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How to make cassava bread: the introduction of metal graters in the Guianas during the 17th century

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Recent archaeological research on Cayenne Island (French Guiana) showed that maize was a very important crop during the late pre-Columbian period (AD 900-1500), at least among the coastal population of this part of the Guianas. In contrast, the post-Columbian or Modern Times (AD 1500-1900) of this particular region are dominated by reports of the consumption of manioc, notably cassava, manioc beer and later on of *farinha*. This dichotomy makes sense when discussing various events during the 17th century by means of careful reading of the historical documents, the comparison of material culture and the interpretation of local Amerindian oral tradition. In this manner, it is proposed that the introduction of metal graters by Europeans has favored the consumption of manioc over maize.

Keywords: Guianas, grater boards, metal tools, manioc, maize.

Comment faire de la cassave : l'introduction de râpes en cuivre dans les Guyanes au XVII^e siècle

Des recherches archéologiques récentes sur l'Île de Cayenne (Guyane française) ont montré l'importante consommation de maïs pendant la période précolombienne récente (AD 900-1500), au moins au sein de la population du littoral de cette partie des Guyanes. Cependant, au cours de la période post-colombienne ou de l'époque moderne (AD 1500-1900), on observe plutôt une forte consommation de manioc, notamment la cassave, la bière de manioc et, plus tard, la farine. Cette dichotomie prend tout son sens lorsqu'on la discute à la lumière d'une lecture attentive des documents historiques du XVII^e siècle, d'une approche comparative de la culture matérielle et de l'interprétation de la tradition orale amérindienne locale. Ainsi, nous proposons que l'introduction de râpes en métal par les Européens a favorisé la consommation de manioc au dépens du maïs.

Mots-clés : Guyanes, râpes métalliques, outils en fer, manioc, maïs.

Como fazer o beiju a introdução de raladores de cobre nas Guianas durante o século XVII

A pesquisa arqueológica recente na Ilha de Caiena (Guiana Francesa) mostrou que o milho foi um importante cultivo durante o período precolombiano tardio (AD 900-1500) entre a população costeira desta parte das Guianas. Já o período poscolombiano e os tempos modernos (AD 1500-1900) desta região, em particular, é dominado por relatos sobre o consumo da mandioca, notadamente o beiju, a bebida de mandioca fermentada e, por fim, a farinha. Esta dicotomia faz sentido quando discutimos vários eventos por meio da leitura de documentos históricos do século XVII, da comparação da cultura material e da interpretação da tradição oral ameríndia. Nesse sentido, propomos que a introdução dos raladores de metal pelos europeus favoreceu o consumo da mandioca em detrimento do milho.

Palavras-chave: Guianas, raladores, ferramentas de ferro, mandioca, milho.

IN THE 1990s, when the author stayed among the Palikur of French Guiana and Brazil for several years to learn how to make pottery, the former spiritual leader of the Palikur, Orlando Noriño, told the author that the Palikur used to grate their manioc tubers in ceramic bowls (Figure 1, next page). I had not seen such bowls in the village, only wooden planks with iron nails encrusted in a wooden board, but both iron and ceramic graters were called *tymah* or teeth in Palikur (Bel 1995: 80).¹ The Brazilian-German ethnographer Curt Nimuendajú,

however, had seen broken pieces of these ceramic graters in the 1920s on Palikur cemeteries:

Ein andres Produkt der Palikur-Töpferei, [sind] die flache, geriffelte Schüssel, in der man die Mandioca rieb, findet heute nur noch in Bruchstücken auf den alten Wohnplätzen und Friedhöfen dieses Stammes und ist durch ein rechteckiges Reibbrett mit eingesezten eisernen Topfsplittern ersetzt worden. (Nimuendajú 1926: 47)

Another product of Palikur Pottery [are] the flat, grooved platters, in which one grated the *Mandioca*, which is found today only in fragments at the former dwelling places and cemeteries of these tribes and has been replaced by the rectangular grating board in which irons nails have been inserted.

1. Interestingly, linguistic root of the Palikur word *tymah* resembles the Cariban *chimali*. The latter word is mentioned in the Anonyme de Carpentras (2013: 54) and by Father Raymond Breton (1665: 156).

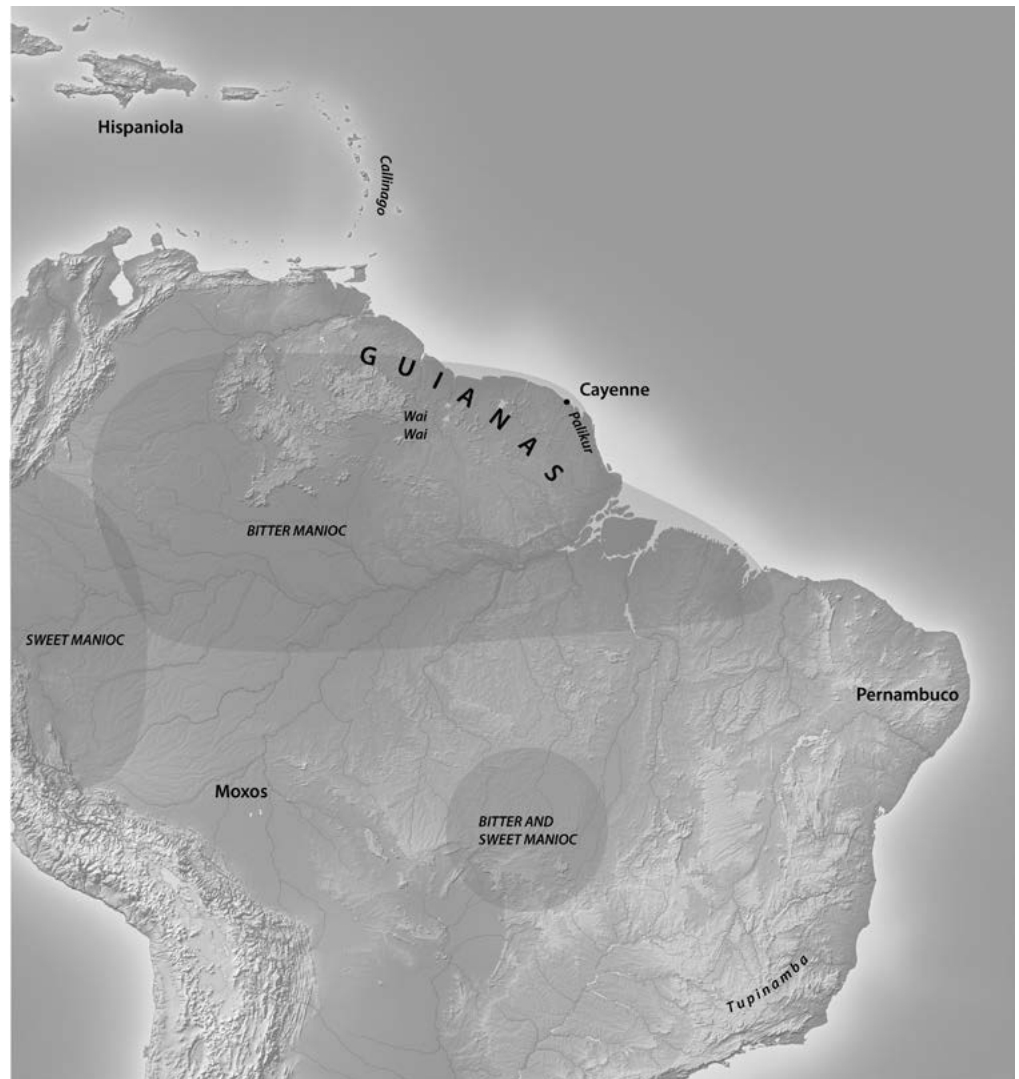


Figure 1 – Map of northern South America with places discussed here. The translucent zones represent the contemporary distribution of bitter and sweet manioc after ethnographic sources in Amazonia (adapted from Arroyo-Kalin 2012, fig. 8).

So, according to Nimuendajú, the case was clear: the Palikur had replaced the good old ceramic graters of their ancestors with iron ones, thus stepping into the modern times. This is also confirmed by a Palikur myth about the *Kamuyune*, or People of the Sun, who introduced metal graters to the Palikur (Grenand and Grenand 1987: 59-62). Nimuendajú clearly associated the ceramic graters an earlier, likely pre-Columbian period which was later confirmed by the Brazilian archaeologist Peter Paul Hilbert (1957: 10-14, 18-24). Hilbert had found similar objects during excavations at a cave site near Vila Velha, situated on the left bank of the Cassiporé River in the present-day State of Amapá. He opined (ibid.: 15, fig. 5; 33) that these objects were “shallow bowls in the shape of a drain” and attributed them to the (Late) Aristé ceramic complex. More recently, similar ceramic graters have been found in French Guiana and Amapá during excavations (Figure 2). Remarkably, similar grating tools, called *ralladores* or grinders, are also known from the Llanos de Mojos region in Bolivia (Nordenskiöld 1913; Walker 2011: 124) where they were apparently used to grate maize and not manioc (Dickau et al. 2012: 364).

