BETEL MANIA, FROM CULTURE TO CANCER: DIGESTIVE AND DISCURSIVE USES OF THE BETEL NUT *(ARECA CATECHU)* IN GUAM

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Chewed in the Marianas for centuries, *pugua,* known scientifically as *Areca catechu* and colloquially as betel nut, is the world's fourth most commonly used psychoactive substance after tobacco, alcohol, and caffeine-containing beverages. It has and continues to serve numerous cultural, social, political, medicinal, and economic purposes. At the same time, health concerns are mounting against *pugua* due to its classification as a carcinogen by the World Health Organization, as well as to high rates of cancer among Chamorros and to federal research funds that promote an antichewing agenda. This paper uses a range of sources to examine the historical use of *pugua* on the island, specifically reflecting upon tensions of race, class, and culture as they play out in twenty-first century Guam.

Introduction

My grandmother, Maria Uncangco Leon Guerrero Perez, died was I was eight years old, and I don't have many memories of her. The most richly detailed one involves betel nut—referred to as *pugua* by Chamorros and scientifically classified as *Areca catechu*. The year was 1969, and my grandparents were preparing for a trip to the United States, a trip that included me and my cousin Geraldine. Traveling to the mainland was a big deal, especially in the nineteen sixties, when air travel was still uncommon among Chamorros. It was a huge production, a chance to meet with the diasporic Chamorro relatives scattered around a variety of American bases in places like Vallejo and Long Beach, California.

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The night before our departure, the scene played out with my nana, my mother (Fermina Perez Hattori), and my aunties Lole' (*si difuntan* Dolores Leon Guerrero Francisco), Chai (*si difuntan* Rosita Leon Guerrero Jesus), Winnie (*si difuntan* Winnifrieda Perez Quintanilla), Cathy (Catherine Perez Emmi), and Mona (Ramona Perez Cruz). Sitting around the dinner table, they laboriously prepared a sack of *pugua* for travel. It was painstaking, unpleasant work, requiring them to husk the rock-hard nuts, split them in half, and wrap the individual pieces in aluminum foil. The betel nut scissors, *tiheras pugua,* are not easy to use, and the arthritic hands of Nana and my older aunts struggled to make it through the sack.

They laughed about what they were doing, joking that by the time we arrived in California, the *pugua* pieces would already be withered and hardened. Within just a day, those rock-hard slices would be the pieces that folks at home would throw into the trash, bearing little resemblance to the flavorsome nuts that the Chamorros on Guam chewed. Yet to their California recipients, those little nuggets may as well have been made of gold. They had the magiclike ability to transport people to a different place and a different time—to their island, their village, or their ranch or to a wedding, political rally, or family meal.

Days later, as my California aunties and uncles put the *pugua* into their mouths, I watched as they closed their eyes and slowly and patiently sucked on the pieces to nurse them back to life, using their saliva to remoisten them, using their mouth's muscles to extract some flavor out of them. Later in life, I came to realize that in those moments, the hardened remnants of *pugua* represented home, family, and friendship. They were markers of hospitality and vessels of reciprocity. *Pugua* inspired bittersweet tears of joy and pain, each morsel bringing home to the homesick.

This paper examines the story of the betel nut as it interacts with its human consumers, showing it to be a rich conveyer of numerous cultural and social concerns on Guam for at least the past 400 years. The nut has played a starring role in Chamorro cultural dynamics and family interrelationships for centuries, and over the course of the island's long colonial history, its treatment has revealed tensions of class status and cultural identity, particularly in the face of rampant Americanization. In recent times, *pugua* has become ensnared in contemporary racial tensions as the numbers of chewers from beyond our shores increasingly immigrate to Guam. Furthermore, this small nut has become the featured subject of a bevy of studies by international researchers in the sciences and social sciences, leading to its 2003 identification by the World Health Organization (WHO) as a substance cancerous to humans (International Agency for Research on Cancer [IARC] 2003). Subsequently, the University of Guam (UOG) formed a Cancer Research Center (CRC) in partnership with the University of Hawai'i and immediately

began funding betel nut–related projects. Millions of US federal tax dollars have been dedicated to *pugua,* climaxing with feasibility studies aimed at creating *pugua* cessation programs to steer the island's chewers away from the nut. This paper explores the power of *pugua* to transcend its nutritional value as a carrier of proteins, fats, and carbohydrates and convey stories of Guam's past, present, and future. *Pugua* here serves as a lens through which a variety of Chamorro cultural, social, and biomedical issues can be viewed and understood.

Telling the History of a Nut

This research situates the consumption of *pugua* as a special, social act that activates a variety of specific cultural and historical contexts and meanings. It owes much to a growing body of scholars who have trenchantly demonstrated that nature's products can tell important stories in history. Transcending their value as simple objects for human consumption, items grown naturally, such as foods, drinks, spices, and drugs, contain the power to convey histories of people and events from ancient to modern times. Food scholarship has proliferated over the past four decades, encompassing nearly every consumable imaginable and, as expressed by Ken Albala, demonstrating the potency of a "combination of food and history" (2009, 7). On its heels are histories and anthropologies of psychoactive substances, similarly demonstrating that an exploration of items labeled as drugs can fruitfully open windows into cultural, political, and social life.

Sidney W. Mintz's seminal *Sweetness and Power* (1985), for example, emphasizes the importance of substantiating the "many local, particular, and distinctive meanings" of items such as sugar, cakes, puddings, and other consumables throughout the course of human history (172). He reminds us that ingestibles have particular, local meanings, as well as broader, global consequences. Similarly, Wolfgang Schivelbusch's *Tastes of Paradise* (1993) demonstrates that since the fifteen hundreds, even items consumed purely for pleasure, including spices, sugar, coffee, chocolate, tea, tobacco, and opium, have taken turns driving the course of foreign trade. Tom Standage's *History of the World in 6 Glasses* (2005) likewise assesses the history of beverages, including beer, wine, coffee, and tea, to assert that specific drinks have influenced the course of history in unexpected ways. More than simply participants in a range of cultural rites throughout the course of human history, foods and beverages have participated in the constitution of class and culture.

