

READING 14-3

V.W. von Hagen 1957. *The Ancient Sun Kingdoms Of The Americas*, The World Publishing Company, Ohio

Inca Agriculture

The state of mind of the Andean Indian, like that of the Roman peasant, was the mind of the farmer-soldier, not farmer, not soldier alone, but farmer-soldier. Although part of an agrarian militia, his life was based on agricultural routine. The caprice of weather might frustrate him and undo his work, but planting, growth, and harvest followed in appointed series.

He was a head count in the decimal system of classification, and a call for so many heads for war could take him from his fields and put him into battle, but no matter how grave the crisis, war was not his life rhythm. So deeply ingrained was this agricultural cadence that when the Inca, with his people, rebelled against their Spanish overlords in 1536 and subjected Cuzco to a terrible siege of sixteen months, it failed principally because of this. For even with his very way of life threatened if he did not succeed, still the farmer instincts dominated the soldier instincts and the uprising failed; the army melted away, demobilized so that the farmer-warriors could go back and cultivate their fields.

In the sense of the farmer-soldier, the Andean Indian must be understood.

Under the guidance of the Inca's "professionals," the whole of the realm—which included Andes, desert, and Upper Amazon—became a great center of plant domestication. *More than half of the foods that the world eats today were developed by these Andean farmers*; it has been estimated that more kinds of food and medicinal plants were systematically cultivated here than in any other sizable area of the world! One has only to mention the obvious: corn—that is, maize—(20 varieties); potatoes (40 varieties); sweet potatoes, squash, beans of infinite variety; manioc (from which come our farina and tapioca); peanuts, cashews, pineapples, chocolate, avocados, tomatoes, peppers, papaya, strawberries, mulberries; so many and so varied the plants, and so long domesticated in the Old World, one forgets that all of these originated in the Americas.

The potato is dominant in the high Andes. Nowhere else are there so many localized varieties or colors of potatoes as in Peru: white-yellow, pink-gray, brown, purple, black, spotted, and streaked; they are planted from the hot coast seemingly to the sky; the *tatu* variety is planted up to 15,000 feet above the level of the sea and is fully able to withstand the heavy frosts.

A member of the nightshade family, the potato was avoided by the European for 3 centuries because he believed it caused leprosy. In the 17th century the lowly "spud" was considered to be an aphrodisiac. The origin of potato (*papa* to the Incas) is so remote that its beginnings are lost in antiquity. Moreover, few plants have had the social influence of the potato. Since it grew in the utmost livable heights of the Andes, it was the vegetable base of the Inca realm, but since the potato, unlike the other cultivated plants raised by the Andean farmers, was perishable, someone invented the chuñu process of potato preservation, and the Inca rulers systematized this by product into an industry; in a large sense it prevented famine. Chuñu (pronounced "ch'un-yu") was the first really dehydrated food, and it was prepared in this manner: the potatoes were left outside to freeze, and on the following morning the people squeezed out the water with their feet. The process was repeated on 5 consecutive days. Chuñu may be preserved whole or made into a very white, light potato flour, and in this powdered dry state it can last for years. Chuñu was one of the principal foods stored in the public granaries throughout the Andes.

The grass we call "corn"—maize to the Mexicans, *sara* to the Incas shared the social base with the potato, and it was, as now, the great food staple of the American Indian. The origin of corn is a fascinating botanical puzzle, and to the problem Dr. Paul Mangelsdorf and his associates in plant genetics have given much patient time. Its place of origin is still unknown; "present evidence points to a dissemination in all directions of the early forms from an unknown center." Not able to withstand as harsh climate as the potato could, corn reaches its highest limits of cultivation in sheltered slopes about Lake Titicaca, at an altitude of 12,700 feet. *Sara* also has great antiquity; it is found in pre-Inca graves dating back to 3000 B.C.; it was even then fully matured as the Indian maize we know. The varieties are many. To the Incas sweet corn is

choclo; parching corn was *kollo-sara*; corn for the making of *chicha*, *saraaha*; corn for making a sort of hominy (*mote*) had kernels the size of hazelnuts.

