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Building a Ranch From the Ground Up

THE SANDY ARROW RANCH

WRITTEN BY
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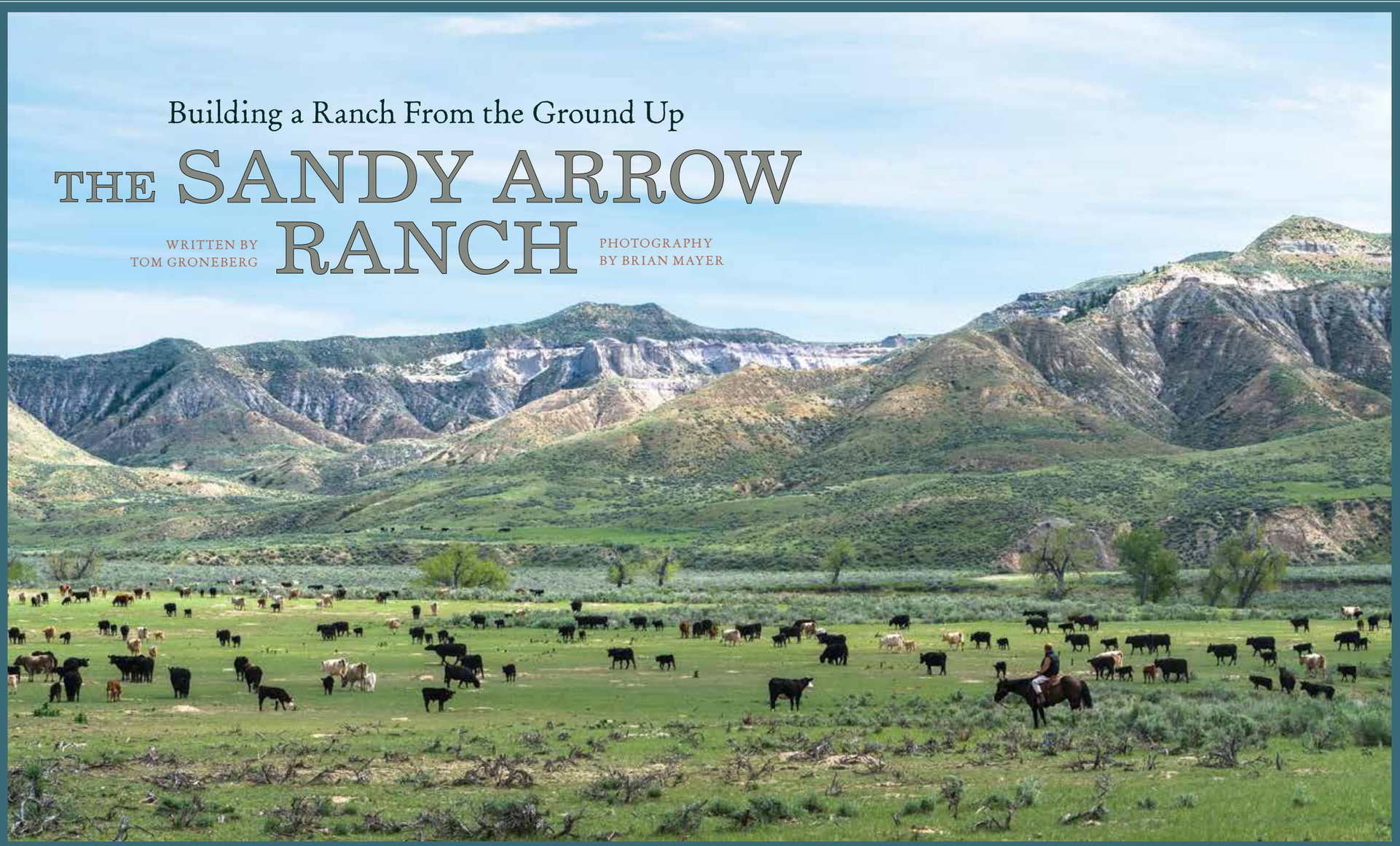
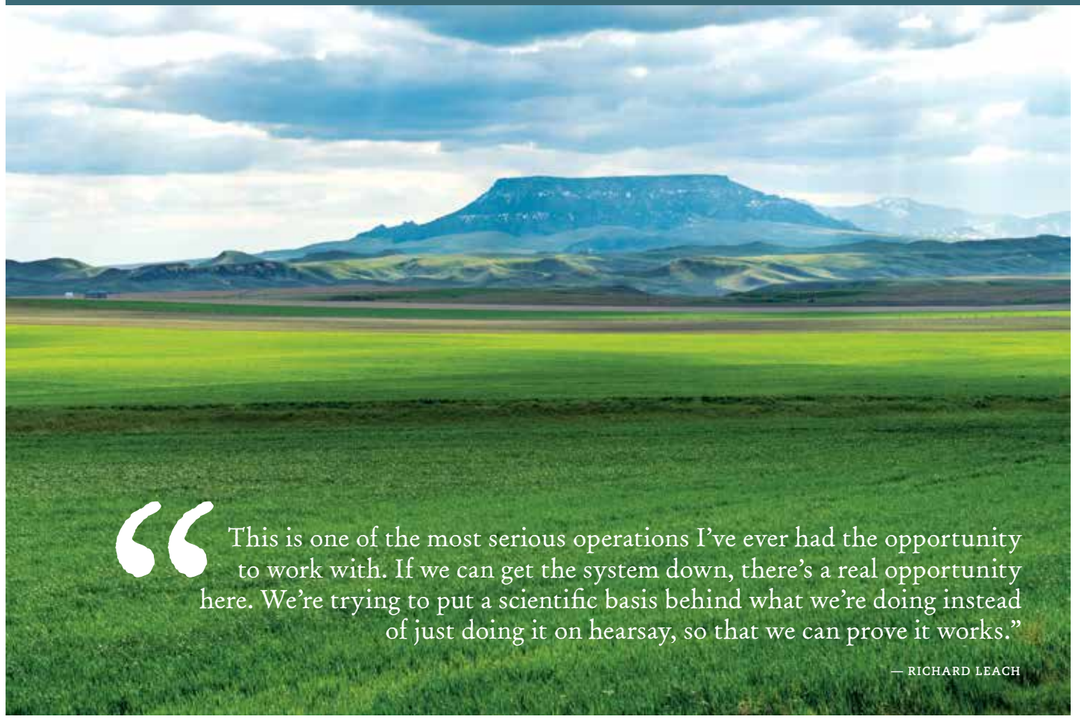
PHOTOGRAPHY
BY BRIAN MAYER



