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SWEET CORN AMONG THE INDIANS

GEORGE F. CARTER

THE question of the pre-Columbian existence of sweet corn among the American Indians has been under discussion, in which its early history and probable role in Indian agriculture are clouded unnecessarily.¹

In the United States the term "sweet corn" evokes pleasant thoughts of fresh maize as a delicious vegetable. Botanically, sweet corn is *Zea mays saccharata*. The basic difference between other corn and sweet corn is that the latter has lost the ability to convert its sugary endosperm into starch. All other varieties of corn, conveniently referred to as "field corn," pass through a sugary stage but convert their sugary endosperm into starch. It is possible, then, to pick field corn at the proper moment and by cooking it immediately to have the rough equivalent of sweet corn. It is only a rough equivalent, however. Some field corns, such as the Corn Belt dents, make poor eating even when picked at their best. Others, such as the *elotes* of some parts of Mexico, are probably as flavorful as our best sweet corn.

Although there is only a single gene difference between sweet and field corn, it is obvious from observation of the plant that in the development of sweet corn for its special usages other modifications have also been made. The single gene difference is important, however, for it means that a simple mutation can change any corn into a sweet corn. Such a mutation has been observed to occur in pure strains of corn.

The term "sweet corn" has been, and in part continues to be, a fertile source of confusion. This is due to the tendency to place varieties with similar usages into the same botanical classification. Writers have tended to interpret the use of corn in other areas, and in the United States in the past, in terms of our present usage. As will be shown below, however, our particular usage of sweet corn is probably to be viewed as rather unusual.

It is also clear that in America in the past "sweet corn" had at least one other widespread meaning—what we should call "dehydrated" corn. The Indians of North America widely practiced the custom of picking field corn in its sugary stage. They boiled, roasted, or steamed it and then dried it for indefinite storage. Corn so prepared could at any time be dropped into

¹ For aid in the clarification of this problem I am indebted to Mr. G. F. Will and Drs. Edgar Anderson and Volney Jones. Dr. Jones has been particularly helpful in supplying critical notes and citations.

► Dr. Carter, associate professor of geography at The Johns Hopkins University, contributed "The Role of Plants in Geography" to the *Geographical Review* (Jan., 1946).

age of A.D. 1250-1300 for sweet corn among the Pueblo people of this area. The third find, a few grains, was made by Dr. Byron Cummings at Gourd Cave, Nitsie Canyon, northern Arizona. These grains have been identified by Castetter and Bell.¹² This material has not been dated but is considered prehistoric and is probably not later than A.D. 1300. The archeological corn from Peru has been described by Hendry.¹³ It is a floury sweet corn and came from Huamachuco, in the highlands of Peru. It is of Inca or pre-Inca age. This archeological corn shares with sweet corn still grown in the area the peculiar character of being sweet only in the upper half of the kernel.

What weight are we to give to these few examples of sweet corn in archeological collections? There are at least two aspects to this problem. What are the chances for the preservation of sweet corn? And what is the significance of the sweet corn that has been preserved? The archeological preservation of corn is relatively rare at best, and only a small amount of that which has been preserved has been adequately described. Only from the arid Southwest do we have significant amounts of preserved corn, and even here only a small part of the material includes kernels. Of the kernels preserved, many are charred and hence are not useful for determining sweet versus field corn. In four months of collecting agricultural material among the Indians of the Southwest, one month of which was spent among the Hopi, only once did I see sweet corn hanging in the house. Other seed corn was common, and grain corn was abundant. Practically every Hopi family grows some sweet corn,¹⁴ but, as Whiting¹⁵ states, in September all the ears are baked and if not eaten immediately are then dried, except for a few ears saved for seeding. The chances of archeological preservation are, therefore, extremely small, and the survival and recognition of one ear and a few grains is as much as one could expect. In the humid eastern United States the odds against preservation are even greater, and virtually all the corn preserved is charred, hence useless for identification as sweet corn. The amount of the archeological evidence, then, would seem to be significant.

