

**From Acapulco to Manila, Culinary Spices to Medical Supplies: Useful Plants Introduced  
to the Philippines in the Age of the Galleons**

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...they presented fish, a jar of palm wine, which they call *uraca*, figs more than one *palmo* long, and others which were smaller and more delicate, and two cocoanuts [...]. The king had a plate of pork brought in and a large jar filled with wine. At every mouthful, we drank a cup of wine [...]. We ate with such ceremonies and with other signs of friendship. I ate meat on holy [Good] Friday, for I could not help myself.<sup>1</sup>

When the Magellan-Elcano crew landed in the Philippines in March 1521, Antonio Pigafetta recorded his impressions of the hospitality of the local people, various foods served, as well as flora, fauna, gold, and other items the locals possessed. Magellan's fleet, the *Armada de Molucca*, had, after all, come in search of the Spice Islands, and direct access to Asian resources, goods, and trade was central to the Spanish Empire's ambitions of conquest in the Pacific. Magellan was killed a month later by Lapulapu and his warriors in the Battle of Mactan, but the Philippine archipelago eventually fell to colonial rule. For the next three centuries the islands served as the Spanish Empire's foothold in Asia, an international trade hub where Asian, American, and European cultures crossed and exchanged goods, metals, and ideas. This was

made possible by Urdaneta's discovery of a direct route between the Philippines and the west coast of Mexico, a route that ran from 1565 to 1815 and came to be known as the Manila-Acapulco Galleon Trade.

In early European accounts like Pigafetta's, we read descriptions of the 'Spanish East Indies' teeming with natural resources to rival Dutch and Portuguese supplies. Even now the term 'green gold' perhaps conjures images of fragrant and precious cargo such as tea, cacao, nutmeg, and cloves, all shipped by the tons from Asia and the Americas to satiate a growing European appetite during the early modern period.<sup>2</sup> Less attention, however, has been paid to the movement in the other direction. What plant materials were being carried into Asia-Pacific?

Numerous food plants of tropical and subtropical American origin are ubiquitous in the Philippines today. The potato (*Solanum tuberosum* L.) and corn (*Zea mays* L.) are staple ingredients, and Doreen Fernandez writes that the tomato (*Lycopersicon esculentum* Mill.) is 'as indispensable to Philippine cooking as it is to Mexican cuisine'.<sup>3</sup> Pineapple (*Ananas comosus* (L.) Merr.), papaya (*Carica papaya* L.), and guava (*Psidium guajava* L.) have likewise found their place on the Pinoy dinner table. These plants are Filipino food because they have become so. However, their assimilation into Filipino culture was not necessarily immediate or straightforward, and use-knowledge likely changed over time.

This paper explores the changing use-knowledge of two culinary plants in the Philippines, *atsmete* (*Bixa orellana* L.) and *pasotes* (*Dysphania ambrosioides* (L.) Mosyakin and Clemants, better known by its synonym *Chenopodium ambrosioides* L.). Our ongoing research utilizes medical botanical works, understudied sources in Filipino food history, in order to investigate how plants introduced to the Philippines during the 'Age of Empire' were used over time as both food and medicine. Doing so can reveal a richer historical context for these

foodstuffs that, despite being material evidence of a dark colonial past, still find appreciation on plates today.

**Case Study 1: *Bixa orellana* L., ‘Achiote’, ‘Achiotl’ (Mexico) / ‘Atsuete’, ‘Achuete’, ‘Chotis’ (Philippines)**

*Bixa orellana* L. is a shrub or small flowering tree originating from the tropical regions of the Americas with hairy red pods containing red seeds dusted in red powder. These seeds are usually sold in the UK and US by the names *annatto* or *achiote*, and in the Philippine names include variations of *atsuete* and *chotis*. The names derive from *achiotl*, the classical Nahuatl name for the tree.