Today, the Palikur no longer consume *mayk* or maize; their daily menu is dominated by processed bitter manioc



Figure 2 – Photograph of a “ceramic grater” (AP-CA-18.107-93.37) found at the LCA megalith site of Rego Grande in Amapá (photo by Mariana Cabral, IEPA).

tubers which they grow via swidden agriculture. When the tubers are ready for processing and consumption after about one year, they are cut away from the stems (which are re-used for planting) and carried to the place of processing; often a small wooden hut where all equipment is stored or gathered but unmistakably harboring a fireplace. The Palikur soak part of the harvested tubers or *kayg* in water for a few days before being peeled, grated, and be mixed with non-soaked peeled and grated tubers. This two-component pulp is then squeezed in the famous *matap* or plaited manioc pulp squeezer in the shape of a snake (also called *tipiti* or *couleuvre*) to squeeze the toxic matter out of the grated pulp. The water drained from the *tipiti* is captured in a bucket and boiled down to get rid of the cyanide in order to keep the juice (known as *kaharu* in Palikur or *tucupi* among Brazilians). Peppers are added to the juice when it is cold, and then used as a base for stews incorporating fish and meat. When this liquid is stored for a few days and the water drained, a pure residue of manioc starch is obtained what is called *kayut* or *tapioca* among Brazilians. Now the squeezed pulp is taken from the *tipiti* and the rather dry columns of pulp are then sifted in the sieve (known as a *huw* or *manaré*) before being baked in large quantities upon a large iron plate to produce *couac* or *farinha de mandioca*. The squeezed pulp from the *tipiti* can also be used to bake cakes, known as *awebru* in Palikur and perhaps better known in Kali'na as *alepa*.² The cassava bread can also be chewed to produce manioc beer in large vessels that are commonly known as *wohska* or *kasili*.

Perhaps Nimuendajú was right considering “modernization” among the Palikur by the end of the 19th century: they had discarded the old ceramic graters for new iron-nailed boards to grate manioc tubers for some reason. If they also shifted from maize to manioc, this is not stated by Nimuendajú, but archaeological research in French Guiana reveals the abundant presence of maize. The analysis of black soot recovered from fissures of numerous late pre-Columbian ceramic bowls, griddles and grinding tools (Bel et al. 2013; Bel, Pagán-Jiménez, and Fronteau 2014) from Cayenne but also in other regions along the Atlantic coast of the Guianas (Perry 2001; McKey et al. 2010; Iriarte et al. 2010; Iriarte and Dickau 2012; Rostain 2013; Oliver 2014)³ and the Lesser Antilles (Righter [ed.] 2002; Bonzani, and Oyuela-Caycedo 2006; Harris 2006; Lane et al. 2008; Mickleburgh and Pagán-Jiménez 2012; Figueredo 2012; Ciofalo, Sinelli, and Hofman 2019) suggest the importance of maize for pre-Columbian populations, notably during the pre-contact period. This fact is emphasized by Roosevelt (1980, 1997) and Perry (2002a, 2004, 2005) for

the Lower Orinoco River as well as by Iriarte et al. (2012) for the early post-Columbian period in French Guiana.⁴

The apparent quasi-absence of manioc *versus* the omnipresence of maize starch in the fissures of griddles (nowadays unmistakably related to the production of cassava or cassava bread) is striking, and begs the question as to what occurred between these two moments. Fortunately there are numerous descriptions of the preparation and consumption of manioc and maize, from this intermediate period that enable us to trace the consumption of these products in the present among the Palikur and Kali'na, and to a lesser extent the Creole population along the coast, Amerindian groups in the interior, and Maroons, all of whom grow their manioc tubers on temporary slash and burn fields (Grenand 1979; Carneiro 1983; Balée 1989, 1992). Therefore, I tend to use a direct historical approach by using both a critical and nomological analysis of the sources. For this matter, it should be noted here that this contemporary or early 20th century image of semi-permanent (independent) Amerindian villages consuming manioc is widely distributed in the Guianas (Gillin 1936, 1948; Kloos 1971; Rivière 1969, 1984) and that this modern image is also an image often projected into the past by researchers as far as ancient pre-Columbian times, as if nothing has changed ever since (Heckenberger, Petersen, and Goes Neves 2001). This was already pointed out in the renowned “cautionary” note by Warren DeBoer (1975) who drew our attention nearly half a century ago that the use of griddles in pre-Columbian, and notably during post-Columbian times, was not only restricted to produce cassava or manioc bread.

Indeed, the contemporary picture is believed to be the result of many changes at various levels (economic, social, religious) in Amerindian society during post-Columbian times. For example, the introduction of the iron axe is thought to have changed the horticulture of the Amerindian society profoundly, even suggesting that “shifting cultivation, as an ancient practice in Amazonia, seems to be a myth” (Denevan 1992: 161). In this light, it is postulated that the present consumption of manioc in the Guianas is the result of a historic adaptive process wherein the coastal population of the Guianas came to favor manioc over maize during in post-Columbian times. Moreover, it hypothesized that the modern, wooden rectangular shaped grater boards, inserted with small stone flakes, are Amerindian copies of the European metal (copper) graters sheets as used by the Portuguese in their *farinha* mills in north-eastern Brazil. In the Guianas and Lesser Antilles, the latter sheets were nailed on wooden boards and traded during

2. Palikur vocabulary can be found in Launey 2003.

3. Notwithstanding the fact that recent isotopic research in the mouth of the Amazon River has possibly proven otherwise, suggesting that maize was not an important staple food in this region (Hermenegildo et al. 2017: 9).

4. The first draft of this paper has been presented at IEPA in Macapá for the SAB Norte meeting and has been published in Portuguese in *Revista Amazônica* in Portuguese (Bel 2015a). The present paper is an enhanced version of this matter which was also presented in my PhD at Leiden University (Bel 2015b).

the early 17th century. They represent the abandonment of raised field agriculture and population decline in early post-Columbian times (Iriarte et al. 2012, fig. 3), thereby contributing to the present-day image of a predominantly manioc based subsistence economy.

The questions assessed here are organized in three sections: first, a presentation of the archaeological data and short state of affairs. Secondly, I will present the historical and ethnographic data in chronological order to show how and why metal graters were introduced in the Guianas; and finally, I will try to show the possible impact of these changes upon Amerindian society and the establishment of modern society in the Guianas. It is highly possible that similar events have unfolded elsewhere in Amazonia, but as there surely is a certain degree of diversity, the topic has been restricted to the Guianas and French Guiana in particular. Nonetheless I do not exclude interesting cases elsewhere to illustrate our discussion. We preferred to provide the original transcription in quotations, whereas citations in the text are translated in English and the original is provided in the footnote.

THE ARCHAEOLOGICAL PERSPECTIVE

Unfortunately, there has been little starch-grain and phytolith analysis done in the Guianas to identify crops consumed by the pre-Columbian population, with the exception of the coastal plains in French Guiana (McKey et al. 2010; Iriarte et al. 2010; Iriarte and Dickau 2012; Pagán-Jiménez et al. 2015; Bel 2018). The research in this latter region revealed the importance of maize over manioc at two late pre-Columbian sites at Cayenne Island where manioc appears almost entirely absent from the samples: only a single starch grain! (Bel et al. 2013; Bel, Pagán-Jiménez, and Fronteau 2014) (Figure 3). Although manioc tubers may simply not have been prepared or consumed at both sites, the absence of manioc starch in our samples can also be related to the tools that were sampled for analysis, i.e. ceramic griddles, irregularly-shaped milling stones, and ceramic cooking and drinking containers. In this case they apparently were not used for manioc products.

The process of obtaining manioc pulp as we know it today and as described by the chroniclers of the Guianas aims to extract the liquid from the tuber by means of separating the poisonous juice from the pounded pulp, thereby obtaining a starch-poor half-product. Therefore there should be less chance of coming across starch granules in this pulp and its food derivatives. Additionally, manioc starches damaged by heating or pounding are more difficult to identify (Chandler-Ezell, Pearsall, and Zeidler 2006). Even if the manioc starches have been missed during microscopic research, it still remains fascinating to observe how maize was “lost” during post-Columbian times. Maize was no longer consumed

in large quantities by the modern and contemporary populations of coastal French Guiana according to recent historic sources and early ethnography.

In addition, the later ethnographic documents also represent the source for the interpretation of small stone flakes as grater board flakes. Under influence of New Archaeology, Jeffery B. Walker (1980) suggested about four decades ago that microliths, or stone flakes, were inserted into wooden boards by the pre-Columbian population of Saint Kitts to use them as grater boards. The interpretation of archaeological microliths as grater teeth, based on ethnographic analogy, has been a topic of debate throughout the last two decades (Barse 1989, 2008; Perry 2001, 2002a, 2000b, 2004). The introduction of innovative microscopic techniques (e.g. SEM, starch and phytolith analysis) made it possible to gain further insights into the function of lithic tools that was hitherto difficult to assess. Use-wear analysis has proven to be an important means to determine the function of a certain tool by means of experimentally testing the relationship between types of lithic tools and movement. However, grating teeth or flakes, perhaps because they are so small, have as yet received little attention in Amazonia relative to other regions (Crock and Bartone 1998; Nieuwenhuis 2002; Perry 2005; Knippenberg 2012; Dickau et al. 2012). Furthermore, this research is also hampered by the fact that the majority of supposed grater flakes are made of quartz which



Figure 3 – Late pre-Columbian granite milling stone found at CPP (French Guiana) which yielded only maize starches (analysis by Jaime R. Pagán-Jiménez and photo by the author).

is difficult to analyze with the naked eye (Mourre 1996: 213-214, 2004; Gijn 2014). To date, use-wear analysis of quartz flakes often results in common traces “similar in form to those used for the scraping of relatively soft materials (e.g. animal hides) in experimental studies” (Perry 2005: 419).⁵

