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PRIMITIVE AGRICULTURE OF THE INDIANS.

The opinion seems to have been formed from tales and traditions of early Indian life that the Indians living north of Mexico at the time of the first European settlements in this country were virtually nomads having no fixed abode, and hence giving but little attention to agriculture. On the contrary, the older records, particularly concerning the temperate regions, show that almost without exception the Indians were generally found from the border of the western plains to the Atlantic, dwelling in settled villages and cultivating the soil. De Soto found all the tribes that he visited, from Florida to western Arkansas, cultivating maize and various other food plants. The early voyagers found the same thing true along the Atlantic from Florida to Massachusetts. Captain John Smith and his Jamestown colony, in fact all the early colonies, depended at first largely for subsistence on the products of Indian cultivation. Jacques Cartier, the first European to ascend the St. Lawrence, found the Indians in the present locality of Montreal cultivating the soil and reports them as having "good and large fields of corn." Champlain and other early French explorers testify to the successful tillage of the soil for subsistence by the Iroquois. La Salle and his companions observed the Indians of Illinois and along the Mississippi southward cultivating and largely subsisting on maize.

Sagard, an eyewitness of what he reports, says, in speaking of the agriculture of the Huron in 1623-26, "that they dug a round place at every 2 feet or less where they planted in the month of May in each hole nine or ten grains of corn which they had previously selected, culled, and soaked for several days in water. And every year they thus planted their corn in the same places and spots, which they renovated with their small wooden shovels. He indicates the height of the corn by the statement that he lost his way quicker in these fields than in the prairies or forests." (Histoire du Canada, I, 265-266, 1636.)

Indian corn, the great American cereal, "was found in cultivation from the southern extremity of Chili to the 50th parallel of north latitude" (Brinton, Myths of the New World, 22, 1868). "All the nations who inhabit from the sea as far as the Illinois, and even farther, carefully cultivate the maize corn which they make their principal subsistence." (Du Pratz, History of Louisiana, II, 239, 1763.) "The whole of the tribes situated in the Mississippi Valley, in Ohio, and the lakes reaching on both sides of the Alleghenies, quite to Massachusetts and other parts of New England, cultivated Indian corn. It was the staple product." (Schoolcraft, Indian Tribes, I, 80, 1851.)

Harshberger says that maize was introduced in the United States from the tribes of Mexico and from the Carib of the West Indies. The ease with which it can be cultivated and conserved, and its bountiful yield, caused its

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Grinnell, George Bird:

Blackfoot Lodge Tales. New York: Charles Scribner's Sons, 1892.

Blackfoot Indian Stories. New York: Charles Scribner's Sons, 1892.

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did not. The writer, speaking of the Rio Grande Valley, adds: "There is much corn here."

The sunflower was cultivated to a limited extent both by the Indians of the Atlantic slope and those of the Pueblo region for its seeds, which were eaten after being parched and ground into meal between two stones. The limits of the cultivation of tobacco at the time of the discovery have not yet been well defined. That it was cultivated to some extent on the Atlantic side is known; it was used aboriginally all over California, and indeed a plant called tobacco by the natives was cultivated as far north as Yakutat Bay, Alaska.

The word "tobacco" is of American origin, and has been adopted, with slight variation, into most foreign languages to designate the plant now smoked throughout the world and largely produced in connection with American agriculture. Tobacco was cultivated in most Indian tribes by the men alone, and was usually smoked by them only. The plant had a sacred character to the Indians; it was almost invariably used on solemn occasions, accompanied by suitable invocations to their deities. It was ceremonially used to aid in disease or distress, to ward off dangers, to bring good fortune, generally to assist one in need, and to allay fear.

The planting of medicine tobacco is one of the oldest ceremonies of the Cross, consisting, among other observances, of a solemn march, a foot race among the young men, the planting of seed, the building of a hedge of green branches around the seed bed, a visit to the sweat house, followed by a bath and a solemn smoke, all ending with a feast; when ripe the plant was stored away, and seeds were put in a deerskin pouch and kept for another planting. The tobacco plant was carefully dried by the Indians and kept as free of moisture as possible; that intended for immediate use was kept in bags of deerskin or birch bark, skins of small animals, or baskets neatly woven of roots and grasses. The bags were often elaborately decorated by the women.