As with foods and beverages, researchers exploring the cultural history of a range of psychoactive substances have demonstrated their fluidity and significance in history as natural products and as items whose uses have been subject

to culturally constructed notions of propriety and legality. In Thomas Maroukis's treatment of peyote, for example, he argues that its spread in the early eighteen hundreds from Mesoamerica into what is now Texas and Oklahoma and across the southern and northern Plains was met with opposition by both government and nongovernmental agencies, believing it threatened their joint "'civilizing' and Christianizing agendas" (2013, 162). Even more broadly, Andrew Sherratt argues that psychoactive substances ought to be considered "not so much a category in themselves" but alongside foods and other consumer goods that provide insight into a range of social activities (Goodman, Lovejoy, and Sherratt 2007, 7). In their edited volume *Consuming Habits* (2007), Goodman, Lovejoy, and Sherratt aggressively assert that "no ethnographic or culture-historic account is complete" without consideration of the ways in which psychoactive substances such as betel nut and kava are integral to the constitution of culture, the nature of sociality, and the construction of religious experience, gender categories, and rituals of social life (230). As the only psychoactive substance known to the Chamorro people before colonization, and as a major participant in both daily and ritual activities, *pugua* is poised to guide us closer to an understanding of Guam's past and present.

International Areca

The IARC, a branch of the WHO, urges disuse of the term "betel" in favor of "areca," maintaining that the wording "has caused considerable confusion in the scientific literature and should be avoided" (2004, 42). The areca nut is the seed of the fruit of the *Areca catechu* tree, a member of the palm family within which there are more than 50 species of *Areca* and several botanical varieties. *Areca catechu* thrives in "tropical everwet climates" and adapts to a "wide range of soil types," thus finding wide distribution in East Africa, on the Arabian Peninsula, across tropical Asia, and in the Pacific Islands (Staples and Bevacqua 2006, 4). The botanical misnomer "betel" has been misused by people throughout the world for centuries, caused by the areca nut's enduring association with the betel pepper vine, *Piper betle,* whose leaves serve as the wrapper when preparing a package for chewing.

The chewing package, referred to as the quid, varies significantly from one place to another and even from one person to another. The areca nut can be eaten young and soft or mature and hard. Some people eat it raw, while others dry or cure the nut. A variety of ingredients may be added to the chewing quid, including slaked lime, tobacco, cardamom, cloves, freshly grated coconut, ginger, turmeric, saffron, cumin, coriander, nutmeg, and cinnamon (Reichart and Philipsen 1996, 18). In much of South Asia, for example, the quid features a cured or dried mature nut with a variety of spices, while Pacific Islanders

tend to chew raw nuts, either young or mature, topped by slaked lime and all wrapped in the *Piper betle* leaf.

The WHO estimates that 600 million people around the world chew the areca nut, making it the world's fourth most commonly used psychoactive substance, after tobacco, alcohol, and caffeine-containing beverages, and even more popular than chewing gum (IARC 2004, 33). Archaeological evidence of areca nut chewing dates back to more than 3,000 years at a Neolithic village site in Southern Vietnam. At Nui Nap in Thanh Hoa province, archaeological examinations of human remains reveal both residue of the nuts and teeth stained by prolonged chewing (Oxenham et al. 2002, 909). The oldest written mention of betel nut dates from 504 BC in a description of a princess of Ceylon making a gift of betel to her nurse, as recorded in the *Mahawamsa,* a register of events in Ceylon written in Pali (IARC 2004, 33). Accounts by some of the great early travelers such as Marco Polo in 1298 and Ibn Battuta in the thirteen hundreds show the extent and significance of areca in India, as well as in Arabia, Yemen, Oman, and East Africa.

Numerically, most of the world's chewers are from the heavily populated region of South Asia, including India, Pakistan, Bangladesh, and Sri Lanka, where the habit is described as ubiquitous, although countrywide surveys have not been conducted. Large numbers of chewers can also be found in China's Hunan Province (IARC 2004: 63–64), as well as in Taiwan, where an estimated 10 percent of its 2 million population chews, although among the indigenous Taiwanese, the percentage rises to 42 percent (Gupta and Warnakulasuriya 2002, 81). Chewing is also prolific throughout Southeast Asia, from which the WHO believes the plant may have originated, specifically in Malaysia, although the habit appears to be on the decline in Thailand and Cambodia, as well as in Indonesia, according to an East Java study published in 2001 (quoted in IARC 2004, 70). The widespread Indian diaspora has transported the areca nut to parts of Africa—especially South Africa, Tanzania, Uganda, and Kenya—as well as England, Australia, and Canada, where much of the leading biomedical research is being conducted on the topic.

In the Western Pacific, *Areca catechu* is believed to be native to Melanesia, and chewing is widespread, particularly in the Solomon Islands, northern Vanuatu, and Papua New Guinea's coastal villages, where the nuts are grown (IARC 2004, 71). Within the northwestern Pacific, natives of Palau, Yap, and the Mariana Islands have long chewed the areca nut. In the Republic of Palau, research data demonstrate that betel chewing is truly a ubiquitous habit. Among both men and women, a 1988 survey conducted of thirty-one Palauans more than ninety years of age found that all of them had regularly chewed *Areca* in their lifetime, although three had quit (IARC 2004, 72). The most recent islandwide survey of Palau, conducted by the government's Office of

Planning and Statistics, reports that 76 percent of its islanders chew, including 55 percent in the 5- to 14-year-old age bracket. The Palau survey also found that 86 percent of all chewers added tobacco to their quid (Republic of Palau Office of Planning and Statistics 1995, 5). Although surveys have not been conducted in Yap, anecdotal evidence suggests that the chewing habits there likely mirror those in Palau. Furthermore, as Palauan, Yapese, and Chamorro chewers interact with increasing numbers of other Micronesians, particularly from Chuuk, Pohnpei, and the Marshall Islands, the habit is spreading to islands where the habit was not indigenous. WHO evidence shows "that the frequency of betel nut use is increasing in the Western Pacific Region and that its use is more frequently associated with the chewing of tobacco" (WHO 2012, 7).