WHEN THE OLD ROYCE APPLEGATE RANCH, southeast of the small community of Square Butte in Central Montana, changed hands in November 2013, the new owner had his ranch manager build some new barbed wire fence. At the entrance to the ranch, a laser-cut sheet metal sign was erected, depicting iconic Square Butte and bearing the ranch's new name, the Sandy Arrow Ranch. And then, after he'd taken a good, hard look at the ground beneath his feet, the ranch's owner, Eric Dillon, knew deep down that he had a lot more work to do.

The Sandy Arrow Ranch is comprised of approximately 20,000 acres of rangeland, grazing for the ranch's 500 mother cows. There are an additional 2,500 acres of farm ground, used for growing hay and dryland winter wheat. The northern part of the rangeland borders the Upper Missouri River Breaks National Monument. This is country where sagebrush and greasewood and native grasses thrive in the gumbo soil. Some of the ranch's hay ground — fields of sainfoin and improved grasses — lies along the cottonwood-lined banks of Arrow Creek. The balance of the farm ground lies to the north, on the Square Butte Bench.

CLOCKWISE FROM LEFT: The Sandy Arrow Ranch Charolais-cross cattle graze along Arrow Creek. • CEO of operations, Richard Leach (left) and owner Eric Dillion (right), consider a pile of compost in the ranch's "tea room." • Dillion studies a compost sample in the Sandy Arrow Ranch's soil lab. • Soil health begins at the microscopic level.



> “This is one of the most serious operations I’ve ever had the opportunity to work with. If we can get the system down, there’s a real opportunity here. We’re trying to put a scientific basis behind what we’re doing instead of just doing it on hearsay, so that we can prove it works.”
>
> — RICHARD LEACH

Here, dryland wheat is grown as it has been since the time this area was first settled a century ago. After a few good crops were harvested during the homesteading era, wheat yields began to decline as the nutrients were stripped from the ground. Dryland farmers began fallowing their fields, giving the soil a year off to recoup between plantings. But in order to keep weeds from invading the bare ground, farmers tilled the fallow fields and — more recently — they applied herbicides to control invasive weeds. On the Sandy Arrow Ranch, the constant cycle of tillage and chemical applications had basically sterilized the ground. Dillon was shocked to learn that the land under his feet wasn’t made up of healthy soil, it was just dirt.