Kinnikinnick, an Algonquin word meaning "mixed by hand," designates a mixture of tobacco with some other plant for imparting a more pleasant odor, or to reduce its strength, as the trade tobacco is commonly too strong to suit the Indian's fancy. Among the western tribes tobacco was ordinarily used by mixing it with gum, sumac, and bearberry, the bark, leaves, and roots of two kinds of willow, manzanita leaves, Jamestown weed, arrowwood, and a variety of other woods, barks, leaves, twigs, and even insects.

In much of the southwestern country, such as among the Hopi of Arizona, the Indian is the original dry farmer. He has learned through unnumbered years of coping with arid and semi-arid conditions the fundamentals of getting seeds to grow and produce somewhat more than the quantity planted. The first experiments of the white farmers in this region were sad failures by the side of the native's methods. His corn planted at the usual depth made a fine start ahead of the Indian's, but soon withered and yielded practically nothing, while the corn which the Indian planted in a hole a foot or more in depth, made by a pointed implement, rooted into the necessary moisture by the time it had to contend with conditions above the surface and brought fair results. By studying the Indian's methods, the white farmer has added some improvements, mainly in cultivation, such as maintaining a dust mulch to prevent evaporation, proper thinning, removal of suckers, etc.

The Indians of New Mexico and Arizona had learned the art of irrigating their fields before the appearance of the white man on the continent. This is shown not only by the statements of early explorers, but by the still existing remains of their ditches. "In the valleys of the Salado and Gila, in southern Arizona, however, casual observation is sufficient to demonstrate that the ancient inhabitants engaged in agriculture by artificial irrigation to a vast extent. \* \* \* Judging from the remains of extensive ancient works of irrigation, many of which may still be seen passing through tracts cultivated today as well as across densely wooded stretches considerably beyond the present non-irrigated area, it is safe to say that the principal canals constructed and used by the ancient inhabitants of the Salado Valley controlled the irrigation of at least 25,000 acres" (Hodge in American Anthropologist, July, 1893). Remains of ancient irrigating ditches and canals are also found elsewhere in these territories.

It is found that some of the ancient canals were about 7 feet deep and 4 feet wide at the bottom, but the sides sloped gradually, rising in steps, giving the acequia a width of about 30 feet at the surface. Both the bed and the sides were carefully tamped and plastered with clay to prevent waste through seepage. Remains of what are believed to have been wooden head gates have been exposed by excavation. Where canal depressions have disappeared, owing to cultivation or to sand drift, the canals are still traceable by the innumerable boulders and water-worn concretions that line the banks; these, according to Cushing, having been placed there by the natives as "water-towers" to direct the streams to the thirsty fields. Several of the old canal beds have been utilized for miles by modern ditch builders; in one instance a saving of \$20,000 to \$25,000 was effected at the Mormon settlement of Mesa, Maricopa County, Arizona, by employing an ancient acequia that traversed a volcanic knoll for 3 miles and which at one point was excavated to a depth of 20 to 25 feet for several hundred feet.

Even where the water supply of a pueblo settlement situated several miles from a stream was obtained by means of canals, each house cluster was provided with a reservoir; and in many instances through the Southwest, reservoirs, sometimes covering an area measuring one mile by one-half mile, designed for the storage of rain water, were the sole means of water supply both for domestic purposes and for irrigation. In the valleys of the Rio Grande and its tributaries, in New Mexico, small reservoirs were the chief means of supplying water to the ancient villages.

Hand irrigation is still practiced to some extent by the Pueblo Indians. Formerly the Zuni women, in order to raise their small crops of onions, chili, etc., were obliged to carry water in jars on their heads, sometimes for several hundred yards. It was then poured on the individual plants with a gourd ladle. At the Middle Mesa villages of the Hopi, garden patches were watered in much the same way, except that here the gardens are within easier reach of the springs and were irrigated by means of a gourd vessel fastened to the end of a long pole. Both the Hopi of today and the ancient inhabitants of the vicinity of the present Solomonsville, on the Gila, constructed reservoirs on the mesa sides from which terraced gardens below were readily irrigated, the reservoirs being supplied by impounding storm water. Throughout the Southwest where pueblos occupied the summits of mesas, reservoirs were provided. For hundreds of years the pueblo of Acema has derived its entire water supply for domestic purposes from a natural depression in the rock which receives the rainfall from the mesa summit.