Another technique which involves the identification of tool function is the analysis of starch grains, such as that carried out by Linda Perry (2001) with regard to small flakes. She extracted starch grains attached to small flakes from the Pozo Azul site situated on the Upper Orinoco River, at a site excavated by William Barse in 2008. I agree with Perry in that it is highly speculative to attribute the presence of starch granules retrieved from unwashed flakes to the activity of grating on grating boards. Perry’s conclusions should at least be verified by means of numerous other samples, preferably those with tar or natural glue-mixtures attached to them. For example, when drawing on ethnographic analogies, this tar served to fix the teeth in the boards among the Macusi of Guyana (Farabee 1924: 20-21) and should provide a better context to extract starches.⁶ As Harris pointed out, Perry’s “results do not falsify the assumption that ceramic graters armed with microliths were used in pre-Columbian times to process bitter manioc, but they do reveal that these artifacts have been used to process a wider variety of starch-yielding plants, including maize, and that archaeological evidence of them should no longer be uncritically regarded as a proxy indicator of manioc cultivation” (Harris 2006: 68). In addition, this is also the conclusion of Debert and Sheriff (2007: 1895-1899) who analyzed the so-called “*raspaditas*” from the Santa Isabel site in Nicaragua, represented by means of small “pointy” [pyramidal] flakes. Further research on “possible” grater flakes has been realized in Brazil but did not yield pertinent results in favor of grater flakes being inserted in wooden boards or related to grating activities (see Prous et al. 2009; Moraes, Lima, and Santos 2014; Duarte-Talim 2015). Finally, the analysis carried by Dickau on flakes from the Mojos out did not yield many results either. This suggests that grater teeth could be made from other materials than stone (Dickau et al. 2012: 368). Therefore, the microscopic results remain scarce in the Guianas and the most pertinent results are obtained

from pots, griddles and grinding tools; in short, we find more maize than manioc starches.

THE HISTORIC PERSPECTIVE

The historical perspective begins with the first Spanish eye-witness reports on how cassava bread was made from manioc tubers. Such detailed description is provided by Fernando Oviedo y Valdez (1535) when he stayed in Santo Domingo during the second decade of the 16th century. Chapters 1 and 2 of his seventh book show the reader how to make tortilla and cassava bread respectively. He also relates the difference between bitter and sweet manioc of which the latter, called *boniata*, can be cooked or roasted and eaten straight away. After his description Oviedo adds that this bread keeps very well over time and sustains at sea. He also says that the extracted juice from the *cibucan* is very poisonous but once boiled it serves as a very good soup or “potage.” To illustrate his description we insert Figure 4 to show “How bread was made” from maize according to Girolamo Benzoni who visited the Indies and Middle America in the 1540s:

Estas maçorcas de la yuca son como gruessas çanahorias; y aun como gruessos nabos de galizia, y mayores: tienen una corteza aspera de color dun leonado obscuro; y algunas tiran al color pardo; y por de dentro esta muy blanca y es espesa como un nabo: y hazen destas maçorcas o yuca unas tortas grandes que llaman caçabi: y este es el pan ordinario d[e]sta ysia y de las otras poblados de christianos: lo qual se haze desta manera. Despues que los indios y indias han quitado aquella corteza a la yuca, raspandola como a nabos y que no quede nada daquela costra con unas conchuelas, o venera de almejas: rallan la yuca, assi mondada en unas piedras asperas y rallos que para esto tienen: y lo que assise ha rallado metenlo en un cibucan, que es una prensa hecha como talega luenga de empleyta: hecha y terida de cortezas de arboles blandas, de lavor dun estera de palma y es luenga diez o doze palmos y gruessa como una pierna o algo menos en redondo: y hinchén esta tal talega o prensa de aquella yuca rallada: y esta hecha alli un alçaprima de madera de que cuelgan el cibucan en lo alto por el un cabo: y en el otro baxo echanle pegas de piedras gruessas y estirase el cibucan en tal manera que se estruja y exprime la yuca y le sale todo el çumo y se cuela en tierra por entre las junturas de la lavor del cibucan o empleyta del. Y aquella agua pestifera sale toda vertiendose por el suelo, quando quieren que se pierda, y lo que queda espremidodela civera dentro en el cibucan est como quedan unas almendras espremidas mucho, y seco, toman despues aquesto: y tienen aparte assentado en el fuego un Buren: que es una caçuela llana de barro, y grande quanto un harnero y sin paredes: y debaxo esta mucho fuego, sin que la llama suba a la caçuela que esta assentada y fixada con barro: y esta tan caliente aquella plancha, o caçuela, que llaman Buren, como es menester: y encima echan

5. Whether small flakes have been inserted into boards applied when grating food has been tested for example by André Prous by creating a grater board (Prous et al. 2010: 213-214).

6. The Macusi grater board was made “by driving small sharp stones of porphyry into a soft board” (Farabee 1924: 20). Farabee remarks: “An enterprising Taruma trader living among the Wapishanas married a Waiwai girl who is a good grater maker and through her industry he supplies a large market” (ibid.: 21). See Roth (1924: 278-280) for a description of the fabrication of a Taruma grater board (by a Waiwai girl?). Notably Barse (2008) and Perry (2005) do not correctly refer to Roth’s publication, as is the case regarding Farabee in Barse’s reply to Perry.

de aquella yuca expremida como si fuesse salvado o arena en torno, tanto quanto quasi toma la caçuela, menos dos dedos alrededor: y tan alto como dos dedos o mas: y tiendenlo llano y luego se quaja: y con unas tablillas que tiene para aquello la hornera en lugar de paleta, dale una vuelta, para que se cueza de la otra parte; y en tanto quanto se haze una tortilla de huevos en una sarten, o mas presto, se haze una torta deste caçabi en el Buren, segun es dicho. Y despues tieneno un dia o dos al sol, para que se enxugue y queda muy buen pan. (Oviedo y Valdes 1535, f. 73va-b)⁷

The *yucca* ears are like fat carrots, even as fat as the Galician turnips but bigger. They have a rough skin and a dark tawny colour whereas some are more brownish. Inside they are very white and thick as a turnip. They make of these *yucca* ears large cakes they call *caçabi*. This is the daily bread of this island as well as the other Christian people which is made in the following manner. After the male and female Indians have removed the skin from the *yucca*, they scrape them just like turnips so that nothing remains of the skin with shell-stone [coral?] or with clam shells. Now they grate the *yucca* into groats on a rough stone with stones [pestles; *manos*] they have to do so. What they have grated, they put in a *cibucan* which is a press much like a plaited sack made of soft tree bark, in the same manner as a palm mat and measuring ten to twelve palms [hands] in length and thick as a leg [thigh], or a bit less, in circumference. They fill up this sack or press with grated *yucca* and when done they have a wooden counterweight from which they hang the *cibucan* up high on one of its ends and on the other side below there is the weight of large stones, thus stretching the *cibucan* in such manner that it squeezes and wrings out the *yucca* until all the juice comes out and falls on the ground through the joints of the plaited *cibucan*. And this infected water gets out and pours on the ground when they want to, and the residue which what is left behind in the sack looks like very dry and heavily squeezed almonds, and take this matter. Now they have a *buren* installed on the fire which is sort of flat platter made of clay as big as a sieve but without walls. Below it, there is much fire though the flame does not go into the platter which is seated and fixed with clay. This platter they call *buren* needs to get as hot as a *plancha* [Sp. griddle]. Then they put on top of it some pressed *yucca* which looks like bran or sand in a circle almost covering the whole platter except for two fingers around the rim and as thick as two fingers or more and spread it to keep it flat. With a pair of slats, which the female baker has for this instead of a *paleta* [Sp. small shovel], turns it over in order to cook the other side. And when one makes an egg tortilla in frying pan, one can even make a cake of this *caçabi* in the *buren* faster as has been told. Next, they keep

it one or two days in the sun to dry them so it stays a very good bread. (Translation by the author)



Figure 4 – Engraving of How to make bread or ‘*Modo di fare il pane*’ by Benzoni (1565 [1565], f. 57r). We see three women in a hut grinding maize (left) and making tortillas (middle) and, to my opinion, another woman preparing *tamales* (right). Remark the legged and elegantly shaped *metate* which objects commonly found at Taíno sites on Santo Domingo.

Considering the Guianas, the production of cassava is very similar and the tubers are peeled and grated or otherwise pounded upon a rock according to the earliest sources: Masham (1890: 194), Leigh (1906: 313-314), Mocquet (1617: 82), Harcourt (1906: 378-379), Ultzheimer (1971: 82) and Roth (1924: 277). It can also be added here that the descriptions of manioc processing into cassava in these early documents are often rather lengthy and detailed. In addition to the fact they were apparently intrigued by means of this sophisticated method to extract deadly poison, it also reveals a general interest in manioc and notably in cassava bread.

Maize or Guinea weed, on the other hand, receives little attention (Anonymous 1996, f. 13v; Masham 1890: 189; Leigh 1906: 310; Mocquet 1617: 90; de la Mousse in Collomb 2006: 221) and its presence is often only mentioned quickly. Nevertheless, it is still produced in large quantities in Amazonia such as upon the Lower Tapjos River where the population honored their idols by producing “great quantities of corn which is their livelihood as they do not use manioc to make flours as other nations do.”⁸ But maize clearly receives less

7. The description of the preparation and consumption of manioc is similar in other early Caribbean sources such as Benzoni (1572 [1565], f. 57v-58) and Pietro Martire d’Anghiera (1912, vol. I: 64). They all mention rough rocks to pound manioc tubers. Furthermore, the manioc description is placed after the maize description suggesting that maize was more important to the Amerindians than manioc.