With his mop of blond hair and his rugged build, Dillon might remind you of Robert Redford, if Redford had gotten his MBA from Rutgers and pursued investment instead of acting. Dillon grew up on the water in Anacortes, Washington, and spent eight summers working on commercial fishing boats in Alaska while attending school. After graduate school, Dillon headed back west to Seattle, where he eventually founded Silver Creek Capital, a hedge fund that specializes in alternative investments. “Alternative” is an apt description of how Dillon approaches not only investing, but farming and ranching as well.

“When there are six adults looking at a truck stuck under a low bridge, I’m the kid saying ‘Let the air out of the tires,’” says Dillon. “My ‘let the air out of the tires’ moment with farming came when I was standing in a field with my manager and I said, ‘I don’t understand it. It’s July and there’s bare dirt here. Explain this to me.’ I said. It made absolutely no sense to me, I don’t accept the answer of ‘We’ve always done things this way.’”

“I’ve been here my whole life,” says Dave Martin, “all 27 years of it.” Martin is the manager of the Sandy Arrow Ranch, and he grew up on this land. His father, Mel, worked for the previous owner for more than two decades before Dillon bought the ranch. Martin has managed the Sandy Arrow for the last seven years, and it’s obvious that this is his home, that this piece of ground is something that he takes great pride in.

In the huge metal shop, Martin discusses upcoming plans with Richard Leach, the ranch’s CEO of operations. A fourth-generation Montanan, Leach says, “I played cowboys and Indians with my little brother in the Arrow Creek badlands growing up. This is home.”

Dillon determined that, with the help of these two men who have such long histories with this ground, he would fix the ranch’s depleted soil.

Leach, with his beard and ponytail, is a craftsman, having spent 30 years in the construction trade. And he is still in the building business, but now he builds soil instead of houses. When asked what surprised him most about the whole project, Leach responds dryly, “The whole project.”

So what, exactly, is the whole project? It is composed of a number of steps. First was completing a final tillage of the farm ground. Then in the fall of 2016, the ranch went “cold turkey” and did away with chemical herbicides.

Next, they needed to address the issue of the damaged soil. For this, Dillon hired soil experts Elaine Ingham and Molly Haviland. Ingham is a highly-sought after soil scientist who has developed soil-building projects on large scales across the globe, from a 12,000-acre vegetable farm in South Africa to commercial citrus groves in Florida. Ingham and Haviland came up with a plan for turning the Sandy Arrow Ranch’s sterile dirt into healthy soil.

Healthy soil isn’t just dirt, it’s a complex balance of soil and organic matter, and billions of microbes. The microbes are composed of countless species of bacteria, fungi, protozoa, and nematodes. Any good organic gardener knows the value of compost, and what Ingham and Haviland proposed was composting on a massive scale.

In its most basic sense, composting is the process of turning organic matter into black soil through the addition of bacteria and other microorganisms. It helps to think about making compost like you’re making sourdough bread. Instead of flour and sugar, the Sandy Arrow’s raw ingredients start with eight parts old grass hay and straw bought from local farmers. To this they add two parts manure hauled in from the Deerfield Hutterite Colony’s dairy, and finely-chopped high-nitrogen alfalfa and sainfoin. An active ingredient — like yeast — needs to be added to break down the organic matter. This inoculate is made of pure soil that hasn’t been treated by chemicals; some of this mix even came from the top of Square Butte itself. Add water, up to 10,000 gallons a day. Add oxygen by turning the windrows with a specialized compost turner. The compost pile heats naturally to about 160 degrees and it begins a slow cook. When all of the compostable material is done being acted on by the microbes, the pile cools down and it is ready to be spread on the fields. Like sourdough starter, some of the compost is held back and used as the active ingredient for the next batch

FAR LEFT: Winter wheat flourishes on the Square Butte bench. **ABOVE**: Eric Dillon, owner of the Sandy Arrow Ranch, is working toward a more pristine vision of the landscape. **BELOW**: Richard Leach sits at the controls of a high-capacity compost turner.

of organic materials. The Sandy Arrow Ranch's compost is specific to this area. "The compost needs to be made of locally-available microbes that are adapted to the land," explains Ingham. "You can't buy compost in Seattle, bring it to Central Montana, and expect that it will work." The Sandy Arrow Ranch made 2,000 tons of compost in 2016. It was spread on 1,200 acres of farm ground. In 2017, more compost will be made and used to treat the remaining 1,300 acres.