Classified as a stimulant, the physical effects of areca nut chewing include skin warmth, with temperature increases of 0.5°C–2.0°C, as well as palpitations, sweating, and facial flushing. Novice chewers report such symptoms, while frequent users have "reported the development of tolerance to its effects" (IARC 2004, 173). The major constituents of the areca nut are carbohydrates, fats, proteins, crude fiber, polyphenols (flavonols and tannins), and alkaloids (IARC 2004: 55–56). While polyphenols are responsible for the astringency and bitterness, the alkaloids within the areca nut are of the most biological and chemical interest due to their psychoactive effects. Specifically, among the five or so alkaloids present in areca nuts, arecoline features prominently in scientific studies due to its "cholinergic effects (enhanced effects of the parasympathetic nervous system) and anthelmintic effects (expulsion of parasitic worms)" (Paulino et al. 2011, 20).

The IARC reports rare episodes of areca nut psychosis, altered states of consciousness, and intoxication (2004, 173). As quoted in one psychiatric study, "Generally speaking, betel nut produces very little significant emotional change" (Cawte 1985, 84). In anthropologist Mac Marshall's study of drugs in Oceania, he likens areca chewing to coffee or tea drinking in the West. Describing it as "a mundane, widely shared substance," Marshall identified it as a substance that "stimulates social activity, suppresses boredom, enhances work, increases personal enjoyment, and symbolizes friendly, peaceful social relations" (2004, 201).

Chewers self-describe a variety of physical, at times conflicting, effects. Some, for example, report that it relaxes and soothes them, while others say it reenergizes them. Commonly, chewers proclaim its benefits as an appetite suppressant, as a breath freshener, and as an aid to alleviate stomachaches and headaches (Paulino et al. 2011: 22–23). In countries across Asia and the Pacific, areca has been used to treat dysentery, tapeworms, rheumatism, and arthritis, to name a few issues. Positive health benefits have also been reported in numerous

dental studies, showing that areca chewers have fewer dental cavities than nonchewers as the "fibrous substance acts as a cleansing agent" (Hornung 1930, 73). This finding has been replicated in archaeological studies of areca-stained teeth that report few cavities among ancient areca nut chewers (Leigh 1929, 15; Gerry, Smith, and Carlton 1952, 19; Pietrusewsky et al. 1986, 6; Haddock 2010, 177). Yet despite its numerous medicinal and hygienic uses across the Pacific and Asia, a 2009 study reported, "Few health benefits of betel nut chewing have been described in the literature" (Paulino 2009, 4). Rather, in a bevy of scientific studies, areca has been predominantly associated with a battery of negative health consequences, including asthma, diabetes, obesity, hypertension, and cardiovascular disease.

Undoubtedly, the predominant focus of disease due to areca nut chewing has been the human mouth. Chewers have been reported to experience higher incidences of a range of periodontal problems and diseases, ranging from severe tooth wear, particularly degrading the enamel covering, to oral submucous fibrosis and oral cancer. The IARC has noted the difficulties in interpreting dental studies due to "confounding variables such as the level of oral hygiene, dietary factors, general health and dental status, and especially tobacco smoking, which may have a significant influence on periodontal status" (IARC 2004, 174). Despite these analytical challenges, amid a plethora of intertwined factors, the IARC declared, "A growing body of evidence over the last five decades from epidemiological and experimental studies has shown that areca nut, *even when consumed in the absence of tobacco or slaked lime,* may have potentially harmful effects on the oral cavity" (IARC 2004, 173, emphasis added).

For the past few decades, chewing on Guam has been on the decline among Chamorros, as well as among the island population at large, according to data available in the annual Behavioral Risk Factor Surveillance System surveys. While the 1991 survey reported that 26 percent of Guam's Chamorro population chewed, by 2007 the figure had dropped to 24 percent, although 44 percent reported that they had chewed at some point in their lives (quoted in Paulino 2009, 11). By 2010, the percentage of Chamorro chewers had decreased to 16.6 percent, while on an islandwide level, chewing among the 657 people surveyed was reported at 10.6 percent At the same time, while numbers of Chamorro chewers on Guam decreased from 24 percent in 2007 to 16.6 percent in 2010, chewing among other Micronesian residents on the island increased from 23.6 percent in 2007 to 28.9 percent in 2010 (Government of Guam Department of Public Health and Social Services 2010, 1; A. Uncangco, pers comm.). Statistical trends point to some of Guam's shifting social and cultural dynamics, as the *pugua* chewing populations on Guam become increasingly numbered by non-Chamorros, raising issues that will be addressed later in this paper.

Areca catechu on Guam

In the Mariana Islands, areca nuts are grouped into two cultivars, red *(ugam)* and white *(changnga)* with the mature *ugam* nuts being, by far, the more popular among Chamorro chewers. Research by Guam's leading *pugua* scholar, Yvette Paulino, documents that 91.0 percent of Chamorro chewers opt only for *ugam,* while an additional 5.1 percent chew both varieties. Fewer than 4 percent of her study group expressed a preference for the white *changnga* (Paulino et al. 2014, 4). For much of Guam's history, the typical chewing quid, or *mama'on,* was composed of pieces of the husked nut, topped with a small quantity of slaked lime *(åfok)* and wrapped in the *Piper betle* leaf *(pupulu)* (Cunningham 1992, 141). Explorers' accounts from the fifteen hundreds onward repetitively describe the three-ingredient quid. Contemporarily, however, inclusion of lime in the quid has all but disappeared among Chamorro *ugam* chewers. When and why the use of lime diminished is unclear, the earliest survey documenting its disuse dating to 1986 (quoted in IARC 2004, 73). More recent investigations posit that only 3.8 percent continue the *åfok* practice (Paulino et al. 2014, 5).

