

A photograph of a man wearing a cowboy hat and a light-colored shirt, kneeling in a grassy field. He is holding a young child with blonde hair. In the background, several dark-colored cows are grazing. The scene is set in a natural, outdoor environment with trees and hills in the distance.

For the Love of Land

Global Case Studies of Grazing
in Nature's Image

Jim Howell

Foreword by Allan Savory

Cows Have Culture Too –

Understanding Livestock/Landscape Interactions

IN ZIMBABWE, ONE of the protein staples of the native human population is mopane worms. They are big, fat, black, caterpillar-looking critters. When my wife, Daniela, and I are there with our tour groups, we always make sure our clients are presented with the opportunity to munch on this local delicacy. After all, getting in touch with native custom is one of our big draws. Amazingly, most of our adventurous travelers decline the privilege, turning their noses up like a five-year-old presented with a plate of broccoli. The local folks, on the other hand, eat 'em like potato chips.

Why is this? How can a food item so readily devoured by one group of humans be so repulsive to another? What does this have to do with managing livestock? Actually, the principle(s) involved transcend the species gap like you wouldn't believe. Food preference probably has just as much to do with culture as it does with nutrition, if you define culture as the norms, traditions, and accepted code of conduct between members of a population, and assume that culture contributes to a population's success at surviving within a given set of environmental constraints.

In humans, culture is learned. We learn to eat, or not eat, worms. Most of us figure that groups of animals don't really have culture. We think they do everything innately, by instinct—that they don't learn to eat things, they just know what to eat.

Well, in December of 2001, I attended a one-day workshop by one of the more grounded and practical academics I've met—Dr. Fred Provenza from the Department of Rangeland Resources at Utah State University—which greatly expanded my appreciation of what makes a cow a cow. Turns out that cows (or sheep, goats, bison, reindeer, or whatever species you prefer) have culture too.

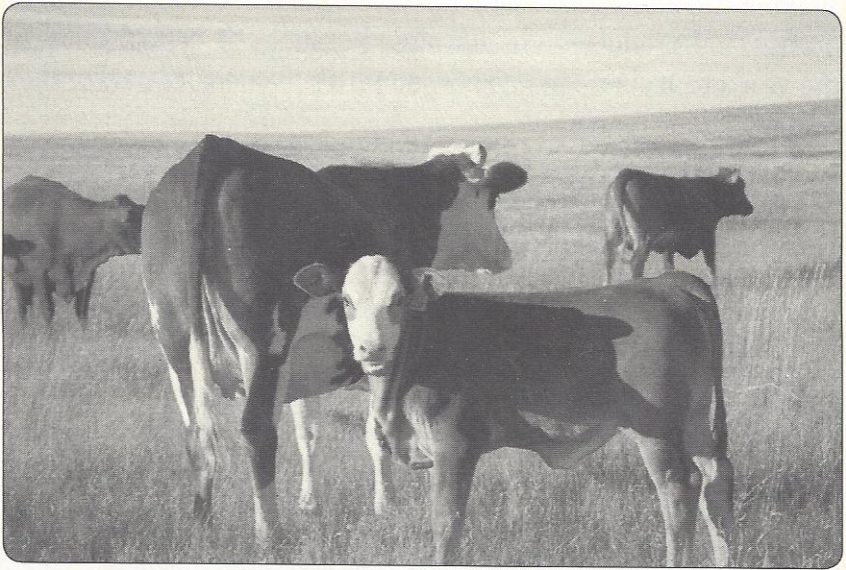
For those of us managing ranches holistically, this whole issue of livestock culture has huge implications as we begin to plan our grazing and develop our ranch infrastructure. In my opinion, it goes a long way to explaining why so many of us have struggled as we transition to planned grazing. If we can understand the components of culture and more deeply appreciate the ways that animals interact with their environments, I think we might be able to smooth out these discouraging learning curves.

A Change of Scenery

Most of us who manage livestock realize that it's hard to take a bunch of critters from one environment to another and expect them to keep on breeding back and weaning big calves without missing a beat. There's always the dreaded adjustment period. Depending on how different the environments, the pain of this transition can be highly variable, but it pretty well always happens, even when moving from relatively tough country to what looks like easy street. This adjustment period also happens when we decide to change our management for the benefit of our land. When we start amalgamating animals that don't necessarily want to be with each other, and then make them go into areas that they don't particularly fancy being in, a uniform chorus of bovine protestation can result.