*Early Records of Atsuete: A Food Spice with Medicinal Qualities*

*Atsuete* was well known among the Aztecs to colour the froth of the *xochiaya cacahuatl*, one of several types of cacao beverages used for religious and social purposes.<sup>4</sup> Cacao mixed with *atsuete* may have symbolized blood, and white maize bones, in Mayan stories of birth, rebirth, and creation.<sup>5</sup> In addition to the use of its bark for rope-making and wood for fire, its seeds were also used to make red body paint and were traded as a dye among the Aztecs and Mayans, the Incas and Mohicans, as well as the Chaco.<sup>6</sup> By the time the Spaniards set foot in what is now Mexico, *atsuete* was a well-established spice plant in Tenochtitlan, the capital of the Aztec empire. The plant’s medicinal uses were described in the *Libellus de Medicinalibus Indorum Herbis*, the oldest known surviving American herbal written in Nahuatl by Martín de la Cruz, a member of the young Aztec nobility, and translated into Spanish by Franciscan friar Juan

Badiano. Here as a medicine, *atsuete* was recorded as an ingredient in an astringent wash to treat genital infection and in a mixture for urinary problems.<sup>7</sup>

*Atsuete* was actively cultivated across the Americas prior to European contact. In 1526 Oviedo wrote in his *Historia Natural* that the tree was both wild and cultivated across Nueva España and Terra Firme, the northern Spanish territory of South Americas.<sup>8</sup> Hernández also reported that *atsuete* was widely esteemed and planted around houses during Spain's first royal scientific expedition (1570-1577).<sup>9</sup> While there is a possibility *atsuete* reached the south of Asia and Africa through the Portuguese trade that linked Brazil to Goa in India, the earliest documented uses for *atsuete* in the Philippines closely mirror those of Nueva España, to which it was directly linked.<sup>10</sup> Association of *atsuete* with its origin is suggested by the phonetic similarities we see today between the Nahuatl word *achiotl* and names in the Philippine lexicon such as *atchiti*, *chotes*, and *sotis*.<sup>11</sup>

### *Atsuete in the Philippines*

By the end of the sixteenth century the Spanish empire had access to *atsuete* plantations across the Americas, and the plant was recorded in the Philippines by 1611. It would have been cultivated for domestic use only, however, and not for export to Europe; valuable cargo space on ships leaving Manila would have been reserved for the lucrative goods found exclusively in Asia, and fresh *atsuete* supplies could be obtained when ships passed through the Americas on the return journey to Europe.<sup>12</sup> Furthermore, the Philippines' primary role was as a colonial trade hub rather than a spice source; the few well-known attempts at Spanish cultivation efforts were thwarted by lack of local leadership, communication, and funding, as in the case of the eighteenth-century commercial cinnamon failure in Mindanao.<sup>13</sup> Indeed, in 1628 Carmelite friar

Antonio Espinosa wrote that *atsuete* was commonly ‘exported from Nueva España to China, where it sells very well for dying silk and for other purposes’.<sup>14</sup>

*Atsuete* was listed in the Philippines’ earliest surviving medico-botanical work, *El Libro de Medicinas Caseras* by friar Blas de la Madre de Dios in 1611, for its use in treating burns, boils, scabies, and swellings. These uses are included in *El Libro de Medicinas de Esta Tierra*, written between the 1660s-1680s by Augustinian friar Ignacio Mercado, called the first Filipino-born botanist. Both Madre de Dios’ and Mercado’s manuscripts were intended as practical manuals for other missionaries’ use and focused on locally available plants to treat both Spaniards and the various *indios* of the Philippines.<sup>15</sup> This is in contrast with the more general *relaciones*, ethnographic accounts such as Pigafetta’s, and academic-oriented works, such as what is considered the first flora of the Philippines, *Herbarium aliarumque Stirpium in Insula Luzone Philippinarum*, written by Jesuit Georg Josef Kamel and published in 1704 as an appendix to the famous *Historia Plantarum* of English physician John Ray.<sup>16</sup> Mercado was a self-taught botanist, but he had access to the major writings that shaped the early modern European medical tradition. In his work he cited Laguna’s recent translation of Dioscorides and drew from the well-known European accounts of ‘New World’ plants from the sixteenth to seventeenth centuries, such as those of Carolus Clusius and Francisco Hernández.<sup>17</sup>