While tobacco is a common ingredient of the quid in the wider region of Micronesia, Chamorros rarely add it and have not generally done so throughout history. In 1819, for instance, French explorer Louis Claude de Freycinet wrote that tobacco was not an ingredient in the Chamorro quid but was instead popularly consumed in cigar form (Freycinet 2004, 118). He observed:

> …*betel* is an object of prime necessity on the Marianas, where that masticatory is made of nothing more complex than palm kernel, *betel* pepper leaves, and a touch of lime. Tobacco, which was only recently introduced to the Marianas, was never an ingredient and is not now. It is in connection with cigars that the tobacco plant has become very fashionable and popular. (118)

This observation was repeated in 1899 by US Navy officer William Safford, who wrote that although nearly every family on the island has a tobacco patch, the ingredient was not added to the basic nut, lime, and leaf chewing quid (1903, 8).

The inclusion of tobacco is noted in a song penned sometime in the nineteen fifties or nineteen sixties by the late Clotilde Castro Gould. In her *Manbiha na Tiempo* (The Old Lady's Time), she writes:

> *I mambiha na tiempo mamboka mama'on*
> *Mana'dana I afok, amaska yan hagon*
> *Yanggen mahulat mangangas pues siempre mafa'on*

Machuli'i i mattiyu ha hagu mafa'on
Ti sina un sangani ni uno na lachi.

Translation:
In the old lady's time, they ate areca nut
They mix lime, tobacco, and betel leaf
When they can't chew it, then they'll pound it
Take the hammer and you break it.
You can't tell them they are wrong. (Gould n.d., 44)

Gould's nineteen fifties and nineteen sixties reference to elderly women adding tobacco to their quid correlates with visiting American anthropologist Laura Thompson's observation in 1939 that "Occasionally a piece of tobacco leaf is added to the quid, a recent innovation to give more punch" (1941, 26). US Navy dentist Roger G. Gerry and colleagues likewise conveyed in 1952 that "older users will sometimes also add some tobacco to the quid for additional flavoring" (Gerry, Smith, and Carlton 1952, 8). Surveys in recent decades have found rates of tobacco inclusion by Chamorros ranging from 5.9 percent in a 1993 survey of 402 chewers to a high of 38.8 percent, found in a 2014 survey of 300 self-identified chewers (Jarvis, Wood, and Bachtold 1993, 8; Herzog 2014, 154). However, these 2014 data are highly suspect, even based strictly on observation of Chamorro chewing practices. The small sample size (n = 300) is perhaps responsible, and perhaps the author's failure to separate Guam's Chamorros from those of the Northern Mariana Islands, where chewing the young nut with lime and tobacco is the norm, could explain the irreconcilably high figure.

Paleoenvironmental data collected in Guam's Orote Peninsula area establishes that *Areca catechu* was an indigenous plant, present in early Holocene deposits, after the Ice Age but before human settlement (Athens and Ward 1995, 205). Archaeologist Nicolette Parr's recent work, however, suggests that *pugua* chewing was not yet a common activity among prelatte Chamorros—that is, those who lived before the innovation of megalithic latte stones on Guam. Her archaeological studies from the Naton Beach site, dating from AD 590 to AD 1000, showed only 3 percent of the studied human remains exhibiting betel stains (6 percent adult males and 3 percent adult females), compared to 66 percent who lived in the latte period (Parr 2012). Parr's findings corroborate archaeologist Mike Pietrusewsky and colleagues' study of an ancient burial site that included a population of 28 prelatte individuals, among whom none of the teeth are stained (1986, 9). Their pronouncement of prelatte Chamorros as nonchewers was put forward cautiously, with the researchers writing that the "conclusions reached are tentative given the small samples involved" (14).

Excavations of latte era sites, however, consistently demonstrate high rates of *pugua*-stained teeth. Dental analyses thus affirmatively date the consumption of *pugua* to at least 1,500 years ago; human skeletal remains show almost universal *pugua* staining of teeth among both males and females, from teens through adults. Leigh's 1929 study of 106 Chamorro remains held in the Bishop Museum's Hornbostel Collection reports that all adult females had areca-stained teeth, while all but six adult males were unstained (Leigh 1929, 13). Similarly, Pietrusewsky and colleagues' study of 54 human remains found at two sites in Tumon village discovered that almost all examined teeth revealed betel staining (1986: 6, 12).

Thus, both archaeological evidence and written sources affirm that by the time of contact with European voyagers in the fifteen hundreds, *pugua* had become an indelible part of the daily life of the Chamorros. Moreover, the resultant staining of the teeth was regarded as a sign of beauty on Guam, as indicated in written accounts over a 400-year span. One priest commented in the sixteen hundreds of teeth staining that "they think it makes them beautiful, or majestic," while another in the seventeen hundreds wrote, "As regards their beauty, of which they are very proud, their ideas different much from those of European ladies; for to them beauty consists in black teeth" (Coomans 1997, 9; Delgado 1912, 1). In 1850, more than a century into Spanish colonial rule, a visiting whaler expressed, "The young Ladrone beauty prides herself as much on the bright-red appearance of her teeth as the American ladies do on the pearly whiteness of theirs," while a 1925 American naval dentist wrote, "The Chamorro is far from reluctant to display his share of black concretions and the ability to exhibit a row of dirty-looking black teeth seems to be regarded as a mark of real accomplishment" (*Guam Recorder* 1921, 3; Wells 1925, 437). The popularity of stained teeth on Guam finds parallels in the rest of the areca-chewing world, illustrated by the nineteenth century example of Thai dentists producing sets of black false teeth (Rooney 1993, 28).

