

EXPLORATION

Volume 3, Number 1 *Quarterly*



◊ *We shall not cease* ◊







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EXPLORATION

Vol. 3, No. 1 (July 2026)

Quarterly

**“WE SHALL NOT CEASE FROM
EXPLORATION**

And the end of all our exploring

Will be to arrive where we started

And know the place for the first time.” – T.S. Eliot

Welcome to Exploration Quarterly, the publication for those who do not cease to BE CURIOUS . . . to LEARN . . . to EXPLORE . . .

We define exploration in the broadest sense:

Exploration can be geographical.

Exploration can be fractal.

Exploration can be introspective.

Exploration can be expansive.

Exploration can be structured.

Exploration can be unplanned.

Exploration can happen every day.

Exploration is continuously seeking new places, new ideas, new knowledge.

Exploration is the essence of being human, what brought us from the forests into the savannahs, and beyond the horizons of Earth to the edges of the known universe.

We shall not cease from exploration.

Thank you for joining us.

Jonathan Hanson

Roseann Hanson

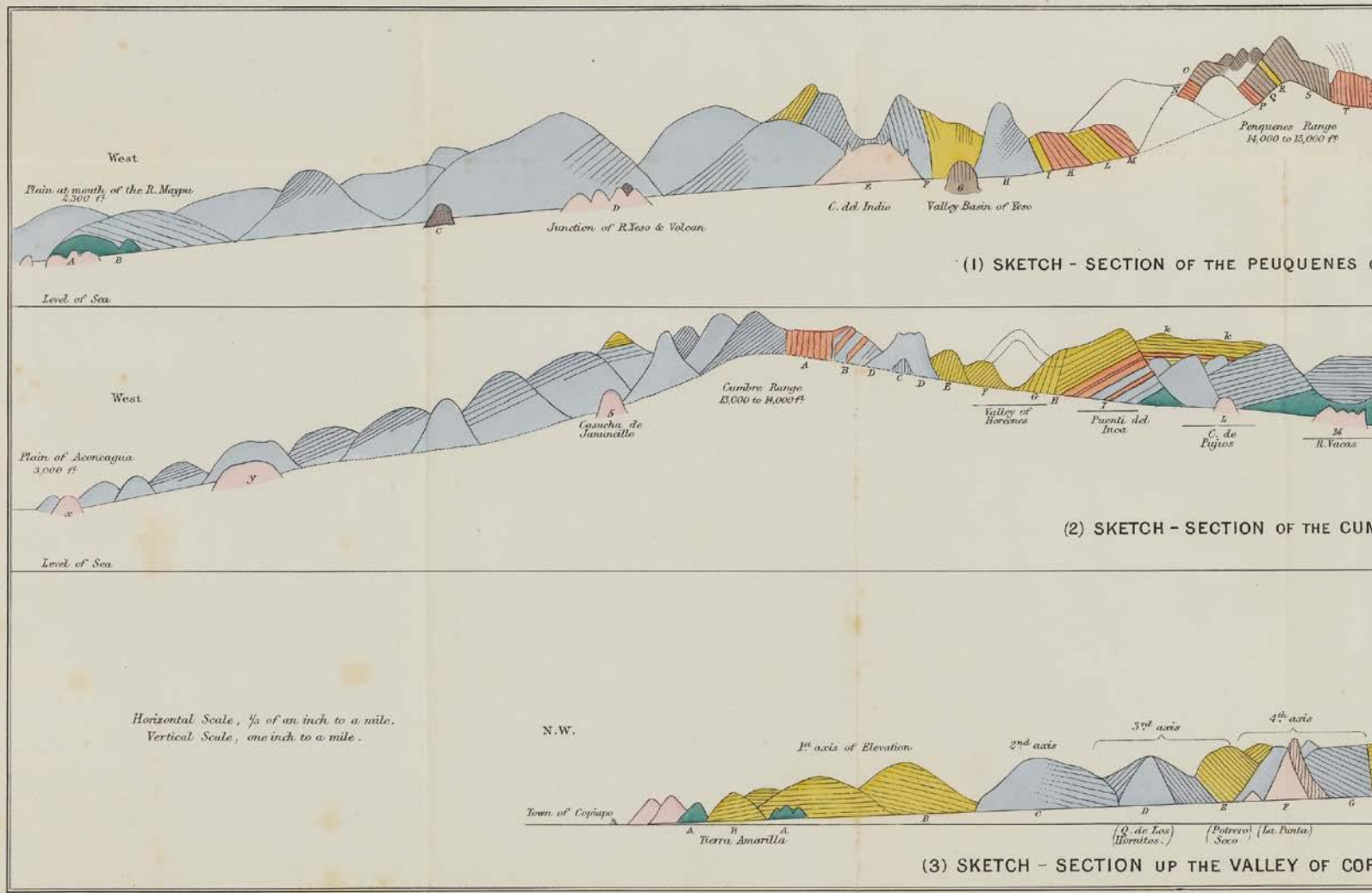
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*Printed twice a year by Modern Litho in the USA
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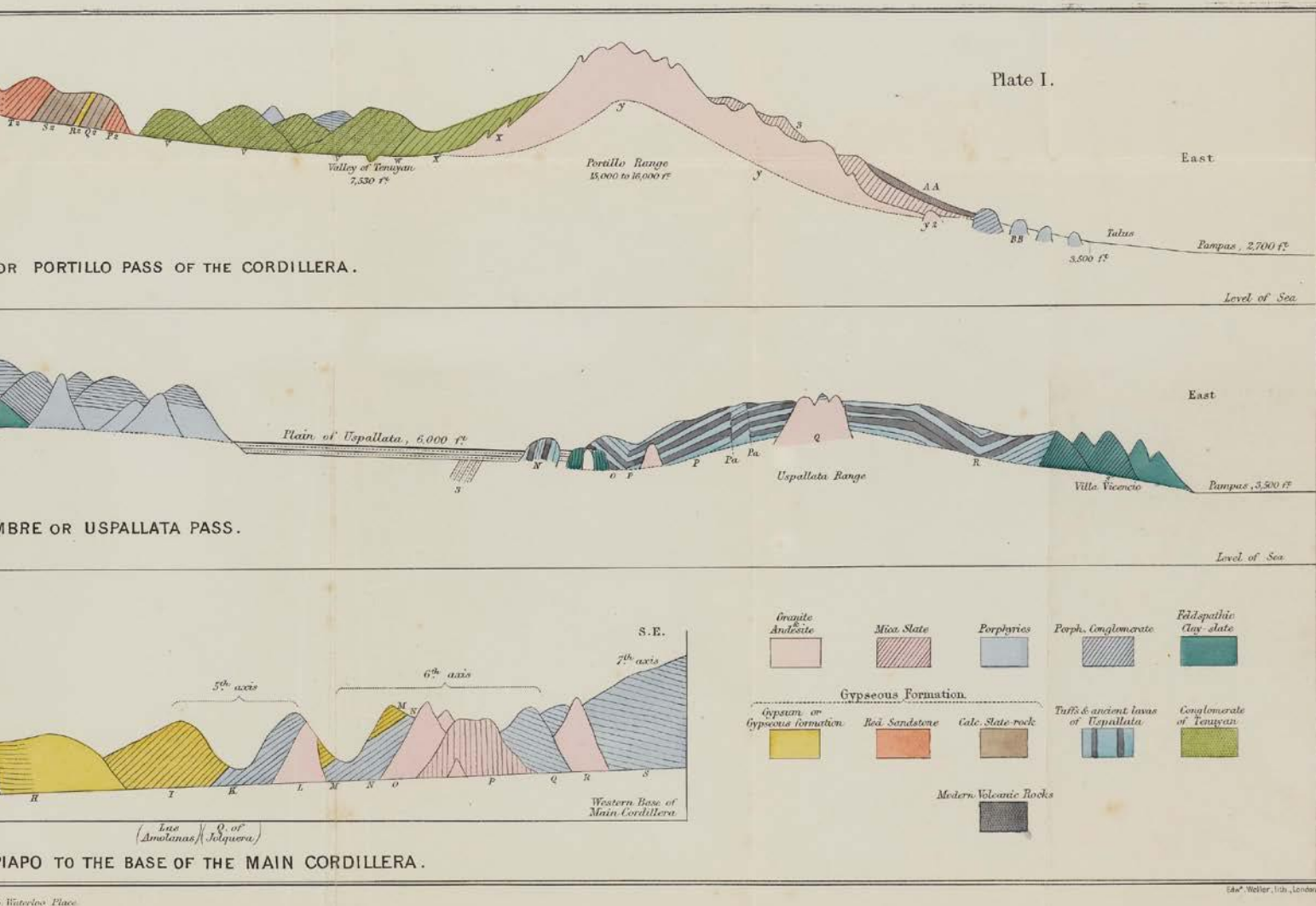
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A Map That Changed

