

READING 14-2

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

Maya Agriculture

Corn was the epicenter of the Maya world. The cornfield, the *col*, was their preoccupation; “the greatest number of them were cultivators...who applied themselves to harvesting maize,” said Diego de Landa. These observations are confirmed by another priest in a sixteenth-century document written in the Maya highlands: “If one looks closely he will find everything these Indians did and talked about had to do with maize...” The grain is ancient; the latest dating through maize finds in the Bat Caves of New Mexico places it as cultivated plant before 2000 B.C. Dr. Paul Mangelsdorf, whose studies on the origin of corn in the Americas are classic (and never given to undue speculation) believes that “the present-day races of maize in Mexico...are the product of four thousand years or more of evolution under domestication.” Its place of origin within the Americas is still undetermined.

The Mayas had corn as a developed plant. This corn (*ixim*) after life itself was their greatest preoccupation. Yum Kaax, believed to have been the corn god, is always represented as youthful and wearing an ear of corn in his headdress. Prayers were offered to him. The head of Yum Kaax, found at the ruins of Copán, is among the most sensitive in primitive American art.

Methods of agriculture seem not to have changed much since the earliest times. The Mayas felled trees and brush with a stone ax (*bat*) and burned them during the dry season. The earth was turned with a fire-hardened digging stick (*xul*). Each Indian was allotted by his clan organization a portion of corn land, a *hun uinic*, of four hundred square feet. Land was communal property: “...the land was held in common and so between the towns there were no boundaries or landmarks to divide them except when one [city-state] made war on the other.” The technique of corn culture was the same everywhere in the Americas: the felling of trees, burning, fencing, planting, weeding, bending the stalks at harvest (so as to deter the birds), harvesting, and shelling. The Mayas preserved the corn in storage bins; “they kept it in fine underground granaries called *chultunes*.”

Water was, as mentioned earlier, always a Maya problem. Those in the hinterland built huge reservoirs. At Tikal an immense one was located in a deep ravine, the porous rock cemented and held by a masonry dam. The sites of Piedras Negras, Palenque, and Yaxchilán were located on rivers. Cobá, in Yucatán, was set felicitously between two lakes, but most of the cities in Yucatán had as their only permanent source of water the well, the *cenote*. A Maya farmer tried to locate his milpa as close as possible to the wells. As new fields were needed, there was a tendency for the Maya farmer to move farther and farther from a given center. This in time doubtless loosened his connection with the city-state. Agricultural decentralization could well have been one of the factors which loosened the social structure of the Old Empire and contributed to the disintegration of cities.

Between January and February, at the time of light rains, trees were felled. From March to May was the hot and dry season, the living trees blossomed and the cut trees were burned. The larger unburnt logs were dragged to the edge and built into a crude but effective fence against deer and other animals. Ash from the burned plants was turned over with the digging stick, and the land was cultivated. From June through August, the rains fell heavily.* These were the planting months.

Planting was ritually controlled. Maize, the gift of the gods, was sacred, and planting had to be done with the proper ritual. The rain god Chac was properly propitiated and those days when rain should fall

* Rainfall is heavy in the jungle regions, eighty inches a year. In El Petén (near where the first great Maya cities, Tikal, Uaxactún, etc., were located) it rains sixty-five inches a year; in Yucatán, forty-six inches. There is a high incidence of rain but water is not held by the shallow soil; it percolates down through the porous limestone into the cenotes one hundred feet below the surface. Some water remains in pockets called aguadas. These were the planting months.

were selected for planting, in order that the newly planted seeds would sprout. Astronomy was mostly astrology. But the almanacs for planting were based on empirical observation; in one of the Maya codices it is stated: "This is the record of the year-bears of the *uinal*..." Actually, this was weather forecasting based on observation of previous years. In the ninth month, Chen (Moon), and the tenth, Yax (Venus), planting was to be done during certain lucky days. Typical interpretations of the Maya planting almanac were these: "Cimi, the 5th day of the 11th month Zac [February]...bad day for planting...with rain incantations there is a good down-pour...The month and day of 9 Caban [February- March]...good day, lucky day, heavy rains, good for planting everything."