8. Mauricio de Heriarte 1964 [1662]: 44 [f. 42]: “*que sam de grandes milharadas, e ser osen sustento, que nam uzam tanto et mandioca para farinha como os mais nações.*” As we shall see, maize (*Zea mays*) is written and referred to in numerous ways notably by its Spanish names (*mil*, *milho*, *millet*), but also as Indian or Turkish wheat (*Triticum vulgare*). In the Carib language or Cariban, we come across names for maize such as *aoiãβi*

attention in the early documents of the Guianas, perhaps because this seed crop is better known and already grown and consumed in 16th century southern Europe (Anghiera 1912, vol. I: 64; Dubreuil et al. 2006: 281).⁹

For the chroniclers, manioc processing was often related to the production of cassava bread and eventually the preparation of manioc beer. Robert Harcourt (1906: 378-379) compared cassava bread to oat cakes esteeming the latter to be consumed by poor farmers in isolated rural areas, such as Peake and Staffordshire in England, whereas beer was considered a more noble product of which manioc beer could be kept the longest in very large jars for ca. 10 days. Other edible (starch) products did not attract much of the voyagers' attention. This can be related to their (cultural) culinary backgrounds but also to the less interesting benefits of these products. One was familiar with maize: maize soup or stew (Biet 1664: 377; Stedman 1796, vol. I: 407-408), maize bread or *tortillas* (Herlein 1718: 143), and even as *tamales* (Hartsinck 1770: 25) as was beautifully illustrated by the servant Guillaume Coppier in his *Histoire et voyage des Indes occidentales* among the Callinago or Island Caribs:

Ils ont encor[e] du Maïs, ou Miio, que nous appelons icy bled de Turquie, qu'ils pilent bien fort dans des roches, ou pierres creuses, espece de mortiers; lequel pilé, ils le roulent en forme de saucisses, & l'enveloppent dans des feuilles de Balliris, qu'ils font en apres cuire dan de l'eau bouillante, ce par apres servant de pain, qui (Dieu graces) substantive tres-bien. (Coppier 1645: 79)¹⁰

They also have maize or milho, what we call Turkish wheat, which they pound very well in rocks or hollow stones, being sort of mortars. What has been pounded is then rolled into a sausage-shape and wrapped in balliris leaves [*Heliconia* sp.] which they subsequently put into boiling water, and then serve as bread, which (Thanks to God) nourishes very well. (Translation by the author)

The Dutch historian Hartsinck (1770: 25) discusses also maize corn wrapped in palm leaves:

De Chica, is een soort van Bier, gemaakt uit verscheide Graanen of Fruitien, maar gemeenlyk van Maiz of Turksche Tarw: na dat zy dit Graan hebben fyn gestooten, maaken hunne Vrouwen er Brood af, het

(Biet 1664: 421), *aiiossy* (Boyer Du Petit-Puy 1654: 396), *aoussi* (Brûletout de Préfontaine 1763: 79), and *awasi* (Ahlbrinck 1931: 125). Interestingly, the historic and modern Tupian word for maize or maize beverages is very similar: *avati* (Léry 2008 [1992]: 247).

9. Interestingly, José d'Acosta (1590: 236) already stated by the end of the 16th century that the Amerindian population of the Greater Antilles had abandoned the consumption of maize: "*De las Islas de Barlovento que son Cuba, la Española, Iamayca, San Juan no se que se usasse antiguame[nt]e el Mayz, oy dia usan mas la Yuca, y Caçavi, de que luego dire.*"

10. See also Father Raymond Breton on manioc wrapped in leaves (1665: 429).

welke zy in Palmite bladen bewinden, en dan in een Pot met Water laten kookten.

The *chica* is a kind of beer made of various wheat and fruits but mainly of maize or Turkish wheat. Once they have pounded this wheat to powder, their wives make some bread of it, what they put in palm leaves, and then they put it in a pot with water to boil'. (Translation by the author)

But next to cassava bread, the Amerindians also consumed manioc prepared in other ways without using a grater, as they do with maize (see *infra*); they make soups and dried balls for storage, as witnessed among the *Tapuias* in north-eastern Brazil:

Seiches, nettoyées, & pillées, on en fait de la farine, puis de la boüillie, de laquelle les sauvages font des gâteaux fort blancs & délicats. Ils l'endurcissent & seichent à la fumée sur des claies, il en detrempent la farine avec de l'eau, la mettent en boules, & en font leur provision pour en user en leur nécessité, la gardant aussi long-temps qu'ils veulent, puis quand ils s'en veulent servir, ils pillent les boules, & les meslant avec de la nouvelle farine, ils en font du biscuit, duquel les sauvages se servent quand ils vont à la guerre, & les Portugais sur mer. Ils font de cette farine un breuvage qu'ils nomment Mingaou, & la meslant avec de la farine de ris, ils en cuisent du pain levé, semblable à celui de froment sortant des fours de nos boulangers. (Baro 1651: 269)

Dried, cleaned and, pounded, one makes a flour, then a stew, of which the savages make delicate and white cakes. They harden and smoke-dry them on a rack, they soak off the flour with water and make balls out of it which is their provision whenever they need it and they can keep it as long as they wish. When they want to use them, they stamp the balls and mix them with new flour and make biscuits out of them which the savages use when they go out to make war and the Portuguese when they go out to sea. They make of this flour a beverage which they call *Mingaou* and, mixing this up with rice flour, they also bake leavened bread, similar to wheat bread coming out of the ovens of our bakers. (Translation by the author)

The main goal of these early voyages to the Guianas was to trade with the Amerindians for local products. This merchandise would be resold in the Caribbean, the North American colonies and in Europe. Notably during the first half of the 17th century, before the advent of large European colonies along the Guiana coast, these ships also required a sufficient amount of victuals in order to continue their privateering activities in the Caribbean. Therefore, they demanded from the Amerindian population large quantities of salted fish, fruit, smoked or salted meat (mostly sea cows) and many piles of cassava: all products that would last during the next voyage. According to Father Ahlbrinck (1931: 509), the ancient Kali'na extracted salt from the bark of the *wasei* (C.) or palmito tree (*Euterpe* sp.):

In den ouden tijd leverde deze palm het zout. Stukken prasara [Sr. palmito], ter grootte van een mensch, werden op elkaar gestapeld en in brand gestoken. De asch deed men in mandjes. Men liet water door de mandjes loopen. Beneden ving men het water weer op. Dit opgevangen water liet men een tijd staan. 't Kreeg een bezinksel, het zout namelijk.

In the old days, this palm tree also yielded salt. Pieces of prasara [palmito], the size of a human, were stacked and fired. The ash was subsequently collected in baskets. One poured water in the baskets and below the water was gathered again. This captured water was left to stand for a while and the residue was to be the salt. (Translation by the author)

Maize-derived products (e.g. the above-mentioned *tamales* and possibly *tortillas*) did not fall into this category apparently. Cassava however most certainly did as the Europeans purchased or traded large stocks of it.

Although cassava was praised as long-lasting bread, maize, however, was reputed for its impressive crops as it could be harvested up to two or three times a year while a single ear of maize produced more than 1000 seeds (Harcourt 1906: 379; Le Febvre de La Barre 1666: 33-34) and thus representing an interesting commodity for European settlements. Nonetheless, the consumption and production of cassava eventually caught on, mainly among the English, Dutch and French visitors, as illustrated by the French colonists who settled Cayenne in 1652:

[II] n'y a dans cette Isle aucune beste venimeuse, plusieurs bonnes racines s'y rencontrent, comme patattes, et manioque duquel l'on fait du pain que l'on appelle cassave en cette sorte; L'on grege cette racine sans estre sechée, puis l'on met ce qui est gregé dans un petit sac de grosse toille, que l'on presse, afin d'en faire sortir le jus, qui est du poison, et en suite on met le marc par poignée sur une platine de fer, de la grandeur de nos platines de cuivre à empeser sur du feu, et le pain se fait incontinent sans autre façon, ce pain semble d'abord choquer l'esprit de ceux qui n'en ont point mangé, mais je puis assurer que je l'aimerois mieux que le pain chalant de Paris. Il faut neuf mois entiers pour estre en maturité, et dans les Isles il faut un an et quinze mois, mais pour toutes sortes de legumes, toutes racines, et tous autres fruits ils viennent en maturité trois fois l'année, et le bled de Turquie, autrement du mil, meurit en deux mois. (Laon 1654: 109-110)

There are no venomous animals on this island, [but] various good tubers can be found there, such as potatoes and manioc of which the bread is made called cassava in this manner. It is grated without being dried, then what has been grated is put in a small canvas sack which is pressed in order to extract the juice which is poisonous; and then we put handful of the residue on top an iron plate, being the size of our copper plates, to be put over a fire, and the bread is made only in this manner. This bread may surprise the spirit of those who have never eaten it but I can assure you that I like it better than the heavy white bread from Paris. It needs

nine whole months to reach maturity and in the Islands up to one year and fifteen months, but for all other kinds of legumes, tubers, and fruits reach maturity three times a year, and the Turkish wheat, or the millet, matures in two months. (Translation by the author)