After exploring and mapping the Andes, Charles Darwin began rethinking geologic time—and evolution

by Jonathan Hanson



the World

Ask anyone moderately well-schooled in the history of evolutionary thought to name the *eureka* specimen that enabled Charles Darwin to develop his theory of natural selection, and the answer will almost certainly be “a finch”—referring of course to the Galapagos finches whose diversity and adaptation to their isolated island habitats helped cement his ideas about random variation and the ways it might lead to speciation.

In truth, the better answer might be “a rock.”

Steeped in Ritual

Tea, the overlander, and the volcano kettle

by Roseann Hanson

A nice cup of tea can make you feel “wiser, braver, and more optimistic.”— George Orwell.

Indeed, our expedition friends who hail from the United Kingdom and Commonwealth of Nations hold firmly to the convention that when things go sideways on a journey, you first stop to make a cup of tea. This allows the team to relax, regroup, and plan the recovery rather than start dashing around in an unorganized, chaotic manner that might well lead to further drama or injury. Call it the tea reset. It works—and there is evidence to support it.

Behavioral scientists Francesca Gino and Michael Norton explain in *Scientific American* that rituals make us feel more calm in the face of uncertainty. “People facing situations that induce anxiety typically

take comfort in engaging in preparatory activities, inducing a feeling of being back in control and reducing uncertainty.”¹

Dr. Keith Souter, author of *The Tea Cyclopedia*, went to far as to say tea drinking is more philosophy than simple habit.

Residents of the United Kingdom are apparently quite philosophical: 84% of the population drinks tea—to the tune of 100 million cuppas every day, according to the UK Tea & Infusions Association. But per capita, the UK ranks *behind* Turkey and the Republic of Ireland.

Leaves of the plant *Camellia sinensis* steeped in hot water as a beverage became popular in China during the 8th century, though some legends suggest tea’s origins to be in 28th-century BCE China. Millennia of cultivation and subsequent naturalization throughout Asia have obscured its original range, though it’s fairly certain East Asia is the general locus. Tea plants need upwards of 50 inches (127cm) of rain annually as well as full sun; they can grow at high elevations (7,000 feet), and today there are plantations in Europe, Eurasia, Africa, and South America. There is even a plantation in Scotland’s Orkney Islands.

In the wild, the tea plant is a woody shrub or tree that grows to a height of around 3–16 feet (1–5m), but can be as tall as 66 feet (20m). On plantations, it is trimmed to approximately 3 feet tall with a flat top; the most high-quality tea leaves are harvested by hand (with considerable exploitation of child labor) but at large-scale production there are now harvesting machines for maximizing production of cheaper teas. Tea plants reach peak productivity at 30 to 50 years, and can produce for over a century.



*Image of early Sirram Volcano
Kettle courtesy Ian Hunter.*





ABOVE: Tea plant, from *Medizinal-Pflanzen* by Hermann Adolph Köhler (1834–1879; CC 4.0 license, Wikipedia). RIGHT: Tea harvest, Sri Lanka. Approximately 13 million people work in tea production globally, with 9 million smallholders producing 60% of output (Marcin Dobas, Adobe Stock).

Black tea, fermented pu-erh (or pu'er) tea, oolong, green tea, yellow tea, and white tea are all made from either *Camellia sinensis* or *C. sinensis* var. *assamica*. Once the leaves are harvested, they are dried and carefully tended to reach a specific degree of oxidation; the darker the tea, the stronger the oxidation and flavor.²

The Dutch East India Company brought Chinese tea home in 1606, and by the middle of the century it was very popular in the Low Countries and parts of Europe.³ The Dutch adopted the word “tea” from the Min Chinese word 茶, pronounced “tê.” England, however, was slow to love this new beverage, much preferring coffee. It is thought that in the 1660s, Charles II’s new queen, Catherine of Braganza (daughter of the king of Portugal), was a fan and brought the drink to court, where it quickly became *de rigueur* for the upper classes.

High taxes on tea kept it out of reach of ordinary people, until eventually the tax was rescinded (1783), the British East India Company ramped up importation, tea’s popularity skyrocketed—and the rest is history (including a certain Tea Party in 1773, during which 92,000 pounds of leaves were dumped in Boston Harbor; value today would be equivalent to USD\$1.7 million, which signaled to England just how angry the colonists were about taxation without representation and probably helped convince the government in the home counties to avoid further revolutions by doing away with the egregious taxes).

And this brings us to the venerable tradition of brewing cuppas on overlanding expeditions. Two of our five guest experts in “Vehicle Essentials: The five things you need to buy first” (Vol. 2, No. 3) are fans of the



kelly kettle, aka volcano kettle, as an essential piece of kit. Scotsman Duncan Barbour has organized and led more than 60 vehicle-based expeditions over the last 40 years, and firmly believes in the tradition of brewing a cuppa as an aid to getting things done in a well-planned, calm manner. Graham Jackson has both British and U.S. citizenship and was born and partly raised in southern Africa, where he started overlanding before he graduated out of nappies; over the last 30 years he has driven London to Cape Town and explored the Americas extensively, including several significant Central American expeditions.

When we crossed Australia and southern Africa with Graham and his wife Connie Rodman, we didn't experience any dramas that necessitated a cuppa-for-calm, but nearly every day during our overland travels,

come 10 am or so, we'd park the Land Cruisers, pull out our respective kelly kettles, and set to brewing tea—coffee for Jonathan—and maybe cook some bacon butties (should you not know of this glorious repast, it comprises hot slabs of British-style back-bacon served between slices of soft white bread or buns, with butter and HP brown sauce, or ketchup for you heathens).

And what is this mythical kelly (aka “volcano”) kettle? The ingenious water chamber is constructed like a tall donut: a doubled-walled cylinder forms an interior chimney (the water fills the chamber formed by the two walls of the cylinder; it's sometimes referred to as a water “jacket”); wood, paper, pine cones—anything flammable—is placed in a base that is well-ventilated, set alight, and the cylinder set over the base. The chimney effect quickly facilitates a roaring vortex and can boil 24 ounces of water in two minutes and 51 seconds.⁴

Although our Kelly Kettles and Volcano Kettles (modern trademarks, harkening to the late 1800s and early 1900s) certainly are ingenious, the concept of a fire-containing base

supporting a central chimney that is surrounded by a container was not actually new at all.

The Chinese hotpot may be thousands of years old—it is a cooker made of either copper or brass, incorporating a fire base and central chimney. The chimney is surrounded by an open trough in which is placed fat that heats to sizzling temperatures when a fire is built in the base. Placed on a communal table, diners grab raw meats and vegetables with their chopsticks and dip them into the fat where they quickly cook (see page 19).

Of similar design, the samovar of western Asia is a three-millennia-old design to heat water using the same concept: a central pipe filled with burning charcoal heats the surrounding water tank, maintaining high temperatures for hours.

