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Article abstract

Mayan and Andean medicine included empirical perspectives and botanical cures that were transmitted in the urban spaces of colonial Spanish America, spaces themselves built over former Amerindian cities. Mayan and Andean peoples, whose histories included development of both urban and rural aspects of civilization, brought their medical knowledge to the Hispanic cities of the colonial Americas. In these cities, despite the disapproval and persecution of the Inquisition, Native American medicine gradually became part of the dominant culture. As this article will demonstrate, Mayan and Andean medical knowledge was absorbed by the “new cities” that Imperial Spain constructed in the colonial Americas, church disapproval notwithstanding. Cities and urban space became prime conduits for the circulation and incorporation of Native American medical knowledge among the newer Hispanic and mestizo population in the colonial Americas.

Mayan and Andean Medicine and Urban Space in the Spanish Americas

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Mayan and Andean medicine included empirical perspectives and botanical cures that were transmitted in the urban spaces of colonial Spanish America, spaces themselves built over former Amerindian cities. Mayan and Andean peoples, whose histories included development of both urban and rural aspects of civilization, brought their medical knowledge to the Hispanic cities of the colonial Americas. In these cities, despite the disapproval and persecution of the Inquisition, Native American medicine gradually became part of the dominant culture. As this article will demonstrate, Mayan and Andean medical knowledge was absorbed by the “new cities” that Imperial Spain constructed in the colonial Americas, church disapproval notwithstanding. Cities and urban space became prime conduits for the circulation and incorporation of Native American medical knowledge among the newer Hispanic and mestizo population in the colonial Americas.

La médecine maya et andine comprenait des approches empiriques et des remèdes à base de plantes qui furent transmis dans les espaces urbains de l'Amérique espagnole coloniale, des espaces qui avaient eux-mêmes remplacé la présence de cités autochtones plus anciennes. Les peuples mayas et andins – dont l'histoire comprend le développement d'aspects civilisationnels ayant trait à la fois à la vie rurale et à la vie urbaine – ont apporté leurs connaissances médicales dans les villes hispanophones des Amériques coloniales. Dans ces villes, malgré la condamnation que faisait peser l'Inquisition sur ces pratiques, soumises à la persécution, la médecine traditionnelle des populations autochtones s'est progressivement intégrée à la culture dominante. Comme le montre cet article, les connaissances médicales mayas et andines furent absorbées par les « villes nouvelles » construites par l'Espagne impériale dans les Amériques coloniales, en dépit de la désapprobation de l'Église. Les villes et l'espace urbain devinrent des canaux privilégiés de la circulation et de l'incorporation du savoir médical amérindien au sein de la nouvelle population hispanique et métisse des Amériques coloniales.

Introduction

Previous generations of scholars in Latin American studies have grown up with the myth of the essentially rural Native American, propagated by Uruguayan author Angel Rama.¹ Rama insisted that the fundamental difference between Native American culture and Spain's imperial model was the nature of cities, and the very conception of urban social organization. Native constructions, according to Rama (who, while a great literary critic, had no archaeological

1. Angel Rama, *La Ciudad Letrada* (Hanover, NH: Ediciones del Norte, 1984), 10–23.

training), were ceremonial in nature. With the possible exception of Mexico City, which Rama admitted was constructed directly upon the ruins of the former Aztec capital of Tenochtitlan, Rama viewed “urban space” as a concept implanted in the Americas by colonial Spain.

This error has been conclusively overturned in the past thirty years by significant archaeological discoveries in Latin America. Whereas LiDAR scanning revealed notable urban habitational concentrations in Mayan cities in Guatemala in 2018, 2020 brought with it the discovery of “the oldest and biggest Maya structure” in Aguada Fenix, Mexico; Andrew Scherer of Brown University estimates that “The public spaces at Aguada Fénix are huge, and there is nothing to indicate that access was limited to a privileged few,” as urban life began for the Maya over 2,500 years ago.² Those among the Conquistadors who chronicled their own experiences (Cieza de Leon and Pedro Pizarro, cousin of Francisco, in the Andes; Pedro de Alvarado among the Maya; and of course, Hernan Cortes among the Aztecs) actually did make mention of large urban spaces populated and built by Amerindians and later subjugated by them.

Alvarado, who bragged of burning alive the chieftains of the Mayan city of Gumarkah, remarked on the fine structures and active trade that characterized that town when those chieftains were still alive.³ We now know conclusively from LiDAR studies directed by the archaeologists Francisco Belli-Estrada, head of Guatemala’s PACUNAM excavation project, and the University of Arizona’s Takeshi Inomata that Mayan civilization prior to the arrival of the Spaniards was latently cosmopolitan, with densities far surpassing the norm in late medieval Europe. The 2018 National Geographic laser mapping survey revealed over sixty thousand interconnected urban structures in the forests of Guatemala, including “previously unknown cities [...] houses, farms, highways and even pyramids.”⁴ It also reversed the lower population hypotheses, often touted by imperial “apologists” such as Maria Elvira Roca Barea who

2. Bruce Bower, “LiDAR Reveals the Oldest and Biggest Structure Yet Found,” *Science News*, accessed 3 June 2020, [sciencenews.org/article/lidar-reveals-oldest-biggest-ancient-maya-structure-found-mexico](https://www.sciencenews.org/article/lidar-reveals-oldest-biggest-ancient-maya-structure-found-mexico).

3. George Lowell, Christopher Lutz, and Wendy Kramer, *Strike Fear in the Land: Pedro de Alvarado and the Conquest of Guatemala, 1520–1541* (Norman: University of Oklahoma Press, 2020), 93–119. The entire book provides graphic accounts of Alvarado’s brutality, which he implemented in urban Mayan spaces, making an example of rebellious leaders in the centres of Mayan power: the cities.

