

MUTANT EARS TAKE OVER

THE ORIGINS OF FARMING IN THE AMERICAS

“ SQUASH SEED IN
MEXICO AND
PALEOFECES IN THE
UNITED STATES

The world that Cristobal Colombo, a.k.a. Christopher Columbus, bungled his way into was so strange he called it the New World. The people were different. The animals were different. Even the plants were different.

Who had ever heard of an underground nut? (A peanut.)

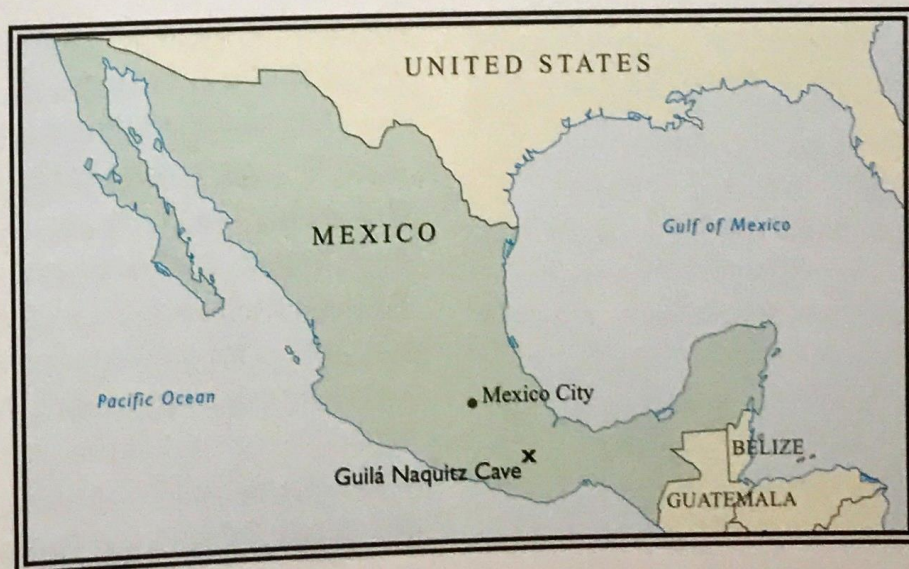
And the red juicy berry, how on earth would you cook with that? (The tomato; the Italians obviously found ways.)

The potato was so bizarre to the Europeans that they thought it gave you leprosy.

Columbus had traveled to find spices and he wasn't about to go home empty-handed—even if these crops *did* look awfully strange. Chili peppers, he decided, were just the thing—a spice. (Chili peppers spread so quickly throughout the Old World that until recently botanists thought chili peppers had originated in India instead of South America.)

On each of his return trips to Spain, Columbus loaded his ships with seedlings and plants. The corn and beans transplanted well in the Old World.

They were a lot like the cereal crops Europeans were familiar with—the wheat and barley and rye. So they spread quickly. Other plants were a bit of a curiosity. No one quite knew what to make of the pineapple. And chocolate? The damp cargo hold of the ship turned the cacao beans moldy. It's no wonder chocolate wasn't very popular in the Old World.



This Navajo woman shows off two plants farmed in the Americas today—corn and greenthread. Greenthread is used to make flavorful teas that have medicinal value. The corn has come a long way from its scrawny wild ancestor.



A FEW KERNELS

Corn is often called maize after its scientific name *Zea mays*. In Britain “corn” means cereals such as wheat and barley.

PLOWING THROUGH EUROPE

The plow seems to have been invented in Mesopotamia more than 5,000 years ago. As with many useful inventions it caught on and spread quickly. By 4,500 years ago the plow had spread throughout most of Europe.

And why was Columbus sailing to the Americas instead of Native Americans sailing to Europe? Why didn't Native Americans “discover” Spain? What was it about the European way of life that had people hopping into ships and setting out to discover new worlds? It all boils down to farming. What was it about agriculture in the Americas that made it so different from agriculture in the rest of the world? And how does the way you farm give rise to your way of life? To answer those questions, we must go back thousands of years before Columbus's voyage. We must go back to the beginnings of farming and see what made it different in the Americas.

One of the major differences was the domestication of animals. There were many large animals in Europe and Asia and Africa that were right for taming—cattle, sheep, goats, pigs, horses, and donkeys. Not only could farmers eat these large animals, but they could also make the wool and hides into everything from clothing to shelter. The animals provided transportation and they worked for the farmers. They were the tractors of the prehistoric world. They pulled plows and turned millstones to grind flour. And what dropped to the ground while the animals worked made great fertilizer.

Large animals increase crop production. They can till a field faster than a human, and the plows certainly can break up crusted, rocky topsoil better than a human toiling by hand. The Old World animals helped with threshing, grinding, and irrigation—all the while fertilizing away.

The large animals in the Americas that had survived the extinction at the end of the last Ice Age were not ideal for taming. Only two large animals, the llama and the alpaca, were domesticated in one small area of South America, high-altitude grasslands in the Andes. And even these animals had their limits. You couldn't ride them, and they wouldn't pull a cart or plow. Guinea pigs, turkeys, dogs, and ducks were also domesticated, but these few animals can't compare to all those tamed in the Old World.