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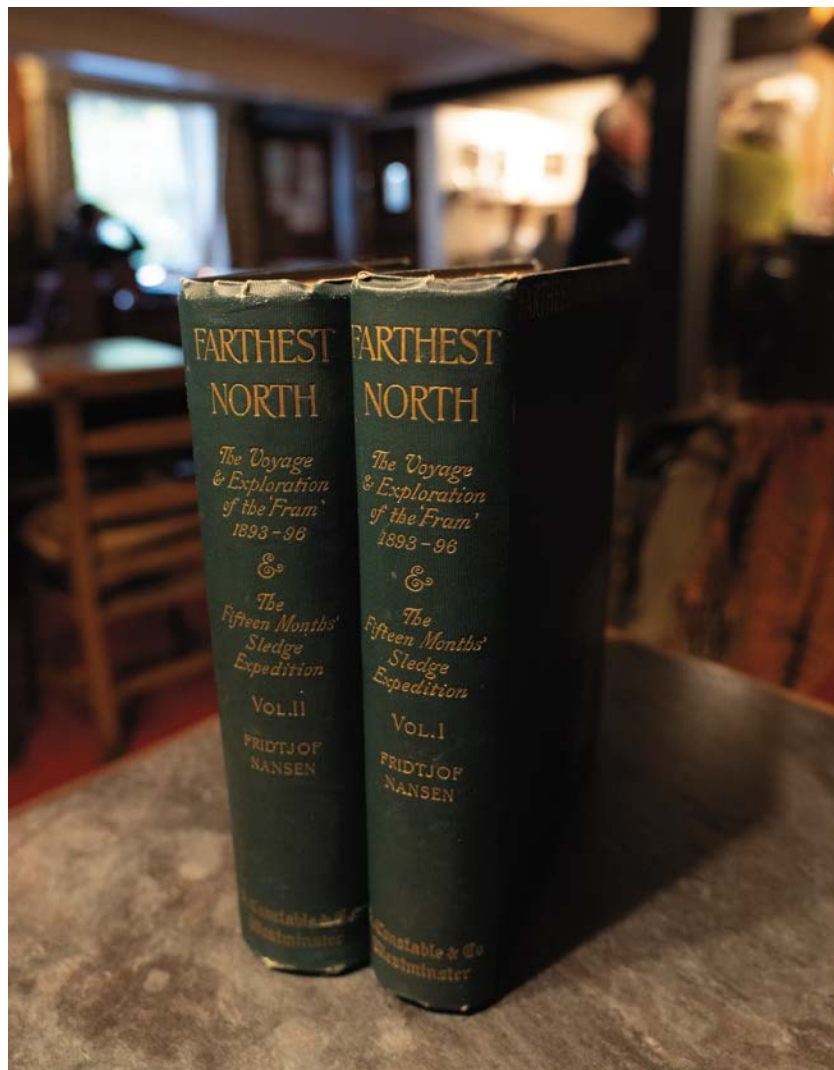
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An Evening with An Exploration Legend

by Jonathan Hanson



The 1897 first edition two-volume set of Norwegian explorer Fridtjof Nansen's *Farthest North*, purchased at Hay-on-Why Antiquarian Booksellers.

Philip Curtis is an evil man.

Oh, I don't mean "evil" in the sense of a criminal mastermind, a crooked politician, or someone who dog-ears the pages of hardcover books. In fact, he is one of the nicest people you'd ever want to meet: a soft-spoken Englishman who knows as much about antiquarian maps, charts, and instruments as any person on the planet. But, evil.

Let me explain. Five or six years ago, while Roseann and I were in London on our annual trip to attend and present at the Royal Geographical Society's Explore event, we spent part of the day afterwards looking for antiquarian map stores along Cromwell and Brompton Roads in Knightsbridge. We first stopped at Robert Frew Fine and Rare Books, Prints, and Maps, where two well-dressed male staff studiously ignored us for ten minutes until we gave up in disgust and left. Was this snootiness intrinsic to the business model, we wondered? We stopped for a pint and lunch at The Bunch of Grapes, a lovely old pub on

the corner of the evocatively named Yeoman's Row, then walked the block to Beauchamp Place, just down which on the right was The Map House.

I knew a bit about it: founded in 1907, The Map House supplied maps to Ernest Shackleton and Winston Churchill, among many other notables. The young Edward Prince of Wales (future King Edward VIII) was so entranced with the place that he worked incognito in the basement without pay. The current website claims it has the largest collection of antique maps anywhere in the world.

Our reception could not have been more different. The manager, who turned out to be Philip, greeted us and asked if we were searching for anything specific. When I said we were interested in John Rae's explorations in Arctic Canada, his eyes lit up in recognition of us as fellow students of obscure explorers. We spent the next two hours getting a full tour of the three-floor shop's overwhelming inventory, and purchased several superb 19th-century maps.

By Ice, Air,

✦ EXPLORERS



The boldest expedition to Greenland in history was led by a 25-year-old explorer few remember today.

& Sea



by Jonathan Hanson

*Images courtesy the Royal Geographical Society, Scott
Polar Research Institute (University of Cambridge),
State Library of South Australia, and the author*

*“I have known . . . all the polar explorers
of the last half-century, but no one can
stand beside young Watkins, save the young
Fridtjof Nansen . . . Watkins was loved by his
comrades, with whom he generously shared
the credit for their joint achievements, and
he drew the affection of older men in a way I
have never seen equaled.”*

— Hugh Robert Mill

(FRGS, FRSE), geographer, meteorologist, and patron
of British polar exploration





On the evening of February 20, 1928, a man stepped to the lecture hall podium and looked out over several hundred expectant Royal Geographical Society fellows. He was there to describe a groundbreaking expedition he had recently led: a complete foot traverse of Edgeøya, the southeastern-most island in the Svalbard chain, the interior of which had never been explored due to the hostile conditions and extreme difficulty of access.



The man was hesitant at first, but soon the sheer improbability of what he had accomplished with a few companions, a leased motor-driven sealing ship, and the modern equivalent of \$10,600 had the jaded audience captivated. The team's first attempt at a west-to-east traverse ended when they became stranded in a multi-day blizzard and had to retreat to their base camp on the southwest coast. That failure had devoured half of their planned stay, but rather than try the shorter route again the leader picked two men and headed north across the entire 70-mile length of Edgeøya, after sending the rest of the team by ship to meet them. After five days of perfect weather—during which they proved that the interior of the island boasted a rich mixture of habitat rather than the expected ice cap—storms and icy fog again slammed into the party. The men's sleeping bags were soaked, paraffin leaked into their food supplies. The final march downhill to the north coast was done nearly blind. Out of food, they waited on the fog-bound coast and had nearly given up when the ship (which had been delayed after running aground) finally appeared.

The ovation at the end of the talk was universal and prolonged, and on the spot the RGS president announced that the speaker had been elected as a fellow of the society.

But a problem arose. Whispered discussion made the issue clear: the man was under the minimum age required for fellowship. Within minutes the RGS had amended its bylaws, and George Henry "Gino" Watkins was elected as the youngest-ever fellow of the Royal Geographical Society. He was 20 years old.

Four and a half years later he would be dead.



TOP: An undated photo of young Gino Watkins. LEFT: The Lowther family home on Kensington Gore, facing Kensington Gardens, was converted into the headquarters of the Royal Geographical Society in 1918. RIGHT: Society members attending a lecture in the Aeolian Hall circa 1930. Aeolian Hall was a London event venue used by the society for larger lectures [Images courtesy the Royal Geographical Society.]