For every detail of planting, sowing, and harvesting there was ritual, yet much of it was based on the shrewd observations of the earthbound man, who related them to the priest-scribes. The priests in turn set it all down in glyph script so that it could be remembered. During his excavations at the ruins of Copán, in Honduras, Dr. Sylvanus Morley found that two stone time markers were placed four and a half miles apart in such a position that the sun set directly in line with them on April 12 and September 7. It is thought that April 12 was the date chosen for burning the brush in the fields around Copán.

Chac was the rain god. He is represented in the Maya glyphs in books, on sculpture, and in painted murals as the long-nosed god. His eyes, T-shaped, suggest tears and, symbolically, rain. His importance in the Maya pantheon can be gauged from the fact that the Chac name glyph occurs 218 times in the three surviving Maya codices. Chac was a benevolent deity and considered to be man's friend. The Maya farmer always evoked his name when planting. He was the god. So in the months of Chen and Yax there were great festivals to honor him.

Planting was simple and effective. All that was required was a bag to hold the maize kernels and a fire-hardened planting stick. A hole was made in the soil, four or five inches deep, and into it three to six kernels were dropped. After that, Chac willing, the Maya waited. He frequently weeded the fields and waited for the maize to grow. "And when it rains," exclaimed Diego de Landa, "it is marvelous to see how maize grows." September and October brought light rains; they were also the hurricane months. In November, when the weather was cool and dry, the corncob was bent downward to keep it from the birds. Dry, it was harvested.

What did it yield? From exhaustive studies made in Yucatán over a ten-year period an idea has been gained of how much maize was harvested. How many fields of four hundred square feet the Maya farmers planted, we have no precise idea. "They plant in many places, so that if one fails, the others will suffice." The yield of corn from a given field would vary. Production was higher in the humid areas than in Yucatán, where the statistical studies were made. The present-day farmer in Yucatán plants an average of twelve acres. A hundred and ninety days of the year are given to preparing the field, burning, planting, weeding, harvest. The average cornfield produces 168 bushels a year. An average family of five consumes 6.55 pounds of maize per day, 64 bushels a year, including that fed to the live stock. From the fruits of his 190 days of labor the Maya feeds his entire family and still has a corn surplus of 100 bushels, which he uses to buy the luxuries that he cannot produce. It is presumed that since the Mayas in ancient times cultivated less land than at present, and kept no draft animals, his farm labor consumed only forty eight days of the year. In the surplus time of nine to ten months year, he built the great city-states.

The Maya cultivated much besides maize. In the same cornfield, using the maize stalk for support, the farmers planted beans; on the ground, squash and pumpkins grew. Chili peppers were grown at the edge of the fields or in the houses as an ornamental shrub. In separate fields in the warmer areas the Mayas grew the pale sweet potato. The sweet cassava (*dzin*) was known, as was *chicham* (from the Mexican *xicamatl*), a root shaped like a turnip. They had one good green vegetable, the chayote, the fruit of a herbaceous vine that when cooked tasted like summer squash. Around the gardens which surrounded their houses the Mayas planted papayas (*haaz*) "which they esteemed very highly." The avocado (*u cheel*), a "very large and fresh tree with fruits of great delicacy," appeared in groves, while the soapberry tree they put near their houses to obtain the roots from which they made a kind of soap.

The fruit of the *achiote* tree, mentioned earlier as a source of color, was also used in food, giving "color

to their stews, like saffron.” The gourd tree, which produced large, unedible melon-sized fruits, provided very thin but durable drinking cups that, as Diego de Landa observed, “they paint very handsomely.” The *balche* tree was planted; its bark yielded the strong alkaloid used in making honey mead.

Hemp was raised for its fiber, “from which they made an infinite number of things”: sandals, ropes, twine, bowstrings, fishing line, and so on. Cotton was of two kinds; both were grown and “gathered in wonderful quantity.” It was of great economic importance because of the cloth manta woven from it. The ceiba (*piim*), a sacred tree that was supposed to hold up the Maya heavens, yielded a fine cotton made into pillows for Maya heads. The sapodilla, or “chewing gum tree” (*ya*), the source of our modern chicle, is a large tropical fruit tree growing to a height of sixty feet. The Mayas boiled its sap to a sticky mass and used it in making blowguns and for adhesion when a strong glue was needed. It was an article of trade; Maya boys chewed it, calling the stuff cha. The search for chicle to fill modern needs has done much for archaeology; many of the Maya ruins were discovered by *chicleros*, who spend the rainy season searching for sapodillas.