Another difference in farming between the Old World and the New has to do with lifestyle. Do you move on after the harvest, or do you stay in one place and live off the same plot of land? In the Old World many early farming societies lived year round in one place. In the New World very few of the first farming societies stayed in one place. They moved with the seasons.

Guilá Naquitz Cave in the highlands of Mexico is a good example of this seasonal way of life in the Americas. Scientists can tell what time of year the cave was occupied by the plant remains found around the hearths. Small bands, perhaps extended families, lived there from August to December each year. They ate acorns, berries, and the seeds and fruits of thorny cactus. At first, only a small part of their diet came from the wild squash and bean plants that grew in the area. The families tended the wild squash seed beds. They watered and weeded and watched. They thinned the bed, pulling weeds and the smaller squash plants to make room for the heartiest squash. Over time this attention to the wild plants altered them so much that scientists no longer consider them wild. To date, this domesticated squash is the oldest evidence of farming in the Americas—as old as 10,000 years ago.

Native Americans had begun to farm, yet most stayed mobile. Five thousand years ago small family bands were still



“ Squash seed, Oaxaca, Mexico, 10,000 years ago

on the move, seasonally farming a very small percentage of what they ate. Although farming was widespread in the Americas, most of the land was still occupied by hunter-gatherers.

One of the plants that eventually spread throughout the Americas was corn. Corn's wild ancestor teosinte still grows in Mesoamerica. It doesn't look very much like the corn we're used to seeing. For one thing, it has no cob. It looks more like a giant wild grass. Native American farmers selected mutant teosinte plants. They chose plants with cobs—small cobs compared to what you are used to seeing in the supermarket—but cobs nonetheless. Over time the cob evolved from its original tiny fruit case to the large cob with lots of tightly packed kernels we eat today. Corn is a perfect example of artificial selection—where humans, not nature, select. In the case of corn, people chose the plants with larger cobs for easy picking. But the tightly packed seeds sprouted a mass of overcrowded seedlings. The seedlings choked one another out. What nature would have rejected, humans selected, but now domesticated corn had to be planted by human hand.

Hand planting is slow and labor intensive. In other parts of the world, farmers planted cereals easily just by scattering seed. In the Americas, the cob had to be picked by hand. Cereal farmers cut their crops with a sickle.



Corn cobs have changed over the years. Teosinte, corn's wild ancestor, is on the left, and modern corn, like you find in a supermarket, is on the right.

Cereal planting had speed and ease on its side. And when you farm, you feed more people, and when you feed more people your population is free to grow. With larger populations, villages grow into towns, which then grow into cities. When people grow more than their families can eat, they can trade the surplus. People are then free to specialize—to become artists, or toolmakers, or shipbuilders—and trade their skills for food. Soon you have adventurers setting out to discover new lands, filled with new things to trade.

Corn in the Americas may have had many drawbacks. It may have contributed to slow population growth, but it still spread from Mesoamerica through North America. In southeastern North America, communities experimented with strange alternatives—goosefoot, sunflowers, and marsh elder. If it hadn't been for those teosinte mutants, you might be eating goosefoot for breakfast.

So how *do* scientists know what prehistoric people ate? You may not want to know the answer—one way they learn is from paleofeces. Oh, yes. There are scientists dedicated to dung. They get their scoop from the poop, so to speak. There are even dung conferences where scientists talk about the digestive habits of ancient peoples—their paleo-diets. The old “you are what you eat” saying has truth to it, so it seems. And what goes in must come out. Does fecal matter? You bet. It reveals a lot about lifestyle and health.

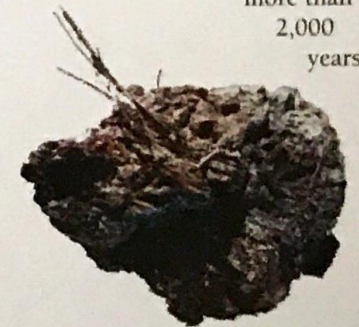
Archaeologists have gathered hundreds of fecal samples that are more than 2,000 years old from places such as Hinds Cave in Texas. The rock shelters in this area are dry, protected environments perfect for preserving perishable materials such as baskets, mats, nets, sandals, wooden spears—and paleofeces. What scientists are finding in the paleofeces supports what they thought ancient lifestyles might be like—for example, the shift from large game to small game. Deer had once been the main source of protein for the people of Hinds Cave and is present in the early paleofeces. Over time, the content of the dung shifts to reflect a diet of smaller animals—rodents, rabbits, snakes, and birds.

What prehistoric people ate isn't the only information gained from studying paleofeces. Digested pollen tells scientists what time of year a particular site was occupied. Parasites tell a lot about the general health of the individuals. DNA tells which plants were farmed and which plants were foraged. And the feces themselves can be dated using a special offshoot of carbon dating.

Agriculture in the Americas may have gotten off to a slow start, but today these plants selected by the first American farmers feed over half the world. And the chocolate? Well, it seems people have acquired a taste for it after all.

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Paleofeces, Texas,
United States,
more than
2,000
years



Paleofeces, such as this sample excavated at Hinds Cave in Texas, contain evidence of what ancient people ate.