4. CBSnews.com, “Archaeologists Uncover Massive Network of Mayan Ruins with Laser Technology,” accessed 5 February 2018, [cbsnews.com/news/mayan-ruin-discovery-lidar-laser-technology/](https://www.cbsnews.com/news/mayan-ruin-discovery-lidar-laser-technology/).

downplay the physical density of Native populations in the Americas so as to avoid uncomfortable discussions centring on the reasons for those people's "disappearance" (as is the case with the Taino Indians of the Caribbean).

Following the PACUNAM 2017–2018 LiDAR studies in Guatemala and Yucatan, the estimation of the pre-Hispanic Mayan population has morphed from two million to twenty million inhabitants, well beyond the population of any contemporaneous European power. Archaeology in Guatemala, Belize, Honduras, and Yucatan has confirmed the definitively urban nature of Mayan existence. The Mayance peoples were divided into independent city states during the Classic Period (200–900 CE). What were previously thought of as isolated ceremonial centres, such as Copan, turned out to have had considerable residential populations close to the more celebrated ceremonial sites. This is so in Chichen Itza, Edzna, Tikal, El Waka, and numerous other sites throughout Central America; similar patterns have been found in England's Stonehenge.

Some of the Conquistadors, such as Francisco Pizarro, took an active role in transforming previously populated areas. Colonial Lima was built on the outline of an extensive coastal settlement populated by the native Ychma cultures (the name "Lima" may have referred to an Ychma deity venerated since at least the tenth century⁵). This tendency to "build over" the settlements and cities of America's Native peoples explains why Amerindian medical heritage penetrated Hispanic New World culture, independent of its believed "pagan" religious or spiritual orientation. Medical practices and beliefs regarding health were part of the very base and fabric of urban life, along with the tracings of its (demolished) architecture.

Mayan and Andean medicinal systems were based more frequently on empirical observation and scientific trial and error than many pro-Indigenous analysts of the twentieth century could admit, impeded as they were by an overly "mystical" attitude towards Amerindian peoples. This was due in part to theorists such as J. Eric Thompson (regarding the Maya) and Raoul Porras Barrenechea (regarding the Incas and other Andean cultures), who often viewed Amerindian civilizations through a "magical" lens in which Native peoples lived close to Nature and only approached permanent votive sites to render offerings.

5. Jesus Cosmalon Aguilar, "Lima," *Oxford Bibliographies*, accessed 4 June 2021, doi: 10.1093/OBO/9780199730414-0250.

The situation has been altered in the past decade, however. Archaeologist Ruth Shady has substantiated the thoroughly urban nature of Andean civilization in Peru's Caral settlement four thousand years ago.⁶ Caral is a highly constructed space that included trade networks linking coastal, mountain, and desert geographies with the cities of Peru's seacoast. Urbanization was the rule in pre-Colombian Peru, in all successive civilizations that followed Caral, from Chavin's theocracy to the more militarized Wari empire (400–1000 CE) based in Ayacucho and extending throughout the Andes. And the Inca, who augmented Cuzco and changed it from a town to an imposing imperial capital, utilized the Andean urban matrix. That included habitational structures for the mass of the population, and aristocratic/ritual centres—protected by moats that catered to the elite here as in contemporary Europe.⁷ Large, complex, and dynamic cities existed in the ancient Americas, prior to the Conquest.

The error of intellectuals such as Rama lay in assuming that only ritual function constituted the crux of Native architecture. The truth was otherwise. In America, just as in medieval Europe, the most spectacular examples of masonry were certainly reserved for the temple priests and the royal elites they catered to. But both Machu Picchu, straddling the midpoint between the Amazon and the Andes in Peru, and Santiago de Compostela in Spain's Galicia province were home to thousands of agriculturalists and builders, not only the ruling class who benefitted from their subjects' labour.

Medicine was also practised by experts in the Andes—called *hampiqamayoc* in Quechua, meaning literally “those who are wise in healing.” The *hampicamayoc* administered to the Inca elite and the classes they dominated. And Inca rulers did not hesitate to make use of the knowledge of the peoples in their tributary areas, such as the Kallawayas. Kallawayas healers were revered botanical doctors long before the rise of Tahuantinsuyu (the Inca polity and its conquered territories) in roughly the mid-twelfth century. These *hampiqamayoc* tended patients in large administrative and political centres in the Inca empire, such as Cusco, Chimú, and Quito. But they also worked in smaller regional settings, such as Argentina's Shincal, themselves satellites of the expanding Inca

6. Ruth Shady, “Caral-Supe y su entorno natural y social en los orígenes de la civilización andina,” *Investigaciones Sociales* 9.14 (2005): 89–120.

7. Michael Moseley, *The Incas and Their Ancestors* (London: Thames and Hudson, 2002), 208–17.

capital of Cuzco.⁸ Medical knowledge flowed along a two-way street, from city to village and back again.

The Maya, too, made use of these communication routes to expand and perpetuate their medical practice. Mayan doctors were known as *q'anil*: literally, “touched by lightning.” Among the Maya, the ability to heal was viewed as a shamanic gift accessible only to one who had suffered an illness, who had been, literally or figuratively, “struck by lightning” and recovered.⁹ The *q'anil* travelled throughout Central America, working with the Mayan elites in the power centres of their city-states, and the village people who kept those elites in their place. During the eighth and ninth centuries, in political capitals such as Cancuen and Bonampak, uprisings by discontented nobles and disaffected “commoners” dislodged many of those rulers. As a result, many urban settlements in the highlands of Guatemala were abandoned. But in the tenth century, new centres sprang up to the north, in Yucatan, and Mayan urban life continued uninterrupted until the Spanish conquest of the 1520s.¹⁰ Significantly, the *q'anil* continued to labour among the inhabitants of both cities and villages, in the Guatemalan highlands, in Honduras, and in the cities post-classic (1000–1519) Yucatan; their work continues to this day.¹¹ This work, of course, invited the ire of colonial religious authorities, who designated the *q'anil* as witches.