These 2 staples were supplemented by quinoa (a pigweed, member of the goosefoot family), a tall reddish stalk, whose seed is much used as oatmeal is in the Scottish highlands, and *oca*, a tuberous plant which, like the potato, grows in the altiplano uplands. These 4 were the basic subsistence plants, although there were many more. In the warmer valleys, below 8,500 feet, a whole cornucopia of fruits and vegetables appeared: chili peppers, the principal condiment along with salt, tomatoes in considerable variety, beans (all world varieties except the European broad bean and the soybean), squash, pumpkins, wild gherkins, and fruits known and unknown to the world—papaya, chirimoya, avocado, guavas, and the granadilla, the fruit of the passionflower.

In the wet zones of the Montaña, the *yungas*, that part of the Upper Amazon under control of the Incas, peanuts, chocolate, 2 varieties of manioc, pineapples and soursop were cultivated—all of which originated in the Americas. And from the hot desert coast, fully under Inca control after A.D. 1450, came sweet potatoes, corn, squash and gourds, and a large variety of other plants long developed by the pre-Inca coastal peoples and immortalized in the realistic ceramics of the Mochicas, who existed between 400 B.C. and A.D. 800.

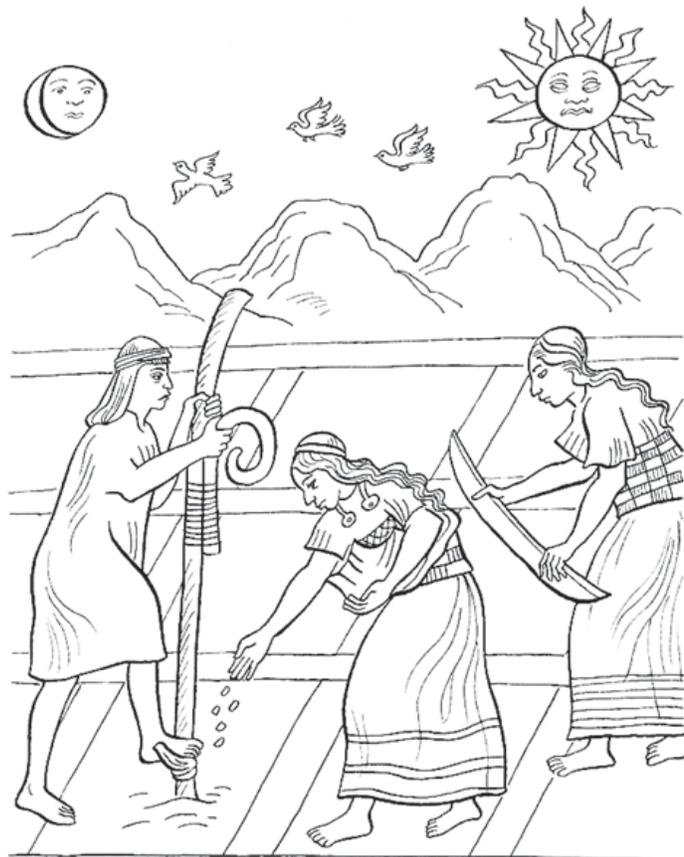
The archaeological world is today besieged by the “diffusionists” who once again (as has been done often in the past centuries) wish the Incas to come from some place else, much in the same manner as those who argue that Shakespeare could not have been Shakespeare. It is impossible for them to accept that indigenous man evolved culturally in this American world. Some claim that the Incas, unsatisfied with their vast Andean realms, went off into the Pacific on a fleet of balsa rafts and so colonized Polynesia; a contrary school suggests that the Incas owe their culture instead to the Polynesians, and to test it a raft was also launched in the opposite direction, that is, west to east. The Mayas must come from Angkor Vat, the Incas from China; the Hy-Brazilians, replete with alphabet, must be immigrants from the sunken continent—Atlantis.

Diffusion has long been known to be an essential dynamic factor in human culture. And it is agreed that many common cultural elements are due more to diffusion than to originality. In our own historical times we have seen how countries have benefited by borrowing—mostly through agricultural borrowing of domesticated plants.

