoma. Ordovician limestones thrust up through hard scrubland farm land north of Cement, right across the Caddo County line, and south of that, an amoeba-shaped bubble of Cambrian igneous formations known as the Wichita Mountains covers much of Comanche County, and therefore much of Ft. Sill. Geronimo is said to have leapt to his death from one of the split faces of such a fire-born rock rather than submit to capture, but that’s an Edwards Plateau version of an urban legend. Geronimo actually ended up riding in Teddy Roosevelt’s inauguration parade and died of pneumonia at Ft. Sill outside Lawton, Oklahoma. Signal Mountain, upon which generations of new second lieutenants have practiced their cannon fire at abandoned tanks, received its name from messages, sent from its summit and conveyed as smoke columns, between Indian bands.

Packing my grandfather’s library—consisting almost entirely of books about the Old West—I can also envision him driving his beat up late ‘40s model Ford out onto highway 62 west of Chickasha, Geiger counter on the seat beside him, winding through Anadarko following highway 9, and living in some kind of a dream world of adventure, exploration, and raw earth, perhaps even involving friendly encounters with Native Americans, all healthy, dignified, and independent, not uprooted and sent packing a thousand miles into a land of cactus and rattlesnakes. Somewhere near Cement he would meet up with the Lister Brothers, scan his detector over the crumbly yellow rocks in the Caddo County school yard, pull out his pocket knife to check the hardness then stand back with his hand on his hip for a photograph. I have no idea how they split up the money. There is no question in my mind that all of these men believed completely, unequivocally, in what they were doing, namely, digging in the red Oklahoma dirt for their fortunes. There was as much dirt under their fingernails as under their fenders, and it was equally embedded, as incapable of being washed away as the stain on a dead skunk’s stripe.

The Lister Brothers, if that’s indeed who these men were, standing beside Frank Janovy in the photograph, represent one of humanity’s few clearly definable relationships with the planet upon which we evolved, a relationship that may, in fact, have shaped much of the Oklahoman personality. The Cambrian period ended approximately 500 million years ago, the Paleozoic era ended about 270 million years later, and conversation fragments heard on Tulsa streets commonly concern these events. Regardless of whatever myths ultraconservative Oklahoma Bible Belt literalists tend to pound into their obedient and unsuspecting children’s brains, it is common knowledge even among roughnecks out on a drilling rig south of Durant that since the Paleozoic era ended the Earth’s crust has undergone massive reconstruction. Thus the Cambrian granite Wichita Mountains represent a truly ancient upheaval and reassembly of planetary surface, and the carnotite vein in a nearby Caddo County schoolyard is little more than a lucky—at least for the Lister Brothers—poke through dirt that is itself very likely an assemblage of soils carried hundreds of miles by water and thousands of miles by air to be dropped in the southwest quarter of former Indian Territory.

Few metaphors better describe Earth’s crustal turmoil than a serious automobile accident, one that crushes bumpers, doors, grills, fenders, underlying struts and supports, paint, and a driver’s future, all into a tangled and unrecognizable mass of metal and color. Few metaphors

better describe Oklahomans' approach to this accident than the sculptures of John Chamberlain who, since the late 1950s, has been making an international reputation out of the metal debris produced when Detroit's finest collide. Like Chamberlain himself must do in the junkyard, the Lister boys and their self-styled ridgerunner who'd watched those early wildcatters fail and succeed spectacularly, the former more often than the latter, walked out on the North American crustal plate expecting—*expecting*—to find something of value, deposited there through no fault of their own. And like must be the case with Chamberlain or any other artist who makes his or her pieces from found objects, expectations turn eventually into assumptions that if one looks long enough, one finds. The Lister boys found \$6000 worth of uranium ore; Chamberlain finds images that connect with neural networks that in turn send signals to fingers that write big checks so they can take his pieces home.

When looking and finding are our business, however, and accidents are our raw material, then experience tells us that we do a whole lot more looking than we do finding. Like artists, ridgerunners fail far more often than they succeed. And like artists, this facet of their profession eventually turns into a fact of their life: failure is the price of success and if you're afraid of the former forget the latter. This core characteristic of explorers is in stark contrast to that of the farmer who buys insurance against failure and who therefore represents another of our clearly defined relationships with the planet. The statement that "if you look hard enough you will find" differs significantly from the one that claims "if you work hard enough you will produce" only to the extent that "look" and "work" are separate activities, separate entities, indeed separate ideas. Thus whatever "work" a person like my grandfather might do, I suspect, is little more than a means to support his or her "looking."