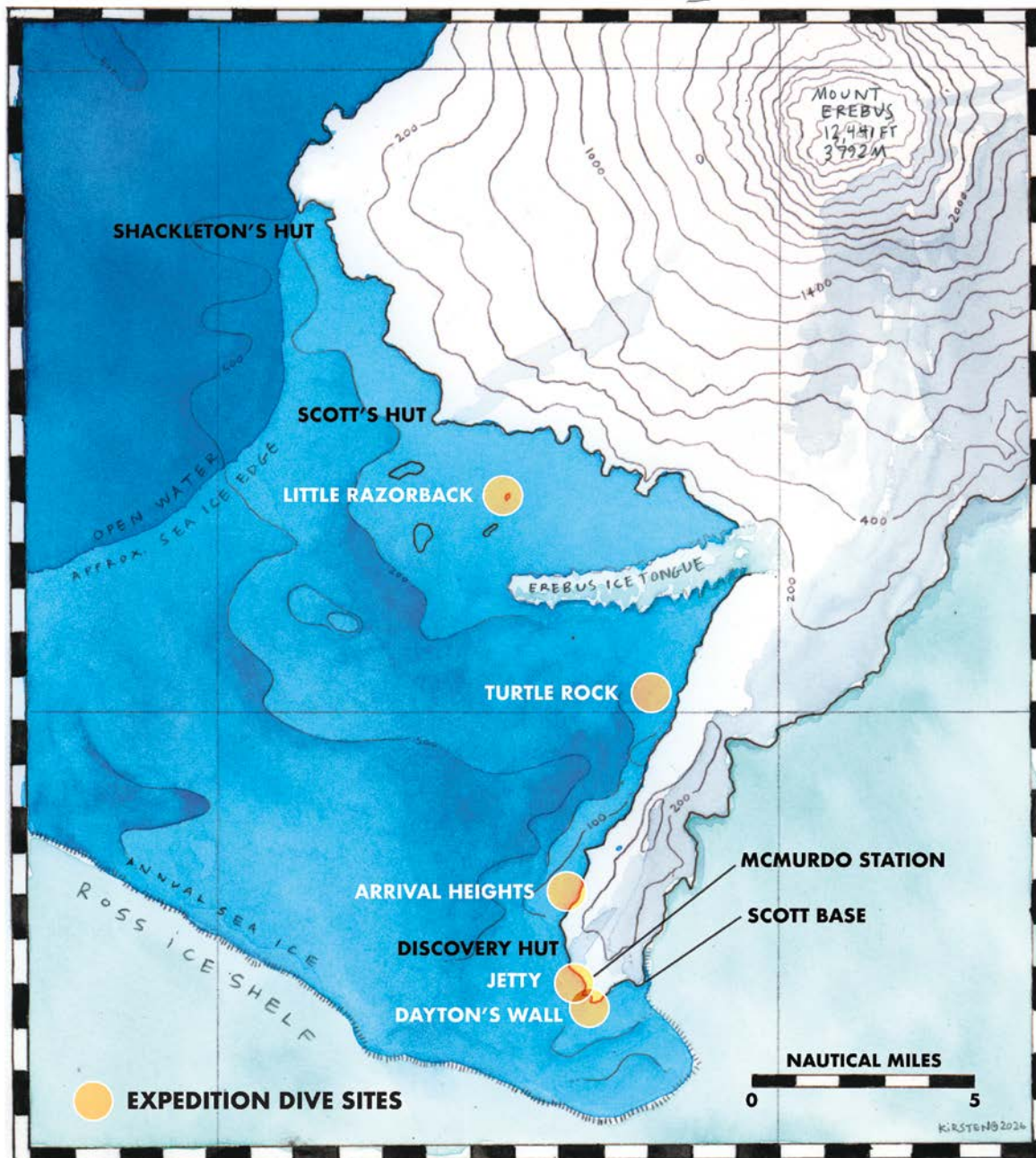
LESSONS FROM UNDER THE ICE



*Exploring the coldest
ocean on Earth for
art and science*

By Kirsten Carlson

*Images and art by the author
(unless otherwise noted)*



ICE JOURNAL—Tuesday • 31 OCT 2017 • 10:07 • Dive V • Arrival Heights, Ross Island

My fins dangle over an abyss filled with water so clear I can easily see the glowing silhouettes of sea life 21 meters below. Regulator in mouth, I twist and hop in. Splash . . . Gasp! The -1.8°C (28.8°F) water hits my exposed face between mask and hood. Beneath two meters of ice what awaits me is anybody's guess, but I am going to draw it.

I'm handed a custom dive slate holding two sheets of waterproof paper and a pencil attached with surgical tubing. I hold it close because it's a tight squeeze

through a dive hole 1.2m in diameter. One moment I'm breathing air on the surface, the next I feel like I'm free-floating in outer space, gazing at colorful constellations of stars on the dark volcanic sea floor.

*There's an eerie sound unique to the Antarctic Ocean that contributes to an otherworldly feel: the chirps, buzzes, and vocalizations of Weddell seals (*Leptonychotes weddellii*). I don't see them every dive, but I can hear them. It's my favorite sound in the world. I remind myself that time is ticking,*



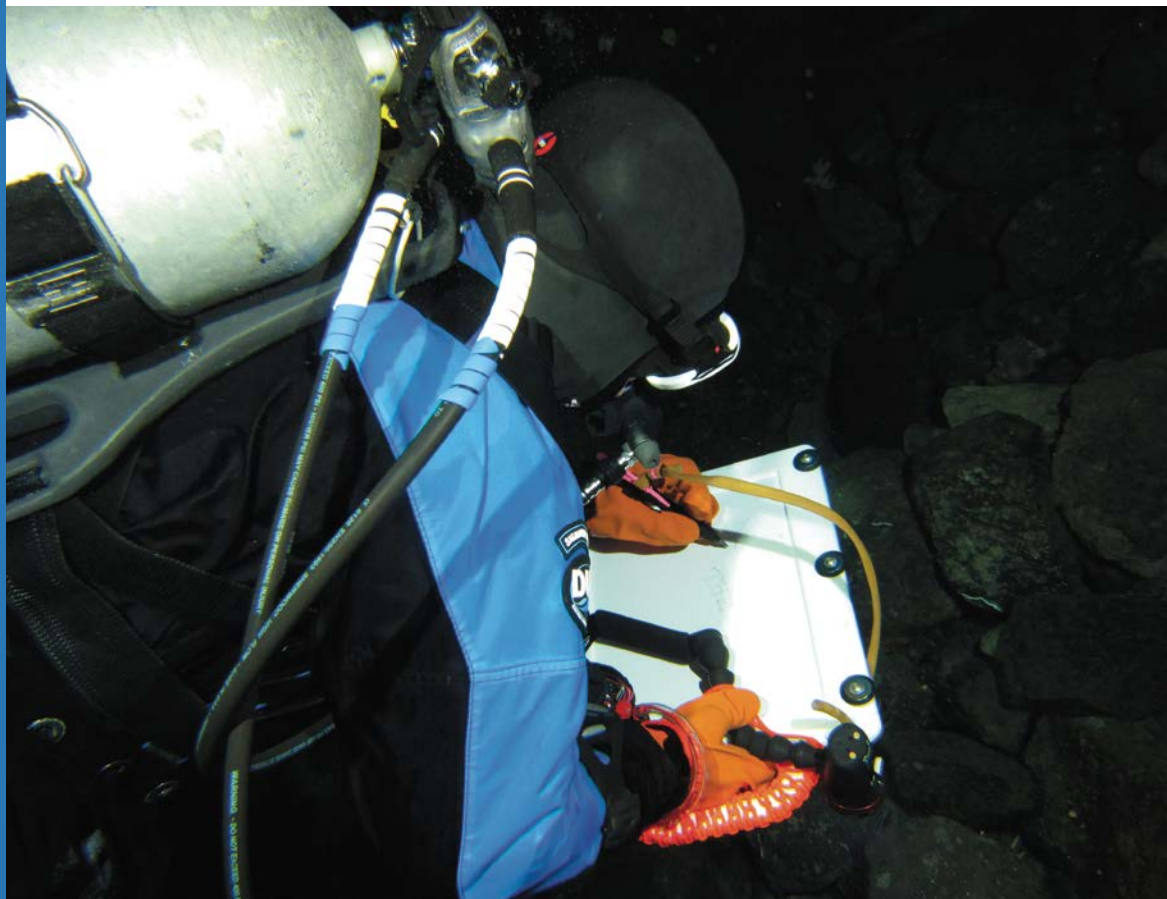
ABOVE, LEFT: Kirsten sketching a giant sponge and the neighboring sea life at Arrival Heights (image by Rob Robbins).