But the Western Hemisphere, once it had its successive waves of migrants from somewhere out of Asia, was apparently sealed off by a geological transformation (as is equally evident in the diffusion of the primitive camel and llama from a common protocameloid ancestry from out of North America—see *The Llamoids*, Page 456), and American man developed from man-as-animal into man-as-culture-bearer without any appreciable “outside” influence.

To show this, here is a comparative list of what man was using in the Old World and in the New in, say, 500 B.C.

Men and women working together, sowing the land. Note the difference in the puric’s dress. The first plowing when was festival; now work is at hand, and he wears common work dress. Redrawn from Felipe Guamán Poma de Ayala.



Eurasia

1. *Green vegetables*: cabbage, lettuce, spinach, onion, cucumber, egg plant, okra, asparagus, cress, garlic, artichoke
2. *Roots*: beet, parsnip, carrot, radish
3. *Fruit*: apple, pear, plum, cherry, grape, lemon, fig
4. *Nuts and oilseeds*: walnut, linseed, poppyseed, olive
5. *Legumes*: peas, lentils, soybean, broad bean
6. *Cereals*: wheat, barley, rye, oats, millet, rice
7. *Condiments*: mustard, cane sugar

Industrial Plants:

1. *Vessel gourds*
2. *Fiber plants*: flax, hemp, cotton
3. *Dyestuffs*: madder, saffron, indigo

America

1. *Green vegetables*: cabbage palm, chayote
2. *Roots or tubers*: potatoes (many varieties), manioc, camote, oca, olluco, ñu .
3. *Fruit*: chirimoya, papaya, avocado, tomato, cacao (chocolate), pineapple, soursop, gerkin, strawberry, raspberry
4. *Nuts*: cashew, brazil, peanut, hickory
5. *Legumes*: *canigwa*, *tarwi*, *molle*, beans (all world varieties except European broad bean and soybean)
6. *Cereals*: maize
7. *Condiments*: peppers (chili—aji)
8. *Pseudo cereal*: quinoa
9. *Beverages*: mate, guayusa

Industrial Plants:

1. *Rubber*
2. *Vessel gourds*: many varieties
3. *Fiber plants*: cabuya, cotton, etc.
4. *Dyestuffs*: cochineal, achote, genipa

It will be immediately noticed that the 2 lists are almost completely different; only 1 item—cotton—is common to both continents, and that is wrapped in great mystery.

From the Fertile Crescent came wheat, rye, barley, and the pulses (leguminous plants with high protein content); wheat appears as early as 2500 B.C., and of course never appeared in the Americas until it was brought there by the Spaniard. Eurasia knew no beans other than the soy and the little-known broad bean, *Vicia faba*, descendant of a wild African variety; all other beans, no matter where they appear in the world, are American. White man, after the discovery of the Americas, was the intercontinental plant distributor; it was white man who brought tobacco, maize, tomatoes, chocolate, vanilla, strawberries, squash, potatoes, cranberries, pumpkin, red peppers (hence paprika), pineapples, papaya, and cashew nuts, to be cultivated in Europe and elsewhere. It was white man who brought the banana from Africa to the Americas in 1535, coffee from Mocha in Turkey in the late 18th century, sugar cane from out of the Fertile Crescent to the tropics of America in the first days of its discovery; and rice. White man brought the pineapple to Hawaii, and in turn brought back, in one of the early voyages from the Philippines, the coconut—completely absent from the Americas. It is curious that in all the hypothetical diffusion contacts which play so great a part in the anthropological literature, the people of different continents did not make any plant exchange; they also forgot to bring to the Americas the vehicular wheel, the architectural arch, or the potter's wheel or the spinning wheel. In the matter of diseases, after the first contact, they did better; white man brought smallpox,

the Indian gave him syphilis.

