

# Women Who Eat Dirt

NOT TOO LONG AGO, I received a package from a village in Nepal, high in the foothills of the Himalayas. It was from the brother of the shipping clerk in my husband's office, and it contained, as clearly written on the outside, two kinds of mud: red and white. These are the muds that the inhabitants of that faraway village use to plaster their houses, red for the bottom and white for the top. They are also the muds that the women of that village are known to snack on, especially during pregnancy. Victor Ghale, my husband's shipping clerk, knew I was interested in people who include dirt or clay in their diet, and so he asked his brother to send samples of these muds to me in New York.

The package arrived, fortunately, before fears of anthrax had made us all suspicious of envelopes containing powdery substances. So I had no reservations about opening it and deciding to give these two chunks of hardened clay a try. The first was the white one, which was gritty and gummy-tasting as it dissolved, very slowly, in my mouth. It was hard to swallow and seemed to give me an almost instantaneous allergic reaction, since I itched all over for about an hour. The red mud, which I waited a day to try, was also gritty and gummy-tasting. But in some ways, it was like a good wine. While it dissolved, I sensed on the back of my palate the smell of fresh earth just after a rain.

As I savored the smell, I remembered the words that Victor had used when he told me about this gastronomic habit from Nepal. "The clays smell so good when it rains," he had said almost enviously.

"How handy to be able to snack on your own house," I had joked. "Every woman has her own twenty-four-hour convenience store."

"Nobody gives it much thought," he said with a shrug. "It's just something women do."

BUT THE FIRST THING that everyone should know about these women who eat dirt—and about this widespread habit of snacking on special clays or muds that has been reported among women in almost every part of the world—is that it's not just women who eat dirt. Dirt or clay eating is more usual among women, especially pregnant women, in many parts of the world, in Nepal, Africa, India, Central America, and the American South. But in other parts of the world, and at other times in history, entire populations have been known to consume dirt. In Northern California and in Sardinia, where acorns used to be the

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**Right:** A trader from Western Nigeria sorting bags of eko clay at the market in Uzalla, Nigeria. This woman buys clay in volume, then sells it to individual marketers over great distances. She came to the market in a ten-ton truck.

COURTESY OF DONALD VERMEER







dietary staple, the traditional bread was made by mixing acorn flour with clay and water, then baking the mixture in a slow oven.<sup>1</sup> In Germany in the last century, some of the poorer workers and their families used very fine clays to “butter” their bread. In China, as in other parts of the world, clay was eaten by much of the population during times of severe want. Some clays, such as smectite, have a tendency to swell when they take up water, and these clays are present in famine food samples from China.<sup>2</sup>

The list goes on and on and should make those with a peculiarly “female” explanation of dirt eating (“geophagy,” as it is known in scientific circles) question their assumptions. Geophagy has often been attributed to mood swings, hormonal rushes, magical and superstitious beliefs, and/or beliefs in the fertility of the earth—causes more closely associated with the distaff population. But any cogent explanation of this behavior, any explanation that pretends to make real and lasting sense, must also account for these examples of universal consumption.

The second thing that everyone should know is that it’s not just humans—men, women, and children—who eat dirt. Dirt eating is also widespread among animals. It’s been reported in many species of birds; many species of herbivores (antelopes, elk, bison, elephants, and the like); and many species of omnivores (porcupines, bears, rats, gorillas, and chimpanzees). No strict carnivores have ever been reported eating dirt (for reasons I will come to), but carnivores do hang around the dirt sites used by other animals because of the hunting opportunities they present.

Many of us are familiar with dirt eating in the animal kingdom, at least with such descriptive place names as Licking Hollow, Elk Lick, and Three Bed Lick,<sup>3</sup> which portray the activity of animals at specific dirt sites. So many of us don’t find anything surprising about this behavior in other animals. But dirt eating in animals can shed a lot of light on dirt eating in humans. And it can help us to question our assumptions about diet and the nature of what should and should not be eaten.