This influence is evident in Mercado’s description for *atsuete*:

It is cold in the third degree, and has some astringency [...] it severely quenches thirst and burning fever, and it is useful for fevers, caused by heat, and it dissolves growths and swellings. Hence, it can and should be used, with very good success [...] in drinks and syrups, and in delicacies when it is intended to cool and refresh. Add achiote to cocoa for hot tooth

aches: it clenches and fortifies teeth, quenches thirst, and is good for the poor instead of saffron [... It] comforts the stomach, increases milk and restricts the chambers. Mixed with resin, it cures the scabies, and other sores. Poured into cocoa, it makes it possible to drink more than usual, without harm or damage to health because it helps digestion and never causes disgust.<sup>18</sup>

This appears to be derived from Hernández's *Historia Natural*:

[It is] cold in the third degree and with some dryness and astringency [...] it calms the burning of fevers, relieves dysentery and makes tumours disappear, for which reason it can be conveniently mixed with [...] any [cool] foods or medications. It is added to *cacáoatl* as a refresher and to enhance its colour and flavour. It removes tooth pain caused by heat, and strengthens them; it causes urine, quenches thirst, and among certain people acts as saffron [...] mixed with resin it cures scabies and ulcers; strengthens the stomach, stops the flow of the belly, and increases [breast] milk. Mixed with *cacáoatl* shells, makes it harmless whatever the amount in which it is taken, as it is usually digested with its help without any discomfort.<sup>19</sup>

Hernández's descriptions influenced many botanical works during this time. Robert Lovell in Oxford, for instance, published a nearly identical description in 1665 in English, although no source was mentioned:

It's cold third degree and somewhat dry and binding. The seed drunk helps the heat of feavers, and dysenteries, and applied repelleth tumours,

and is mixed with remedies for the like purposes. It helpeth the toothache of a hot cause, it corroborareth, and evacuates urine, it helpeth thirst, and is used instead of saffron. The gaines being boiled in water, and mixed with [resin] it helps the scab and ulcers: it corroborates the stomach, stops the belly, and causeth milke.<sup>20</sup>

Such plant description parallels exemplify how the circulation of medical knowledge of ‘New World’ plants directly impacted the works of scientists and missionaries who were sent to the Philippines, and, in turn, shaped the colonial Philippine botanico-medical tradition.<sup>21</sup>

#### *Atsuete and Colour: Across and Beyond the Food-Medicine Interface*

In Europe, *atsuete* appears to have been generally considered an insignificant culinary spice in the early modern global trade in comparison to spices like nutmeg, cloves, cinnamon, and pepper. It did, however, constitute a regular part of the pigment trade that rose in the mid-sixteenth century and continued through at least the end of the eighteenth. Hernández had described it as producing a dye ‘so tenacious that a mere dab will not wash out’, and the spice was imported as a colourant for yellow silks, a finishing dye, and a red pigment alternative to the one produced by the far more costly cochineal.<sup>22</sup> In 1665, Lovell had called it ‘dyers-tree’, and we know *atsuete* was listed among the cargo being shipped from the Spanish West Indies to Europe in Woodes Rogers’ famous 1708-1711 voyage.<sup>23</sup> In 1766 the Spanish ship *Nuevo Constante* was reportedly carrying about 5000 pounds of *atsuete* bound for Cadiz when it wrecked off the coast of Louisiana, along with over 40,000 pounds of other dye products.<sup>24</sup> In late eighteenth-century England *atsuete* was recorded as ‘for the use of the dyers, principally’; ‘the preparation [was] made by the druggist, both in England and in the country [...] the

pigment, it is said, was formerly collected in Jamaica: but has of later years been brought there (in seproons, or bags made of undressed hides) from the Spanish settlements.<sup>25</sup>