Cotton is the great puzzle, and it is riddled with mysteries. It was first cultivated in the Nile Valley after the 5th century B.C. The first exact date is 370 B.C., but Junius Bird, of the American Museum of Natural History in New York, found cotton in Peruvian graves which date back to 2000 B.C. At that early date, early Peruvian man cultivated cotton, spun and wove garments from it, and this before it was cultivated by the Egyptians. It was known to the Assyrians as “tree wool,” yet the Greek etymology of the word points to the fact that it came originally from India.

Cotton as a botanical puzzle causes botanists genetic nightmares, for American varieties show that the chromosomes of cotton point to a trans-Pacific passage west to east by an Asiatic parent, an incompleting return movement of the tetraploid ancestry, which means that the “distributor” must have been birds if not man, who in the early history of the Americas “brought” cotton from the Old World, then several millenia later picked up the American cotton which had developed new chromosome patterns, and brought back again to Eurasia. But what a thing to assign to birds, especially as birds do not eat the *Gossypium* seeds? And winds cannot distribute them for 3000 miles. Then, how to account for the same cotton, containing the same genes, in both continents?

Still, until someone presents us with something more positive than the accidental resemblance of sculpture between the Old World and New, it is safe to assume that man in America created his own culture without contact with the other continents, and if the American Indian shares, as he does, 49 cultural traits with the Polynesian, then, it merely shows how severely limited the human animal is. In 12,000 years he has been unable to think up another deadly sin. There are traits shared by the Tibetan living at 13,000 feet and the Inca living at the same altitudes—and why not? Geography itself is a determinant.

Agriculture was the soul of the Inca Empire; it determined everything. The Andean farmers' year was divided into 2 seasons: wet and dry. The wet season began in October and extended to May; the dry season, starting in May, although subject to considerable caprice (hence the Inca's preoccupation with obeisance to the unseen powers), continued into November.

In the autumn the lands of the commune were divided fairly between the members of the *ayllu*, the earth cell which controlled the communal land tenure. First the lands (*chacras*) assigned to the Inca, that is state lands, were cultivated communally (part of the Indians' *mita* tax of service), then the lands of the Sun, the state religion. The fruits thereof were harvested and stored for the use of these agencies. These state granaries were stocked, so the early Spaniard remembered, with maize, quinoa, *chunū*, *charqui* (dried llama meat), fish, cards, hemp, wool, cotton, sandals, and military arms, stored in hampers, each item in its appropriate warehouse. They were seen Francisco de Xerez, the first soldier-chronicler of the conquest in 1533, who remembered these storehouses as being “piled to the roof, as the Merchants of Flanders and Medina make them.”

Men and women plowing the fields together. The men use the foot plow, called *taclla*; the women break up the clods of earth. Another woman brings corn chicha to drink. Redrawn from Felipe Guamán Poma de Ayala.



The work of tilling these fields done, the *puric* then turned to his own.

August was plowing time, and work in each other's field was—like all else—communal. It began with a festival. The nobility took it all most seriously and always participated. “If,” wrote the Jesuit historian Padre Cobo, “the Inca himself or his governor or some high official happened to be present, he started the work with a golden digging stick which they brought to the Inca, and following his example all the other officials and nobles who accompanied him did the same.” (No different in idea today than some state official turning the soil with a gold-plated shovel or else laying a cornerstone with a golden trowel.)

They had no plow as such, and no draft animals. Men used, as they still do, the *taclla*, or foot plow, which was a thick pole six feet in length with a fire-hardened point; sometimes it was bronze-tipped. There was a footrest near the tip and it was driven deep into the soil by a thrust of the foot and shoulder pressure. The clod of earth was then prized up. The digging stick, like all else in the realm, was a group tool and was seldom used by only one man. His kinsmen of the *ayllu* formed a long line across the field to be plowed, and with a rhythmic chant “*Jailli*” (pronounced “whay-lyi,” which means “triumph”), “...they triumphed over the soil,” writes Garcilaso “the Inca,” “plowing it and disemboweling it.” The chant went something like this:

QHARICUNA:	Free translation
Ayau jailli, ayau jailli	THE MEN:
Kayqa thajilla, kayqa suka!	Ho! Victory, ho! Victory,
Kayqa maki; Kayqa jumpi!	Here digging stick, here the furrow!
WARMICUNA:	Here the sweat, here the toil!
Ajailli, qhari, ajailli	THE WOMEN (answering):
	Huzzah, men, huzzah!