Like humans, other animals are very selective about the dirt they eat. No adult animal, it seems, eats just any dirt—a kind of indiscriminate, exploratory behavior seen only in very young animals, including children. A troop of gorillas or a herd of elephants concentrates on just a few sites that they return to again and again. East African elephants routinely excavate the caves of certain hillsides where they are able to access iodine-rich salt deposits. According to some scientists, elephants are particularly prone to iodine deficiency, and even their familiar, elephantine habits of wallowing in mud and throwing dirt on their hides are attempts to absorb iodine through the rich blood supply in their skin.<sup>4</sup>

Mountain gorillas in Rwanda are not the regular dirt eaters that elephants are, but they do visit sites five or six times a year where all the members of a group occupy themselves in digging and eating soil for about thirty minutes at a time. This soil, located high up on the side of a volcano, is rich in both salt and iron, and observers suspect that the gorillas may be after those two important nutrients. Mountain vegetation, after all, is usually very low in sodium, and gorillas, like all mammals living at high altitudes, need extra iron for the extra red-blood-cell production that is required at those altitudes.<sup>5</sup> The easiest way for them to get this extra iron may be these volcanic soils.



And here's another insight into human geophagy that animals help us to see. Just as strict carnivores do not eat dirt or clay, human populations that include a lot of animal products in their diet also do not eat dirt or clay. Clay eating is rare, even nonexistent, among the Maasai of Kenya, cattle-herders whose diet consists largely of milk and blood. But it is extremely common among the neighboring Kikuyu, agriculturalists whose diet is based largely upon plants.<sup>6</sup>

Animal products are important for both what they have and what they don't have. They have most of the minerals that humans and other animals need to survive, including sodium, iron, phosphorus, zinc, selenium, and calcium (but only if the bones are chewed, since meat itself is low in calcium). And they don't have the many toxins that plant foods have: the tannins in acorns, the glycoalkaloids in potatoes, the phytates in soybeans. Because so many of the plants we eat in the United States have been bred to lessen their toxic load, we have the luxury of knowing very little about these chemicals, which were designed to protect plants from being attacked by funguses, as well as animals. But they can cause severe and sometimes fatal damage. Some limit the nutrients available for growth, while others act as poisons, releasing cyanides, carcinogens, and other dangerous substances, bursting red blood cells and damaging neurons, kidneys, and the endocrine system.

Plant eaters are not entirely at the mercy of plants, though, and many find ways around these toxins. Some plant eaters process plants to remove the most toxic parts, and some have become specialists in handling certain toxins, like the koala, which eats only eucalyptus. Others consume clay along with toxic plants so that the clay particles can absorb most of the toxins. Clays are ideal antitoxins for several reasons. Their very fine particles give them a large surface area and make it likely that those particles will come into contact with the toxins in foods. And their crystalline structure is layered with positively charged ions, primarily of silicon and aluminum. Since many organic toxins are also positively charged particles, they essentially trade places with the ions in the clays, then pass harmlessly through the digestive system.<sup>7</sup>

Animals seem to be aware of the benefits of adding clay to a plant-based diet, and in some animals, detoxification of plant foods seems to be the primary reason for eating dirt. In a study of the daily, dirt-eating behavior of tropical, plant-eating birds in New Guinea, Jared Diamond found that the soil chosen by these birds (cockatoos, parrots, and pigeons) is particularly good at binding the positively charged molecules of strychnine, quinine, and tannic acid that lace their diet of seeds and unripe fruits. The soil is not rich in any minerals that the birds might need, but it binds one-tenth of its own weight in toxins and has 50 percent more binding capacity than the surrounding soils that the birds do not eat.<sup>8</sup>

Dirt eating in animals also allows us to see how irrational we can be about dirt eating in humans and how differently we regard the behavior of our own species. While few scientists question the underlying functionality of this behavior in other animals, in humans, such arguments have usually been dismissed. Dirt eating is seen as a sensible, instinctive way that animals can compensate for deficiencies in their diet and/or remove toxins from their foods. In humans, it is a perverse activity that few educated persons would ever admit to.