The import of *atsuete* to Europe for textile purposes from the sixteenth century onwards may have encouraged a new use for it in food: cheese. Realizing they could skim the cream off and sell it separately, European cheesemakers used *atsuete* as a ‘trick’ to colour the resulting low-fat cheese, since the natural yellow colour of a full-fat cheese served as a measure for its quality.<sup>26</sup> Surveyor William Marshall complained in 1789 that the ‘crime of colouring cheese’ had ‘long been practiced by the Gloucestershire dairymen’, and that, ‘such cheese having been found to bear a better price [...] than cheese of a paler color, they set about *counterfeiting nature*’; he also noted that the practice was done in other countries.<sup>27</sup> This cheese colouring practice continues today; *atsuete* is used to colour many cheddar cheeses and Gloucester cheese, and it is responsible for the signature colour of Leicester Red.<sup>28</sup>

In the Philippines, *atsuete*’s association with colour caused a shift in its perceived medicinal use. The Dominican Fernando de Santa Maria, operating in the Philippines between 1730 and 1774, wrote *Manual de Medicinas Caseras*, a missionary manual with the explicit intention of assisting ‘*pobre Indios*’ in places where ‘*no hay médicos ni botica*’.<sup>29</sup> First published in 1768, Santa Maria’s work groups *atsuete* as one of four *azafrins* (saffrons): saffron (from stigma and styles), turmeric (from a root), *atsuete* (from seed pods), and safflower (from flower petals). These different spices were reportedly interchangeable to an extent and used for the same purposes as saffron, signalling that its basis as a medical spice in colonial Philippines had by this point altered to include association with a particular pigment. Santa Maria’s manual was reprinted at least nine times between 1768 and 1905, indicating its influence persisted beyond Spanish rule and into the American colonial period.

If *atsuete* had been first introduced to the Philippines for medicinal use, it was as a food colouring substitute for saffron that *atsuete* achieved its role in Filipino culture that it maintains today. As food historian Felice Prudente Sta. Maria and Filipino chefs Amy Besa and Romy Dorotan write, today you will find *atsuete* in many cherished Filipino foods including ‘fiesta dishes’ like *kare-kare* (peanut-based oxtail stew); in sauces for noodles as in *pancit palabok*, *pancit luglug*, and *pancit malabon* (rice noodle dish variations); and comfort foods like chicken *inasal* (basted chicken) and *adobong pula* (red adobo).<sup>30</sup>

**Case Study 2: *Dysphania ambrosioides* (L.) Mosyakin and Clemants, ‘Epazotl’, ‘Epazote’ (Mexico) / ‘Pasotes’, ‘Apasote’, ‘Pasotis’ (Philippines)**

*Pasotes* is a common plant in its native Mexico, where it is known as *epazote* or *epozote* and used extensively as a culinary herb in foods like corn stews and fried beans dishes. When crushed, its leaves give a distinctive aroma that some have described as akin to gasoline; the name *epazote* is said to derive from the Nahuatl word *epatl*, for skunk. The flavourful leaves serve a double function in bean dishes, since they are believed to reduce stomach gas, and the essential oil has long been known among Native peoples of the Americas to be an effective vermifuge. It easily disperses and has become an invasive species in many regions of the world, usually growing along roadsides and rocky areas as a weed.<sup>31</sup>

*Pasotes as Food and Medicine*

In Mesoamerica, the ubiquitous plant was interestingly not mentioned in the de la Cruz-Badiano manuscript of 1552. Hernández, however, described it in detail in his *Historia Natural* (1570-1577):

It is a herb with branched roots, from where stems of a long elbow with oblong, crenelated and reddish leaves, and seed with spikes. It is pungent, odorous, and calorific in the third degree; It is eaten raw or cooked, and added to meals strengthens, relieves asthmatics and breast sufferers, and provides pleasant food. The decoction of roots contains dysentery, removes inflammations and [expels harmful worms] from one's stomach.<sup>32</sup>

In the Philippines, *pasotes* is considered a galleon introduction, either as a medicinal food plant intended for cultivation which subsequently escaped into the wild, or an accidental introduction which was then recognized and put to use.<sup>33</sup> European-trained missionaries in the Philippines would have been familiar with it from studying 'New World' plants and medicines.