The above extract is of interest because it refers to the application of an iron plate to bake their flat bread, demonstrating the adaptation and integration of European artifacts in the alimentary processes among the Amerindians as early as at least ca. 1640 (Hulsman 2009). The absence of ceramic griddles on late 17th and 18th century sites is acknowledged by the author for at least two Amerindian historic sites in French Guiana counting more than 10,000 shards for both sites (Bel et al. 2015; Bel in Delpéch et al. 2019). However, in case of the griddles, iron and ceramic specimens may have been used simultaneously but at different place. The co-existence of artifacts with the same function but made of different matter and origin has been displayed by Father Maurile de Saint-Michel who stayed in the Lesser Antilles during the 1640s, observed this transition among the Callinago who used large stones as well as copper plates:

Cette cassave est faite de la racine d'une espèce d'arbrisseau, qu'ils appellent manioc, lequel monte jusqu'à la hauteur de six pieds. Ses feuilles ressemblent à celles de nos osiers. Sa racine est blanche, laquelle on racle, ou gratte. Puis on la grage c'est-à-dire qu'on la réduit en farine, avec une pierre, ou avec une râpe de fer plate, laquelle ils appellent grage. On presse cette farine en sacs ou petits pressoirs pour en tirer la première eau, qui est poison. Puis on la passe en hibichet, ou sas. On la met sur la platine de terre ou bassin de fer au feu, ou bien au soleil sur la case pour y cuire. On ne la fait pas manger chaude, car elle ferait mal. Mais quand elle est froide, on la mange comme une galette, elle est blanche et fort insipide. Il est à remarquer que de cette susdite farine on tire la fine fleur et en fait-on certaine cassave, qu'ils appellent de la mouchache, qui est meilleure que la cassave commune, mais ce n'est toujours que du pain de racine. (Maurile de Saint-Michel 2013: 51)

This cassava is made of the tubers of some sort of shrub they call manioc and which grows about six feet high. Its leaves resemble those of our willow [this is rather strange though!]. The tuber is white and it is scraped or grated. Then it is grated, that is to say, it is reduced in flour by means of a stone or with an iron sheet grater which they call “grage.” This flour is pressed in bags or small presses in order to get rid of the water which is a poison. Then it is put through a “hibichet,” or sluice. It is put on top of the earthen or metal plate with fire or on top of the hut to cook in the sun. It is not eaten when hot, because it would hurt you. Once it is cold, it can be eaten like a cake, being white but very tasteless. It has to be noted that from the this flour, one extracts the fine mass [starch or *tapioca*] and one makes a type of cassava they call “mouchache,” which is considered of better quality

than the common cassava; however, it still remains but the bread of a tuber. (Translation by the author)

Another example of a copper grater from the 1640s is given by the Anonyme de St. Christophe (2013: 124) which reminds us a lot of the Oviedo y Valdez description:

Pour les accomoder et réduire en pain que nous appelons cassava, on les nettoie et gratte comme on fait les raves, puis on les râpe comme une muscade ou pain de sucre dessus une pièce de fer blanc percée de même que nos râpes, et cette râpure qui est blanche est mise dans un sac, qu'on presse pour en faire sortir la liqueur semblable à du lait, qui est mortelle à qui en boirait. Puis étant ainsi épurée de jus mortifière, on trouve la râpure subtile et déliée comme de la farine, qu'on met sur une platine de fer et non de cuivre avec du feu dessous pour la cuire, et en fait-on une galette de l'épaisseur de demi-doigt, laquelle étant à demi-cuire d'un côté, on la retourne de l'autre et puis on la met au soleil pour l'achever de cuire. Ce pain est de telle substance que bien facilement nos Français s'y accoutument.

In order to accommodate and make bread we call cassava, it has to be cleaned and scraped as we do with turnips; then we grate it like we do nutmeg or sugar candy on a piece of pierced tin similar to our graters; now this grated matter, which is white, is put in a sack which is squeezed in order to extract the liquid resembling milk, which is lethal if drunk. Once purified of this mortal juice, the pulp is now subtle and loose as flour in such manner it can be put on an iron plate, not a copper one, with a fire below it in order to cook it; and one makes a cake about half a finger thick which has to be half-cooked on one side, and flipped on the other side and then we put it in the sun to fulfill the cooking process. This bread is of such substance that the French can accustom to it rather easily'. Adriaan van Berkel also observed an iron baking plate among the Arawak living in the vicinity of the Dutch Berbice colony in ca. 1670. (Berkel 1695: 70 [translation by the author])

THE INTRODUCTION OF METAL TOOLS

The metal manioc grater as we know it today in the Guianas is a rectangular wooden plank into which nails have been hammered, or to which a large metal sheet has been attached in which many holes have been made by means of a sharp object (nails). The ethnographic record from the 19th and early 20th century confirms this description (Schomburgk 1922: 30; Brett 1868: 30, note 1; Crevaux 1883: 119; Im Thurn 1883: 260; Wallace 1889: 336; Coudreau 1893: 435; Penard and Penard 1907: 109; Farabee 1918: 21, 1924: 20; Gillin 1936, Plate 7b; Delawarde 1966: 524). Metal graters were probably introduced by the Dutch during the 17th century in the Guianas (Hulsman 2009: 185, 2011: 188). The idea was probably derived from the Portuguese when they occupied north-eastern Brazil between 1630 and 1654 as the latter produced manioc

flour in large quantities in so-called *farinha* mills (see Soares 2009: 66, fig. 2) but also with grater boards (Figure 5).¹¹ Captain Georges Garstman described the importance of copper plates for such a mill when he invaded Rio Grande (Brazil) with his WIC army in 1633:

Oock sullen mijn heeren gelieven de voordesen begerde huijds ofte leer tot de blaesbalch inde smits neffen andere saecken met eerste gelegentheijt te oversenden benefens een koper platen die bequaem zijn tot een farinie molen te gebruijcken, Namentlijck dat rad daarmede te bedecken daer toe beslagen dan dat oude cooper soo daer op, is niet meer te gebruijcken. (National Archives, Den Haag, 1.05.01.01 50, document 52, f. 10)¹²

The Lords would also please to send over upon the first occasion the before mentioned demanded skins or leather needed to [manufacture] bellows in the blacksmith and other affairs as well as copper sheets which are appropriate to use in a farinha mill, in order to cover that wheel with those [sheets] which are nailed to it, because the old copper is finished and not usable anymore. (Translation by the author)



Figure 5 – Detail of an engraved map of the Capitania of Pernambuco showing the ‘manufacturing of manioc into *farinha*’ (Geelkercken 1624: 22). Courtesy of the John Carter Brown Library (access n° 07667-1).

The Dutch historian Jan Jacob Hartsinck (1770: 23) provided a detailed description of the copper plates: “The graters used for that purpose are made of copper, fifteen to eighteen inches long, and ten to twelve inches wide, nailed to a plank of three and a half feet long and one foot wide in the middle.”¹³ In fact, about 120 years

11. The Portuguese also imported the cotton gin from India to improve the local cotton production which might have been exported again by the Dutch to the Lesser Antilles (Bridenbaugh and Bridenbaugh 1972: 57).

12. ‘See also the highly interesting and detailed description by Dierick Ruiters (1913: 13-15) to produce *farinha* in Brazil by means of metal graters, squeezing bags, and iron pans.

13. Concerning the Lesser Antilles, see also Jean-Baptiste Du Tertre (1654: 182), l’Anonyme de Saint-Vincent (2013: 212), or Hyacinthe de Caen (in Ouellet and Le Bras 2014: 167).

earlier, father Antoine Biet observed the same metal graters among the *Galibi* of Cayenne:

Le pain se fait en cette sorte : l'on ratisse cette racine comme un fait un navet, on la râpe avec une rapoire de fer ou de cuivre, que l'on appelle une greige dans le pais, après estre rappée on la met dans des sacs, que l'on met dans une presse pour en tirer le suc, on passe cette farine, l'on en prend dans un plat que l'on étend sur une platine de fer épaisse d'un doigt, que l'on met sur un petit feu, laquelle estante cuite d'un costé, on la tourne de l'autre, cela est incontinent cuit, une personne en peut faire cuire pour le moins soixante en un jour. (Biet 1664: 336)

The bread is made in the following manner; one scrapes the tuber just like a turnip, one grates it with an iron or copper grater which is called a “greige” in this country; once it has been grated, it is put in bags which are being pressed in order to extract the juice, then the flour is sieved and spread out on an iron plate, about one finger thick, which is put on a small fire; when one side is done, it is turned over to the other side until wholly cooked; one person can make about sixty of them in one day. (Translation by the author)

The adoption of iron tools related to horticulture and food production (such as axes, chisels, baking plates, knives, needles, graters) by the Amerindians was rather swift. It is presumed that towards the second half of the 17th century all tools were replaced by means of iron equivalents, as suggested by the majority of historic documents concerning the Guiana littoral. These new tools are believed to have altered the way of food production in a similar way in regard to the introduction of the iron axe. It may even have increased the production of cassava which the Europeans demanded from them in large quantities. They preferred cassava as the cakes resembled their oat cakes and were rather tasty when fresh. However, more importantly, they could be stored for a long time during voyages at sea, thus locally creating a large demand for this manioc product. On the other hand, the Amerindians demanded iron tools and commodities which were eagerly supplied by the Europeans, thereby forming a reciprocal and growing trade over time for both parties. Importantly for the Europeans, this trade positioned the Guianas as a stop to revitalize their ships for the return trip across the Atlantic.