Well, what would you do if you were unwillingly plucked off of your pretty farm in the green hills of Missouri, transported to a new ranch in the badlands of Wyoming, given a brand new set of friends, all new food, different weather, a novel landscape, and salty water? You most likely would protest and perform below your potential, at least initially. What if you had been on that same Wyoming ranch your whole life, and had been in charge of the winter country down

in the Red Desert all that time. You know every square foot of that place—where all the winterfat and best grass patches are, the good places to take shelter in blizzards, how far you can ride out and still get back before dark (or how to get home in the dark), etc. You are intimate with the land. Now your foreman has decided to move you to the summer unit in the Green Mountains. How long will it take you to learn that place and become as intimate with it as you are with the winter country? Probably a long time, but if you have to do it, you will. You can adapt. You have the capacity to change your habits to enhance your prospects for survival.



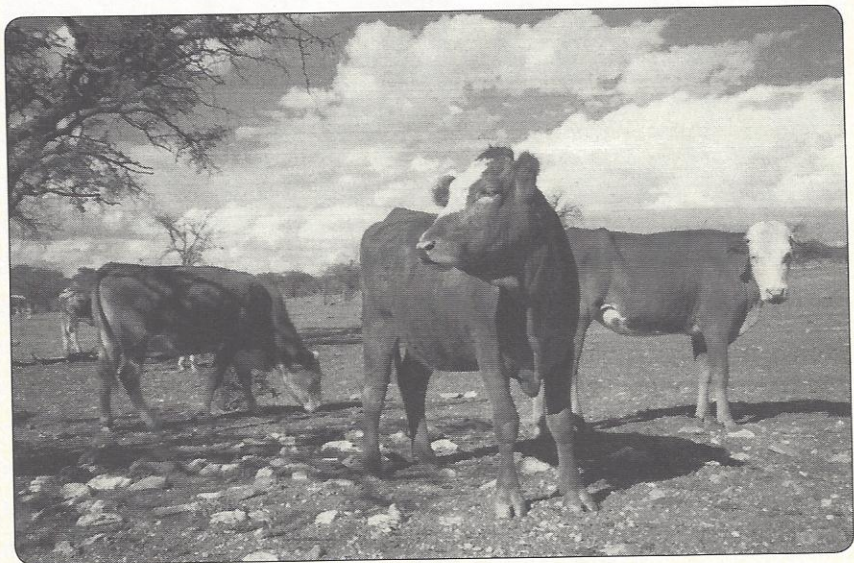
Babies learn what to eat, and therefore how to survive in their environment, from mom. Lasater Ranch, shortgrass prairie, eastern Colorado

Such scenarios are equally as applicable to your animals, including this ability to learn and adapt to new circumstances. That's good news for those of us who realize we need to change our management. Riparian zone blowouts, overrested mesas, and sagebrush monocultures are not acceptable in the modern West. To begin to rectify these problems, we need to change the behavior of our animals, which means we must change their culture.

How Do Cows Get Cultured?

Now, to get to the point, what exactly constitutes bovine culture, and how do we change it? Complexity is the rule, but here are some basics. According to Dr. Provenza's studies, young animals learn what to eat and how to eat from their mothers. Sounds simple, but its impact on how animals use the range is huge. If a calf or lamb doesn't see its mother grazing larkspur, it won't eat it either. If it sees its mother munching fallen mesquite beans, or sagebrush, or taking a bit of snakeweed every now and then, by golly it will too. By following their mothers, young animals learn which toxic plants to avoid, which toxic plants they can eat some but not a lot of, which grasses, forbs, and browse are most nutritious at certain times of the year, etc. It's not innate knowledge. It's learned; it's part of their culture.

Dr. Provenza's trials also show that once mother becomes less of a focal point, peers start to have an important impact on foraging behavior. For example, if you buy a load of yearlings and stick them in



Simmental cattle, native to the lush pastures of temperate Europe, survive on pretty thin pickings in Namibia at the end of an extended drought. Over the past 100 years, the animals that have figured out how to survive in this new environment have passed that behavior on to their offspring. They evolved a new culture.

with your weaned heifers, the new kids on the block will watch what the experienced locals are eating, and they'll gradually take on those habits.