The men worked backward, the women followed facing them and breaking up the clods with a sort of hoe called *lampa*. *Sara* (corn) was planted in September, potatoes when the rains began to fall, i.e., between October and November. After plowing the fields of the Inca, the Sun, and their own, they next turned to those fields of kinsmen who were serving in the army, and then finally to those of the sick and the halt. Their principal tribute (it was part of their tax), said Garcilaso, was “the working, and cultivating and harvesting of the lands of the Sun and the Inca.”

Agriculture was bound up very closely with terracing and irrigation, since the amount of flat land was severely limited and the Andean valleys are deep and narrow. The sides of the valleys were wonderfully terraced, and these terraces are very exciting when seen for the first time. The rainy season run-off carries away soil; terracing prevented it. Terracing further extended the soil community where the earth surfaces were scant; so the Indians, too, were soil-makers.

Under Inca rule, terracing of the Andean valleys was a systematic part of their methods of soil preservation and soil creation. In the greater projects, those, for example, of Pisac—where the terraces stand poised over the heights of the Urubamba River—or at Ollantaytambo (where the workers cut into the living rock), professional architects were sent out from Cuzco to plan them. It was an enormous expenditure of labor. That these terraces still stand after 5 centuries is sufficient testimony to the foresight of those Inca rulers.

Irrigation was tied closely with terracing and so naturally with agriculture. It was the lifeblood of empire. In the wet season rain does not always fall nor does all this borax-filled earth hold the water, so irrigation was the answer, and the Inca engineers harnessed the brawling streams pouring out of glaciers and brought them down in the most careful manner to water fields, even though separated by immense distances from the watercourse. These techniques helped to control the density of population and gave the social body a meticulous balance between population and productivity. Much Inca-directed skill was devoted to irrigation. There were immense water reservoirs in the fortress of Sacsahuamàn above Cuzco; water was laid underground in superbly made stone-laid sewers in many widely spaced areas. Rivers were straightened, canalized as one sees the Urubamba River, a few miles east of Cuzco and below the great fortress of Pisac. This type of advanced engineering once extended throughout the empire, but is now only dimly seen since

so much has been lost to the insults of time.

Irrigation techniques are inseparable from a developed agriculture, and their elaboration marked man as a settler, brought about a corporate life with settled habits; irrigation also created the city-state.

Irrigation, it need hardly be said, was not an Inca invention, but it *was* an Inca perfection. On the desert coast the Mochicas, to mention one great pre-Inca dynasty, had vast irrigation works, and their heirs, the Chimús, built their cities on the ruins of those of the Mochicas and extended the irrigation system so that their cities were supplied by gigantic stone-laid reservoirs.

In the Ica-Nazca coastal regions, west of Cuzco on the Pacific Ocean, these cultures, between the years A.D. 500-800, also elaborated immense irrigation works; the underground reservoirs are still known as *puquios*. Of all this, the Incas were the inheritors.

Yet under the Incas terracing was perfected and extended. Water was so engineered as to be introduced at the top of the terraces, thence it ran down from one gigantic terraced step to another, the whole area being watered by a single stream. Water conduction demands careful design and must be determined by a knowledge of hydrologic conditions, the nature of the soil, and the general conformation of the land. To secure the flow it must run down a slight incline: too fast, it will erode the banks; too slow, it will allow weeds to grow and silt will choke up the channels. It is scarcely curious that wherever in this variegated globe water conduction has been practiced, the techniques of it are almost identical. In ancient Mesopotamia, after its conquest by Hammurabi in 1760 B.C., land exploitation was centralized, which led naturally to the erection of canals, reservoirs, and irrigation dikes. King Hammurabi's "Water Code" is written in a form that sounds like an Inca text: "Each man must keep his part of the dyke in repair." Royal letters were dispatched to governors giving them over-all responsibility to keep the waterways open and the dikes in repair: "Summon the people who hold the fields on the side of the Damanu Canal that they may scour it."