In order to meet Amerindian demand for iron wares, the Europeans, and notably the Dutch, also manufactured iron replicas of Amerindian tools (axes, baking plates or griddles, chisels, hoes, graters) as the Dutch historian Lodewijk Hulsman pointed out (2009, 2011).¹⁴

14. An exemplary shipping list or “*cargasoen*” for the Essequibo colony can be found in the proceedings of the WIC Zeeland Chamber dated 30 June 1642, revealing the presence of “50 lb thin, yellow [colored] copper sheets” (British Guiana Boundary Commission 1898: 129-130). Another reference was found in the city archives of Rotterdam stating that skipper

For example, if we take into account Leigh’s observations that manioc tubers were pounded or grated on a stone by women “in an earthen panne against certain grates of stone” we acknowledge that these Amerindians did not use a wooden grater board as we know it today. It is presumed here that the Europeans (and notably the Dutch) exported and even designed the metal graters in order to fit the local processing of manioc tubers and in this manner, the Dutch created an economic dependence in order to control the local market (Figure 6).



Figure 6 – Metal grater attached to wooden framework mainly used to grate sugar blocks also called *panela* or *rapadura*. Bought by the author at the market of the Brazilian border village of Oiapoque in 2012, situated at the right bank of the Lower Oyapock River. Certainly not used to grate large manioc tubers but showing you the pierced copper colored sheet (photo by the author).

Furthermore, this hypothesis may also imply that the increasing demand for manioc by Europeans resulted in reduced production of less desirable food crops among coastal Amerindians, such as maize-derived products. From this point of view, it can be opined that modern grater boards with iron nails are replicas, or a local adaptation, of the plate metal graters the Dutch exported during the 17th and 18th century. If this is the case, it can subsequently be suggested that wooden boards with stone-chip implements are down-the-line copies of metal graters, emphasizing an innovative development of grating instead of pounding (manioc) tubers during the post-Columbian times (Figure 7). The cultural exchange of copying, re-appropriation and integration of metal or copied (let’s say “home-made”) grater boards in Amerindian society fits the ongoing debate of archaeology and colonialism in the Americas regarding complex cultural processes such as creolisation, hybridity, and ethnogenesis (e.g. Silliman 2015; Voss 2015).

Harmen Nanningsz took with him to the West Indies, at the request of merchant Aelbert Cox, 2 barrels of brandy and copper graters (NL-GAR ONA 18 499 192, f. 240 [16460906]). The English however also produced “cassada-irons” to be sold to the Amerindians of the Upper Oyapock River as early as the 1630s, see Lorimer 1989: 318-321.



Figure 7 – Pyramidal or pointy calibrated flakes or rocks (unidentified raw material) found in a very large burial urn at the Amerindian site of Eva 2 (French Guiana). It is possible that these flakes have been inserted in a wooden plank and given to the deceased; however they may also represent the content of a *maraca* (photo by Sandrine Delpech).

However, this inference does not necessarily imply that early post-Columbian or pre-Columbian Amerindians did not grate their foodstuffs at all. They may also have inserted small flakes into grating sticks and/or ceramic platters as well as other grating devices. Grating and pounding did most certainly coexist and both activities have been applied in order to produce food. It is stressed here that the way of mashing boiled or dried tubers by means of pounding and/or grating may have changed in early post-Columbian times with the introduction of metal graters. Various 16th century descriptions of rather small graters are available, such as the ones presented by Jean de Léry regarding the Tupinamba of southeastern Brazil. The graters they used to make their *farinha* resembled the much smaller European nutmeg grater:

Premierement apres les avoir seicher au feu sur le boucan, tel que je le descriroy ailleurs, ou bien quelques fois les prenans toutes vertes, à force de les râper sur certaines petites pierres pointues, fischees & arrangees sur une piece de bois plate (toute ainsi que nous raclons & ratissons les fromages & noix muscades) elle les reduisent en farine, laquelle est aussi blanche que neige. (Léry 1578: 132)

First, after having dried them [tubers] on a smoking fire [*boucan*], as I will describe elsewhere, or sometimes taking them wholly green, by grating them on small pointy stones, arranged and stuck on a piece of flat wood (just as we grate cheese and nutmeg), they reduce them in flour which is as white as snow. (Translation by the author)

Interestingly, similar small graters are still observed in the Gran Chaco (Kamienkowski and Arenas 2017).

Concerning the Guianas, Hartsinck (1770: 24) pointed out that before colonization the Amerindians grated their tubers on pieces of wood—no size is given—into which small stones were inserted, known as *samarie* as well as rough stones.¹⁵ Another example is shown by the Anonyme de Carpentras in ca. 1620 as he observed among the *Callinago* of the Lesser Antilles who made a graters with small gunflint flakes, which were also a European introduction:

Le Pain de nos Indiens est fait de la racine cy dessus nommée Magnioc ou tierriet ne peut estre mise en oeuvre que par les femmes & filles de nos Indiens, ou par leurs captifs et captives, ce qu'ils font en cette sorte. Elles ratisent fort la racine avec un couteau ou coquille, qui est fort propre à cela, à celle fin de la despouiller de sa pelure, qui est quasi semblable et s'enlève comme celle d'un Cerisier. Apres ils la lavent fort et rasclent sur un ais qu'ils nomment Chimali, qui est d'environ 4 pieds de long et 2 de large, au milieu duquel il y a environ un pied & demy de petits cailloux à fuzil si bien enchassez qu'il est difficile de les retirer, et la dessus elles ratisent leur racine en cette posture. Elles dressent leur dit Chimali et mettent le bout d'enbas dans un petit baquet pour recueillir ce qui tombé de ratisé, et s'appuyent l'estomac sur lautre bout d'en haut en s'abaissant un petit ratisant apres avec les mains, Et ce qui tombe dans le susdit baquet est comme de la passe fort blanche à cause du suc qui est dans ladite racine qui est blanc comme lait. (Bibliothèque Inguimertine, Carpentras, ms. 590, f. 45; Anonyme de Carpentras 2013: 54)

The bread of our Indians is made of the tuber which is called as mentioned before *magniocou tierriet* and can only be worked by the women and girls of our Indians, or by their male and female captives what they do in the following way. They scrape the tubers really good with a knife or a shell which is rather appropriate to do so in order to get rid of its skin which resembles and is stripped in a similar way as cherry-wood. Then they wash them well and scrape them on a plank which they call *chimali*, which is about 4 feet long and 2 in width and in the middle of which there is about one foot and a half of small flint rocks so very well embedded that is would be difficult [f. 45v] to pull them out, and upon this [plank] they scrape their tubers in this position. They dress their said *chimali* and put the end down in a small bucket in order to collect what will fall down as grated matter, and push their stomach to the other, upper end and bend over a bit and grate with their hands. And what falls in the said bucket is just like flour [*passe*: sifted wheat?], really white because of the juice, which is inside the said tuber being as white as milk. (Translation by the author)

15. See also Quandt (1807: 189) and Kappler (1854, t. II: 41) who both noted that grater boards, or *simari*, were traded with the Macusi. At present, a grater is called *shumarli* (*chimali*?) in Makusi (Siravo 2009: 16). Ahlbrinck (1931: 423) suggests that *samariapo* is cedar wood (*Cedrela odorata*) in Kali'na.

It must be noted that the Anonyme de Carpentras (2013: 55) also observed ceramic griddles or *toucqué* among the Callinago.

Interestingly, Father Raymond Breton stated perhaps 20 years later that the *Callinago* also had wooden grater boards inserted with small stones and that the colonists used metal wheel-graters (Figure 8):

Grager veut autant dire, que moudre par deça : les moulins des sauvages sont des planches garnies de petites pierres pointuës, qui y sont enchassées, (parmy nous sont des râpes posees sur une planche, ou appliquées autour d'une rouë) apres le souper toutes femmes ratissent leur racines de magnoc, qui sont seulement necessaires pour le jour suivant [...] qu'elles lavent, gragent & reduisent en farine sur la râpe. (Breton 1665: 139)

Grager means as much as grinding it: the mills of the savages are planks furnished with small pointy stones which have been embedded (amongst us the graters are placed on a plank or fitted to a wheel [this is the Brazilian farinha mill also common in the Caribbean and the manioc mill is driven by water]). After supper all women only scrape the manioc tubers which are necessary for the next day [...] which they wash, grate and reduce into flour on a grater. (Translation by the author)

Furthermore, the Paris manuscript version (VP) of Father Breton's *Relation de l'Isle de Guadeloupe* (VP 1647, f. 17v) is very explicit when mentioning the usage of pierced copper plates for manioc grating whereas the Savages have inserted small stones in wooden planks:

On racle la petite escorce de cette racine, comme des naveaux, puis on gra^gge la racine sur une placque de cuivre percée. (Les sauvages se servent de gra^gges qu'ils font avec de petites pierres, qu'ils fichent dans une planchet.)