Which brings me to the third thing that we need to know in order to understand the human practice of geophagy. In fact, most of us *are* geophagists in that we seek salt from





the earth or the oceans to add to our diet. We usually don't think of salt as dirt, but salt is a deposit found in rocks, and clay and dirt are nothing more than weathered rocks. Animals that are carnivores don't need to add salt to their diet because the muscles and the guts of their prey have sodium enough to meet their needs. But most herbivores and omnivores—and that includes humans—cannot rely on diet alone for adequate amounts of this nutrient, essential to nerve transmission, muscle contraction, and the maintenance of fluid balance. Because salt is scarce in many parts of the planet, and hence in the plants that grow in those places, many animals must seek out salt licks or salt mines. The problem is particularly acute for inland vegetarians, such as the mountain gorillas of Rwanda, or much of the population of India. Because of this inverse correlation between meat consumption and salt requirements, a poor man, in general, needs more salt than a rich one. And a poor country needs more salt per head than a rich one, a fact of nature that led Gandhi to protest the British policy of salt taxation and take his followers on a “salt march” to the sea.<sup>9</sup>

We so take for granted this almost universal form of geophagy—the saltshaker—that we don't even see it as geophagy. And, therefore, we don't understand that geophagy is neither an uncommon, nor an abnormal behavior, but a reflection of the fact that being an omnivore is a tricky business in many parts of the world. Humans need forty or fifty different nutrients to stay healthy, and sometimes we have to go outside the bounds of what is

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**Above:** Edible clays at a market in Accra, Ghana. The disks and pegs are from Togo; the spindle-shaped pieces from Ghana; the large, crudely shaped pieces from the Accra area; and the one plate of eko (bottom left) from Nigeria. Other plates hold medicinal herbs and plant materials. COURTESY OF DONALD VERMEER



considered food to find them. Or we have to add things to our diet, like clay, in order to turn toxic foods into nutritious ones. Since women, especially pregnant women, have a harder time meeting their nutritional needs, and since pregnant women must also protect the child that is growing inside them from the toxins in food, women tend to eat more dirt.

Calcium and iron present two of the biggest nutritional problems that women face over the course of their lives. A woman's need for calcium increases dramatically during pregnancy, from 800 to 1200 mg per day, a challenge everywhere on earth, but especially in places where calcium levels in the soil are naturally low and/or in cultures where milk and milk products are not a part of the diet. A woman's ability to absorb calcium from the foods she eats increases during pregnancy, but to get the same amount of calcium as in one glass of milk, she would have to eat two and one-half cups of beans or two cups of cooked collards. Tofu is almost as good a source of calcium as dairy products, so Asian women have no harder time meeting their calcium needs than women in dairy cultures, but women all over the world can easily consume too little calcium during pregnancy and lactation, shortfalls that they will pay for later with bone fractures and other signs of osteoporosis.

Some of the clays eaten by pregnant women in Africa provide large amounts of calcium, up to 80 percent of a pregnant woman's RDA, assuming a consumption pattern of 100 grams per day (the equivalent of a stick of butter). Others, however, provide only trace amounts of calcium. But, as Andrea Wiley and Solomon Katz point out in a theoretical paper on the role that calcium might play in geophagy, clay consumption can help a woman's calcium balance in ways other than by actually providing her with calcium. Clays can slow down the motility of the gastrointestinal system and thereby increase the time during which calcium can be absorbed from foodstuffs. And by binding with secondary compounds in plant foods, clays can also release minerals, including calcium, with which these compounds often form complexes.<sup>10</sup> The traditional method of preparing corn tortillas in much of Mexico and Central America, by boiling the corn with limestone, markedly improves the calcium, as well as the protein, content of the tortillas and is probably the reason for the low incidence of osteoporosis in those same areas.