In his seventeenth-century description for *pasotes*, Mercado again chose to draw from Hernández with a near-identical description as the one above. However, he included another use: an infusion of its seeds in wine 'dulls the senses in such a way that those who are flogged do not feel the lashes and those put in torment do not feel it'.<sup>34</sup> While Nicolas Moñardes, a contemporary of Hernández, had also mentioned the use of *pasotes* for pain in Nueva España, the specificity of this use, Mercado asserted, was based on his personal observation of Filipino patients.

In 1837 Franciscan friar Manuel Blanco, in his landmark botanical work *Flora de Filipinas*, copied Mercado's descriptive use as an anaesthetic and wrote, 'this is what has been written in the Islands', supporting Mercado's claim that this was not an imported use for an imported plant, but something new based on experience in the Philippines.<sup>35</sup> Some fifty years later noted Filipino physician and historian Trinidad Pardo de Tavera also quoted Mercado's

description in his *Plantas Medicinales de Filipinas* (1892) and commented, ‘these properties, if true, make this plant one of the most useful in the Philippines.’<sup>36</sup>

#### *Adapted Dishes, New Uses in Philippine Food*

Today, *pasotes* does not appear to be well known as a medicine, much less an anaesthetic, possibly linked to its inconspicuousness, its smell which is often seen as undesirable, or concerns of its toxicity. It is, however, still used in regional cuisine, with two notable examples.

In the Ilocos region, the Filipino dish *pipian* was adapted from the Mexican dish of the same name and calls for both *pasotes* and *atsüete*. Besa and Dorotan write that ‘in Mexico, *pipian* is a sauce thickened with ground toasted *pepitas* (pumpkin seeds); in the Philippines, ground toasted rice is used instead [... T]he main flavouring agent is the *pasotes*, called *pasotes* in Ilocos’.<sup>37</sup> Besa and Dorotan suggest that it is only found in Ilocos Sur, in northern Luzon. While the plant is found elsewhere in the Philippines, it should be noted that Vigan, the capital city of Ilocos Sur, is a UNESCO world heritage centre located near the northwest tip of Luzon Island and, as a major commercial port for the galleons, traded directly with China throughout the colonial period.<sup>38</sup> It is fitting that Vigan, known for its colonial Spanish architecture, would have retained such plant knowledge and blending of traditions that resulted from this period.

In the Visayan region of Cebu, *pasotes* is the secret ingredient in a local version of what Anthony Bourdain once called ‘the finest pig’ and ‘the best of the best’: Cebu *lechón*, a fire-roasted whole-pig fiesta dish.<sup>39</sup> *Lechón* deserves its own place in Filipino food history, as its Spanish-given name conceals its likely pre-colonial indigenous Filipino origins. There are many varieties across the islands which are often stuffed with various local herbs, and *pasotes* is used to make the Carcar City, Cebu version. Doreen Fernandez writes that foreign dishes like Spanish

*paella* and Chinese *batsui* were ‘adjusted to the Filipino palate’ when they were incorporated into Filipino cuisine.<sup>40</sup> Conversely, Carcar *lechón* exemplifies how a foreign ingredient was incorporated to an indigenous dish and contributed to a flavour that is celebrated as uniquely Filipino.

#### *Notes on Taxonomic Changes and Vernacular Names*

Tracing plant uses across contexts is often complicated by taxonomic classification, which is based on both morphological and phylogenetic features and may not always reflect how plants are grouped with others as traditional foods and medicines. In the case of *pasotes*, cultural distinctions between plants have been reported based on morphology, specifically colour. Among Zapotec, for example, *bitia morad* (purple-stemmed *pasotes*), and *bitia nol* (white-stemmed *pasotes*) are reportedly somewhat interchangeable and used when cooking beans, whereas young leaves of the green *bitia z* should be used exclusively in corn stews.<sup>41</sup>