All this begs another even more fundamental question: What exactly tells the mother cow that it's safe to eat this, a little bit of that, and none of that? She probably learned from her mom, too, of course, but this knowledge had to start somewhere. I often think of the poor Fleckvieh Simmentals from the lush pastures of Germany that first set foot in Namibia, in southwestern Africa. Those first bulls were lowered into the icy Atlantic, swam ashore onto the Namibian coast, and were then lined out in a forced march across the blazing Namib Desert to the scrubby arid savanna of the country's interior. Talk about culture shock. How did those poor critters learn what to eat?

Satiation vs. Palatability

For many years now, Allan Savory has been saying that animals don't select their diet based on which species are palatable as opposed to unpalatable. They simply select from all the plants on hand to meet their energy, protein, mineral, and vitamin needs. Sometimes this correlates to a particular species, but oftentimes it doesn't. Things such as growth form (young and tender vs. old and fibrous) and growing site (highly mineralized vs. leached soil) often have just as much or more to do with a plant's attractiveness as the species itself. The animals know how to select what they need. Many academics have said that's hogwash.

Dr. Provenza isn't one of them. In fact, his trials indicate that animals can figure out what they need. It's not a conscious choice, but the result of a complex web of interrelated physiological and cognitive processes. In one trial, as lambs were given an energy infusion into the rumen during the consumption of straw, daily intake of straw increased steadily. The body sensed that its energy needs were being met, the lambs associated this sensation of satiation with the flavor of the straw they were eating, so they kept eating straw. In the control group without the energy infusion, daily consumption of straw steadily dropped. The straw was not satiating their energy needs, so they quit eating it. These two groups were in pens side by side, and

Dr. Provenza had parts of the trial on video. By the third day, when the straw was placed in the pens, the energy infusion group was diving into the feed rack with enthusiasm, while the control group watched them through the fence, with looks on their faces that seemed to say, “What on earth do you guys see in that crap?”



Plants growing under shrubs are often highly selected, regardless of species, due to superior nutrient content created by mineral deposition and nitrogen fixation by the shrub, especially if a legume—highly brittle savanna grassland near the Botswana/South Africa border.

And not only do they know what they do need, they also know what they don't need. The emetic system is the body's defense mechanism against overconsumption. Animals can eat too much of a good thing, like protein or energy, or too much of a bad thing, like toxic compounds. In either case, when too much goes down the hatch, the emetic system kicks in, making the animal feel sick to its stomach.

Humans can relate. Usually we can sense this coming before we need to head for the bathroom, and we naturally stop eating the thing that's making us full or starting to make us nauseous. If we go too far, the unique sensation just prior to losing one's cookies tends to stick with us. Your brain associates that sensation with the food you just ate, and maybe even with the restaurant or room you ate it in. Chances are

that food or restaurant will be unpopular for years to come. According to Provenza, the same goes for animals. When an animal overeats on a particular plant, it remembers it for a long time. A bad eating experience can last a lifetime.

Diversity—the Spice of Life

From a practical management point of view, this is both good and bad. If the plant is indeed highly toxic, we want the animal to avoid that plant for the rest of its life. More often than not, however, the plant has the potential to play an important part in meeting the animal's needs as long as not too much of it gets consumed at any one time. Dr. Provenza has demonstrated that when presented a variety of different plants containing toxic compounds, livestock will consume more total nutrients per day than with only one or two mildly toxic plants available. This isn't because the high variety diet contains more nutrients per pound than the simpler diet; it's because an animal will only eat so much of one plant type before it becomes satiated on that plant and wants to eat something else.

In this case, the satiation is caused by toxic compounds in the plant. Essentially all plants contain these compounds and are potentially toxic if overconsumed. The emetic system starts to tell the animal to slow down on one plant and switch to another. It's important to emphasize that an animal initially begins to select a particular plant because of its protein or energy content. If there were no toxic compounds in the plant, it would continue eating that plant until its energy or protein needs were satiated. But when a plant contains toxic compounds, the animal may become satiated on that toxicity before it fills up on protein or energy. To continue filling those nutrient needs, it must switch to another plant type.