ABOVE, RIGHT: Kirsten's view of the underside of the sea ice with dive buddies getting ready to surface through the dive hole at Dayton's Wall.

LEFT: Trying to hold light and slate in one hand while drawing a sea star at the Jetty (image by Rob Robbins).

PAGE 42, TOP: Kirsten exploring the shallows of Turtle Rock with her improved drawing platform—a slate holding waterproof paper, with attached camera, light, and pencil anchored by surgical tubing (AKA a “doojie-wajee,” image by Rob Robbins).

PAGE 42, BOTTOM: Diving from the Jetty (image by Mike Cloutier).





there's just 40 minutes to explore and draw before I have to go back through that portal. I start the critical process of slowing down so I can get into drawing mode. I exhale slowly and watch as the stream of bubbles that is my breath bump, expand, and wander upward, then pool against the underside of the sea ice and make little mirror-like air pockets. I'm reminded to take a last look at the dive hole with its safety line, spare air, checkered flag, and flashing light—the only way in and out of this universe. Then I turn my attention to the dark expanse of volcanic seafloor and the flora and fauna thriving in this extreme environment.

I fin-kick toward a subject I know won't swim away: a giant volcano sponge (Anoxycalyx joubini). There are several, but this is the largest. It looks like a huge white porcelain vase, but microscopically it is an efficient pump, pulling water in through the large opening, filtering nutrient particles from it, and passing it out through the exterior wall. Tracing its silhouette, I begin to notice patches of yellow and brown, rather large holes on the inside wall, and much smaller ones on the outer sponge wall. A fish

rests on the rim like it owns the place. A nudibranch is heading towards the sponge in high gear, at sea-slug speed. I find out later it likely has plans to feed on this species of sponge. What I thought was one stoic animal is a whole neighborhood. I begin to draw my way around the one-meter-diameter creature.

Wrapped around the drawing slate and pencil, my fingers begin to tingle with the first hint of numbness. I let the pencil float on its tether and raise both hands in the universal “this is a stick-up” position. For a few seconds nothing happens, and then the warmth begins to creep back into my fingers, prickly and welcome. It feels great, but it will be short-lived. I've found the crux of the whole expedition, because every few minutes the pencil has to stop, and it disrupts my flow.

I've been keeping an eye on my air pressure and dive computer, and they both signal it's time to depart. I've been told no one has tried drawing underwater here before, and I'm beginning to see the absurdity of it.

View a video featuring underwater scenes, the illumination process, and an interview with Kirsten in the digital flipbook version of this issue (in the EQ subscriber area on ExploringOverland.com).





ILLUMINATING THE DIVE SKETCHES:

The illumination process begins with the underwater sketch, which was done on synthetic paper. FAR LEFT: For Dive II (final shown above), I tried adding watercolor directly to the synthetic paper while at McMurdo Station, but the color didn't adhere well.

LEFT & RIGHT: The fuller process unfolded in my home studio, working from photographs, notes, and reference books. After printing the sketch on watercolor paper, I built the illumination around the original composition. Scientific names, small details, and selected facts were added as a second layer of observation.

(Image at far left by Elaine Hood.)





OVERLANDING FUNDAMENTALS

ICE CHEST OR FRIDGE?

by Jonathan Hanson

From 12-volt dual fridge-freezers to heavy-duty 2-inch-thick roto-molded polyethylene or vacuum-sealed aluminum coolers, we explore the details and limitations for keeping your comestibles cold.



Images courtesy Dometic and Canyon Coolers.

Thomas Moore had a problem.

Among the other things produced on his farm, he churned fresh butter—a valuable commodity—for markets in Georgetown and Washington D.C. The problem was getting the butter there before it melted—this was 1802, you see, and the 20-mile journey was via a horse-drawn wagon. Like his competitors, he made his delivery runs at night to exploit cooler temperatures, but even so some melting and spoilage was inevitable, especially during summer.

Thomas, however, was an inventive man. After pondering on the challenge for some time, he constructed an oval tub and lid from cedar, then made a tin box that fit inside. The box held 22 one-pound blocks of butter, and left space between wood and tin for ice from a local ice house. He wrapped the whole thing in linen and rabbit fur for insulation.

Thomas's contraption worked so well that his chilled, firm butter sold for significantly more than his competitors'—in fact he was able to forego the night runs and make his deliveries during the day. He quickly submitted a patent application for his device, noting that in addition to keeping butter chilled for transport, housewives could keep provisions in one in the cellar, butchers could use it to keep meat from spoiling without using salt, and “fresh fish may be brought from any part of the Chesapeake Bay, in the hottest weather and delivered at Baltimore market in as good condition as in the winter season.”

Moore's patent was signed by President Thomas Jefferson—who later purchased one of the devices and used it for at least two decades.

Thomas Moore called his invention a “refrigeratory” (later shortened for marketing purposes to “refrigerator”).



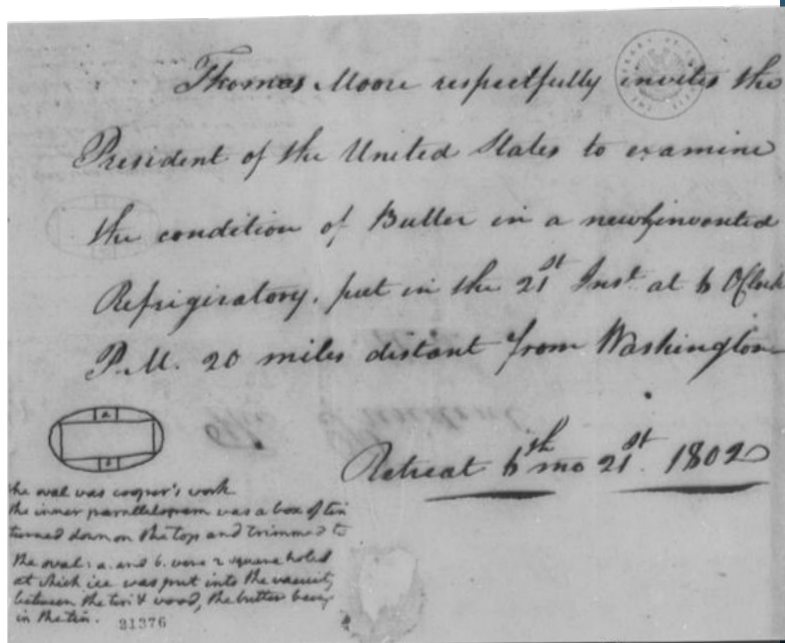
These days, we're more likely to be concerned with keeping beer and soft drinks cold while traveling than getting butter to market. But there are other, eminently practical reasons for carrying some type of “refrigerator” along on our journeys. The satisfaction of an icy Coke after a dusty drive, or a chilled ale or chardonnay in camp at sunset, is really only a minor benefit compared to the practical and health benefits of a cold box. The ability to carry fresh vegetables, fruit, and dairy products allows you to enjoy a diet closer to that you're accustomed to at home—and that means fewer digestion and intestinal issues that so often dampen remote journeys. And then of course there's chocolate . . .