Taxonomically, the species was previously a member of the *Chenopodium* genus until it and several other species were moved to the Australian genus *Dysphania* following phylogenetic studies in the 2000s. In testing, the essential oil of *D. ambrosioides* var. *ambrosioides* was found to be much lower in ascaridole, and thus less toxic, than *D. ambrosioides* var. *antihelminthicum*.<sup>42</sup> This taxonomic change may be highly relevant from a plant systematic perspective, but it is problematic for traditional uses and names of the plant, especially for those studying use-histories. It also does not seem to correlate with local plant taxonomies. With the Rarámuri people of Chihuahua, Mexico, for example, it is one of three plants with similar uses, called *chuí*; the other two plants are *Chenopodium album* and *C. graveolens*, which are also used like

spinach among indigenous groups of North America but have other uses for medicine and in rituals, and possess different chemical constituents from *D. ambrosioides*.<sup>43</sup>

Common names can also cause confusion when citing uses from historical literature. Several plants unrelated to *pasotes* share the name ‘Mexican tea’, such as *Ephedra* spp., which has a long history of use in many medical systems including Chinese medicine and are of pharmacological interest.<sup>44</sup> Another name for *pasotes*, ‘wormseed’, has been applied to various plants with perceived vermifugal properties, such as those of the genus *Artemisia*; and the name for *pasotes*, ‘Jesuits tea’, is perhaps most known in the context of *mate*, the caffeinated drink made from *Ilex paraguariensis* A. St.-Hil, a member of the holly family.

### **Final Thoughts**

The cases of *atsuete* and *pasotes* demonstrate the nonlinear journeys across and beyond the food-medicine interface that spice plants, and any useful plant, can take as they are introduced into a new environment. Intentional botanical introductions often come with existing use-knowledge attached which are enforced in the new cultural landscape, and over time are continued, rejected, forgotten, or transformed into new uses. *Atsuete* was used for centuries as a food, medicine, and pigment source before the European expansion. It traversed all three of these spheres as it was introduced to Europe in the sixteenth century and traded as a pigment, inserted into Spanish Philippine medicine, and found a permanent place as a food colouring. Similarly, *pasotes* was recognized early on by European missionaries in the Philippines and entered into written tradition as a medicine and leafy vegetable. Eventually, both these uses fell out of practice, and today you may know it as a regional herb for a traditional Ilocano dish and in a tasty, tourist-attracting Cebuano roasted pig.

The year 2021 marks 500 years since Magellan and Elcano landed in the Philippines. The first circumnavigation was a significant milestone in botanical exploration and had profound effects on the peoples of Asia and the Pacific world that altered their courses forever. While we confront the detrimental history of colonialism and reflect on the impact non-native plants cause on new environments, may we also find ways to look forward to the future and celebrate the healing and nurturing power of foods that bind our world together.

### **Acknowledgements**

We thank the organizers, Laura Romuroso, Paz Nolasco, and Consuelo David for sharing their time and knowledge, and Raf Ignacio at Filipino Food Crawl. In memory of Dr. Manuel B. Datiles III, MD.

### **Notes**

<sup>1</sup> Antonio Pigafetta, *Primo Viaggio Intorno al Mondo* (Original Text of the Ambrosian MS, with English Translation), ed. and trans. by J. A. Robertson (Cleveland: Arthur H. Clark Co, 1906), pp. 103-04, 119.

<sup>2</sup> See, e.g., Daniela Bleichmar, *Visual Voyages: Images of Latin American Nature from Columbus to Darwin* (New Haven: Yale University Press, 2017); Harold J. Cook, *Matters of Exchange: Commerce, Medicine, and Science in the Dutch Golden Age* (New Haven: Yale University Press, 2007); Paula de Vos, 'The Science of Spices: Empiricism and Economic Botany in the Early Spanish Empire', *Journal of World History*, 17.4 (2006), 399-427; Stephanie

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<sup>3</sup> Doreen Fernandez, *Tikim: Essays on Philippine Food and Culture*, 2nd ed., (Leiden: Brill, 2020), p. 147.