The most extensive archival descriptions of areca-chewing practices among the Chamorro people come from the 1819 account of French explorer Freycinet. Describing *pugua* as "an object of prime necessity in the Marianas," he documents its social function in everyday life, as well as its ceremonial role in festivities surrounding birth, death, and, perhaps most prominently, marriage (2004: 137–38). As Freycinet documented,

> As soon as a marriage union was planned, the mother of the would be bride-groom or, in case of need, his grandmother or closest female relation, would arm herself with a box for *betel (saluu)* and pay a visit to the mother of the girl he had in view. On arrival, she would hasten to offer some of the *betel* she had purposely brought with her, before the

> hostess had time to offer her any of the usual *betel*. By starting her visit in this particular way, she immediately gave her hostess to understand that a marriage was to be discussed. (2004: 137–38)

By initiating the social call in this particular way, flagrantly forestalling the hosts who would ordinarily provide the areca and its accompanying condiments, a formal betrothal would be initiated. Furthermore, by accepting the *pugua* offering, the bride's family signified their endorsement of the marriage proposal.

In addition to its pivotal role in marriage ceremonies, the areca nut has long been associated with peace and peaceability, because sharing *pugua* requires a level of mutual amity and camaraderie. Freycinet's 1819 account reproduces a chant sung at the end of war "in the course of festivities held specifically to mark the return of peace" (2004, 145). The first verse of this chant reads (2004, 146):

Hasngon, gof-dja pala-uan ho,	Deliberately, beautiful woman of mine
Nga ho saddi, gui mina-ho	You sit on my lap, in my presence
Ho sunni ngo mamaon	I inflame (your desire) with (a wad of) betel,
Ngo plupludjon djan puguaon.	With a betel leaf and (crushed) areca nut.

This chant of peace reads like a courtship verse, implying perhaps that the end of war opens the doors for the start of different kinds of pursuits. In one of its multiple meanings across Asia and the Pacific, the areca nut is connected with romance and seduction. Anthony Reid, for example, has noted that in Southeast Asia, placing the nut, the lime, and other ingredients in a delicately rolled betel leaf was one of the intimate services a woman could perform for a man (1988, 44).

The areca nut and betel leaf also serve a number of functions in the medicine chest of traditional Chamorro healers. For example, the betel leaf and nut are boiled to make a tea for infants with sore mouths or diarrhea due to teething, and the boiled juice from the young green nut can be used to treat vomiting (Haddock 2010, 207). In the panoply of remedies made and used by traditional healer *Suruhåna* Tan Carido Ogo Kiyoshi, *Åmot Påchot* (mouth medicine) is made by "pounding the young noni fruit that has flowers and the *ugam* (red) betel nut and then apply it to the mouth" (Inetnon Amot Natibu 2009, 244). *Suruhåna* Aguida Pangelinan Sablan, as well as *Suruhåna* Trinidad "Daling" Pinaula Magofña, use *pugua*—both the leaf of the plant and the *ugam* nut—as ingredients in their *Åmot Såggue,* boiling it with leaves from the *dågu* (yam), *nika* (wild yam), and *pågu* (red or yellow wild hibiscus) trees and then imbibing it as a medicinal tea (Inetnon Amot Natibu 2009: 441–42, 253).

This sketch of betel nut use provides a glimpse into a society that, over the past 1,500 years, viewed *pugua* chewing as a positive activity, associating it with a range of emotions and occasions. It has been present during historical episodes of socialization, romance, beauty, seduction, and marriage and at births and deaths, political gatherings, and religious feasts. Implemented as an herbal medicine, *pugua* takes its place in the repertoire of traditional healers and has served as a vessel of peacemaking and conflict resolution. *Pugua* serves as a vehicle of *inafa'maolek,* the Chamorro philosophy that prioritizes group harmony and reciprocity. In its versatility and easy portability, *pugua* opens doors to hospitality among strangers as much as among family and friends, breaking the ice and slowing the pace so that social interactions can occur.

Ultimately, *Areca catechu* serves a plethora of purposes, many of them unique to the particular chewer or to the particular occasion. Contemporary studies of Guam's Chamorro chewers show a diverse range of reasons for chewing, aligned with factors identified in the global chewing community: some flocking to the nut to relieve tension and stress, others using it to suppress their appetite, some chewing to freshen their breath or cure stomachaches and headaches, and others using it to bond socially with other chewers (Paulino 2009: 66–68). Yet on Guam, while the percentage of Chamorro chewers declines, the meanings for its chewers appear to be expanding. As members of the chant group Fanlalai'an expressed to me, *pugua* reinforces their sense of being Chamorro, their uniqueness as indigenous people, and their self-conscious perpetuation of cultural traditions (J. Cepeda, G. Ecla, and J. Pangelinan, pers. comm.). Respondents to other studies have echoed these sentiments, proclaiming that chewing relates to "keeping the culture alive" and practicing "the Chamorro custom of inafa'maolek, or caring for one another" (Paulino et al. 2011, 23; Sablan 2016a, 1). In its twenty-first century incarnations, *pugua* has expanded to become a modern marker of Chamorro cultural identity.

Class, Race, and *Pugua*

Declining patterns of *pugua* use among Chamorros on Guam, accompanied by rising use among Micronesian immigrants living on the island, point to a complex history that is informed by a variety of entangled considerations. Among Chamorros, its decline can be traced in written accounts to the latter half of the twentieth century, although disparaging remarks by colonial officials since the sixteen hundreds convey a general Euro-American disdain for the custom. Little evidence exists of Spanish attempts to subvert the practice through their seventeenth to nineteenth centuries of colonial rule, but from the earliest years of the twentieth century, US Navy officials expressed opposition to the practice. Even Safford, who served essentially as the de facto governor

upon the navy's arrival on the island in 1899 and who is generally admired in Guam's historiography for his cultural sensitivity, wrote of the *pugua* practice, "it discolors the teeth in time and causes them to crumble away, while the constant expectoration of saliva, red like blood, is a disagreeable habit" (1903, 8). The charge against *pugua* chewing among the Chamorros was part of a broader effort to Americanize the natives. Within the continental United States, assimilation programs instructed immigrants on personal grooming and hygiene so that by "linking the toothbrush to patriotism, Americanizers clearly demonstrated that becoming American involved a total makeover of personal habits" (Hoy 1995, 89). On Guam, in the broader context of a new colonial regime and its aggressive campaign for Chamorro assimilation into American social and cultural norms, the physical appearance of their teeth, fingernails, and other body parts became markers of progress and modernity (Hattori 2004: 183, 186).