For over a century after Moore's invention, portable cooling meant an ice chest. Most likely the first of them recognizable to a traveler today would have been the Esky

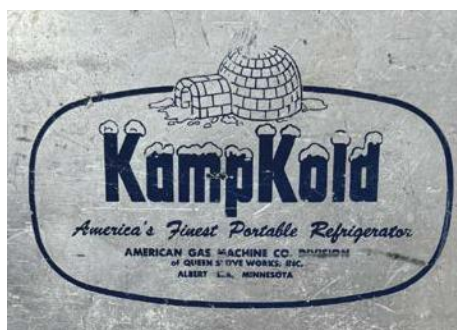
Auto Box, introduced in 1952 by Malley's in Australia, comprising a galvanized sheet-metal box with a hinged lid, insulated with cork. So popular was the Esky that today the word remains a generic term in Oz for any ice chest. Just one year later in the U.S., Richard Laramy was granted a patent for a “portable ice chest for storing food and the like,” which incorporated a compartment in the bottom for ice. The company he worked for, Queen Stove Works, marketed it as the Kampkold, presciently adding an external bottle opener. And just one year after *that*, Coleman, heretofore known mostly for lanterns (see Vol. 1, No. 2) bought the Queen Stove Works and quickly increased production of what they called a “cooler.”

In 1957 Coleman switched from metal shell construction to injection-molded plastic—and also introduced (some would say unfortunately) a line of very inexpensive coolers

RIGHT: Thomas Moore wrote to Thomas Jefferson, June 21, 1802. "Thomas Moore respectfully invites the President of the United States to examine the condition of Butter in a newly invented Refrigeratory, put in the 21st Inst. at 6 O'clock P.M. 20 miles distant from Washington." A sketch is annotated with the description: "The oval was cooper's work, the inner parallelogram was a box of tin turned down at the top and trimmed to the oval; a. and b. were two square holes at which ice was put into the vacuity between the tin and wood, the butter being in the tin." *Courtesy the Library of Congress.*



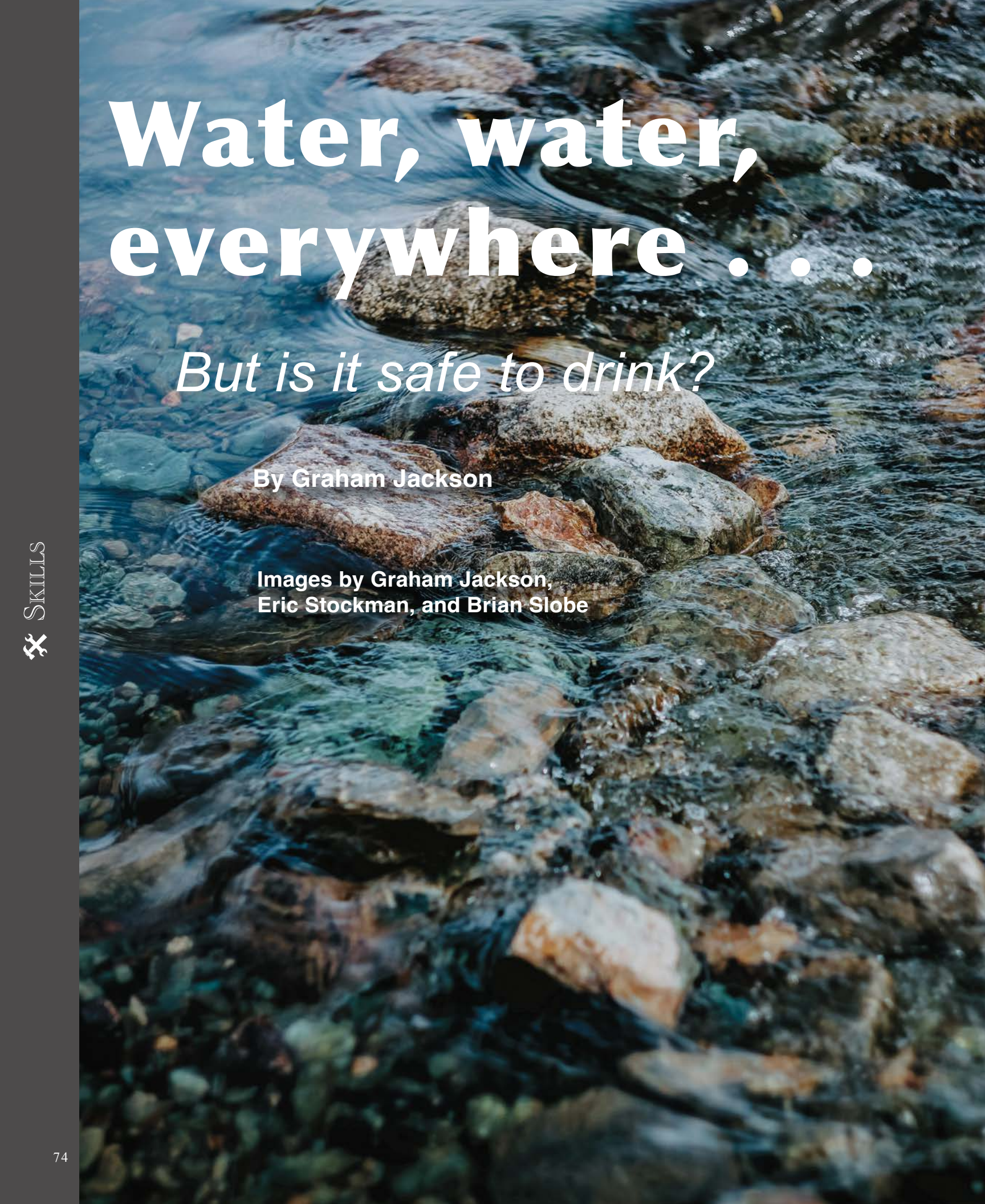
LEFT: A "portable ice box" from the late 1950s made by the Esky brand, which was founded in Sydney, Australia in 1884 by Francis Malley (the company was originally called Malleys Limited, a sheet metal and appliance manufacturer). Named the "Eskimo Ice Box," the wildly popular cooler's name was soon shortened to "Esky." This example is a permanent exhibit at the Yarrila Arts & Museum (YAM) in New South Wales; the inside is lined with galvanised metal and has a rubber seal. *Image courtesy the City of Coffs Harbour, New South Wales.*



RIGHT: A brochure from the 1940s-1950s for the "Kampkold Home Ice Box and Kampkold Junior" made by AGM (American Gas Machine) and sold by the Ohio Stove Company. *Courtesy the Scioto County (Ohio) Public Library Local History Digital Collection, contributed by Paul O'Neill.*



ABOVE: Detail from a 1950s KampKold for sale on Etsy.



Water, water, everywhere . . .

But is it safe to drink?

By Graham Jackson

Images by Graham Jackson,
Eric Stockman, and Brian Slobe

“Filthy water cannot be washed.”

– West African proverb

While the lesson of the proverb probably had nothing to do with water, the originators might be surprised to know that we actually do have the technology to wash water.

Several years ago I watched popular survival show personality Bear Grylls demonstrate how to ‘survive’ in the desert where dehydration was the ‘biggest enemy.’ At one point he caught a snake, then killed, skinned, cooked, and ate it. Later he urinated into the excised snakeskin using it as a storage bladder. He then proceeded to continue his desert survival quest, walking during the day. Later, presumably really thirsty, he drank his urine out of the snakeskin. “It smelled foul,” said one crew member. It’s a fairly legendary piece, and there is a lot wrong with it, but the fundamental message of conserving and carrying water is key, though read on for what he could have done better.

Range-of-travel on a vehicle-dependent expedition is determined by two liquids. Fuel will determine the range of the vehicle, and water (not urine!) will determine the range of the people. And yes, I’m ignoring the rare cases of electric vehicles for long-range trips. Water systems for vehicular travel include a multitude of considerations: what is in the water, where to find it, how to carry it, and how to clean it.

What Is In It?

Water is made up of two hydrogen atoms and one oxygen atom. Called the ‘ultimate solvent’ by chemists, it dissolves and retains a vast number of chemicals in addition to being the primary media for life and therefore giving home to multitudes of living organisms. In both cases, chemical and biological, some are benign and some very dangerous. Getting the dangerous ones out should be the obvious focus of any water treatment system, but we cannot discriminate.