This is only one instance of parallelism in human inventions, for after all it is the stomach that is the all-compelling motive of invention, and man through his ages tested, tasted, and tried the fruits and grains that fell within his ken; he learned to evaluate them, select and plant them—for this reason one need not become unduly overexcited about the parallelism of means and methods in terracing used by peoples out of contact, for where geographical conditions are similar, agricultural methods and water induction will also spring up naturally. One need not fall back on diffusion as an explanation. The peasant is landbound. He may be a Peruvian *puric* or an Egyptian *fellah*, but he remains the "eternal man." He is, in the Spenglerian dictum: "the eternal man, independent of every culture that ensconces itself in the cities. He precedes it, outlives it: a dumb creature propagating himself from generation to generation, soil bound, a mystical soul, a dry, shrewd understanding that sticks to practical aptitudes."

In Peru, after the September planting, especially in those lands unreached by irrigation, October was always the "critical" month; if rain did not fall, there would be a crop failure. In instances of prolonged drought the Indian fell

The drum was a part of the festival in which tribesmen imitated the things of their lives. The men are dressed as birds. Redrawn from Felipe Guamán Poma de Ayala.



back on the “mysteries” and the high priests took over.

Throughout the planted land llamas were sacrificed to the rain gods. If that did not seed the rain clouds, then a man, a woman, perhaps even a child, was sacrificed. The procedure was repeated in Cuzco on a greater scale. The people paraded dressed in mourning; black llamas were tied without food or drink in the belief that the gods could not withstand the plaintive wail of the llama and would send rain to assuage it.

When the corn was ripe, the Indians faced another crisis: birds and animals in the Andes converged on the grain to get at it before it was harvested. Boys, disguised with wolves’ skins over their heads, waited to plague birds with slingshots; at night women stayed up to beat on a small drum. Everything, it seemed, conspired against the Indian.

When the crops survived all of this, then there occurred the corn harvest festival; all joined together in the field, and that part of the grain that would not be immediately consumed was stored in the public granaries.

It was after this that the Incas offered the first fruits to their local shrine—the *huaca*.

The idea of the *huaca* is intimately bound up with religion; it combines that which is magical and charm-bearing. *Huacas* were varied and numerous. A *huaca* could be a natural feature of land, a mountain crag; rivers were *huacas*, such as the Apurimac, “the Great Speaker,” over which the Incas hung their greatest suspension bridge; and *huacas* were lakes, springs, or other natural objects. All were worshiped in one form or another. But since religion was practical and life was religion, agriculture as such was holy too, and any ritual connected with it was *huaca*.

The best-known and incontestable *huacas* were those built in the fields; they are still to be seen throughout the Peruvian coast. Some near Lima contain upward of 12 million individual bricks. They began, certainly, as a stone deposit; as an Indian worked the fields he tossed stones onto a common pile. This became a shrine and was formed into a stepped pyramid, as most *huacas* are built. Then on top was added a gaudy canopy, where a wooden or stone effigy was placed. That was the *huaca*: “a primordial synthesis in which the conceptual differences of content have never been made analytically distinct.”

These *huacas* erected in the people’s fields were the primary source of religious expression of the people. Here the first fruits of the harvest were laid. The *huaca* is certainly not wholly Inca nor is it exclusively American; the farmers cultivating their soil, as in Mesopotamia, built their shrines, called *Tells*, more or less in the same manner, and they were placed in the wheat fields. The Sumerian civilizations in the fertile Tigris-Euphrates delta believed also that they, as farmers, were dependent on the favor of the deities, and to secure, to maintain these favors, such as rain and sun, they paid tributes from their first produce in quite the same manner. Human beings everywhere act like human beings. They knew that the gods were dead, but they persuaded themselves that they were living and fell, just as we ourselves do, into inextricable contradictions.

When the corn is ripe, everything conspires against its harvest. A boy protected by a wolf’s skin kills animals and birds with his sling. Redrawn from Felipe Guamán Poma de Ayala.