One scrapes the thin skin of this tuber, just as turnips, then one grates the tuber on a copper sheet which is perforated. (The savages [also] use graters which they



Figure 8 – Engraving of a man standing and grating manioc tubers (after Rochefort 1658: 88).

manufacture with small stones which they stick in a plank.) (Translation by the author)

Jean Goupy explains how the *Pirious* and *Ariannes* made their graters in French Guiana by the end of the 17th century, which is done in a similar fashion by the Wai Wai from Roraima (Brazil) and southern Guyana (see Howard 2001; Prous et al. 2009; Duarte-Talim 2015):

Les pirious et les Ariannes ocupent a faire des Grages pour la Magnoc laquelle se fait en prenant une planche de bois blanc longue de 2 a 3 pieds et large denviron un pied sur cette planche il y font de petits trous anlong avec la pointe d'un couteau ayant soin de laisser un bord large denviron un poulces des deux cotez et anhaut et anbas larges denviron demy pied sans y faire des trous et apres que ses trous sont faits ils prennent d'un Escorce d'arbres d'un certain bois rouge qu'ils font boüillir dan leaüe jusques que cet Eaue vienne gluante et espaises comme de la Colle apres quoy ils couchent leurs planches piquées anbas et jettent cette glüe dessus toute boüillante ce quy antre dans ses trous de pointe de Couteau ensuite ses Indiens prennent du Gravier qu'ils ramassent au bort de la Mer et dan chaqu'un de ces trous ils y an metten un grain qu'ils anfoncent avec une roche plus grosse quy leurs sert de Marteau ce qu'ils continuent ainsy a chaque trous si bien que quand cette Grage est faite elle ressemble a un rappe a sucre le[s]uelles grages durent assés mais lorsque ces petits cailloux viennent a tomber ils antrent dans la farine de Magnoc et quelques fois en mangeant la Cassave ils se trouvent sous les dents se quy fait de la paine cest les Indiennes quy font ses grages. (Bibliothèque municipale, Rouen, ms. 2336: 35)

The *Pirious* and *Ariannes* take care of the manufacturing of graters for manioc which are made by taking a wooden board made of white wood of 2 to 3 feet in length and about one foot in width. In this board they make small elongated holes [incisions] with the point of a knife and taking care to leave one thumb [inch] distance on the edge on both sides as well as on the upper and lower part of about half a foot without making any holes there. Once the holes have been made they take some sort of red wood tree bark that they boil down in water until this water becomes glutinous and thick as glue whereupon they put down their boards and put this glue on top of it still boiling which will find its way in the holes made with the point of a knife. Then the Indians take some grit, which they had found at the seaside, and put in each hole a grain which they drive deeper with a larger rock which serves them as a hammer what they will continue to do nicely in this manner for each hole until that when the grater is finished it will resemble a sugar grater [see Figure 6]. These graters are fairly sturdy but when these small stones start to fall out and enter the manioc flour, sometimes they end up in between your teeth when you eat some cassava which is painful. The female Indians make these graters. (Translation by the author)

In order to support the idea that grater boards were introduced by Europeans, their introduction shows a similar pattern in Africa. Once the Portuguese had discovered and settled in Brazil, they shipped maize

and manioc to their trading forts in Africa where the local populations started to produce and consume these new crops as well (Jones 1959; Gaulme 2003).¹⁶ Both bitter and sweet manioc must have been imported. The Africans peeled and boiled the sweet manioc tubers as they probably had learnt from the Portuguese who had copied it earlier from the Tupinamba. About 1620, the German Samuel Brun stated that the populations along the Slave Coast of western Africa: "... grow the tubers as big as the thickest part of the male leg, which they call *Casavy*, pound them and dry them in the sun, becoming as white as the best flour" (Brun 1913: 6).¹⁷ A few decades later, metal graters had been introduced and the local population started to prepare pulp of (bitter) manioc instead of boiled down (sweet manioc) tubers (ibid.: 62-63). On the island of São Thomé, for example, it is said that *mandihoka* flour is obtained just as in Brazil (Dapper 1668b: 77) whereas in the southern parts of Ethiopia a metal grater is used (Dapper 1668a: 601-602). In sum, these African examples confirm a preparation of manioc tubers as in Brazil and an introduction of metal graters about 1650 as is the case in the Guianas.

THE AMERINDIAN ORAL TRADITION

The introduction of metal tools is recounted in oral history among the (coastal) Amerindian population of the Guianas. As stated in the introduction, the *Kamuyune* showed how to grate manioc on metal graters instead of ceramic ones. The *Kamuyune* have eyes that shine like the sun and will blind you, perhaps referring to the glimmering copper graters. It reveals that the introduction of a metal tool, which existed in a local version, has received an important place in their oral tradition as it has modified their way of processing manioc tubers according to Palikur myth. The Palikur oral tradition also tells us that the *Sauyune* or "People of the Otter"—nowadays an extinct clan incorporated in the modern Palikur nation (Passes 2004)—introduced the metal grater to the Palikur (Grenand and Grenand 1987: 34, 40) which was subsequently integrated in oral history. From this indigenous perspective, it is perhaps somehow strange to Europeans that Amerindians—thus not Europeans—introduced iron tools to (other) Amerindians. This, however, was probably most often the case when Amerindians groups or leaders presented themselves as middlemen and traded between the indigenous hinterland and the European ships or merchants. Furthermore, in our example, we have to accept the presence of a powerful Palikur oral tradition which goes back at least 400 years.

16. For the arrival of maize in Africa, see also Marees 1617, f. 48r.

17. "Bey ihnen wachsen Wurtzeln so grosz, alsz eines Mannsbein am dicksten, welche wurtzen sie *Casavy* nennen, stampffen dieselbig, und dörren sie an der Sonnen, werden so weisz als das beste Mal."

When doing so, it is thought that the *Sauyune* represent the historic Yao population who, at the start of the 17th century, had settled at the mouth of the Oyapock River (Grenand 2006: 111). However, these Yao were refugees who had fled from the Island of Trinidad where they had been maltreated by the Spanish and their allies, the *Arawaccas* (Keymis 1968 [1596]; Mocquet 1617; Leigh 1906). Under command of their (war) leader *Anacaioury*, the Yao left Trinidad to get hold of the Lower Oyapock River and position themselves as the middlemen for the Europeans and the surrounding Amerindian groups (Bel and Collomb 2019). According to Harcourt (1906: 368), the latter were tributary to *Anacaioury* and shared a large network extending to the east and south. It is suggested here that, in addition to intrusion and warfare, *Anacaioury* occupied an important position among the local Amerindian groups because he controlled the trade with the English and Dutch (Figure 9, next page). In this manner, he introduced iron tools to the Amerindians in the Oyapock region.

FOOD FOR THOUGHT

It may be evident that manioc did not replace maize as we do not have sufficient archaeological data to support such a hypothesis, but maize certainly lost ground and possibly (cultural) importance during the course of the Colonial period. Despite this change, maize beverages were still consumed among the Kali'na of Suriname at the start of the 20th century:

Awasi ai-curu = Drank uit mais getrokken. Wanneer de mais goed uitgedroogd is in de zon, roept men de jongens en meisjes bijeen om in een 8-tal houten vijzels de maiskorrels fijn te stampen. De fijngestampte mais werpt men vervolgens in de boot [...]. Een kalabas "gekauwde" mais gaat er eveneens in als kamira (zie dit woord) [fermentation]. De boot wordt van water voorzien, vervolgens zorgvuldig toegedekt. Na een nacht gestaan te hebben wordt de drank gezeefd. De samaku, waarin men bij het zeven den drank opvangt, wordt wederom toegedekt. Na nog een nacht te hebben gestaan is de drank klaar (Ahlbrink 1931: 125; Farabee 1924: 20)

Awasi ai-curu = Beverage made of corn. When the corn has dried out well in the sun, the boys and girls are gathered to pound down the maize kernels in 8 wooden mortars. The pounded corn is thrown then in a boat [...]. A calabash of "chewn" maize is also added as kamira (see this word) [fermentation]. The boat is filled up with water and subsequently covered [with leaves]. After one night standing, the beverage is drained. The samaku in which one captures the beverage during sifting is again covered. After another night of fermentation the beverage is ready'. (Translation by the author)

The (slow) abandonment of maize in favor of manioc reflects the changes or adaptation to another

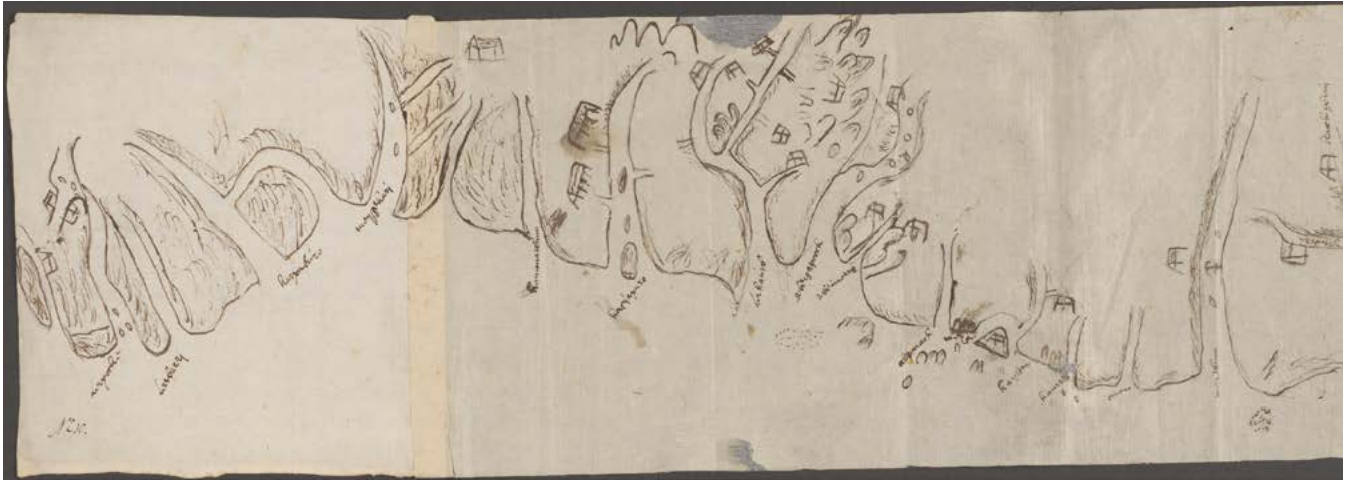


Figure 9 – Part of an anonymous Dutch manuscript map (ca. 1615) of the coast of the Guianas showing the Oyapock bay and hinterland where the *Arocouros* dwelled according to shipwrecked Dutchman Lourens Lourensz who was captured by them in 1618 (see Bel 2009).