Most rangeland landscapes support a broad diversity of species, especially those in which the ecosystem processes are functioning effectively. Most of those species can be used by our domestic livestock to one degree or another. We often assume that broad, uniform utilization of our ranges can only be achieved by a mix of livestock species. That of course is one way to do it. Some species have higher tolerances for some toxic compounds than others. Goats, for instance,

will tend to browse sagebrush more readily than cattle. But oftentimes, a particular species has the potential to feed over a much broader range of plants than we give them credit for. The reason they don't, typically, is because they've never learned to. This learned behavior can take years to evolve, but there are things we can do as managers to help it develop faster—more on that in a minute.

Culture Shock

This brings us back to culture. The Fleckvieh Simmentals in Namibia know how to make a living in their very un-German environment. Over the past hundred years, the animals that have figured out which combination of plants they can best make a living on have been the ones to survive and pass that behavior on to their offspring. They have evolved a new culture.

A population of animals that is intimately familiar with a ranch, and that has been managed the same way for years, decades, or even centuries, will have developed a very strong culture—a culture of survival molded by history and dependent on a diversity of plants. When we change that culture by mobbing them up into bigger and bigger herds, for example, and into tighter and tighter units of land, we have to expect a culture shock. Many of the little bunches that formerly occupied their own smaller home ranges are now being forced into areas of the ranch where they seldom venture, and possibly exposed to plants they've never seen.

The foraging patterns or habits of each original little bunch will change drastically, because the land they have access to on any given day will be totally different to what they're accustomed to, and it will take time before the animals learn a new grazing pattern that meets their nutritional needs. If the animals are moving through lots of pastures, they'll have to go through this learning curve in every pasture. This is stressful, but the animals will figure it out. In my experience, the more radical the change of environment, especially if generally of lower nutritional quality, the higher the stress.

While managing a grass-based dairy in east Texas, I brought in 600 springing heifers over the course of a year. With the exception of one truckload, all of those animals came from a confinement heifer-

growing operation in the upper Midwest, and they battled to adapt to a grazing lifestyle for their entire first year. Only that one truckload of 40 heifers adapted with minimal trouble, and it came from a grazing operation in eastern Oklahoma, with a climate and forage base very similar to their new home in Texas. My experiences buying and grazing cattle in arid New Mexico and high altitude cold Colorado have been similar.

Smooth Transitions

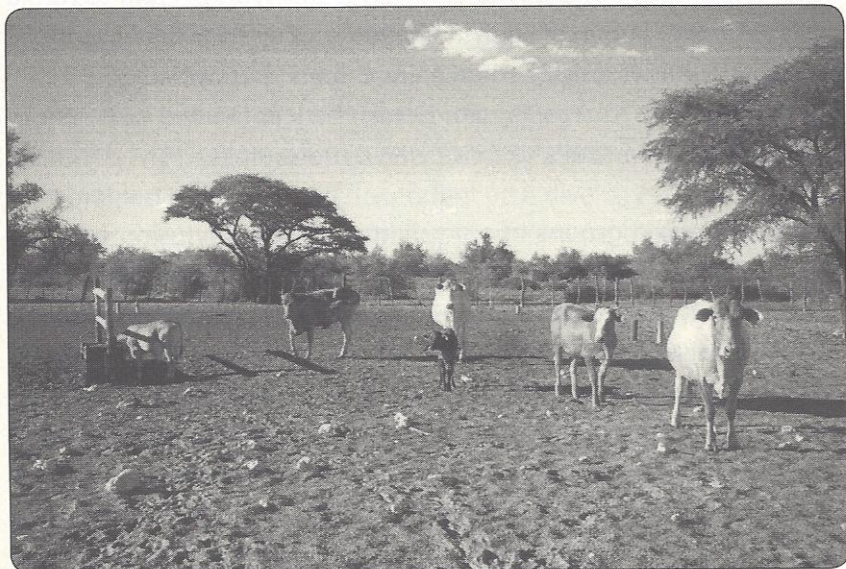
Be prepared for trouble, but be patient, observant, and don't give up, because the good news is that the animals will learn. They will change their culture, and there are some things we can do to help them along. One of those is to take things slowly. Expecting to turn a desert into the Garden of Eden in one season is wishful thinking. Initial enthusiasm wanes quickly when animals aren't happy.