Copal, which yielded a resin burned in all religious ceremonies, “was a commodity and is very great business,” wrote Landa. Cedar (*kuche*, which meant “tree of God”) was used for the large dugout canoes. There was brazilwood, the famous dyewood called *cachte*; “when thrown into water it turns to red.” It was used for dyeing cotton cloth. Palms were many, and their leaves were used for thatching house roofs. Cacao was grown on the two extremes of the Maya domain, Tabasco to the northwest and Honduras to the southwest. It was a Maya passion and farmers in Tabasco grew it exclusively, even to the detriment of the traditional maize, and traded “that gold of the country” for their needs.

One fruit, the banana, was not native to Maya land: “There are many bananas...the Spaniards brought them; for before this there were none.”

Droughts were frequent and of great intensity and their “disastrous consequences play an important role in Maya literature.” As explained in an earlier section, rains were usually heavy, but the greater part of the lowland is only a thin soil cap laid over a lime stone outcrop (“the country with the least earth that I have seen,” says Diego de Landa). The rain trickled through the porous lime stone and down into natural cisterns. The Mayas tried to combat this; at many of the city-states they built artificial cisterns. During the rainy season water was gathered from the roofs by means of cemented run-offs and was directed into wells, which were elaborately roofed to prevent evaporation in the hot weather. Tikal, although in one of the wettest zones, suffered repeatedly from drought. There the engineers cemented up an entire ravine of porous limestone around the principal plaza, to create giant-sized reservoirs. Over these passed causeways, which served as both dams and roads. All this was to no avail for the maize fields. When rain did not fall at its stated interval, the soil quickly dried up, cracked, and became cement-hard.

When this happened (and it is obvious from the frequent appeals to the rain gods that it happened often), the Mayas abandoned their cities, went into the jungles, and were reduced to eating the bark of trees. The old, who were unable to come, were left to die. Human sacrifices to the gods were frequent on these occasions. Other Mexican tribes suffered in the same measure from drought, and the Aztecs sacrificed thousands to the rain gods.

One of the enigmas of the Mayas is that Neolithic mental block which prevented them from devising a way in which to obtain the water which lay immediately below the land surface. Landa noted that there “are few places where one digs down that water cannot be found, sometimes within one meter.” Irrigation techniques are inseparable from a developed agriculture. The pre-Inca civilizations in Peru, whose rainless coasts were more of a challenge to the primitive mind than the situation which faced the Mayas, solved their problems by the construction of an elaborate system of irrigational aqueducts, water often being brought down for hundreds of miles.

Although they were able to perfect a calendar as good as the Greek or Egyptian and raise stone cities from the jungle, the Mayas used the wheel only in toys for children. It would not have been beyond Maya technique to install a treadmill that dipped into the giant *cenotes* and raised the water to the surface, conveying it then, by means of an aqueduct, to their fields. In arid Numidia and Mauretania (present-day Algeria and Morocco) the Romans used reservoirs, ponds, and underground cisterns, linking them with canals and

aqueducts to convey water to field and home. The water tunnel widely used by the Achaemenian kings in Persia (circa 600 B.C.)—and later introduced into arid Egypt—was a product of the intelligent use of gradients and the natural flow of water into waterless areas. Could it not have been worked out by the Mayas? The giant wheel built by Romans in A.D. 113 in the town of Fayum, in Egypt, lifted water from the Nile by a human tread method and fed it into reservoirs, which in turn flowed to fountains, baths, a brewery, and even to two synagogues. Such a device was surely not beyond the means of the Mayas.

There was a mental block against the principle of the wheel in the Americas, where man was the draft animal. None of the practical uses of the wheel, in whatever form, were known: pulley, arch, roller wheel, rotary quern, potter's wheel, or water wheel. Had the Mayas had the latter in that terrible year of 1464, when there was drought followed by a locust swarm so thick that the weight of it broke the limbs off large trees and engulfed the land until "nothing green was left," they might have survived and weathered the great hurricane which followed and destroyed houses, trees, and fields. "After this the land of Yucatán remained so destitute of trees that...casting one's eyes over the country from some high point it looks as if the whole land had been cut by scissors..."