<sup>4</sup> R.A. Donkin, 'Bixa orellana: The Eternal Shrub', *Anthropos*, 69.1/2 (1974), 33-56; Marcy Norton, 'Tasting Empire: Chocolate and the European Internalization of Mesoamerican Aesthetics', *The American Historical Review*, 111.3 (2006), 672; *The Mexican Treasury: The Writings of Dr. Francisco Hernández*, ed. by Simon Varey (Stanford: Stanford University Press, 2000), p. 19.

<sup>5</sup> Michael J. Coe, 'The Hero Twins: Myth and Image', in *The Maya Vase Book*, ed. by Justin Kerr (New York: Kerr Associates, 1989); Michael Grofe, *The Recipe for Rebirth: Cacao as a Fish in the Mythology and Symbolism of the Ancient Maya* (2007), pp. 34-35.

<sup>6</sup> Donkin, 1974; Varey, pp. 242-43.

<sup>7</sup> Martín de la Cruz and Juan Badiano, *The Badianus Manuscript, Codex Barberini, Latin 241, Vatican Library; an Aztec Herbal of 1552*, trans. by Emily W. Emmart (Baltimore: Johns Hopkins Press, 1940), pp. 287-89.

<sup>8</sup> Gonzalo Fernández de Oviedo y Valdés, *Historia General y Natural de Las Indias, Islas y Tierra-Firme del Mar Oceano*, ed. by José Amador de los Rios (Madrid: Impr. de la Real Academia de la Historia, 1851), Bk 8 Ch VI.

<sup>9</sup> Francisco Hernández, *Historia Natural de Nueva España, Vol. I* (México: Universidad Nacional de México, 2015), Ch XCVIII.

<sup>10</sup> Alphonse de Candolle, *On the Origin of Cultivated Plants* (New York: D. Appleton and Co, 1885), pp. 401-02.

- <sup>11</sup> Paloma Albalá, 'Hispanic Words of Indoamerican Origin in the Philippines', *Philippine Studies*, 51.1 (2003), 125-46.
- <sup>12</sup> For more on the galleon trade, see, e.g., de Vos, Ganger, Reyes, and Schurz.
- <sup>13</sup> Bleichmar, pp. 123-48; Francisco Mallari, 'The Mindanao Cinnamon', *Philippine Quarterly of Culture and Society*, 2.4 (1974), 190-94.
- <sup>14</sup> Antonio Vásquez de Espinosa, *Compendium and Description of the West Indies*, trans. by Charles Upson Clark (Washington DC: Smithsonian Miscellaneous Collections 102, 1942), p. 238.
- <sup>15</sup> Anagnostou; Blas Sierra de la Calle, 'El P. Ignacio Mercado (1648-1698) y las plantas medicinales filipinas', *Archivos Agustinos*, 100 (2016), 331-492 (372-74). See also Sabine Anagnostou, Florike Egmond, Christoph Friedrich, eds., *A Passion for Plants: Materia Medica and Botany in Scientific Networks from the 16th to 18th Centuries*, (Stuttgart: Wissenschaftliche Verlagsgesellschaft, 2011).
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- <sup>18</sup> Ignacio de Mercado, 'Libro de Medicinas de Esta Tierra', in *Flora de Filipinas Gran Edición Curato Tomo*, p. 20.
- <sup>19</sup> Francisco Hernández, *Historia Natural de Nueva España, Vol. II*, (México City: Universidad Nacional de México, 2015), Ch XCVIII.