¹² E. F. Castetter and W. H. Bell: Pima and Papago Indian Agriculture, *Inter-Americana Studies I*, Univ. of New Mexico, School of Inter-American Affairs, Albuquerque, 1942, p. 86.

¹³ G. W. Hendry: Archaeological Evidence Concerning the Origin of Sweet Maize, *Journ. Amer. Soc. of Agronomy*, Vol. 22, 1930, pp. 508-514.

¹⁴ A study in 1935 revealed that 31 out of 56 Hopi families habitually grew sweet corn ("The Hopi Crop Survey of Whiting, Neguatewa and Jones," a joint expedition of the Museum of Northern Arizona and the Museum of Anthropology of the University of Michigan). Information from correspondence with Volney Jones.

¹⁵ A. F. Whiting: Ethnobotany of the Hopi, *Museum of Northern Arizona Bull. No. 15*, Flagstaff, 1939, p. 69.

Sweet corn differs in only a single gene from other types of corn. Mutations to sweet corn have been reported to occur. Are these archeological grains from the Southwest to be viewed as the chance survivals of such mutations? The single grain of sweet corn in Jemez Cave can be accounted for in three ways: (1) The grain may be modern—there was modern material in the cave. (2) The grain is a chance survival of a chance mutant. (3) The grain is a chance survival of some sweet maize purposefully grown by the Indians. The grains from Nitsie Canyon are probably not modern, cannot readily be attributed to repeating mutations, and are most probably to be viewed as seed corn purposefully saved. The whole ear of sweet corn from the Aztec Ruin seems to complete the picture. An ear of pure sweet corn can hardly arise except by man's purposeful propagation. Even if a mutant grain of sweet corn were accidentally planted in a plot of field corn, resultant ears would show only scattered kernels of sweet corn. The chances, moreover, of the accidental planting of such a kernel would be exceedingly small. The American Indians were horticulturists, not large-scale farmers. Seed was most carefully selected and hand-planted seed by seed. So poor-appearing a seed as a grain of sweet corn would be automatically ruled out unless there was an appreciation of its peculiar quality.

We come, then, to the question of how an appreciation of sweet corn ever arose. The propagation of sweet corn is *not* a natural and obvious thing. The archeological material from the Southwest suggests that the Indians were purposefully propagating sweet corn for its peculiar values.

The Peruvian corn seems to tell the same story. It is not a commercial variety but is similar to the present-day sweet corn peculiar to the country and grown at moderate altitudes. We have little material from Peru, and almost none of it has been examined by experts. This one sample seems significant.

Other forms of evidence for the antiquity of a crop are to be found in its use. If, for example, a crop enters into the ceremonial life of a people, the fact is usually evidence of its antiquity. Similarly, nonwhite usages of food plants often indicate prewhite usages. There is considerable evidence of these sorts which indicates that sweet corn had a place in pre-Columbian Indian agriculture.

Certain of the Indians' usages of sweet corn suggest that for them it was a sugar substitute. This is most clear for Jalisco. Kelly and Anderson¹⁶ have given us the most detailed data and have called attention to the im-

¹⁶ Isabel Kelly and Edgar Anderson: Sweet Corn in Jalisco, *Annals Missouri Botan. Garden*, Vol 30, 1943, pp. 405-412.

portance of *use* in the history of sweet corn. They describe it as being grown only in the back country and as being viewed by city dwellers as a somewhat rustic food. It is seldom boiled or roasted for eating. Rather, it is used to prepare confections. The dried, toasted mature maize kernels are ground to a powder, which when mixed with brown sugar and cinnamon is used as the basis for a sweet drink. Such ground-corn drinks are ancient in America. It may well be that, before the introduction of sugar, sweet corn alone was relied on to sweeten the drink. The second usage Kelly and Anderson describe for sweet maize is in *ponteduro*, the local equivalent of sugared peanuts or peanut brittle. The basic ingredients are dry, toasted kernels of sweet corn, sugar sirup, toasted squash seeds, and roasted peanuts.