Thus, the Maya did not first “discover” urbanism when Francisco de Montejo founded Merida in 1542, since Merida itself was built on the ruins of the Mayan centre of T'i'ho (Five Hills).¹² and T'i'ho was part of an area of

8. Joseph W. Bastien, *Healers of the Andes: Kallawayas Herbalists and their Medical Plants* (Salt Lake City: University of Utah Press, 1987), 56–103.

9. Victor Montejo, *Q'anil: Man of Lightning* (Tucson: University of Arizona Press, 2001), dx.doi.org/10.2307/j.ctv1qwwj79. Montejo's book is an intricate depiction of the apprenticeship of a Mayan shaman and healer and is a poetic retelling of a traditional epic of the Jakalteq Maya of Guatemala.

10. The archaeologist Francisco Estrada Belli is an excellent source for further reading on the issue of pre-Conquest Mayan habitational patterns and population migrations.

11. Barbara Tedlock, “The Role of Dreams and Visionary Narratives in Mayan Cultural Survival,” *Ethos* 20.4 (1992): 453–76, dx.doi.org/10.1525/eth.1992.20.4.02a00030. Tedlock remarks that when Tzotzil Mayan subjects are summoned to be doctors, “they are told that they have been chosen to become healers and are given patients to cure” (456).

12. Linda K. Williams, “Dual Messages of Power on the Facade of the Casa Montejo, Merida, Yucatan,” *Studies in Iconography* 31 (2010): 157–210. Williams notes that the Conquistador Montejo the younger had “one of the first structures erected on the remains of the Maya city of T'i'ho [...] the

sometimes feuding and sometimes collaborating Mayan city-states. They were linked by commercial routes called *Sac Beob* (white roads) where basic items, luxury merchandise, and medical goods traversed large distances. The area criss-crossed by the *Sac Beob* led from Quintana Roo in southwest Mexico to present day Honduras. Mayan urban centres marked the confluences of this vast complex of roads, and the *q'anil* doctors and herbalists were as frequent voyagers as the merchants of Mayab.

Similarly, the Andeans did not become “introduced” to urbanism when Francisco Pizarro founded Lima in 1535. The capital of the Incas, Cuzco, was described by Pizarro’s cousin Pedro as an impressive city, comparable to Europe; and the Conquistadors themselves compared the Inca empire frequently to Rome.¹³ From the perspective of the Spanish empire, they took pride in defeating a powerful polity, not a collection of small villages. Conquest-era chronicles mention the presence of the hereditary Ychma leader, Tauliguaycho. Tauliguaycho negotiated directly with Pizarro’s representatives regarding the construction of imperial Lima; and he supervised the excellent hydraulic systems that the Conquistadors left in place. The earlier city of Ychma, before it became “Lima,” thus enjoyed access to well-watered fields and a coastline where merchants plied their goods as far north as present-day Quito in Ecuador. Spondylus shells, prized in South America and Central America as sacred items, were transported in cargos from Quito, finding their way into ceremonial graves in both Mesoamerica and the Peruvian Andes, and linking Mayan and Andean peoples in a far-flung trade nexus.¹⁴

palace’s construction atop Ti’ho’s ceremonial center was meant to suggest the historical continuity and functional importance of the site itself” (57).

13. One of the most emblematic chroniclers of pre-Hispanic and Conquest era Peru, Garcilaso el Inca (Gomez Suarez de Figueroa) frequently compared the Inca empire to Rome—in an attempt to make the Incas more palatable to his Hispanic readers but also to stress the cosmopolitan and sophisticated nature of Inca society. Conquering the Incas was thus equivalent to conquering Rome, which Europeans viewed as a very great city indeed. His *Comentarios Reales* (1609; Royal Commentaries) stressed this comparison. German Campos-Munoz delves deeper into the Rome/Inca empire comparison in his article “Cuzco, *Urbs et Orbis*: Rome and Garcilaso de la Vega’s Self-Classicalization,” *Hispanic Review* 81.2 (2013): 123–44, dx.doi.org/10.1353/hir.2013.0011.

14. Allison C. Paulsen, “The Thorny Oyster and the Voice of God: *Spondylus* and *Strombus* in Andean Prehistory,” *American Antiquity* 39.4 (1974): 597–607, dx.doi.org/10.2307/278907. Paulsen remarked that “aboriginal vessels were entirely capable of making long coastal voyages” (599) and archaeological findings of the past ten years have substantiated that the Ecuadorian spondylus was found in Mayan

The new “Hispanic city” of Lima made use of routes that had been forged long before the age of European presence in the New World. Part of the Inca Road, the *Qapaq Nan* or high road used by Inca and earlier Wari peoples to unify their empires, ran directly through modern-day Lima’s Pontifical Catholic University. Another pre-Inca pyramid of the Ychma people has been identified on the campus of the University of San Marcos, which is Lima and South America’s oldest functioning university. The *Qapaq Nan* in the Andean region and the *Sac Beh* in Mayan Central America were conduits of a cosmopolitan dynamic, not rural paths carved out for votive purposes. The dynamic continued into the colonial period, i.e., Spanish colonial construction replicated and augmented Native American urban centres, though of course Native American temple spaces were forcibly repurposed as central plazas and cathedrals.¹⁵