- <sup>20</sup> Robert Lovell, *Pambotanologia*, (Oxford: printed by W.H. for Ric. Davis, 1665), p. 502.
- <sup>21</sup> Anagnostou; Varey. See also Kroupa, pp. 156-59.
- <sup>22</sup> Varey, p. 197; Elena Phipps, 'Textile Colors and Colorants in the Andes', in *Colors between Two Worlds: The Florentine Codex*, ed. by Gerhard Wolf and Joseph Connors (Florence: Kunsthistorisches Institut, 2011), pp. 272-75.
- <sup>23</sup> Edward Cooke, *Voyage to the South Sea and Round the World* (London: 1712), Vol II, xvii.
- <sup>24</sup> Charles E. Pearson and Paul E. Hoffman, *El Nuevo Constante* (Anthropological Study No 4) (Baton Rouge: Louisiana Archaeological Survey and Antiquities Commission, 1998), pp. 8-9, 27.
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- <sup>27</sup> Marshall, pp. 289-93.
- <sup>28</sup> Thomas Arthur Layton, *The Cheese Handbook: Over 250 Varieties Described, with Recipes* (Mineola, NY: Dover Publications, 1973), pp. 108-10.
- <sup>29</sup> Fernando de Santa María, *Manual de Medicinas Caseras* (Manila: University of Santo Tomas Press, 1768), p. vi.
- <sup>30</sup> Amy Besa and Romy Dorotan, *Memories of Philippine Kitchens* (New York: Stewart, Chobani, and Chang, 2006), pp. 17, 55, 78-79, 175; Felice Sta. Maria, *The Governor-General's*

*Kitchen: Philippine Culinary Vignettes and Period Recipes, 1521-1935* (Pasig City: Anvil Publishing, 2006), p. 81. See also Fernandez, p. 81.

<sup>31</sup> Julissa Rojas-Sandoval and Pedro Acevedo-Rodríguez, *Dysphania ambrosioides* (Mexican tea), *CABI Invasive Species Compendium* (2014) <<https://www.cabi.org/isc/datasheet/113977>> [accessed 10 Jan 2020]

<sup>32</sup> Hernández, Vol I, Ch XL.

<sup>33</sup> Rojas-Sandoval and Acevedo-Rodríguez.

<sup>34</sup> Mercado, p. 15.

<sup>35</sup> Manuel Blanco, *Flora de Filipinas* (Manila: Santo Tomás por D. Candido Lopez, 1837), pp. 200-01.

<sup>36</sup> Trinidad Pardo de Tavera, *Plantas Medicinales de Filipinas* (Madrid: Bernardo Rico, 1892), p. 251.

<sup>37</sup> Besa and Dorotan, p. 119.

<sup>38</sup> UNESCO, *Historic City of Vigan* (2020) <<https://whc.unesco.org/en/list/502/>> [accessed 16 Aug 2020]

<sup>39</sup> Joel Binamira, ‘It’s the Best of the Best’, *Market Manila* (2009) <<http://www.marketmanila.com/archives/its-the-best-of-the-best>> [accessed 28 May 2020]; ‘Recap of the Anthony Bourdain related posts on Marketmanila.com’, *Market Manila* (2018) <<http://www.marketmanila.com/archives/a-recap-of-the-anthony-bourdain-related-posts-on-marketmanila>> [accessed 28 May 2020]; IMDB, ‘Philippines “Land of the Lechon”’, *Anthony Bourdain: No Reservations*, S5E7 (2020) <<https://www.imdb.com/title/tt1566957/>> [accessed 28 May 2020]

<sup>40</sup> Fernandez, p. 173.

<sup>41</sup> Fructuoso Irigoyen-Rascón and Alfonso Paredes, *Tarahumara Medicine: Ethnobotany and Healing among the Rarámuri of Mexico* (Oklahoma City: Oklahoma University Press, 2015), p. 323.

<sup>42</sup> Rovert Tisserand and Rodney Young, *Essential Oil Safety: A Guide for Health Care Professionals* (Edinburgh: Elsevier, 2014), pp. 470-71.

<sup>43</sup> Robert Bye, 'Medicinal Plants of the Sierra Madre: Comparative Study of Tarahumara and Mexican Market Plants', *Economic Botany*, 40 (1986), 103-24; Irigoyen-Rascón and Paredes.

<sup>44</sup> Yuntao Dai and others, 'Quality Marker Identification Based on Standard Decoction of Differently Processed Materials of *Ephedrae Herba*', *Journal of Ethnopharmacology*, 237 (2019), 47-54; Ernest Small, *Culinary Herbs*, 2nd Edition, National Research Council of Canada Monograph Series (Ottawa: NRC Research Press, 2006).