Iron presents an even longer-term problem for women, from the onset of puberty until menopause, from around fifteen to fifty-one. Women have higher iron requirements than men, but they consume fewer calories. So even Western diets—diets that include many more iron-rich types of meat than those in less-developed countries—can leave women with shortages of iron. Iron deficiency, not surprisingly, is the most common nutrient deficiency in the world.

In the United States, women make up for shortages of iron with supplements and fortified foods (or by consuming more food than they need—a subject for another article). Elsewhere, they might visit clay pits or termite mounds. The clays of termite mounds are rich in both calcium and iron and supply a woman who eats at least 20 grams a day with more than 100 percent of her RDA for iron.<sup>11</sup> It has never been proved that women eat these clays in order to obtain extra calcium and iron, but it is telling that, in certain parts of Africa at least, most of the pregnant population makes it a habit of visiting termite mounds. And telling, too, that women must compete for these same clays with many other animals,



including giraffes, chimpanzees, and cattle. The cattle, in their rush for these mineral-rich clays, have been known to knock women and children down.<sup>12</sup>

Another problem that becomes more difficult for women during pregnancy—and one that also inclines them toward dirt eating—is the problem of plant toxins. Many substances that are mildly toxic to adults are extremely toxic to developing embryos. Some researchers have speculated that the nausea and food aversions that plague women during the first trimester help women to avoid the ingestion of these harmful substances,<sup>13</sup> but for women who have no choice but to eat foods that are loaded with toxins, a daily dose of clay could help to minimize their effects. Small amounts of clay might also directly relieve the symptoms of pregnancy by changing the acidity of the stomach and/or by absorbing excessive amounts of saliva. Whatever the actual reasons why pregnant women eat dirt, dirt eating is an integral part of the behavior of pregnant women in many parts of the world. “That’s how you know when you are pregnant,” as one African informant says.<sup>14</sup>

With all the examples I’ve given of dirt eating in humans and other animals, with all the possible benefits that dirt eating can provide, especially to pregnant women, I’m not arguing that all dirt eating in our species serves a clear nutritional purpose. Nor that all dirt eating is benign.<sup>15</sup> Humans can abuse clay just like anything else they put into their mouths, and eating too much clay can cause intestinal blockages that may have to be surgically removed and sometimes result in death. Clay eating also causes tooth abrasion (some dentists are able to pick out the geophagists in their patient population by the amount of wear on their teeth) and is suspected of causing, not curing, nutrient deficiencies, especially iron deficiency anemia, a suspicion that has been around since ancient times.

The relationship between clay eating and anemia is a complex one that has never been clearly resolved. Physicians have long observed that many of their patients who eat dirt are anemic, but is clay eating a cause of anemia or a consequence? Part of the confusion, investigators are beginning to realize, stems from the fact that different clays have very different effects on a person’s nutritional status. Certain clays are rich in easily absorbable minerals, but others actually rob the body of nutrients and minerals. When clays are ingested with food, the cations in the clays trade places with the cations in the food. So there can be a net gain or loss of mineral nutrition depending on the clay and the food. A clay may pick up an iron particle and leave behind an aluminum particle, a net loss for the consumer. Or it may pick up a toxic particle and leave behind an iron particle, a substantial gain. Human and animal populations presumably learn what clays to eat through trial and error and over many generations, but if that knowledge is interrupted through voluntary or forced dislocation, new clays that may be substituted by these populations can do more harm than good.

The experience of slaves in the New World may be an example of this. When slaves were forcibly removed from Africa, they brought their well-established clay-eating traditions with them, and plantation owners were soon commenting on their “mania for eating dirt.” Owners came to blame this practice for much of the illness they saw in the Black population and for a new and often fatal syndrome they called Cachexia Africana, or *mal d’estomac*, a syndrome characterized by sluggishness, anemia, and mental insensibility, as well as dirt eating.