Early Spanish settlers in Peru and in Central America spoke of the medicinal value of previously unknown plants Native American doctors utilized for their Spanish clients in the new towns, sometimes attributing, to both plants and native peoples, a concocted “biblical” origin, as did author Gonzalo Fernandez de Oviedo in the early sixteenth century.¹⁶ A somewhat freer interchange between Spanish and Amerindian doctors occurs prior to the formal establishment of the Inquisition in the Spanish Americas by Phillip II. In Lima, the Inquisition lasted two and a half centuries (1570–1820) and exercised its authority throughout the Andean plateau and the entire geographical area of the Southern Cone. The Maya, meanwhile, became entangled with the seat of the Inquisition in Mexico City (established in 1571 and abolished in 1820). The authority of Mexico’s Inquisition extended into the Captaincy of Guatemala, including most of the Mayan areas. Even though the Native peoples were officially exempt from the Inquisition’s authority—on paper, at least—any practice of Indigenous medicine was deemed “heresy” and “relapsing” into

graves. See Sarah E. Newman, “Sharks in the Jungle: Real and Imagined Sea Monsters of the Maya,” *Antiquity* 90.354 (2016): 1522–36, dx.doi.org/10.15184/aqy.2016.218, and her description of the ceramic and spondylus cache at the site of El Zotz, Guatemala, dated to 800 CE.

15. The most obvious example of this is in Mexico City itself, where the cathedral is built directly over the Aztec Templo Mayor; large swathes of the Aztec temple, replete with the statues of its gods, are excavated and accessible to the public. In Cuzco, the *Coricancha*, the golden plaza of the Incas, was transformed into the Convent of Saint Dominic, and the process was repeated throughout all of Spanish America.

16. Franklin Pease, *El mar peruano: mitos andinos y europeos* (The Peruvian sea, Andean and European myths) (Lima: Sociedad Geográfica de Lima, 2015), 88–89.

idolatry. This had profound implications for the practice of medicine, which was thought to arise directly from pre-Christian “pagan” beliefs. Therefore, any Native healer or doctor could be charged, tortured, and executed by the Inquisition. And many were.

Paradoxically, the Inquisition was headquartered in the urban centres of the empire (Mexico City, Lima, Santo Domingo, Cartagena); it was in those same cities that Native medical tradition best persisted and concealed itself.¹⁷ This was due to population density and the burgeoning amount of ethnically mixed (Spanish/Native American/African) families in cities, as well as the unofficial manner in which Native healers could be summoned and compensated for their services secretly by “noble” Spanish families. The city was where the headquarters and affiliate branches of the Inquisition operated. Inevitably, cities were also the focal point of cultural exchange and medicinal treatments, some of it clandestine, all of it frequent.

Serious risks remained for any Native American medical practitioner. In Central and South America, Native American doctors could also be detained and condemned by the Franciscan order, which was empowered by the Spanish Crown to act as a proxy “arm” of the Inquisition in the Americas. Yale University’s great Mayan epigrapher Michael Coe noted the effects of this fanaticism, when the Franciscan priest Diego de Landa was able to burn thousands of Mayan manuscripts—medical, mathematical, and astrological—in the Mayan city of Mani, Yucatan in 1562, as well as to torture over four thousand Mayans accused of “relapsing” into “idolatrous” customs, such as practising herbal medicine.¹⁸ Coe writes of Landa: “He was a fanatic as far as

17. An invaluable source on the Inquisition in Latin America and its complex relationship to different groups, including Native Americans, is Pedro Guibovich Perez, *Censura, libros e Inquisición en el Perú Colonial* (Censorship, Books, and Inquisition in Colonial Peru) (Seville: Universidad de Sevilla, 2003). John F. Chuchiak’s chapter “Yucatec Maya Witchcraft and Sorcery and Mestizaje of Magic and Medicine in Colonial Yucatan, 1570–1790,” in *Sorcery in Mesoamerica*, ed. Jeremy Coltman and John M. D. Pohl (Denver: University of Colorado Press, 2021), 135–66, provides well-detailed background on the persecution of healers branded as witches. In addition, Irene Silverblatt, “New Christians and New World Faces,” *Comparative Studies in Science and History* 42.3 (2000): 524–46, further elaborates on Inquisitorial trials and victims in Lima’s Inquisition, whose territorial extension was greater than that of Mexico, La Hispaniola, or Cartagena.

18. David Stuart, *The Order of Days* (New York: Random House, 2011), 147. Stuart remarks that “in his own day, Landa had gained a harsh reputation for his overzealous reaction to ‘idolatry’ and for stamping out native ‘works of the devil’ including the burning of hundreds of hieroglyphic books” (147).

native idolatry was concerned, and in 1562 started his famous, and perhaps illegal proceedings against that practice [...] almost all the surviving books of the lowland Maya perished in his terrible auto-da-fe in Mani at that time.”¹⁹ Similarly, the areas of Huarochiri and Chancay, hotbeds of Andean resistance and focal points for the oral transmission of Andean traditional medicine and knowledge, were scoured by Inquisitorial processes in 1670–73. Many of the detained subjects in these instances were Native American herbalists, whose major crime consisted in applying certain plant poultices to infected limbs.²⁰

It is not surprising that the Inquisition intruded upon Indigenous medicine. By the late sixteenth century the Inquisition overreached its original, more circumscribed authority, from which the Native peoples had been officially excluded since 1492. Despite that, Andean and Mayan medical techniques circulated in the growing urban spaces of the Hispanic New World, to the point that many Hispanic and mestizo (mixed Hispanic/Amerindian) peoples began to view Indigenous medicine as an intrinsic element of their own botanical pharmacopoeia.