Is this antagonistic but mutualistic relationship between looking and working a hard-wired one? I believe so. I believe that a drive to explore is inherited, and a drive to insure against failure is similarly passed along with one's genes. A "successful" choice of profession is not a choice at all, but is, instead, like a carnotite outcrop in Caddo County, namely, a unique encounter where opportunity collides with nature. Workers dominate a population, physically, mentally, and politically when there is no opportunity to go exploring. But when looking becomes legitimate work, then explorers rule the cultural landscape. With the first discovery that valuable minerals lie beneath the terrain, explorers assume their cultural dominance. When successful exploration becomes commonplace, however, then the nobility of pure exploration turns into entitlement. My claim is that this last rule is universal, obeyed not only by men sitting in Tulsa offices, but by men half a world away in flowing robes.

What separates present-day Oklahoma from present-day Saudi Arabia is not the probability of finding oil, but the probability of failure to find oil provided one digs in the dirt. When failure is likely—somewhat akin to that of trying to write a successful novel—only the driven retain enough hope to in turn sustain a nobility equivalent to that of the Lister Brothers squinting into a camera beside their carnotite vein. When the chance of failure is slim or none, explorers devolve into shoppers and pay for their sprees with their nobility. These are simple lessons from the heart of America for an evolving nation. Oh, but there is an additional simple lesson for evolving nations, a lesson that also sprouts, unwanted but acknowledged, sort of like weeds, namely, that minerals do not multiply like corn. You don't produce oil. You find oil. There is only one category of natural resource that multiplies if given a chance, yet must be "harvested" by exploration, and that is wild things: microbes, fungi, plants, and animals. And of this last type of natural resource, Oklahoma has an abundance. Had the Lister boys been looking for birds, they'd have found a bunch.

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About the same time my grandfather decided to go prospecting for uranium, another individual came to Oklahoma from back East because of the geology. But this one had already had a career of fun and had “maybeso made the first page,” although in this case the page was that of books and arcane ornithological journals and the fun was that to be had only by a professional golfer or birdwatcher. This one was a birdwatcher. Why would a world-famous scientist, one who had made his reputation through study of birds in the Arctic and Mexico, decide that Oklahoma was the place to finish a career, to write his definitive book? When asked, ornithologist George Miksch Sutton would reply something to the effect that the Rocky Mountain uplift extended down into the Panhandle, Harmon, Jackson, and Tillman counties in the southwest corner represented the northern extremes of the Edwards Plateau, the Eastern Deciduous Forest lapped over the northeastern quarter of the state, the Southeastern Oak/Pine Forest occupied much of the area between Stringtown, Darwin, Lutie, and Arkansas, and US Highway 77 marked the boundary between tall- and shortgrass prairie. Poking up through this amalgamation were a dozen mountain ranges with names like Arbuckle, Wichita, and Kiamichi, none of which would qualify as real mountains to anyone from Vermont or Colorado, but which nevertheless were faithfully labeled as such on maps and equally faithfully accepted as such by anyone who knew their half-a-billion year history. Sutton then left it to you to supply the birdy details. Instead of talking about plants and geological features he could just as easily have said “magpie, road runner, grasshopper sparrow, and red-cockaded woodpecker;” anyone who knew birds could then have drawn the surface geology maps, the climax vegetation maps, and the isometric lines of annual precipitation. And if you called the Arbuckles “mountains” in dead seriousness, you could easily supply the subsurface topography, but instead of magpies you’d be talking about shales, dolomites and isoclines.

Of course by the time I encountered Sutton, common geological terms such as “Arbuckle,” “dolomite,” “gypsum,” “shale,” and a million others that local grownups seemed to toss about with such knowing abandon were very familiar words. I may not have had a clue what they meant—except for “gypsum,” a very large, soft and crumbling sample of which was behind our garage—but I’d heard them repeatedly for years. I knew certain kinds of people used these words over and over again, and that such individuals used them in both casual conversation with their friends and in serious business conversations immediately after which decisions involving thousands, if not tens of thousands, of dollars would then be made and spent. The conversations themselves were not entirely lost on my young mind; I learned how to make a long distance telephone call from listening to my father ask questions about sands with names, about tracings on electric logs, then hang up, pack a small bag, softly tell my mother something about when he’d be back, then take off in the middle of the night for some drilling rig making a humongous mess out of a blackjack oak woodland a hundred miles down some muddy road. From those conversations, I also learned that when your business is that of exploring the natural world, then “9” and “5” are data points, not hours of obligation to some system constructed by human beings. That our lives were inextricably intertwined with a natural universe over which we had no control was a given. It was also a given that the lives of everyone I knew were also equally intertwined. Small wonder Oklahomans collected rocks and hung bird feeders for the squirrels.