The parallel of these usages to those of other American Indians is striking. The Upper Missouri Indians rarely picked the true sweet corn (sugar corn) while green, but permitted it to ripen. The Mandans, Hidatsas, and Arikaras used the sugar corn almost exclusively for the making of corn balls. The tribes farther south, in Nebraska, appear to have used the sugar corn both when green and when ripe in later years; how they used it in earlier times is not known, but as they planted the corn in May and did not return to their villages until early in September, the sugar corn must have been ripe and hard by the time they returned from their summer hunt.¹⁷

Similar evidence is to be found in Wilson's account of the agriculture of the Hidatsa Indians.¹⁸ A type of "gummy corn" is described whose kernels shrink up and become rough or wrinkled. This is obviously sweet corn. Wilson's Hidatsa informant stated: "For green corn, boiled and eaten fresh, we used all varieties except the gummy." "The one recognized use" for this variety, she said, was to make corn balls.

The Hopi used baked, dried sweet-corn kernels as sweetening throughout the winter.¹⁹ In the province of Jujuy in Argentina the native use of sweet corn is "to eat immature and boiled; . . . also to prepare a flour that is used in making a certain cake of the region."²⁰ Erwin²¹ quotes Cutler on Bolivian use of sweet corn: "Sweet corn is only eaten as parched dry grains or used in the fabrication of an especially esteemed potent *chicha*, reputed to have more alcohol than the usual type."

¹⁷ Will and Hyde, *op. cit.*, p. 117.

¹⁸ G. L. Wilson: Agriculture of the Hidatsa Indians: An Indian Interpretation, *Univ. of Minnesota Studies in the Social Sciences No. 9*, 1917, pp. 63 and 38.

¹⁹ Whiting, *loc. cit.*

²⁰ L. R. Parodi: Notas preliminares sobre plantas sudamericanas cultivadas en la provincia de Jujuy, *Gæa*, Vol. 4, 1932-1935, pp. 19-28; reference on p. 21. Parodi also mentions starchy sweet corn in "Relaciones de la agricultura prehispánica con la agricultura actual," *Anales Acad. Nacl. de Agronomía y Veterinaria de Buenos Aires*, Vol. 1, 1932-1934, Buenos Aires, 1935, pp. 115-167; reference on p. 136.

²¹ Sweet Corn Not an Important Food Plant (*op. cit.*), p. 119.

The pattern that emerges, then, is one of use of sweet corn primarily as a confection and a source of sugar, and only secondarily, if at all, as boiling or roasting ears. We may have here a clue to its possible disappearance in some areas, especially in post-Columbian times. Cane sugar and honey, both introduced by the white man, may simply have taken over the role of sweet corn. A possible example of this is found among the Omaha, who say they formerly grew sweet corn but have long since lost the seed.²² The former distribution and importance of sweet corn among the Indians are, therefore, not determinable from its present position. It may quite well have been more important to the Indians in the past than it is to either the Indians or us at present. Sweet corn as a sugar substitute is a nonwhite trait, and it seems likely that it is a pre-Columbian trait.

Another evidence of the antiquity of sweet corn among the American Indians is its place in ritual and proverb. Kelly and Anderson have called attention to sweet corn in proverbs in Jalisco. Will and Hyde have pointed to the exclusive use of corn balls made of ground, dry mature sweet corn in the Cheyenne eagle-catching ceremony as evidence of the antiquity of sweet corn in the upper Missouri region.

There is a wealth of ethnological evidence pointing to the ceremonial importance of sweet corn among the Hopi. Stephen has recorded the ceremonial use of sweet corn in the *Niman* kachina of the Hopi as follows:

They . . . shelled a quantity of sweet corn, taking precautions that no children should see what they were doing. Ha'yi then distributes these kernels privily to some of the men of each of the three villages, telling them . . . that it should be planted tomorrow. It is not planted in the open fields, but in warm nooks where the children may not see it growing, as it is not displayed in public until *Nima'n* kachina. Its planting and cultivation are kept secret from the children.²³

This ceremony is one of the most important among the Hopi; they are an extremely conservative people in all things, but particularly in their ceremonial life.