To control weeds and erosion on the tilled ground, Martin planted a six-variety seed mix. The cover crop restores nutrients to the ground and — when hayed — it provides feed to the ranch's cattle through the winter months. Eventually, the ranch plans to have 1,000 acres of ground on which they will have a perennial crop of hay. They will use another perennial cover crop on the remaining 1,500 acres. Winter wheat seed will be drilled directly into this cover crop, and the wheat will be harvested each year, rather than the every-other-year crop that is typically

harvested on dryland wheat farms.

"Eric is very enthusiastic, and he has one of the sharpest minds I've ever encountered," says Leach. "This is one of the most serious operations I've ever had the opportunity to work with. If we can get the system down, there's a real opportunity here. We're trying to put a scientific basis behind what we're doing instead of just doing it on hearsay, so that we can prove it works."

ABOVE: Even while Sandy Arrow Ranch is at the vanguard in terms of soil conservation, they still maintain certain traditions, including calf branding and roping, as demonstrated by ranch manager Dave Martin. **LEFT**: Soil composting at this level requires massive amounts of organic material, including piles of rotting hay.

Leach's office, in one corner of the large shop, has two microscopes on the counter, covered against the dust. Hanging on the wall is a large map of planted crops, portrayed in an array of colors. A large whiteboard on the opposite wall lists numerous ongoing projects. Phrases on the whiteboard jump out at you: "higher nutritional value," "viable economics," and "tea room." While tea room might conjure up images of women wearing gloves and nibbling scones, Leach's tea room is a huge portion of the metal shop, anchored on one end with plastic bulk tanks. The tea will be a potent inoculant that is a distillation of all of the beneficial microbes in the compost. "Dave and I are trying to figure out how to grow things. If we can do it quickly, without losing any production, then it's a viable option for other operations."

"There is a ton of skepticism out there," says Martin, "because everyone around here is a chemical farmer. They will believe it when they see it. They think Eric is crazy for what he's doing."

Dillon understands that he is a voice in the wilderness at this stage in the game. "It's the perennial cover crop for wheat that's groundbreaking here. If we get this right, we'll have biodiversity and living roots in the soil. We'll plant a cash crop right into that and grow a crop every year. We'll have $150 an acre savings from not having to apply herbicides, pesticides, and fertilizer." Dillon knows that if this new way of farming isn't profitable, it won't be adopted by others.

"Eric is very much a pioneer," says Ingham. Once the Sandy Arrow Ranch gets the process down and shows that it can produce equal or better wheat yields without using chemicals or conventional tillage, it is hoped that other local producers will take note and adopt the same methods. "Eric is an innovator who is willing to do the work," explains Ingham. "The ranch will serve as a source for the microorganisms to move things along further."

Not content to just build the soil on the ranch's farm ground, Dillon is also exploring his new soil's ability to store carbon, rather than releasing it into the atmosphere where it contributes to greenhouse gasses. He set a goal of sequestering 3 tons of carbon per acre on the ranch. "We're trying to raise the visibility of this because we have to, have to, have to, get carbon back into the soil."

The Sandy Arrow Ranch's cattle, 500 Charolais-cross mother cows and their calves, are not exempt from Dillon's alternative plans either. The ranch is working toward raising an all-natural beef calf crop. "We try to stay as natural as possible," says Martin. "We don't steroid the calves or anything, just give them their vaccines and booster shots." The same cattle buyer has purchased the Sandy Arrow calves the last six years, a sign that they are in high demand.

The ranch has developed a number of springs on the ranch for both livestock and wildlife. Ponds are stocked with westslope cutthroat trout. Elk thrive on the sainfoin hay fields in the fall, as well as the perennial cover crop. "Wildlife is a really big deal for Eric," says Martin, "and I take pride in the wildlife out here, too."

"I grew up hunting and fishing, and that's something that's deeply instilled in me," says Dillon. "I have a thing about Montana. I grew up reading cowboy and Indian stories. The country around Lewistown absolutely resonates with me, over and above where everyone else goes when they come to Montana."

Dillon envisions a landscape that will look similar to what Lewis and Clark saw when they came through the area in 1805. Wildlife thriving on the prairie. Native fish teeming in the ponds. Soil that is healthy, organic. Though most of the locals would call Dillon's plans for the Sandy Arrow Ranch the misguided schemes of a newcomer, his ideas are — in a way — ancient. He explains, "I always try to ask 'What would nature do?'" And if Dillon's innovative plans are successful, they will bring about something historic, something that will stand the test of time — by returning the land to what it once was. ▲