Once in a while my father would take me to the field. It must have been summer, although I distinctly remember being taken out of school one day to attend the “Oil Show” in Tulsa. There in a gigantic exhibition hall were shiny new versions of the filthy, greasy, red splattered, machines I’d seen men use to dig thousands of feet into the Oklahoma dirt. I picked

up souvenirs, literature, and a yardstick. The company names on these items were household words—Halliburton, Schlumberger—the former euphonic enough to say it often just to feel the “l’s” roll off your tongue, the latter—“*schlum-ber-jay*”—my first lesson in French. I didn’t know what these industrial behemoths did, exactly, but I knew that when certain tasks needed to be done out in the field, someone would call them. “Halliburton” seemed to be synonymous with drilling mud; “Schlumberger” seemed to have the monopoly on electric logs. Every Oklahoma kid knew what drilling mud and electric logs were for. “Mud” was, and for that matter still is, an intricately concocted soup used to lubricate a drill bit and carry up the grindings, i.e. “samples.” Electric logs were for occupying fathers. Late into the evening, cigarette smoke curling up onto the ceiling, my father studied various colored ink tracings on strips of paper laid out on the dining room table over large maps. When he found the patterns he was looking for, he’d either make tiny circles marks on the maps or pack his stuff and go to the field. When he came back, our garage floor would be covered with little cloth bags, each containing what looked and felt like fine, sharp, gravel. Each bag would be carefully tagged and laid out in sequence. In daily conversation the word “samples” had an Oklahoman meaning: a handful of rock chips through which you could see a hundred million years into the past.

When summer arrived, I often got to go along, out to an oil well. Periodically my father would stop and collect fossils. I learned the word “brachiopod” on one such trip, and have never forgotten the telltale signs of “brachs” in limestone, or, for that matter, in the marble tops of fine furniture. One saw planetary history in curving lines. One learned to see Earth in terms of its organisms and their natural products. As a senior in college, wondering what to do with a degree in mathematics, I enrolled in George Sutton’s ornithology class. It may seem a stretch, but at the time birds and their nests didn’t seem that much different from Mesozoic vegetation and oil, or, for that matter, carnotite. All were distributed in accordance with certain landscapes, whether these were laid out on the surface or a mile below the ground, and the links between surface and subsurface were never questioned by anyone—adults or their children—with whom I interacted. The fundamental rules about one’s relationships with nature had been established by the cultural milieu of Oklahoma: first, you studied landscape; second, you assumed that landscape could tell you something about its history and its contents; third, no matter whether you were looking for oil or birds, you went into that landscape—physically and literally—as a *raison d’etre*.

Sutton’s classes were always small, usually small enough so that we could all fit into his green, 1952, 3-hole Buick. There were no seat belts in 1952 Buicks. Ornithologists drive at highway speeds, but they also watch birds continually. If you fear for your physical safety, never get in a car with an ornithologist. If you have a fear of growing up ignorant of natural history, always get in a car with an ornithologist. George Sutton came to Oklahoma to write a book, eventually published in 1967 by the University of Oklahoma Press and entitled, of course, “Oklahoma Birds.” The subtitle is “Their ecology and distribution, with comments on the avifauna of the Southern Great Plains.” The dust jacket illustration is a watercolor portrait of a Harlan’s hawk, painted by Sutton. Scattered throughout are pen-and-ink drawings: roadrunner with a limp *Cnemidophorus sexlineatus* hanging from its beak, an osprey in the act of alighting on a dead limb, two shovelers making a “V” of ripples on a shallow glassy pond, a loggerhead shrike gripping a thorny branch.

All of these drawings have an inherent narrative. A roadrunner might be able to catch one of the fastest and most wily lizards ever to evolve, but a human could not. A shrike would choose a branch with thorns because shrikes stick their prey on thorns, a sort of larder, for later consumption. On page 90 of “Oklahoma Birds” there is a statement regarding turkey vultures:

“On Salt Plains National Wildlife Refuge, Alfalfa County, pair nested each summer 1954-1965 in tumble-down shed.” The phraseology is telegraphic, typical of systematic work in biological sciences. Inside the front cover there is another statement regarding turkey vultures, this one in India ink, in Sutton’s handwriting: “Inscribed to my friend John Janovy, Jr., who will, perhaps remember the baby buzzards in the old shack on the Salt Plains refuge whenever he uses this book! George Miksch (Doc) Sutton Norman, Oklahoma February 9, 1968.” I remembered the baby buzzards well. Crawling into the dim shadows through a hole in the boards, I’d come face to face with a turkey vulture chick old enough to stand, thrust its beak out to within a few inches of my nose, and slowly regurgitate an unbelievably rotten smelling mass of half-digested road kill rabbit. Whatever desire I had to interact with adolescent vultures disappeared at that moment. Describing this event, now 40 years in the past, the memory of that smell makes my stomach wrench.