Sources for colonial and Indigenous medicine in Latin America

Since the Conquest of the Americas, literature has documented Mayan and Andean medicine, at times in anecdotal rather than systematic form. Mayan and Andean medicines appear on lists of botanical cures redacted by Spanish priests in dialogue with Indigenous informants, during the initial stages of Conquest and colonization. Bernardino de Sahagun, Jose de Acosta, and even the more fanatical Diego de Landa all mention these cures. The intention underlying these transcriptions was immediate efficacy in combating illness, not praise of Indigenous health practices. If there was a contagious disease and Native peoples possessed a botanical solution for it, then it was duly noted by Spanish officials. This was a factor in allowing Andean, Aztec, and Mayan scribes and artists to be trained in Western writing systems. Using the Latin

19. Michael D. Coe, *Breaking the Maya Code* (New York: Penguin Books, 1994), 92–93.

20. Karen Spaulding, *Huarochiri: An Andean Society under Inca and Spanish Rule* (Stanford: Stanford University Press, 1988). Spaulding’s entire book chronicles the rough treatment, including death, meted out by the Inquisition on those Yunca and Yauyo Indians of Huarochiri province who continued to practise traditional medicine and botanical cures. As these Indians were “relapsed,” they fell under the aegis of the Inquisition.

alphabet, their texts were conduits for the transmission of medical knowledge. Urban contact facilitated medical scholarship, however imperfectly—and asymmetrically—such scholarship was conveyed in the colonial context.

Such is the case in Gonzalo Fernandez de Oviedo's *Historia General y Natural de las Indias* (1547; Natural and general history of the Indies).²¹ The quantity of botanical information in Oviedo's compendium is extraordinary, most of it being from his own observations in Nueva Granada (roughly today's Colombia and Venezuela) and the southern Caribbean. While diverse Native plant-based medicines do appear, Oviedo offers limited cultural context, bathed as that context was in "pagan" light for Oviedo's Inquisitorial religious censors. Oviedo's observations are marred by the endless attempt to force diverse Native American culture into the matrix of familiar Greek or Roman "pagan" models. (For Oviedo, and for his Inquisitorial, the Greco-Roman world were more acceptable pagans than were Amerindian peoples).²²

Bernardino de Sahagún's monumental *Historia de las Cosas de Nueva España* (1577; History of the matters of New Spain)²³ is a primary source of Nahua- (Aztec and Tlaxcallan) based medicine. The manuscript was viewed with suspicion by Spain's conservative Phillip II, but it was touted by the Medici in Italy, and remained in their possession from 1588 onwards. Originally written sometime between 1560 and 1570, it was a far-reaching collection of Aztec pre-Conquest medicine, history, and religion. Much of "Aztec" medicine was in fact borrowed from previous civilizations such as Teotihuacan (100–700 CE) and the much older Maya tradition. Sahagun himself seems unaware of those distinctions, and if the Nahua scribes employed by Sahagun did mention this fact, it was never recorded. In his prologue, Sahagun insisted that his work was destined to reveal the illnesses (Aztec belief systems) for which a cure could be more effectively employed (Catholic evangelization).²⁴ There was an undeniable

21. Gonzalo Fernandez de Oviedo y Valdes, *Historia General y Natural de las Indias* (Madrid: Atlas-Biblioteca de Autores Españoles, 1959).

22. Alvaro Baraibar, "Las miradas de Gonzalo Fernandez de Oviedo sobre la naturaleza del Nuevo Mundo," *Estudios Ibero-Americanos* (2014): 7–22, 16.

23. Bernardino de Sahagún, *Historia General de las Cosas de La Nueva España*, vols. 1 and 2, ed. Alfredo López Austin and Josefina García Quintana (Madrid: Alianza Editorial, 1988).

24. Bernardino De Sahagún, *Historia General de las Cosas de Nueva España, parte uno* (1577). In the prologue, Sahagún remarks: "de manera que el buen médico sea docto en el conocimiento de las medicinas, y en él las enfermedades, para aplicar [...] a cada enfermedad la contraria. Los predicadores

architectural presence of the Aztec empire and its former vassal states in the places where Sahagun ministered to the Indian population. Denying the pre-Hispanic urban presence would have been a futile exercise. For Sahagun, that presence had to be absorbed and neutralized, as did its medical lore.

Seventeenth-century persecutions and “reconquests” of relapsed Native Americans in the Andes and Central America, as well as the increasing embeddedness of the Inquisition, inhibited the inquiry into Native medicine that had characterized the earlier efforts of those like Bernardino de Sahagun. The destruction in 1697 of the final hold-out independent Mayan city-state, that of Tayasal in the Peten jungles of Guatemala, ended the opportunity for Mayan doctors, the *dzac yah* (medical masters) to transmit their learning in the framework of an independent Mayan polity.²⁵ Subsequently, the *dzac yah*, male and female, cultivated their botanical pharmacopoeia in the medical gardens of Mayan community farms, where pre-Christian content could be safely camouflaged as plant and flower arranging.

The Inquisitorial persecutions of doctors in the Huarochiri region of Peru in the 1660s have been superbly documented by Ana Sanchez and Karen Spaulding. The trials were overwhelmingly directed at the Yunca and Yauyo curers and healers, apart from the surrounding mestizo population who maintained pre-Conquest botanical remedies. Inevitably, the outcomes (lashings, imprisonment, and exile) cast Native medical practices in a dangerous light. Generational transmission of Andean botanical medicine was harshly and publicly punished. The only “doctors” allowed would be those whose training was in European traditions, sanctioned by the institution of the *Protomedicato*, whose dictates emanated from the urban capital of Lima. By the seventeenth century, the Crown considered that the Amerindian population had practised Christianity for a long enough period to be eligible to be stretched on the rack for any supposed violations of it. Native “pagan-based” medicine was a major violation of Inquisitorial behavioural codes.²⁶

y confesores, médicos son de ánimas” (31; the good doctor is versed in the knowledge of medicines and their diseases in order to apply them [...] to each disease, he must give the contrary cure. And preachers and confessors are doctors of the soul). (My translation.)

25. Stuart, 7–36.

26. Spaulding has detailed these later epochs of the colonial period quite vividly in Huarochiri, emphasizing the cultural heterogeneity of the Andean region.

