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Mud, Mud, Glorious Mud

SUZANNE UBICK

I often help my father-in-law make compost in the garden. Every time we finish a batch, he takes up a handful and says "I could eat this! Look at it, smell it, it just couldn't be any better!" Indeed, the compost is tempting: chocolate brown and crumbly, it looks like black forest cake and smells sweet and faintly earthy.

In fact, earth-eating, or geophagy, is a well-documented phenomenon. In the animal world, parrots seek out particular clays and deer lick hollows into patches of soil, traveling long distances to reach these tasty spots. Cattle will chew on clods of particular earths; in South Africa, cattle will often be found meditatively licking away at termite nests, hollowing out polished scoops in any weak spots. Termite nests are rich in trace elements, as these "white ants" carry up fragments from as much as a hundred feet down.

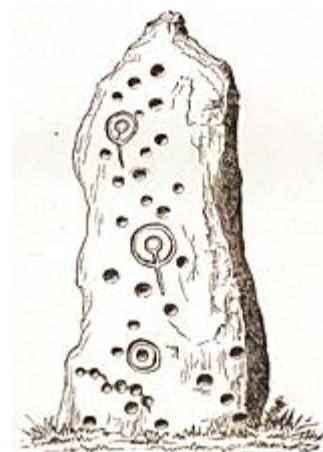
It's usually assumed that table salt, sodium chloride, is the big attraction. Often it is; animals need sodium to maintain a proper electrolyte balance, and the chloride ion is a major constituent of stomach acid. Just as often, though, the animals are garnering iron, copper, magnesium, and a host of trace elements—up to 65 ingredients, according to South African research work.

So eating dirt can be almost like taking vitamins. Ranchers provide their livestock with salt and mineral blocks; poultry and pigs have their feed specially enriched; and people turn to mineral pills. Clay is also an excellent vermifuge, attracting and binding internal parasites and packaging them for disposal.

People have been known to eat earth as well. In developed countries this is thought of as a type of medical disorder called pica, in which people have an "abnormal" desire to eat substances not usually regarded as food. But research by many scientists shows that eating mud pies is, well, a natural thing to do. Children, to their mothers' dismay, seem to be instinctively drawn to eating soils. They often return to particular spots but scorn others.

On the Hawaiian island of Oahu, Kawai Nui Marsh is said to contain a special nutritious mud. Called lepo ai'ia, the mud is described in oral traditions recorded by the Bishop Museum in Honolulu as thick and jelly-like, the cream color of poi but with a texture more like pudding. This mud is said to have been specially brought to a fish pond on Kawai Nui by the eleventh century hero Kaulu-a-Kalana from volcanic pillars off the coast of the Big Island.

A strict taboo, or kapu, was placed on disturbing the pond, a site thought to be a source of spiritual energy. According to legend, when divers went in to



A drawing of a menhir, or sacred stone, at Ballymenach, Scotland. It is marked by cupules where powder was ground from the rock for medicine.

IMAGE: CHARLES RAU

harvest lepo ai'ia, not a single word could be spoken by anybody on the banks, or the divers would be smothered by ordinary mud. Hawaiian folklore records a siege here around 1795, in King Kamehameha I's time. When the food ran out, Kamehameha ordered his men to eat lepo ai'ia. The mud gave the troops enough energy to win the war. Nothing is said of the flavor beyond that it was "pleasing.

The legend's details suggest lepo ai'ia might well have been a bacterial culture made with mud, just as yogurt is a bacterial culture made with milk. This theory is strengthened by aquatic biologist Eric. B. Guinther's work in Kiribati, an island nation in the South Pacific.

During famines, he writes, the inhabitants survived on a thick gelatinous layer that forms at the bottom of freshwater pits. The mud was dug to grow babai, a taro-like staple food. These slippery masses are especially common in pits on Christmas Atoll. This jelly is a sludge secreted by blue-green algae to protect themselves against extreme salinity. The cyanobacteria themselves are a relatively small component of the mass, yellowy lumps suspended like cherries in Jell-O.

According to Guinther, although this blue-green alga is typically found in highly saline situations, it also occurs in fresh and brackish water, including California reservoirs and the reflecting pool in front of Honolulu's state capitol, where it's become an unsightly nuisance. "Whether this is the lepo ai'ia of Hawaiian legend," he writes, "we simply do not know. But the material would provide some nutrition and would be collected from the bottom mud." In Peru, the Aymara people of the high Andes have incorporated clays into their daily cuisine. These mountains are the home of the earth-apple, or potato, and the Aymara have thrived for centuries on this reliable food.

Older cookbooks warn that potatoes with even faintly green skins should never be eaten, because of the poisonous glycoalkaloids that develop during germination. Glycoalkaloids can cause diarrhea, vomiting, and neurological disturbances, and can be fatal to humans. Many of the half-wild potato species the Aymara eat contain dangerous levels of poison, even before any greening occurs. The Aymara cook or steep the tubers with certain kinds of clay to detoxify them. When the clay is drained off, the dish is safe to eat.