Wherever he went, Sutton carried a shotgun. And wherever my father went, he carried sample bags. When Sutton needed evidence—irrefutable tangible evidence—of what the geological collision had attracted to Oklahoma, or allowed to flourish there, he would raise his shotgun and collect a sample. When my father needed evidence—irrefutable tangible evidence—of what the geological collision had distributed far beneath his feet, he stood by a mud trough at the slush pit and collected rock chips, washed them, bagged them, tagged them, and took them back to a cheap motel room, or sometimes a trailer beside a rig, and studied them under a microscope. Sutton’s tools consisted of scissors, forceps, sticks, cotton batting, corn meal, borax, carbon tetrachloride, needles, thread, pins, and cardboard. My father’s tools consisted of forceps, small metal trays of exactly the right shape so that rock chip samples could be easily returned to their bag, and a set of beautifully sharpened colored pencils. Sutton’s products were bird skins—warblers, vireos, wrens, sandpipers—beautifully prepared and preened, carefully labeled with standard tags tied to their crossed feet, and placed in a white steel case with flat wooden drawers and a small box for dichloride crystals to discourage insects. My father’s products were maps—locations and topography of particular, and often cryptically-named, shales and sands far below the ground—and decisions—keep drilling or set casing. Sutton also produced maps, in this case distributions of nesting species, locations where each species had been sighted, all linked back to a database with dates—a space-time continuum of moving animals.

Sutton’s database consisted of small loose-leaf notebooks. One section was a daily chronicle of events—where he went, who he was with, weather conditions, observations on habitat. The other section was a species list. Each species had its own pages, with chronological entries. Most of this material was typed on a manual typewriter with carbon ribbon. Whatever was handwritten was written in permanent India ink. Sutton’s notebooks would last as long as the Dead Sea Scrolls. Nowadays, this information would be put into computer files, and would be called a “relational database.” Assuming there is no nuclear holocaust in the next thousand years, assuming that museum and library archivists do their work for a millennium, assuming our institutions still exist, then a doctoral student writing her thesis on the history of ornithology will be able to put on a pair of white gloves, open those Sutton notebooks, turn the brittle pages, and read his handwritten notes as clearly as any art historian can read a Rembrandt drawing. The relational database, however, will be gone, gone into the same technological hell where lies every spreadsheet, every unpublished novel, every committee report, every e-mail not printed out on acid-free paper and preserved in archive-quality folders away from sunlight and every hard drive not confiscated by the Federal Bureau of Investigation.

As a nation, we've produced ephemerality; as an individual, Sutton produced a permanent and personal vision of the world as it existed in Oklahoma for a 35-year period. As an individual, my father produced a personal and permanent vision of the Earth as it existed in what we now call "Oklahoma" for a 400 million-year period. My father's maps were large, made of some kind of high quality drawing cloth. Sutton's "maps" were notebook paper. Both men had a lifetime's worth of these constructions, snapshots of the planet as viewed from within their professions and moments of time frozen forever in the products of their hands and minds. Sutton made us keep such notebooks for his courses in ornithology. My own entry for October 15, 1960, reads:

Oct 15-Tishamingo [sic] hatchery, Regan, Okla.-We left Dr. Sutton's house a little after 6:00AM and drove first to the hatchery a little way south of Sulphur. The temp was in the high 50's and the sky was mostly overcast and the wind was from the NE at about 5-10mph. We took a short walk down past the shed to the brushy area but didn't go in, saving it for later. We turned back and started circling the ponds. The group split in half and went around the first and largest and then we all split up and walk among the smaller ponds. As usual on our trips the tall grass was very wet and we were completely soaked after a few minutes. After walking over the ponds we went back and started thru the brush north of the shed. After scouring the brush we headed out across the pasture, walking north until we crossed the road and went thru some open brush until we got to Lowrant Lake, very clean and clear water, about an acre or more. After surveying the lake we turned back to the woods, walked along Buckhorn creek, back across the road, and finally into the grassy xxxxx west of the brush north of the hatchery. After walking xx that area we returned to the car and drove to the Tishamingo [sic] hatchery at Regan, Okla. By this time the sky had cleared off and the weather had warmed up quite a bit. After a short delay while Dr. Sutton located the manager we walked thru the ponds in much the same manner as at the other pond. It was well after noon by this time so we drove to the Buckhorn café at Davis, had a good lunch, and returned home.