By 1911, the US Navy's Health Department joined forces with the Department of Education to collectively address Chamorro notions of hygiene. Medical officer C. P. Kindleberger announced in April 1911 that an elementary course in hygiene would thereafter become integrated into classroom instruction in the island's schools (1913, 87). These included lessons on bathing and toothbrushing, with Kindleberger stating that "nearly 60 per cent of the natives are very dirty in their habits, … usually eat with their fingers from a common dish, and are frequently inveterate chewers of betel nut" (1913, 87). Through these lessons in hygiene, navy officials conflated culturally informed ideas about hygiene with lessons on morality and propriety, evidenced in school superintendent Thomas Collins's *1924 Course of Study* that made this link explicit. Collins wrote, "Clean people are liked. Negligence in bathing ears, hands, hair, and teeth are disagreeable and impolite to others" (1924, 488). He added, "The practice of certain health habits gives evidence of good manners and good breeding" (1924, 488).

Although navy dentists such as Dr. Ralph Hornung in the nineteen thirties and Gerry in the nineteen fifties consistently commented on the lack of cavities among Chamorro chewers, they nonetheless discouraged *pugua* chewing due to its staining of tooth surfaces. In 1925, for example, dentist Wells reported on the effort to "discourage the masticatory use of the peppery pellet," stating that "the school children of the island … have been made to see that betel nut chewing is a disgusting habit which will eventually impair their health and good looks" (438). He claimed not only that "many school children" had discontinued the habit but also that "in many cases," children and other family members have come asking the dental officers to remove the black stains from their teeth (438). By 1939, visiting anthropologist Thompson observed, "Due to American influence the betel-chewing habit is losing favor with the young natives who have turned to chewing gum as a mild substitute" (1941, 26).

Despite such pronouncements, in 1952, dentist Gerry and colleagues reported that 62 percent of the more than 2,000 adults that they had examined admitted to chewing, including over three-fourths of those over the age 40. Furthermore, their report asserted that the 62 percent figure was "artificially low" (Gerry, Smith, and Carlton 1952, 891). Gerry and colleagues assessed that Chamorros were underreporting their chewing habits because of social and cultural pressures to quit that were part of the navy's Americanization campaign. As they stated, "there has been some tendency to deny its use by the Guamanians as they feel that the American population of the island considers its use primitive and old-fashioned" (Gerry, Smith, and Carlton 1952, 889). Nonetheless, their perception that betel nut was "considered uncivilized by the more socially and economically advanced," as well as their recognition that Chamorros realized that the Americans considered it a primitive habit, speaks even to contemporary perceptions, as seen in both personal interviews and research studies. When asked why he refrained from chewing areca while most of his family and friends chewed, UOG student Ignacio Dela Cruz emphatically responded, "I love my pearly whites!" (pers. comm.). While stained teeth signified beauty in past centuries, modern dentistry had effected a shift in social attitudes.

But "to chew or not to chew" should also be considered in the context of class issues, in conjunction with Gerry and colleagues' statement that "Betel chewing is considered uncivilized by the more socially and economically advanced Guamanians" (Gerry, Smith, and Carlton 1952, 906). This class dimension contradicts other descriptions of areca chewing as perhaps the most egalitarian of customs in the region. Dawn Rooney's study of areca in Southeast Asia, for example, demonstrates that the habit "cuts across class, sex, or age" (1993, 1), an analysis also made in the case of Yap, known for its highly rigid class system. Dr. David Rutstein, a physician and active member of the island community, observed this class fluidity in Yapese areca chewing practice, stating that "The caste system prevents people from eating together, and in some cases, touching each other's possessions. But people can chew betel nut together and even reach in each other's baskets to do so" (quoted in Huyser-Honig and Huyser-Honig 2002, 202). On Guam, archaeological studies of precontact Chamorro society, in tandem with written accounts from the fifteen hundreds through the late eighteen hundreds, paint a uniform picture of areca chewing as universal among the Chamorros, practiced regardless of gender, age, or class. More recent surveys confirm this analysis; a 1993 report on areca nut use, for example, stated that "betel nut use was not associated with gender (both males and females), age (younger and older), nor income or education (working and middle classes)" (UOG CES 1993, 6). Although the numerous studies conducted in the past five years by members of UOG's CRC have not

surveyed for information pertaining to income and employment, they report that most surveyed chewers are at least high school graduates (Herzog 2014, 155; Little et al. 2014, 2).

Paulino's study divulges that some Chamorros perceived that chewing is "negatively looked upon" and cited this as a major reason for their disapproval of the habit (Paulino 2009, 79). Although part of this negative response no doubt relates to more than a century of colonial indoctrination, some of the sentiment may emanate from the presumed link between *pugua* chewing and spitting, a habit not condoned in modern society. Chamorros have generally frowned upon the practice of spitting since ancient times, demonstrated in both historical documents and in the cultural teachings of elders. One account from the seventeen hundreds reports that "While the people are barbarous and uncouth, there is a sort of culture…. They seldom expectorate, never without taking many precautions. They never spit towards the house of another, nor in the morning, for reasons not very comprehensible, but to them, sufficient" (Delgado 1912, 2). Padre Delgado here refers to cultural mores against the unrestricted elimination of any bodily waste, including hairs, fingernails, and sputum, because of the belief that enemies could use such items in malevolent potions. Moreover, as reflected in Freycinet's 1819 account, "to spit in a man's presence … was the height of rudeness … thus [Chamorros took] great pains not to commit that error.… In fact, the Mariana Islanders rarely rid themselves of saliva or, at least, always did so with meticulous precautions" (Freycinet 2004: 132–33).