Biological Contaminants

The organisms responsible for water-borne diseases fall into several classes, the most important to us being the microorganisms that are small enough to be challenging to remove. We measure them in microns, one of which is a millionth of a meter, or a thousandth of a millimeter.

Protozoa are the largest, and are responsible for such lovely conditions as amoebic dysentery, giardiasis and, the most common of all, cryptosporidiosis. These are 2.0 to 15 micron hard-shelled cysts that can live out of water for a short time and are usually transmitted through a fecal–oral pathway (as with the majority of organisms we will mention)—in other words, from drinking water in which an infected animal (humans included) has defecated, or from contaminated food.

Bacteria vary greatly in size and shape, from 0.2 microns in diameter to over 100 microns long and cause delights including cholera, typhoid fever, dysentery, and salmonellosis. They are single-celled organisms that are common (indeed necessary) in our bodies, but the pathogenic varieties need to be removed from water. They are also primarily transmitted via the fecal–oral pathway. Of related concern are endotoxins or lipopolysaccharides that are found in the outer membranes of bacteria and can be extremely toxic. Endotoxins are much smaller than full bacteria at 0.002 to 0.02 microns, and in the most severe cases can cause septic shock.

Viruses are the smallest of all the biological pathogens. These are parasitic particles comprising a strand of DNA or RNA that invade living cells and redirect the cell to produce more virus. On the order of 0.005 to 0.1 microns in size, viruses are responsible for such ailments as hepatitis A, polio, and gastroenteritis.

Six Essential Field Arts Tools You Need (besides your journal, pen, & colors)



Images and art by Roseann Hanson

You've taken the leap and are dedicating time to keeping a field journal or travel diary, learning to draw (or as I like to say, *drawing to learn*), and adding color using watercolor or colored pencils. Aside from your journal, pen, color media, and a bag to carry them in—your foundational kit (see page 97)—what are the next most essential tools every field artist should have?

I admit that some of the tools I reach for over and over reflect traits of utility and beauty but also sentimentality and romanticism rather than practicality. For example, while I adore my elegant vintage Parker sterling silver mechanical pencil,

it is not practical because I must carry graphite re-loads, which are a slightly off-common size, and the pencil is very fussy to load. My daily sketching pen, a vintage Mont Blanc Classique (1985, a first anniversary gift) is gorgeous and I believe has the most versatile nib of any fountain pen, doing the job of four pens (from tiny whisker-lines up to broad and fat lines), but its cap does not seal well and thus it is prone to drying if not used daily.

In light of these challenges, I do have alternative tools I would more confidently recommend as essential kit—items I do also carry or own—and it's those I discuss in the pages that follow.

No. 1 – Mark-Making: Classic HB pencil

While I include a pen as a foundational field arts tool for your basic kit (see page 97), pens are fallible. They can run out of ink and if you forgot spares, you are out of luck; they can get over-pressurized at elevation (or altitude, such as on a plane) and blork ink into your field bag or all over your page; or the tip may get damaged and stop working.

Enter the classic, old-fashioned pencil as a perfect backup writing and drawing tool, but also as an essential tool on its own. They are inexpensive, simple to use, and versatile. Imagine a tool costing less than 30 cents that:

- ⇒ Will mark on a great variety of surfaces . . .
- ⇒ Will write in any position . . .
- ⇒ Performs dry or wet . . .
- ⇒ Does not leak . . .
- ⇒ Does not need refills . . .
- ⇒ Will work just as well 50+ years from now and . . .
- ⇒ Is made from naturally occurring and largely renewable materials (thus, no plastic to toss into our landfills).

Furthermore, when it gets dull, it can be sharpened with essential tool No. 5. And even better, with your tool No. 5 you can customize the nib: super sharp for fine lines, or create a big, slanted chisel tip for deep shading.

More than 14 billion pencils are made globally every year—laid end-to-end they would circle the Earth 62 times. The average pencil can be sharpened 17 times and can draw a line 35 miles long, or write 45,000 words—compare that

to a ballpoint pen, which might cough up 1.5 miles worth of ink.

High-quality classic pencils are made as they have been since the late 1500s, with a core of kiln-fired clay and fine graphite (originally British Cumbrian—where the modern pencil was invented—and

now often Japanese) encased by sustainably grown cedar wood. I say graphite, but often the term “lead” is used; this is a misnomer. The interior of a pencil does not, nor has it ever, contained lead. One of the earliest writing instruments was the stylus or silverpoint, used throughout the Roman Empire to etch markings into wax tablets or to scribe dark marks on papyrus; the stylus often was made from lead, thus the term.

Most high-quality pencils today come with an eraser end-tip, but in the pencil’s earliest days, teachers did not want erasers on pencils as they thought it would encourage students to keep altering their marks, rather than thinking first and writing second.

There are 20 hardness designations for pencils, each assigned a number and/or letter designation, such as HB, 2B, or 5H. H means “hard” or light in value, through B meaning “soft” or darkest in value. I prefer the HB because it sits right in the middle and can make very light marks and also reasonably dark. HB is equivalent to the No. 2 pencil marketed in the United States. The most popular and recognizable pencil in the world is the cheery orange-yellow, 7.5-inch-long “No. 2” made by Dixon Ticonderoga, who make and sell some 1.5 billion per year—yes, billion. And despite the popularity of electronic devices for writing, pencil sales globally are projected to grow from USD \$2.9 billion in 2025 to USD \$3.7 billion by 2034. That statistic makes me very happy.

My favorite field arts pencil is a Staedtler HB made in Great Britain—these are vintage, but still available in lots on eBay at very affordable prices. Staedtler manufactured pencils in Great Britain, using British graphite and clay, from 1966 to 2007; the Wales-made Noris 120 (HB grade) is blue with a red tip. When I sharpen this pencil, the graphite does not shatter (as can happen with the cheaper, newer Dixon pencils). It holds a point far longer, and, of course, does not have an eraser tip. The Staedtler Mars 100-HB Lumograph pencil is a modern version of the Noris, contains German graphite, and can be purchased in many office or art supply stores.

I would also recommend the new Blackwings, a modern take on their classic 602 that gained legendary status as much for its quality as for its pedigree. John Steinbeck,



Disney animator Shamus Culhane, Stephen Sondheim, and Leonard Bernstein all used original Blackwings for their artistic creations. Culhane allegedly asked to be buried with his beloved 602. Known for its rectangular ferrule (the tip opposite the writing point), extendable eraser, and high-

quality Japanese graphite, the pencil was discontinued in 1998 but successfully revived by California Cedar Products Company in 2010. Cal Cedar also produces the Field Notes pencils, which are simple, unpainted cedar tools of great beauty, also highly recommended.

No. 2 – Un-Mark-Making: Kneadable eraser

As you munch your morning toast, you may reflect that your bread, should it be the white variety, was the original graphite eraser until the late 18th century. A small ball of soft, white, crustless bread was rubbed across drawing paper to remove unwanted graphite marks. These balls could be kneaded into shapes to aid in said removal. But, imagining your mother or spouse might object to you continuously stealing from the daily bread production (not to mention your eraser would quickly mold or be eaten by mice or your dog), it was with great relief that Edward Nairn in 1770 discovered that natural rubber could erase graphite much better than did bread.



Early rubber was unvulcanized, meaning it was uncured and perishable (vulcanization, invented by Charles Goodyear in 1839, hardens rubber through heat-and-sulfur chemical processes—today's rigid erasers are vulcanized).

Unvulcanized rubber behaves like unbaked dough—it is soft, sticky, and pliable, but susceptible to melting or freezing. It was great at erasing graphite from paper.

Today kneadable erasers are made from synthetic rubber compounds, which provide better durability, cleanliness, and longevity. They work by gathering up the graphite (or pastel or charcoal) particles rather than by rubbing them off, as with a hard rubber eraser. The latter can damage your paper, something you



would want to avoid, especially if using high-quality and expensive watercolor paper.