And what did we see on this expedition?

Downy woodpecker Dendrocopus pubescens (Linnaeus) Oct 15-Regan trip-One flew out of tree in the open brush near Lowrant lake.

Horned Lark Eremophila alpestris (Linnaeus) Oct 15-Regan trip-One came flying over us as we were standing near the ponds at the Sulphur hatchery.

The bird list for this trip could go on for many pages. The downy woodpecker page has entries from January 31, 1959, to December 3, 1960, from the woods along the South Canadian River near Norman to a place called Hog Creek. The horned lark page has entries from February 7, 1959, to November 26, 1960, from a place called Indian Springs to the highlands near Boise City in the northwest corner of the panhandle. The typing is in two different fonts, one of which—Elite—I recognize as the portable manual Karen received as a high school graduation present, a 1958 version of a laptop. The other font is Pica; whatever machine it was produced on has long since disappeared from both my possession and my memory. Could I find those bird-watching sites again? Probably not, except for the Tishomingo fish hatchery. Nowadays we'd carry a GPS unit and our notebooks would contain latitudes and longitudes down to the thousandths of a degree. Forty or fifty years hence we would be able to return to the exact same spot where we'd seen a downy woodpecker fly "out of tree in the open brush near Lowrant lake,"

look around, and determine exactly what that small piece of America had become during the preceding half-century.

Would there still be downy woodpeckers in the open brush near Lowrant Lake? Probably; Lowrant Lake is not in a place suitable for a SuperWalmart. Would you still be able to hire some actors, dress them in period garb for a group portrait underneath a tarp beside that same carnotite vein in a dusty Caddo County schoolyard? Probably so; Caddo County evolves rather slowly these days. But can you hire another George Miksch Sutton at the University of Oklahoma? No. No academic institution of any size in the United States of America would hire someone who collects birds with a shotgun for evidence of who lived where when then writes books about the geographical and temporal distribution of those same birds, all the while keeping daily notes and drawing pictures in India ink. American academic institutions want the same thing American professional basketball players want: money and respect, but respect of the kind afforded winners and massive belligerent armies, not the kind engendered by white-haired college professors taking students out to places where they can come face to face with a vomiting vulture chick.

A more intriguing question is whether a thousand years hence, will there still be downy woodpeckers flying out of the brush near Lowrant Lake. History tells us that if museums and libraries do their work and we are still a civilized, semi-literate and semi-solvent nation, then Sutton's watercolors, my father's maps, and my own class notes from 1960 are more likely to be here a millennium hence than are downy woodpeckers. Even in Oklahoma one can find medieval art, portraits of Madonna and Child. However, the population of Oklahoma City was 204,424 people in 1940, 243,504 in 1950, 365,916 in 1975, and is estimated at 519,034 today. At this rate, Oklahoma City's population doubles every half century, so that a millennium from now, it will stand at 2.72×10^{11} or 272,000,000,000, i.e. 272 *billion* Okies, i.e. almost 30 times the estimated carrying capacity of the entire planet, all dressed in red and heading out for a football game in Norman. The history written in limestone beneath Oklahoma red dirt tells us exactly what will happen if the evolutionary forces at work today continue to work. The brachiopod my father plucked from folded sediments is a better predictor of the future than the stockbroker in that gleaming high rise at 210 North Robinson. Thus accumulate the life lessons about what Oklahoma men found when they dug into red dirt, studied rock formations a mile beneath their feet, and took their boys along for the ride.

Afterword:

This piece was originally conceived as part of an "Oklahoma book" I've been thinking about and working on for years. It is an attempt to express that part of a family relationship in which a father involves his children in his business, not necessarily on purpose, at least all the time, but more or less as default behavior. In other words, when your dad's a geologist, and your grandfather likes rocks and practices being a serious amateur geologist, then you grow up talking about the Earth in some rather characteristic ways. You notice the color of dirt; you notice the layered sedimentary formations revealed by a road cut; you study stone floors and stair cases as you walk through some government building; and, you're not afraid to think in terms of plate tectonics and the erosion of mountain ranges. It may seem to be a stretch, but I honestly believe that time spent in the company of applied scientists, namely, my father and his friends, primed me for life as a biologist, and indeed, was the key factor in my decision to become an ornithologist the last semester of my senior year at the University of Oklahoma, two months away from receiving a degree in mathematics.

For other writings by John Janovy, Jr., search “Janovy” (without quotes) on www.smashwords.com, see www.amazon.com/-/e/B005KLWCA0, or click on the Books and Natural Areas link on www.johnjanovy.com.