The clay adsorbs the glycoalkaloids, allowing toxins to pass harmlessly through the body. Luckily, centuries of selective breeding have drastically reduced the amount of poisons produced by the potatoes we eat in the United States. For these potatoes, cooking is sufficient to destroy what little alkaloid remains.

Closer to home, clay is an essential ingredient in some dishes cooked by indigenous Californians. The Pomo tribe mixes clay with acorn flour to make a bread free of the bitter taste of oak tannins and that is easier to digest. The clay particles stick to the tannin molecules and neutralize them. Because of the very small particle size of clays-as fine as talcum powder-the bread is not gritty.

Like the ancient Greeks before them, pregnant women in many African countries eat white clay to alleviate morning sickness. Anthropologists Boyle and Mackey record the use of clay suspensions in treating nausea in Greece in 40 bc, and it was prescribed by the Roman obstetrician, gynecologist, and pediatrician Soranus of Ephesus, who practiced medicine around 100-140 ad.

Clay, in the form of kaolin, is still a common ingredient in western medicines such as Kaopectate, Roloids and Maalox. In the stomach, the negative electrical charges of tiny clay particles attract positively charged toxins from stomach fluids. This clumping prevents very small particles, such as toxic molecules, from passing through the walls of the intestines and enter the bloodstream.

Clumped together, the poisons pass harmlessly out of the system through the kidneys or bowel. Also, because clays are alkaline, they help neutralize acid

poured out by the stomach during digestive disturbances. Once through the stomach and into the intestines, clay particles absorb water and swell. Their presence slows intestinal spasms, easing the symptoms of diarrhea while coating the intestinal walls and protecting against further irritation.

Clay, whether nibbled as a dry tablet or sipped as a drink, also helps in early pregnancy when the mother's body is adjusting to the presence and biochemical activity of the fetus. The bland taste of the clay reduces nausea.

As pregnancy advances, the rapidly growing offspring requires large amounts of nutrients, particularly calcium. Without dietary supplements, this calcium can be quickly drawn from the mother's bones. Not so long ago, women expected to lose teeth during pregnancy. A common adage among English women was "a tooth for every child," as calcium withdrawal caused jawbone erosion. Certain clays supply calcium in a form easily used by the body.

Scientific analyses of clays selected by pregnant women in Nigeria show that eating as little as 500 mg (about the equivalent of two Tylenol capsules) per day can satisfy nearly 80 percent of a pregnant woman's calcium needs. Clay's detoxifying capabilities may also protect the fetus against birth defects that could be caused by plant toxins the mother happens to eat.

But not all dirt is considered equal, so it should be no surprise that dust from sacred places has often been considered good medicine. Evidence of this ancient belief is seen in the rows or clusters of pits found in sacred objects dating back to the Upper Paleolithic period.

These depressions, known as "cupules," are usually about two inches wide and a half-inch deep. Anthropologists describe them as "ritual markings." They're found on petroglyphs, sacred boulders, and on old churches and tombstones in Germany, Sweden, France, Switzerland, and England. Cupules have been recorded in painted rock shelters in Namibia, on the sides of Easter Island statues, on the Sphinx of Giza and even on the tops of Olmec stone heads in Mexico. A broad survey of the folklore of these places shows a consistent belief that dust from these stones would cure infertility and arthritis.

Kevin L. Callahan, an anthropologist at the University of Minnesota, has studied cupmarked boulders in sacred sites such as at Fort Ransom, North Dakota and Blood Run, Iowa. The sites, he writes, are "predictably composed of granite next to a large chunk of quartz, and are typically situated near natural springs and below hills with burial mounds." He thinks that these areas may have been considered both magical and medical. Native American shamans hammered these rocks and dispensed the powder to women eager to increase their fertility.

Callahan's experiments show that a typical cupule will yield one tablespoonful of powder, which he considers one dose. He writes, "It takes only five to 15 minutes of pounding with a stone hammer to collect this amount."

Modern science confirms that minerals derived directly from the earth can be more effective than supplements synthesized by man. In the 1960s, when NASA was preparing to conquer space, experiments showed that weightlessness induced very rapid bone depletion. They funded a range of pharmaceutical companies to develop calcium supplements. But Benjamin Ershoff of the California Polytechnic Institute found that the most efficacious treatment was the tried-and-true eating of clay.

He reported that "the calcium in clay ...is absorbed more efficiently and that it contains some factor or factors other than calcium which promotes improved calcium utilization and/or bone formation." He added, "Little or no benefit was noted when calcium alone was added to the diet."

A slice of Mississippi Mud Pie, anyone?

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