“The only appreciable signs of mental activity exhibited during the course of this disease,” wrote F.W. Cragin, a physician who described the syndrome of Cachexia Africana in 1835, “are the crafty and cunning plans which the patient most subtly [*sic*] matures, and as stealthily executes, to procure his desired repast...of charcoal, chalk, dried mortar, mud, clay, sand, shells, rotten wood, shreds of cloth or paper, hair, or occasionally some other unnatural substance.”<sup>16</sup> Slave owners attributed these unnatural appetites to willfulness on the part of their slaves and viewed geophagy as a slow method of suicide. And they tried, largely unsuccessfully, to break their slaves of the habit (and to protect their economic investment) by chaining perpetrators or by forcing them to wear cone-shaped mouth locks, tin masks that covered the entire face.

In recent years, several researchers have revisited this once-common syndrome, second only to yellow fever as a cause of death among slaves in parts of the South. Some have suggested that a deficiency of B vitamins, along with hookworm infestation and intestinal parasites, brought on the symptoms of earth eating, as well as those of weakness, anemia, edema, and heart failure; others, that the clays eaten by the slaves acted to bind dietary potassium and iron and cause all the symptoms of the disease. But dirt eating is still very common in the South, and physicians see very few patients with symptoms similar to those described by pre-Civil War physicians.<sup>17</sup> So though it is conceivable that the specific clays the slaves ate in the New World initiated a new and often fatal medical syndrome, it is more likely that slaves ate more and more clay when their circumstances and diet left them malnourished, overworked, and unable to fight infections.

Questions about the cause and the nature of this syndrome still remain, though, and they underscore the lack of solid information that accompanies almost every instance of human geophagy. In the South, as in most places where dirt eating has been observed, the usual reaction has been to repress, not study, the habit. From the earliest writings on the subject of geophagy, a term used by Aristotle in the fourth century B.C., medical practitioners have regarded the practice with a skepticism bordering on contempt. Many recognized the usefulness of clay in treating cases of poisoning. But as to the daily consumption of dirt, one physician who lived in A.D. 1000 wrote of the necessity of controlling it, “in boys by use of the whip, in older patients by restraints, prison and medical exhibits, while incorrigible ones are abandoned to the grave.”<sup>18</sup> Clay eating, until recently, has been synonymous with pica, a perversion of appetite that causes one to ingest strange and unsuitable substances.

Perhaps part of this negative attitude toward geophagy has been due to the misconception that dirt eaters eat surface dirt, a truly inappropriate food, since surface dirt is loaded with bacteria, parasites, and other potentially harmful substances. In truth, most edible clays are taken from the band of clay-enriched soil ten to thirty inches below the surface, and the fact that they are usually dried or baked further reduces the possibility of contamination. Perhaps part of the attitude comes from a population that has always had enough meat and dairy in their diet to make geophagy less vital and necessary. Whatever the cause, the effect has been to cover up an aspect of human gastronomy that has been extremely important to the survival of the human omnivore. And extremely ancient. Edible clays have been found



at archeological sites once occupied by early man, and the fact that chimpanzees regularly ingest clays suggests that this practice predates our evolution as a species.

Attitudes toward geophagy have been changing, though, largely as the result of the work of two scientists, Donald Vermeer and Timothy Johns, who both “stumbled across” the practice of dirt eating in the course of other research. Vermeer, a geographer with Louisiana State University and George Washington University before he retired in 1996, was the first researcher to recognize the great similarity between edible clays sold all over West Africa and the commercial pharmaceutical Kaopectate. Johns is a plant biologist at McGill University in Canada, best known for his work on the role that plant toxins have played in shaping human diet and medicine.