As Inquisitorial persecution intensified in rural areas, Native medicine survived in clandestine fashion, either deeper in the forests and mountains, or hidden in plain sight, in so-called “witches’ markets” in bustling urban spaces. In cities that were closer to the seat of power, as one would expect, royal prerogative could override the Inquisition when it was convenient to do so. Hence in 1574 Philip II allowed the publication, in limited edition, of the physician Nicolas Monardes’s *Primera, Segunda y Tercera partes de la historia medicinal*. This was an extraordinary volume that synthesized most of what was known of Amerindian medicine at the time, including the application of guaiac wood to lesions caused by venereal illnesses. Monardes’s work was translated into English in 1577. It was more widely read in Elizabethan England than in Philip’s Spain, owing perhaps to Philip’s need to de-emphasize the wisdom of “pagan” natives. The Inquisition had been established in Mexico (including Guatemala) and Peru barely half a decade before Mondardes’s opus; it would supervise and limit all access to medicine not sanctioned in scriptures. Monardes’s writing, sadly, did not benefit the masses of people in the city where it was first published: Seville. It stayed in the domain of royalty.

Ominously for the Crown, uprisings included contingents of mestizo and Spanish support from the lower economic castes in poverty-stricken urban settlements. Outstanding examples are Jacinto Canek’s uprising in Cistell, Yucatan in 1761, and Gabriel Condorcanqui’s (Tupac Yupanqi II) 1780–81 revolution in Peru. While unsuccessful at the time, those uprisings are now considered precursors to South American independence, with direct implications for the health sciences. In the cities of colonial Spanish America, the calls for emancipation from Spain implied wider acceptance of scientific ideas, from the Enlightenment and beyond. But as late as the early 1800s, the Inquisition still censored all aspects of publishing in the urban printing presses of the Spanish colonies.

Small wonder then that manuals on Mayan and Andean medicine, when published during the Spanish colonial period (1492–1824), were done so anonymously. Such was the case of the late eighteenth-century *Libro del Judío* (The book of the Jew) from Yucatan, for which there is no clear author or exact date of publication.²⁷ This was a compendium of Mayan botanical medicine

27. Anonymous, *Libro del Judío* (Mexico City: José Martín y Espinosa de los Monteros, 1834). There are contradictory theories regarding its authorship. One is that Giovanni Mayoli, known as *El judío* (The Jew) had, in the 1750s, compiled a series of prescriptions that mixed Mayan codices and Judeo-Spanish

most likely written by a doctor who was one of Spain's later crypto-Jews, one who had fled the Inquisition and taken refuge in remote areas of the Mayan peninsula. Eighteenth-century Yucatan also saw the anonymous circulation of the anonymous *Ritual de los Bacabes* (The ritual of the standard-bearers).²⁸ This testament detailed the spiritual and botanical elements of the process of recovery of the patient, in connection with the shaman, who fought disease on the physical and emotional planes simultaneously.²⁹ These manuscripts were copied and passed from hand to hand from late colonial Yucatan to Mexico City, as doctors, with or without the Inquisition's approval, strove to find cures for the contagions and plagues that were a fact of urban life.

Anthropologist Mercedes de la Garza has produced comprehensive investigations of plant-based medicine among the Maya, including the uses of powerful enemas for both purgatory and hallucinatory uses.³⁰ In addition, the anonymous *Codice Cruz-Badiano*, a comprehensive collection published in Mexico in 1552 that catalogued much of Aztec herbal medicine barely one generation after the Spanish Conquest, has merited (along with *El Libro del Judio* and *El Ritual de los Bacabes*) increased appreciation of the accuracy of its medical observations.³¹

Under the limited influence of the Enlightenment in the Andes, Spanish émigré doctors began to question the “primitive” character of Andean medicine. By the mid-1800s, regarding issues such as malaria, it was evident that Andean botanical cures had outperformed prayer and imported European medicine, both formal and folk. The use of cinchona bark—popularly known as “quinine” in English—as a cure for malaria had spread from eighteenth-century Ecuador throughout Europe. Once Native healers had brought the quinine plant to malaria sufferers in colonial Quito, its fame spread quickly from the urban

medical practice. To evade the Inquisition in the Americas, Mayoli supposedly wrote under a pseudonym, Ricardo Ossio. No definitive proof has substantiated this or any other theory, but it is plausible.

28. R. Arzapalo Marin, ed., *Ritual de los Bacabes* (Mexico City: Universidad Nacional Autónoma de México-Centro de Estudios Mayas, 1987).

29. Mercedes de la Garza, *El legado escrito de los mayas* (The written legacy of the Mayas) (México City: Fondo de Cultura Económica, 2012), 42–43.

30. Mercedes de la Garza, *Sueño y Éxtasis* (Dream and ecstasy) (Mexico City: Universidad Nacional Autónoma de México, 2012).

31. William Gates, ed. and trans., *An Aztec Herbal: The Classic Codex of 1552* (New York: Dover Press, 2000).

periphery (Latin American cities) to the urban imperial metropolis (Madrid) by way of Paris. Soon, Spanish nobles in Madrid began to require it.³² In the same century, observing quinine's use among Ecuador's Native cultures, the French scientist Charles Marie de la Condamine had described its potential uses against malaria fever while on a voyage sponsored by the Spanish Crown to map the equatorial regions of its empire.³³ Europe needed to learn of the uses of quinine from the Amerindians of Ecuador's Upper Amazon; hence, it would appear that these Amerindians were no longer quite that "savage." Regular shipments of quinine from Latin America became a facet of eighteenth-century Spanish, and very quickly English, existence, indicating a practical re-evaluation of the "heathen" and "primitive" nature of Andean medicine.