This aspect of spitting by contemporary areca chewers on Guam adds a new layer of complexity to the topic, that of race, highlighting tensions between Chamorro *ugam* chewers who chew and swallow the entire quid and chewers from other islands in Micronesia who not only spit, because the common inclusion of lime in their quid causes an increase in saliva production, but also do not swallow the quid, because it often contains tobacco. Specifically, immigrant chewers from Palau and Yap have traditionally preferred the young, green nut with a soft interior, wrapped in a quid that incudes slaked lime and tobacco. But this form of areca chewing has extended to other Micronesian islanders for whom it was not part of their traditional cultural practice, including growing numbers from Chuuk, who now constitute a notable ethnic minority on Guam. Although some Chamorros, particularly younger ones, have adapted to the younger nut, that particular style of chewing is still associated with Micronesian immigrants. Some observers have assessed the posting of "No Spitting" signs in public places around the island as blatantly racialized markers of tension between indigenous Chamorros and islanders from elsewhere in Micronesia (D. Subido, pers. comm.; J. Viernes, pers. comm.). Spitting has thus become a sign of racial tension on the island.

Consequently, on Guam, the issue of spitting regularly degenerates into thinly veiled racialized comments about "Micronesians" and their supposedly uncivilized habits. Comments posted to the daily newspaper's online poll on May 8, 2016, asking the question, "Do you think chewing betel nut is bad for your health?" reveal this tension. While more than half of the 439 respondents believed that chewing was not bad for your health, half of those leaving comments expressed negative views about spitting (*Pacific Daily News* 2016, 1). One respondent, logging in as Doris Ogo, replied, "I do think that they should stop islanders that spit in public places cause [sic] that just is disgusting and ruins our island of Guam!" Another commenter, identified as Tessie, responded, "Yes [it's bad for your health], if it is chewed like that other islanders that now live in Guam…. When people spit, they do not realized [sic] that they are polluting the ground and we tend to step on it and carry the bacteria into our automobiles, homes, hospitals, clinics, offices, schools, stores and any place we walk on." Tessie added, "let it be known that green beetle [sic] nuts with the yacky [sic] stuff added is bad for your health." Doris's and Tessie's references to "islanders" implicitly target Micronesian island immigrants to Guam, chewing green nuts, and spitting. Through the lens of *pugua,* escalating tensions between the Chamorros and the growing population of Micronesian immigrants living on Guam gain expression.

The history of areca nut is thus densely layered in Chamorro traditions and rituals, as well as in recent expressions of cultural identity and in past and present issues of class and race. Most of Guam's residents do not believe it to be a harmful activity, based on available evidence from an online poll and social research (*Pacific Daily News* 2016, 1; Moss et al. 2015, 147). Yet this precise concern drives a bevy of well-funded research projects active on the island.

Cancer, History, and *Pugua*

Cancer has received international attention for nearly a half century, the United Nations creating a body specifically focused on its research, the IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. A branch of the WHO, the IARC Working Group began in 1969 to evaluate chemicals that might pose a cancerous risk to humans, and it has since expanded to include other potentially cancerous risks, such as viruses, pesticides, and natural products like tobacco and areca nut. To make public its scientific findings, the IARC issues monographs that share the results of an enormous body of scientific and social research before making official pronouncements regarding cancer risks. IARC monographs are recognized as authoritative sources of information on the carcinogenicity of a range of human exposures. Although the IARC explicitly states that "no recommendation is given with regard to regulation or

legislation, which are the responsibility of individual governments and/or other international organizations" (IARC 2004, 10), it invariably exerts pressure on people working in health-related fields.

In 1985, Monograph 37 declared areca nut to be carcinogenic when chewed with tobacco, and 1986's Monograph 38 declared tobacco smoking to be carcinogenic. Perhaps because tobacco was not an ingredient in the typical Chamorro chewing quid, little notice on Guam was paid to this pronouncement. Almost 20 years later, an even bolder announcement was made. On August 7, 2003, the WHO issued a press release stating that the "IARC monographs programme finds betel-quid and areca-nut chewing carcinogenic to humans" (IARC 2003, 1), even without tobacco. IARC Monograph 85 presents a substantial body of scientific and social research, including studies of patients with oral cancer and research on experimental animals such as rats, mice, hamsters, and baboons. In addition to areca's carcinogenicity, the IARC expressed concern for the spread of "a variety of mass-produced, prepackaged areca-nut products" increasingly available around the world and the seeming proliferation of "aggressive advertising," some of which targets children (2004, 34). Increasing mobility and improved means of transportation have also contributed to the nut's spread.

The determinants for oral cancer include not only chewing of the areca nut but also tobacco use, heavy alcohol consumption, tuberculosis, history of oral cancer, and diet low in fruits and vegetables. Despite the many possible causes of oral cancer, the WHO has expressed concern over evidence both that the frequency of betel nut use is increasing in the Western Pacific Region and that its use is more frequently associated with the chewing of tobacco (WHO 2012, 7). In 2012, WHO published a follow-up to IARC Monograph 85 that focused specifically on the Western Pacific, titled "Review of areca (betel) nut and tobacco use in the Pacific" and highlighting its concern for islands in Melanesia and Micronesia that continued to demonstrate increasing patterns of areca nut chewing.

Cancer researchers and epidemiologists have pointed out that although oral cancer is the sixth most prevalent cancer worldwide, it ranks in the top three cancers in countries where areca chewing predominates. The Globocan arm of the IARC, providing statistical data on major types of cancer for 184 countries of the world, reported in 2012 that oral cancer is the leading cancer in Papua New Guinea in terms of incidence among both men and women. While it is the leading cause of cancer mortality among men in Papua New Guinea, for women, oral cancer ranks third for both incidence and mortality, after cervical and breast cancers (Globocan 2012, 1). The IARC reports Melanesia as a whole "to be the Region with the highest incidence," with oral cancer accounting for 12 percent of all cancers, compared to 1.6 percent in the United States and 1.0

percent New Zealand (WHO 2012, 41). In Yap, it is the second most common cancer, reported at 14.1 percent of all cancer cases.