In 1960, when Vermeer was preparing for his first trip to Africa, he came across occasional references to the practice of geophagy in the scientific and medical literature and assumed that dirt eating must play a persistent but fairly insignificant role in the dietary habits of the people of West Africa. When he actually got to Nigeria, though, he found evidence for the habit everywhere: in pestles full of clay pieces outside almost every home; in the pouches of edible clays that women wore around their waists; in the marketplaces where clay was sold and sometimes consumed in public. He once watched a woman eat about 150 grams of clay in five minutes. But the usual amount, he learned, is a small handful of clay (30 to 50 grams) consumed over the course of a day.

Vermeer began to wonder if geophagy might in fact be almost universal in West Africa, at least among pregnant women, and he decided to investigate the mining, processing, and marketing of geophagical clays. He found that four hundred to five hundred tons of eko, a clay from the village of Uzalla in Nigeria, were being produced each year and sold in markets as far away as Liberia, Ghana, and Togo. Irregular blocks of these clays were sun-dried, then smoked and hardened for two to three days over a smoldering fire. In the process, they were transformed from their original gray shale color into the rich chocolate color and sheen of eko, the final product.

Vermeer also reported on how West Africans use this clay medicinally and was the first, as I’ve said, to demonstrate the striking similarity between eko and Kaopectate, widely used in the United States to counteract gastric upsets and diarrhea. Kaopectate is made of pectin and kaolin, a type of clay that forms a protective coating on the mucous membranes of the digestive tract and is capable of adsorbing bacterial and plant toxins. Eko and Kaopectate have X-ray diffraction patterns that reveal an almost identical quantity and size of kaolin particles; not surprisingly, eleven of the nineteen preparations that village medicine men make out of eko are intended for stomach and intestinal problems, including diarrhea. The other eight are for problems associated with pregnancy.

“The extent to which the many different ethnic groups in West Africa are aware of the antidiarrheal properties of eko is uncertain,” Vermeer concludes a paper in the journal *Science*. “The fact that so many medicinal preparations in the village of Uzalla use eko, however, supports the notion that the therapeutic qualities of the clay are recognized by those who supply it to the West African market system and possibly by those who purchase it.”<sup>19</sup>



Why was he the first Westerner to document the uses and composition of eko? I once asked Vermeer, a tall, unassuming, and very genial geographer. We were having lunch one day when he was in New York to attend the annual meetings of the Association of American Geographers, and I was struck by the fact that so many tons of this clay are produced and sold every year, yet only Africans had been aware of its existence.

"I don't know," Vermeer answered in the soft, raspy voice he has acquired from his ongoing treatments for throat cancer. "People must have had blinders on. They must have automatically condemned this practice."

"And why didn't you?" I pursued.

Then Vermeer told me about a childhood spent largely outdoors, in the hills outside of Oakland, California, where he grew up, and in the deserts of New Mexico, where he visited his missionary uncle and played and rode bareback with Navaho children. He has been looking at rocks and soils all his life, he said, so he couldn't *not* see them in the markets of Africa. In order to better understand the practice of geophagy, Vermeer also began sampling clays in Africa, and the good ones, he says, dissolve like a piece of chocolate in the mouth. He has tried hundreds of different clays, and most taste like chalk. He has yet to detect the pleasant "sour" taste that many women say they enjoy about eating clay.

Eko is not the only clay consumed in West Africa, and as Vermeer continued to investigate the practice of geophagy, he found numerous examples that did not paint as neat a picture as eko and Kaopectate. There were coastal groups in Ghana that regularly consumed sand, a totally inert substance, a habit for which he has yet to come up with any kind of plausible explanation other than that it was a habit that formerly interior-living people took with them to the coast. There were groups for which clay clearly seemed to serve a nutritive purpose, such as the Tiv of Nigeria, where women eat a clay that is very high in calcium. But they live right next door, so to speak, to groups where the same explanation doesn't hold. The Igbo people live near the Tiv, and theirs is also a nondairy culture. Igbo women have the same need for calcium as Tiv women, yet the clay they routinely consume has very little of this mineral.