Condamine's impact was felt by other European intellectuals in the New World, including Celestino Mutis. The pharmaceutical and medicinal works of Father Celestino Mutis (1732–1808) were illustrated by renderings of Nueva Granada's indigenous flora, produced by Mutis's apprentices. Mutis viewed the Native cultures as repositories of living botanical wisdom and treatments from which Europeans could benefit. His posthumously edited and published *Expedicion Botanica* (Botanical expedition), enriched with artistic reproductions of the species encountered on his 1783 journey along the Magdalena River, stands as one of the major visual texts of Indigenous medicine.³⁴ It is characterized by Mutis's willingness to contrast scientific findings in both Indigenous and European medical traditions, and by the visual depictions of those contrasts.

In those last days of empire, Alejandro Malespina strove to enlighten Madrid's peninsular bureaucracy, regarding the herbal cures of the Native peoples throughout Spain's American empire, as a result of his voyage in

32. Pellegrino A Luciano, "When Quinine Was King: A Note on the Global Ecology of Health," *Practicing Anthropology* 37.2 (2015): 31–34, dx.doi.org/10.17730/praa.37.2.r745608t35g36606. "Spanish missionaries learned of the tea's use for reducing fever from Indigenous Amazonians in the 17th century and it was even used to cure the wife of the Viceroyalty of Peru, the Countess of Chinchon, from an illness now believed to be malaria" (32).

33. Charles Marie de la Condamine, "Sur l'arbre de Quinquina," *Memoires de l'Academie des Sciences* 4 (1745): 226–43, Wellcome Collection, wellcomecollection.org/works/fxmtmy9x.

34. Esteban Manrique, *Jose Celestino Mutis: A Botanical Expedition* (Bogota and London: La Fabrica/Royal Botanical Gardens, 2019). This bilingual Spanish-English edition of Mutis's work has magnificent reproductions of Ecuadorian and Columbian flora, both medicinal and decorative.

1789.³⁵ Medicine was not the focus of Malaspina's voyage. As with Condamine, mapping imperial boundaries correctly was the avowed purpose. But his admiration for Amerindian botanical knowledge was clear. Although neither Mutis nor Malaspina met with an encouraging reception of their efforts on a governmental scale, their work was instrumental in modifying Western attitudes toward Amerindian science.

These shifting views became increasingly evident by the twentieth century. In mid-century, Leon Goldman and Alan R. Sawyer, writing on medicine in pre-Colombian Peru, alerted both art historians and biologists to an overlooked fact germane to the history of medicine: that the art of the Moche civilization, flourishing roughly 100–800 CE, contained graphic examples of infection in its ceramic portraiture.³⁶ The Moche sculpted heads included anatomically precise renderings of the phases of the leishmaniasis disease. Moche “disease sculptures” constitute an important chapter in the history of medical illustration. Since the 1960s, this art has become more accessible to researchers studying the pre-Inca civilizations of coastal Peru. Moche art, in its representation of imperfection and affliction, has enabled us to better understand how Andean peoples saw diseases, such as leishmaniasis, that were climate based and originated in the humid Amazon.³⁷

The publication of Rosa Arvigo's *Sastun* in the mid-1990s was a watershed event.³⁸ This encyclopedia of Mayan plants comprises a guidebook of botanical cures, many of which were encountered by Spanish travellers among the Maya hundreds of years ago. To date, over 60 percent of them have been tested in the

35. Andrew David, Felipe Fernandez-Armesto, Carlo Novi, and Glyndwr Williams, eds., *The Malaspina Expedition, 1789–1794: The Journal of the Voyage by Alejandro Malaspina*, trans. Sylvia Jamieson (London and Madrid: Hakluyt Society in association with the Museo Naval, 2005).

36. Leon Goldman and Alan R. Sawyer, “Ancient Peruvian Medicine,” *Journal of the History of Medicine and Allied Sciences* 13.1. (1958): 10–14, dx.doi.org/10.1093/jhmas/XIII.1.10.

37. The Larco Hoyle Museum of Archaeology, in Lima, Peru, contains an extraordinary collection of examples of this Moche disease portraiture. Lima's Museum of Anthropology also displays fine examples of this Moche art. The Moche themselves lived in extended urban compounds on Peru's northern coast. Their imposing desert cities offered them a respite from the extremes of high altitude and jungle that afflicted the later Incas, or Amazonian tribes contemporaneous with the Moche.

38. Rosa Arvigo, *Sastun: My Apprenticeship with a Maya Healer* (New York: Harper Collins Publishing, 1995).

laboratories of the New York Botanical Gardens and found to possess effective febrifugal and anti-inflammatory properties.

Researcher Jorge Lira authored one of the seminal works on Andean medicine and its complicated, and clandestine, survival in the sixteenth to eighteenth centuries.³⁹ Apart from its encyclopedic overview of Andean conceptions of mental and physical health, Lira rightly insisted on aspects of cyclicity and repeating temporalities (seasons and ceremonies) within Native medical praxis. The indissoluble nature, as Lira understood it, of bodily and spiritual wellness in Andean thought, occupies an equally determining role in early modern historian Martha Few's narratives on Mayan medicine. This is particularly so in her intriguing study of Mayan health practices during the last century of Spanish colonial rule.⁴⁰ Like Peruvian researcher Ana Sanchez in the 1980s, Few emphasizes thorough examination of Spanish Inquisitorial archives as key to understanding how medicine was controlled in colonial urban Latin America.

Inquisitors demonstrated hostility towards such practices as the medicinal use of chocolate during the Maya early modern period.⁴¹ Contemporary science has affirmed chocolate's high content in flavonoids and vitamin B1, essential for a functioning nervous system; its high calcium content, quintessential for bone strength, and anti-cortisol properties, cortisol being the designated

39. Jorge A. Lira, *Medicina andina, farmacopea y rituales* (Cuzco: Centro de Estudios Bartolomé de las Casas, 1985).

40. Martha Few, *For All of Humanity: Mesoamerican and Colonial Medicine in Enlightenment Guatemala* (Tucson: University of Arizona Press, 2015).