Unlike hard rubber erasers, which wear down, kneadable erasers simply get darker as they absorb more particles; to use them, you stretch and fold the rubber, creating “fresh” surfaces that absorb (erase) more readily. You can tweak them into little points to carefully remove only small sections of a sketch, or use the whole slab.

No. 3 – Drafting: Drawing compass or dividers

This is a favorite and essential tool for so many reasons. It is multi-functional, made from two solid billets of brass, has a fun history, and is lovely to behold. It is a British drawing compass, and I found mine in a jumble (junk) store in Hastings, England; it still held its original, vintage Staedtler Noris pencil, shown in the photo on page 84 (also, see essential tool No. 1). Helix invented this clever little tool in 1894, and by the 1920s and well through the 1970s most British school kids had one (friends confirm this—indeed, several indicated they delighted in using them as impromptu stabbing weapons during playtime; aah, those were the days).

Foremost this tool is perfect for scribing circles—simply insert your pencil, adjust the arms to the desired circumference, and scribe a perfect circle (you can copy over in ink later, which I did on the journal page at right, or use a slim ink pen such as a BIC or biro to you Brits, if it fits into the hole of the drawing-arm—modern drawing compasses have adjustable bales that hold the drawing instrument).

But it is also useful for measuring proportions for drawing. Say you are sketching a rock column (see next page), and you want to ensure you have the correct proportions, which are hard to draw by guessing. Hold your compass at arms-length (straight-arm), close your non-dominant eye, and set the points of the compass (the metal point and the pencil-tip) to either

Quality does matter with kneadable erasers. I recently purchased a box of 50 unbranded kneadable erasers to include with a field arts retreat gift bag along with Staedtler pencils. I found them to be overly sticky and very hard to manage; bits would break off and adhere to surfaces, and even smear across the paper. Go with top-name brands such as Faber-Castell and Caran d’Ache; Prismacolor didn’t score well in some online tests, nor did General’s.



Nature's Superstore

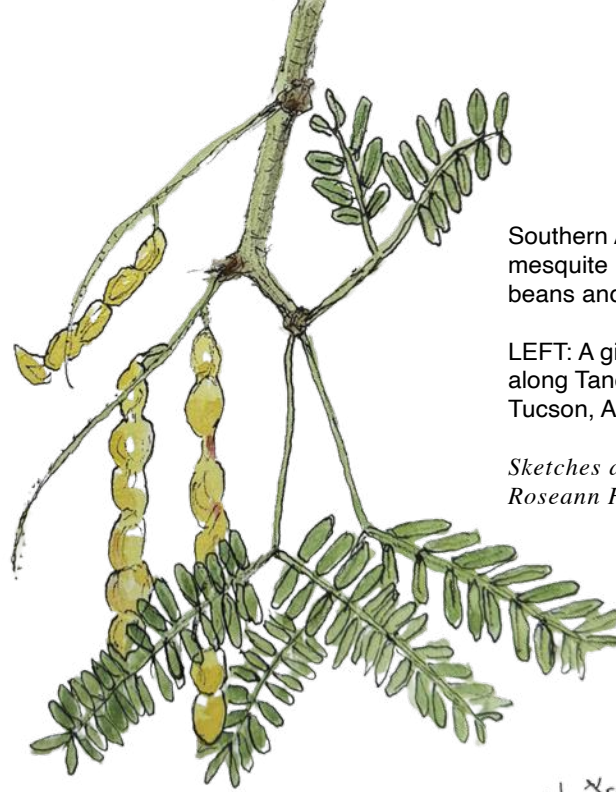
by Roseann Hanson

Groceries, medicines, hardware, cosmetics, building materials, sporting and hunting equipment, paint, cooking fuel—this is a description of today's Walmart superstores. But for millennia, Native Americans in the southwestern United States found the same resources in one tree—the mesquite.

Ethnobotanist Richard Felger was the first to call the mesquite “an early K-mart for desert peoples.” Indeed, it is doubtful any other one plant provided so much for them. They used branches and trunks for building and fires, they made bows from the straightest limbs, balls from boles, and baskets and medicine from the inner bark. The sap from the inner xylem provided black paint for pottery and dye for baskets and hair (for men), and the white gum was used as an eye medication. And of course the highly nutritious

seed pods were a vital food resource, ground into a flour with a higher protein content than soybeans. To the Tohono O’odham, the Desert People, June is *U’us Wihogdag Masad*, “Mesquite Bean Harvest Moon.”

Mesquite is native to North America, its origin dated to the Pliocene (5.33–2.58 mya). Some researchers believe it had a close relationship with megafauna such as mammoths, camels, and horses. The seeds of the tree are encased in

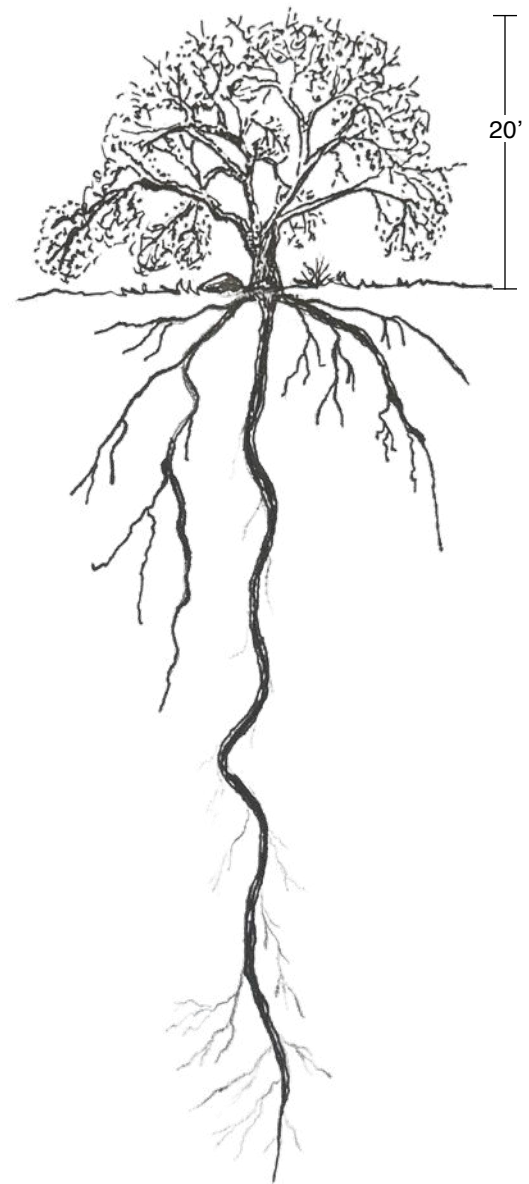


Southern Arizona velvet mesquite (*Neltuna velutina*) beans and leaves in mid-July.

LEFT: A giant velvet mesquite along Tanque Verde Creek in Tucson, Arizona.

Sketches and photo by Roseann Hanson.

To reach water deep underground, velvet mesquites extend a tap root at least 50 feet and sometimes up to 175 feet, the deepest measured. A network of lateral roots also help stabilize the trees.



a hard outer shell, surrounded by a soft, fibrous pod. The animals that ate the pods gained a rich nutrient mix from the pod, while the seeds passed through their systems intact, yet scarified enough to allow germination—aided by the nice dollop of fertilizer in which they were deposited.

When megafauna disappeared about 7,000 years ago, mesquite likely declined, not to flourish again until several events converged: climate changes favored mesquite with dry and warm conditions, and Europeans arrived in the 1500s, bringing with them the perfect new mesquite-seed transport machine: cattle. Although there is some disagreement concerning the degree to which cattle have been responsible for the spread of mesquite, in the absence of large browsers to keep it in check, there is no doubt it has taken over many grasslands.

*“Adventure is in the mind. If you think you’re doing an
adventure, you’re doing an adventure.”*

– Mary Sievier, who rode a 175cc BSA Bantam
around the world (1967-1976)