The mystery of why people eat clay continued to expand with Vermeer's work in the American South, where the habit was once so widespread that clay removal caused considerable damage to roads, and some states posted signs requesting that local inhabitants not dig into the banks.<sup>20</sup> Since most of the southerners who eat clay are Blacks, the usual explanation for the clay-eating habit in America is that slaves brought it to this country from Africa. But clay eating has never been an exclusively Black habit—in Africa or in the South. In Africa, Europeans used to carry their stashes of edible clays in little silver cases; David Livingstone once observed that both slaves and rich men were affected.<sup>21</sup> In the South, the appellations "sand lickers," "sand lappers," and "sand hillers" refer to the practice among poor Whites. During the course of his research, Vermeer has also come across numerous examples of Whites eating clay, such as the nurse in Holmes County, Mississippi, with a Master of Science degree in public health. She pulled Vermeer aside one day to say, "I just wanted you to know that I am also a practitioner."



Clay eating in the South is more prevalent, though, in the Black population, and in the 1970s, 50 percent of Black women admitted to eating clay, about four times the frequency among White women. The percentage of Blacks admitting to clay eating has dropped since then, as clay eaters have become increasingly aware of the stigma attached to their practice and have either broken their habit or switched to eating corn starch or laundry starch (a switch, by the way, that spares women from the humiliation of being known as dirt eaters, but adds only calories to their diets), but the practice is still widespread.

As in Africa, the clays commonly eaten in the South are dug from clay deposits below the surface. And, as in Africa, clays are usually dried before they are eaten, either in the oven or on top of the stove. Clay consumption averages 1 to 2 ounces (30 to 50 grams) daily, and clay eating among Blacks often occurs under social conditions, like watching TV, while the habits of White women, on the other hand, are much more private and covert.<sup>22</sup>

As Vermeer began to look into the reasons why southern women consume dirt, however, he could find no consistent mineral content in clays that could explain the habit. Nor could he find any consistent medical or nutritional problems, such as anemia, diarrhea, toxins in foods, parasite infection, etc., associated with eating clay. He concluded that clay eating in the South does not stem from either a physiological or nutritional need but is, rather, “a common custom arising from traditional values and attitudes.”<sup>23</sup>

“Millions around the world practice geophagy, and I hope I’ve encouraged the medical establishment to approach geophagy with a more open mind,” says Vermeer. Yet all that he can say with certainty about the practice is that it is “neither good nor bad.” It has the chance for being beneficial in some settings; in other settings, it seems to serve a purely psychological or cultural purpose, transferred from one generation to the next, like smoking or dipping snuff. And he warned me, as I began my research, that I will get as many answers about why people eat dirt as people I ask.<sup>24</sup>

Timothy Johns, on the other hand, is much more convinced of the underlying nutritional and medical reasons for most dirt eating, a conviction that stems in part from his knowledge of the ubiquitousness of plant toxins.

Like Vermeer, Johns saw his first edible clays in a market, but a market in the mountains of Peru, where the clays were being sold alongside potatoes. Johns was in South America to study the domestication of the potato, so he was, of course, curious. He knew that wild potatoes growing at high altitudes are full of toxic, bitter-tasting chemicals called glycoalkaloids, which can cause stomach pains, vomiting, and even death if consumed in sufficient quantity. But he had always assumed that Indians living in the Andes ate a domesticated and less toxic version of that wild and bitter food. So it was an eye-opening experience for him to learn that the clays were being sold alongside the potatoes because the Indians ate the clays with their potatoes in order to take the bitterness out. They boil the potatoes, then dip them into a slurry of clay and water before each bite.<sup>25</sup>

“This sounds pretty awful,” Johns said when we were discussing this novel gastronomic technique over the phone, “but the clays are very fine, and their texture isn’t at all gritty. The taste is in fact quite pleasant, reminiscent of unsalted butter or margarine.” Eating



their potatoes in this way, the Indians consume several grams of clay at a meal, and that is enough, Johns has found through extensive absorption studies, to take up most of the toxic glycoalkaloids in the potatoes. The clays that the Andean Indians choose to consume with their potatoes are particularly fine, and they have cation exchange qualities that make them magnets for positively charged substances, particularly glycoalkaloids.