The detail of these rivers shows undoubtedly that these rivers were regularly visited by the Dutch during the first decades of the 17th century; the houses probably indicate the Amerindian villages. Elsewhere in this map (see westward) Dutch names are written next the houses indicating the location of factors (NL-HaNA 4.VEL 652).
Courtesy of the Dutch National Archives.

socio-political situation in which identity and ethnogenesis plays an important role (Wilk 1999; Garth 2013). The apparent recent introduction of *couac* or *farinha* in French Guiana is therefore believed emblematic.¹⁸ The refugee Amerindians from the Lower Amazon River apparently introduced *couac* to the French colony of Cayenne towards the end of the 17th century (Barrère 1743: 55).¹⁹ Indeed, this manioc product reinforced the production and demand of manioc derived products, but it also diminished the daily importance of cassava, which now became restricted to beer fermentation and, in a lesser extent, the pepper pot or *kasilipo* in Cariban. On the other hand, *couac* rapidly obtained an important role as a side-dish to the daily dishes of the Creole, Maroon and Amerindian population.

There is general consensus that the Colonial Encounter in the Guianas provoked changes as to the Amerindian modes of agriculture and tending (Balée 2006; Denevan 2001, 2006). This cannot only be related to the economic demand of Europeans for specific types of nutrition but also to the subsequent introduction of iron

tools. The (coastal) Amerindians adapted their local production to the European demand of certain consumable goods, notably those made of manioc (cassava) and, to a much lesser extent, consumables consisting of maize. In addition to these technological advantages of iron tools, the cultivation of maize is (slowly) abandoned due to the reorganization of the early post-Columbian Amerindian socio-political situation from the second half of the 16th century on. The Spanish and their *Aruac* allies demanded victuals and slaves. The same applied later to the North Europeans and their Yao allies when they contested the existing Amerindian alliances together. As a result, many tribes fled from the “dangerous” colonial regions to settle elsewhere along the coast or to travel up the rivers and take refuge, as was the case in many areas of Amazonia (see Whitehead 1988; Clastres 2001; Monteiro 1999).

Continuous warfare, slave raids, and also religious missions from the second half of the 17th century onwards caused numerous groups—not being allies with the Europeans—to abandon their sedentary life style associated with maize agriculture and to adopt a nomadic or a far less sedentary life for which, I believe, the cultivation of manioc is more appropriate. A successful maize crop highly depends on human care (e.g. tending, irrigation, protection against animals and insects) whereas manioc needs relatively less attention. Aided by means of iron axes for more efficient agriculture, the Amerindians developed a more nomadic way of life, retreating from further European contact deeper into the forest, but now facing confrontations with resident Amerindian populations in these (still) remote areas (Figure 10).

Jesuit missionaries penetrated the colonial hinterlands by the late 17th century and hoarded numerous Amerindian groups in their missions, proselytizing and oppressing the indigenous population. By relocation, installing new social order, suppressing shamanic power and converting the population in these missions, indigenous cultures were altered, assimilated, and their populations gradually declined in the Guianas towards the end of 18th century due to disease (Whitehead 1988,

18. *Couac* or *farinha* is a manioc based product, historically a common staple food among the Tupi population of eastern Coastal Brazil (Léry 2008 [1992]: 238).

19. Because of Portuguese slave-raiding, many Amerindians (notably Aruã) left the mouth of the Amazon River and fled to Cayenne in search of French protection (see Hurault 1989, Chapters 4 and 5). It has to be added here that the Kali’na continued to produce cassava and only recently “switched” to *couac* (Gérard Collomb, pers. comm., 2014).

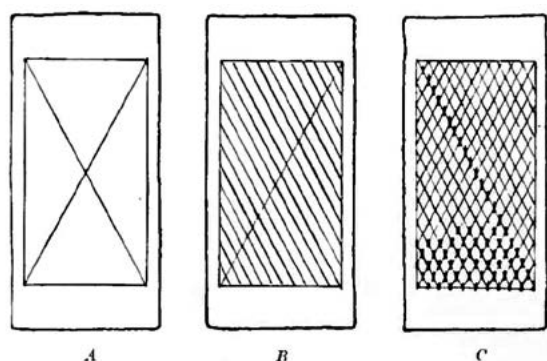


Figure 10 – Three phases of fabrication of a Taruma grater board according to Walter Roth (1924: 278, fig. 84).

1993, 1999; Collomb and Tiouka 2000; Carlin and Boven 2002; Collomb 2011; Santos-Granero 2011).

Despite many Jesuit missions, the Amerindians still continued to live without Christianity, according to the manuscript of La Croix in the late 18th century, expressing a slightly romantic image of this “pitiful” population:

A l'égard de la religion, ils n'en ont aucune, leur âme est enveloppée du voile de l'idolâtrie la plus bornée. Les tentatives qui ont été faites sur ces peuples sauvages par un nombre infini de Jésuites missionnaires, pour tâcher de leur insinuer des sentiments chrétiens ont été vaines et infructueuses jusqu'à présent. Les Indiens les plus susceptibles de comprendre ce qu'on leur objectait à propos du christianisme ne purent jamais se décider à adopter des maximes qui exigeaient d'eux le sacrifice de leurs passions et souvent même de leurs besoins, le pardon des injures, l'amour pour leurs ennemis, et qui leur étaient proposées par des hommes avides de leurs biens, plus occupés à les asservir, à les immoler à leur avarice, qu'à les éclairer et les convertir. D'ailleurs leur attachement pour un genre de vie facile, qui répond à leur indolence, leurs goûts et surtout leur peu d'intelligence et de pénétration, offrent encore des obstacles aussi considérables pour les convaincre des vérités de notre religion. Comme ils ne réfléchissent point et que leur indolence les rend peu susceptibles d'admiration, leur cœur et leur esprit indifférents et tranquilles jouissent des merveilles qu'offre le spectacle de la nature sans émotion, sans y donner même aucune attention. (Marcel 1904: 142-143)

With regard to religion, they have none; their soul is wrapped in the veil of idolatry of the worst kind. The efforts which have been made by an infinite number of Jesuits missionaries in order to try to slip into their savage minds some Christian feelings have been vain and unsuccessful up until this moment. The Indians most liable to understand what was asked of them regarding Christianity were never decide to adopt the sayings which required from them the sacrifice of their passion and most often even their needs, the forgiving of insults, the love for their enemies, which were offered by men hungering for their belongings, and taking more care to enslave them, to strike them down in their greed rather than to enlighten or convert them. Moreover, their fondness for some sort of easy

life, which corresponds to their idleness, their taste and most of all their general lack of intelligence and insight, still provide such considerable obstacles in order to convince them of the truth of our religion. As they do not reflect at all, and because their indolence makes them less sensible to appreciation, their indifferent and quiet heart and spirit enjoy wonders which are shown by the concert of nature without emotion, without even giving it any attention. (Translation by the author)

In general, it can be said that changes in the socio-political systems, hierarchy, trading networks, caused by the above-mentioned factors reduced the large scale (inter-regional) feasts and food consumption to a smaller village—or even to family-level. For example, maize is often related to (specific) ceremonial activities which may have been abandoned during Colonial Times, as is illustrated for example by the Xavante of Brazil:

An interesting aspect of Xavante use of maize is that this, perhaps the most completely domesticated of all crops, was the primary food during periods of aggregation when its symbolic role was to reinforce the solidarity of the community through ceremonial redistribution. In contrast, tubers which are found in wild, domesticated, and semi-domesticated forms, were their staple during periods of nomadism. (Flowers 1994: 254)

These changes fostered new identities, thus creating a firm base for ethnogenesis in the Guianas as we know it today (Whitehead 1996; Dietler 1996; Hastorf 2006; Collomb and Dupuy 2009).

CONCLUSION

The early historic sources of the Caribbean and the Guianas clearly show that manioc was pounded or pulverized with rough rocks and not grated on wooden boards. This stone grater was replaced by a metal grater introduced by the Europeans. It is proposed here that the Portuguese had introduced the copper grater in Brazil to produce *farinha* on a large scale which was subsequently copied by the Dutch in the 1630s who exported this development to the Guianas along with other iron tools. Thus, Amerindians continued to produce and consume cassava, albeit with metal tools such as graters, knives, and griddles.

This innovation might have favored manioc over maize as a staple product which had slowly been losing consumption due to various factors, such as the European demand for cassava, the convenience of iron graters, a general dependence on iron tools, a decreasing demography, and adaptation to a more nomadic life style of smaller groups. The production of manioc is believed more suitable than maize for these nomadic populations²⁰.

20. Today, manioc production is ‘urbanized’, shifting from the forest to villages and towns in the Rio Negro River Basin and elsewhere in Amazonia (Empeaire and Eloy 2014).

Finally, the author wants to point out that this manioc *versus* maize debate obscures the question of what other crops were consumed by pre-Columbian indigenous groups, along with their means of production and mode of preparation. The archaeological presence of ancient starch grains in different tools such as (sweet) potatoes, beans, and all kinds of rhizomes reveals a wide variety of starchy food which is either presently unknown, less important to these populations, or might have been abandoned by the Guiana Amerindians today, potentially revealing a great diversity in pre-Columbian diets than currently assumed.

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