Titiev has described the Hopi method of pit-baking sweet corn, and the ritual involved.²⁴ He also offers some evidence that such pits go back into archeological times. Although Titiev does not give conclusive evidence that he is discussing sweet corn, other evidence cited herein makes it seem likely.

²² Will and Hyde, *op. cit.*, p. 305.

²³ A. M. Stephen: *Hopi Journal*, edited by E. C. Parsons (Columbia Univ. Contribs. to Anthropology, Vol. 23), 2 vols., New York, 1936; reference in Vol. 1, p. 373. As quoted by Whiting (*loc. cit.*), who notes that sweet corn is ceremonially associated with the nadir.

²⁴ Mischa Titiev: *The Hopi Method of Baking Sweet Corn*, *Papers Michigan Acad. of Sci., Arts and Letters*, Vol. 23 (for 1937), 1938, pp. 87-94.

Fewkes recounts the Hopi tradition that when the town of Awatobi was destroyed in 1700, one prisoner was saved who "knew how to make the sweet, small-ear corn grow."²⁵ This, too, is a probable reference to true sweet corn. Forde's Hopi informants considered sweet corn to be aboriginal; Forde, however, says that "this is doubtful," though he gives no reason for his doubts.²⁶ Hough²⁷ refers to Hopi sweet corn as probably introduced, but he also gives no reason. It is possible that sweet corn plays a similar role among the Zuni, for Cushing mentioned sweet corn as one of the sacred corns. However, there was no true sweet corn in Cushing's collection that was sent for identification to Sturtevant.

We have, then, several instances of sweet corn in ritual and of its use in nonwhite ways. The use of sweet corn in Hopi ritual in the area where three separate finds of archeological sweet corn have been made is highly significant. The concurrence of evidence from tradition, ceremony, and food usage strongly indicates the pre-Columbian presence of sweet corn in the upper Missouri region also. The case for Jalisco parallels that for the Missouri region.

It seems worth while to summarize the known occurrences of sweet corn among native peoples in America:

Iroquois. The opening discussion indicated the likelihood that the Iroquois had sweet corn in pre-Columbian times. All investigators of Iroquois food and agriculture have mentioned sweet corn and have made it clear that they referred to true sweet corn and that they considered it part of the aboriginal crop complex.

Tribes of the Upper Missouri River. Our best source for these peoples is Will and Hyde's "Corn among the Indians of the Upper Missouri." The authors specifically mention sweet corn for the Hidatsa, Mandan, Cheyenne, Omaha, Pawnee, and Ponka. Mr. Will has written to me as follows: "I think that there is no question that most of the Great Plains Tribes had special Sweet Corn varieties which they used for very special purposes." It is interesting to note that the Mandan sweet corn is described as having a red ring around the edge of the pith. This is suggestive of the description of the papoon corn, which was said to have had originally so red a cob as to stain the table linen. Such considerations as this suggest that the gap in sweet-corn distribution between the tribes of the Missouri Valley and the Iroquois may be more apparent than real. It also suggests that the source of Iroquois sweet corn may have been in the West.

Maximilian reported sweet corn for the Mandan in 1833.²⁸ He specified *le maïs sucré* and

²⁵ J. W. Fewkes: Archeological Expedition to Arizona in 1895, *17th Ann. Rept. Bur. of Amer. Ethnology*, 1895-96, Washington, 1898, Part 2, pp. 519-744; reference on p. 604.

²⁶ C. D. Forde: Hopi Agriculture and Land Ownership, *Journ. Royal Anthropol. Inst.*, Vol. 61, 1931, pp. 357-405; reference on p. 392.

²⁷ Walter Hough: The Hopi Indian Collection in the United States National Museum, *Proc. U. S. Natl. Museum*, Vol. 54, 1919, pp. 235-296; reference on p. 237.

²⁸ Maximilian, Prince of Wied-Neuwied: *Voyage dans l'intérieur de l'Amérique du Nord*, 3 vols. (and atlas), Paris, 1840-1843; reference in Vol. 2, p. 392.