As you start to amalgamate herds, think about the best way to do that from the animals' point of view. For example:

- Scattered groups of animals that are already using one ecologically distinct region of the ranch (and therefore already know each other and the plants) can be combined into one herd and managed under that new social and spatial context before they're taken into completely new country and combined with totally unfamiliar animals into even larger herds.
- When planning the development of new pastures or grazing units, try to make sure each area has as much plant diversity as possible. Remember that the more plant types an animal has to select from, the more able the animal will be to meet its protein, energy, and mineral needs.
- You may already have animals that know how to meet their needs from the range of plants on your ranch, but if you mob them up into smaller pastures that lack that diversity, expect trouble. I've had personal experience with this challenge on the ranch in New Mexico, which was fairly degraded. If I had understood the importance of access to plant diversity, I would have urged our management group to do our

land planning and subsequent infrastructure development differently.

- When bringing new animals onto a property, remember that younger animals will more readily adapt to the new environment than older individuals. The old adage that “you can’t teach an old dog new tricks” applies to our domestic herbivores as well. Also, those new animals, regardless of age or history, should always be mixed with animals that know what to eat and where to go, and an effort should be made to keep them mixed. The new ones will tend to segregate themselves, but the quicker they integrate, the faster the newcomers will learn how to make a living in their novel surroundings.



If we stay out of nature’s way (and don’t wean calves, separate age classes into distinct herds, etc.), domestic animals form complex social, or family groups, just as their wild relatives—a behavior that undoubtedly contributes to the development and maintenance of a herd culture well-adapted to its environment. This is a family group in South Africa—from right to left: old matriarch cow, her yearling calf, current calf, a four-year old daughter of matriarch cow, with her yearling calf and current calf. The remainder of this 600-head herd is standing behind the photographer.

Fine Tuning Experimenting with the effectiveness of food rewards

And finally, for those of you who have survived the inevitable performance dip and now have culturally sophisticated livestock that prefer to be bunched and constantly moving, here's another tidbit Dr. Provenza threw out. He is now experimenting with different levels of protein and energy supplements designed to stimulate animals to eat plants that they normally don't select (or at least don't select aggressively), like sagebrush and other plants that dominate vast tracts of land in the West. If we can get animals to go after these plants, we'll have a much better chance at healing many severely degraded landscapes. Heavy browsing pressure on sagebrush, in combination with hoof action, will help open up these sagebrush monocultures and stimulate new forbs and grasses to start filling in bare ground. If the animals refuse to eat sagebrush, there is little chance of making this happen.

With two groups of lambs familiar with sagebrush (i.e., it wasn't a novel plant to them), he offered one group a restricted amount of an energy supplement (200 grams per day) and a protein supplement (also 200 grams/day), along with all the sagebrush they wanted. Another group was offered both of these supplements ad lib--they could eat all they wanted--in addition to the sagebrush. The restricted group ate 1500 grams of sagebrush per day, while the ad lib group only ate 800 grams per day of sagebrush.

The ad lib group wasn't stupid. The alfalfa and barley in the supplement met their needs more readily than the sagebrush, so without the restriction, they ate more of it and roughly half the sagebrush as the restricted group. The 200 grams each of protein and energy was enough of a complement to the sagebrush that the restricted group really put away the sagebrush--lots more than they would have without the supplement. Roughly 75% of their daily dry matter intake was composed of sagebrush. That's pretty good.

This indicates that restricted use of strategic supplements, in combination with sound grazing planning, might just be the trick to the utilization and healing of vast tracts of otherwise worthless rangeland, or to getting animals to eat any plant that is potentially useful but greatly underutilized. Anyway, they're currently trying it out on the

Deseret Ranch in northeastern Utah on a commercial scale, so we'll have a better idea of how this works in the real world pretty soon.

One last thing. It's awfully important to remember that most of us, when starting to manage holistically, will not only be changing the culture of our animals, but our own as well. Give yourself time, be clear on what you're doing and why you're doing it (holistic goal), and keep a positive attitude. If you think the transition to a healthier ranch, a healthier lifestyle, and a healthier bank account is going to create more pain than it's worth, you'll probably be right. If you know you're going to make it work and be successful no matter what happens, you'll also be right. It's up to you.

Now go get cultured.



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Stock

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