As the second-leading cause of mortality on Guam, accounting for nearly one in every five deaths (Guam Comprehensive Cancer Control Coalition 2009, 11), cancer is of serious concern. Moreover, while oral cancer rates in the United States have shown a downward trend over the past thirty years, in Guam, as in the rest of the Western Pacific, the opposite is observed (Kingsley et al. 2008, 87). Since 1998, when the Government of Guam began systematically gathering cancer statistics, cancer incidence and mortality rates have steadily increased. Among cancers on Guam, oral ranks as tenth in overall incidence, with a rate of 10 per 100,000, but sixth highest in incidence among men and ninth in mortality among both men and women (WHO 2012, 43). Between 2003 and 2007, thirty-five new oral cancer cases were identified on Guam. The statistics, however, fail to specify whether the oral cancer patients are tobacco smokers or areca nut chewers and, in the case of *pugua* users, whether they include tobacco in their quid. Rather, *pugua* has become the presumed culprit. Further calling into question the blame placed on areca chewing is evidence from the 2007 Guam Behavioral Risk Survey showing that 79 percent of current *pugua* chewers also smoke (quoted in Paulino 2009, 118). Partly because of the questionable data, Chamorro chewers have lingered in denial about the carcinogenicity of the tobacco-free quid.

Capitalizing on global concerns about areca and local concerns about Guam's rising cancer rates, the UOG created the CRC, in partnership with the University of Hawai'i and funded by the National Cancer Institute. Since 2003, UOG's CRC has received $15 million in funds dedicated to developing the institution's cancer research capacity, specifically as it relates to "topics of regional relevance, including cervical cancer and betel nut chewing" (2017, 1). Despite its stated focus, the CRC has thus far funded only one cervical cancer study, compared with seven areca projects, highlighting one that intends to be the world's first direct-intervention cessation program (Eugenio 2016, 1). UOG has obtained sizable grant funding in an otherwise highly competitive arena partly by capitalizing on its unique focus as an areca-cancer research center, the only one of its kind in the United States.

Most research has been sociocultural in nature, explicitly conducted to develop an effective cessation program. As CRC researcher Thaddeus Herzog pointedly states, "behavioral and psychological research is essential for the purposes of designing interventions to reduce betel quid chewing" (Herzog 2014, 155). Appreciating that areca nut chewing is integral to social and cultural practice, whether in everyday life or in ceremonial ritual, the CRC scholars have been careful to suggest that "interventions designed to treat or prevent betel-quid chewing may need to include a strong social/cultural component"

that provides those wanting to quit "with skills regarding how to deal with the social/cultural pressures to chew" (Little et al. 2014, 6).

Herzog's research concluded that areca nut chewers had levels of dependence comparable to those of smokers, based on a survey sample of 300 current chewers. His limited sample included a majority who included tobacco in their areca quid, despite other evidence that shows that as few as 5 percent of Chamorros do so, thereby failing to account for differences between those who did and those who did not include tobacco. Herzog's study also failed to distinguish Guam's Chamorros from those of the Northern Mariana Islands, who more commonly chew the soft nut with tobacco. Consequently, in Herzog's analysis, the classic Chamorro *ugam* chewer was defined as chemically dependent, alongside those who added tobacco to their quid. Similarly, referring to areca as a "recreational drug," cancer research John Moss and colleagues liken chewers and smokers in their attitudes concerning cessation (Moss et al. 2015, 144). Charging that "betel quid chewers have dependence levels similar to those of cigarette smokers," they urge the implementation of a cessation program modeled after existing ones for tobacco smokers and chewers and have received CRC funding to implement one (145).

Paulino stands alone among Guam's CRC researchers in identifying the classic Chamorro *ugam* chewer as separate from other *pugua* aficionados. Her work, beginning with her doctoral dissertation in 1993, has advocated the identification of two separate classes of chewers: Class 1, Chamorros who chew the hard, mature nut, sometimes wrapped in the betel leaf, and often swallowing, and Class 2, a mix of island ethnicities, including small numbers of Guam Chamorros and large percentages of Northern Mariana Islands Chamorros, chewing the young, soft nut, typically with betel leaf, lime, and tobacco, and often spitting. Despite her consistent plea for a two-class framework, other CRC scholars have lumped all chewers into one basket. Such slipshod bracketing makes it difficult to convince the nontobacco *pugua* enthusiasts of the veracity of their research data.

More than thirty years after IARC's initial classification of areca as carcinogenic when chewed with tobacco, CRC researchers have found that Guam residents are unaware of its health risks. While attempting to establish a cessation program on Guam, UOG CRC researcher Moss learned that although most of his participants knew of tobacco's carcinogenicity, "None of our participants were aware of the link between pugua chewing and cancer" (quoted in Sablan 2016b, 4). Most respondents to the *Pacific Daily News* online poll believe that *pugua* chewing is not harmful to their health. As celebrated weaver James Bamba stated of *pugua* in an interview regarding the UOG CRC's new cessation program, "It's not negative and I've never known it to be negative" (quoted in Sablan 2016b, 4). Interviews with community members invariably position

pugua either as an engrained social and cultural practice or as a medicine, especially for nausea, stomachaches, and headaches (Eugenio 2016, 1; Sablan 2016a, 1). Moss and colleagues reflected that in their personal contact with areca chewers, "many people … viewed betel quid chewing as an essential part of their cultural heritage as Pacific Islanders" (Moss et al. 2015, 146). This pervasive disbelief in *pugua*'s benign nature, however, runs opposite to mounting biomedical data and international pronouncements of its deleterious health effects.

International concern expressed by the IARC and local interest reflected in the CRC funding patterns hence foretells a bumpy road ahead for *pugua*. The 2012 WHO report recommends a "platform for action" that includes regulating the sale of betel nut, establishing and enforcing laws restricting betel nut use on school property and at health care facilities, and formulating effective mass communication and education campaigns regarding the dangers of areca chewing, among other actions (10). Cessation programs run out of the UOG, intensifying Americanization of the island, and negative racialized connotations about spitting and chewing, along with a slate of UOG CRC research projects that dissect the nut in every possible social, cultural, and biological way imaginable, promise to keep the nut alive, alongside those who cling to it as an emblem of their cultural identity as Chamorros and as Pacific Islanders.

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