Johns's experience in the Andes gave him a new perspective on geophagy and the role that geophagy probably played in human dietary history. "It's all very well to say that humans have reduced the toxic load of their plants through domestication, but what did they eat before domestication?" he asks. His findings suggest that clay eating gave humans the flexibility to eat a broader range of plants, and this flexibility was important not just in the Andes, but all over the world. The use of clays in Africa had not before been linked to the detoxification of plants. Vermeer, for instance, had not considered the role of detoxification, because he had never seen clays being eaten in combination with specific foods. But when Johns tested edible clays from Africa, as well as from California and Sardinia, he found that they all share this ability to absorb plant toxins.<sup>26</sup>

According to Johns, then, clay eating has allowed us to adapt to an ever-changing array of foods. It is an important part of the behavioral repertoire of experimental omnivores like us and is "a kind of buffer, or protective device, for quelling gastrointestinal stress induced by barely tolerable wild plants or pangs of hunger." It could also make a significant nutritional contribution to the diet, in terms of calcium, iron, or zinc, but this role of clays is harder to pin down because the mineral content of edible clays varies greatly from one clay to the next. Until researchers invest the time and the money to examine geophagy very thoroughly—an unlikely occurrence in this day of cheap mineral substitutes and many more pressing medical problems—we may never know all the reasons why people eat dirt. Perhaps it is enough to know that there are many good reasons and that women, with the extra demands of pregnancy and lactation, have the most reasons of all. "Earth," says Johns, "may not be to everyone's taste, but it is one of the oldest tastes known to humankind."<sup>27</sup>

A FEW DAYS AFTER my conversation with Johns, I received a second sample of dirt in the mail, this time from the Down Home Georgia White Dirt Company in Griffin, Georgia. A company spokesman assured me that this dirt, kaolin from a private mine, is sold strictly as a novelty item (the label says "Not Suggested For Human Consumption"). But the person who first told me about it, the owner of Mrs. Bea's Kitchen in Atlanta, said that all her customers for the dirt were women looking for edible clays. She stocks it behind the cash register, along with the candy and cigarettes, and charges \$1.29 for a one-pound bag.<sup>28</sup>

I broke open the bag that was sent to me and bit off a small piece of one of the white chunks. It was fine, not gritty at all, but very gummy and chalk-like. I can't imagine craving this stuff, and craving it more than food, a feeling that many dirt eaters have reported. But, hey, I'm an omnivore (and a woman too), and so I will keep my dietary options open. ☺



## NOTES

1. Timothy Johns and Martin Duquette, "Detoxification and Mineral Supplementation as Functions of Geophagy," *American Journal of Clinical Nutrition* 53 (1991): 448–456.
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24. I was reminded of this warning when I was visiting friends in North Carolina and got into a conversation with their babysitter, a woman who had eaten clay and laundry starch all through her childhood. After discussing the circumstances of her youth—she was one of thirteen children raised by a family of women in rural Virginia—we came to the somewhat humorous realization that in her case, at least, part of the appeal of clay and laundry starch was that they were the only snack foods in the house. Everything else had to be boiled, fried, and, in the case of chicken, killed and plucked before it could be eaten. All of her siblings and cousins also ate clay, but she gave up the habit when she got married and began seeing a doctor. "Every other day, I had to have a piece of that dirt," this woman still remembers. "It was the prettiest dirt you ever saw."
25. Johns, "Well-Grounded Diet," 40.
26. Johns and Duquette, "Detoxification," 451.
27. Johns, "Well-Grounded Diet," 43.
28. Down Home Georgia White Dirt and Mrs. Bea's Kitchen appear to no longer be in business.

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