41. Cameron L. Mitchell, ed., *Chocolate in Mesoamerica: A Cultural History of Cacao* (Gainesville: University of Florida Press, 2009). Chocolate was first cultivated by the Maya peoples roughly two thousand years ago, and later enthusiastically adopted by the Aztecs, and introduced to Europeans via the Spanish conquests. In its original form, it was a treasured medicinal beverage, sweetened with honey. The Maya believed that chocolate reduced anger and heart palpitations, that it developed strong bones, and calmed nervous outbreaks. What was at play here was solid, sustained empirical observation, centuries later reaffirmed in the laboratory. As chocolate became the favoured drink of Spanish elites ensconced in the cities of Americas and Europe, there was greater willingness to heed Mayan herbal doctors regarding its medicinal properties. Here, again, the city served as conduit for the evidence of curative powers. The Spanish elite would not venture into a Mayan village to search for a doctor, but since Mayan servants were required by the urban upper class, traditional botanical content came into Spanish homes.

“stress hormone.”⁴² Rainer Bussman and Douglas Sharon have analyzed the Amazonian roots of Andean medicinal knowledge, raising interesting questions regarding herbalism’s seasonal adaptability.⁴³ How do plants designated as cures for high altitude or humidity-based maladies circulate through two regions that could not have less in common geographically: the lower jungles and some of the planet’s highest peaks?

Communication, trade, and medicine flourished on pre-colonial trade routes from high to low regions in the Andes and the Amazon. These were not isolated civilizations. If they became so later, it was due to colonial subdivisions of the area, not to innate “isolationist” tendencies.

Ironically, as this article will clarify, the focal points of Spanish colonial power—the cities—defeated the ethnic subdivisions that the colony attempted to enforce. Native peoples and Spaniards intermingled and formed families in the urban areas; and Native health traditions were perpetuated and disseminated widely throughout Latin America, through the (frequently asymmetrical) urban interchange of people and cultures.

Changing medical attitudes in the colonized new world

Drawing on a distinction that Bernardo de Balbuena made in his poem *Grandeza Mexicana* (1602–04; Mexican grandeur), Terukina Yamauchi described the Aristotelian paradigm of “natural thesis” (God-given location) and “phusis” (man-made alteration, for the benefit of the inhabitants) as they affect health and well-being within the setting of the colonial New World city. Mexico City, built on the ruins of the heavily populated Aztec capital Tenochtitlan, initially provided supposed proof of “thesis” and “phusis.” As Yamauchi points out, Mexico City shared Spain’s latitude and was thought to constitute a sort of natural cradle for social development. Taking the “thesis plus phusis” argument one step further, Yamauchi demonstrates how the idea of “natural thesis” led Balbuena and other chroniclers to assert that Mexico City

42. Martha Makra Graziano, “Food of the Gods as Mortals’ Medicine,” *Pharmacy in History* 40.4 (1998): 132–46.

43. Rainer W. Bussman and Douglas Sharon, *Medicinal Plants of the Andes and the Amazon: The Magic and Medicinal Flora of Northern Peru* (St. Louis: Missouri Botanical Garden Press, 2015). This book is especially pertinent as much ethnographic research has pointed in the direction of possible Amazonian origins, not only for Andean medicines but for some of the very earliest models of its cultures.

was far healthier than the Iberian Peninsula, due to Nature and the architectural improvements supposedly of the Spanish Colony.⁴⁴ Like Balbuena in Mexico, other colonial writers such as Bernabé Cobo in Peru and Diego de Landa in Yucatan applied Aristotelian terms to colonial concepts of health, working by way of architecture. They emphasized as the “thesis” the “natural disposition” of certain nations to rule (including, in the imperial gaze, the Spaniards). This “thesis” together with what they viewed as the man-made improvements initiated by Hispanic architecture in the Andes and Central America (the “phusis,” as colonial theory posited) would naturally predispose Spanish creole inhabitants of the New World to be more robust than Native peoples. Following this logic, Spanish creole health was touted as superior to that of Iberian-born conquistadores. Their architecture was viewed as impregnable, and their health supposedly reflected that superiority.

Colonial Lima contradicted that. Built on the better irrigated Ychma Indian town, it was supposed proof of thesis over phusis. Mexico City’s phusis notwithstanding, Lima’s “beautiful air” (“*aire primoroso*”) was believed by late sixteenth- and early seventeenth-century medical authorities in Spain and Peru to cure all ailments, including the contagions of the more polluted Mexico City. Lima’s climate has been the object of elegies throughout five centuries, due to its temperate nature and the pleasant phenomenon of a cool mist, which pervades the city without drenching it in rain. Postal official, traveller, and writer Alonso Carrio y Vandera played a role in cementing Lima’s salutary reputation in his 1776 opus *El Lazarillo de ciegos caminantes: viaje de Lima a Buenos Aires*.⁴⁵ *El Lazarillo de ciegos caminantes* was a brilliant satire on Spanish-Quechua relations, medicine, and social customs in the twilight of the Spanish colonial period. Lima, of course, is described as the crux of robust well-being, its air and seacoast effectively nullifying maladies which could be deathly in the context of Mexico City and Buenos Aires’ urban sprawl and deficient sanitation.

Closer to home, the smaller Mayan cities such as Mayapan, traditionally connected by well-trod commercial thoroughfares, provided a marked contrast to the more densely populated Aztec Tenochtitlan / Hispanic Mexico City. As Bernal Diaz noted in the second half of his *Historia Verdadera de la Conquista de la Nueva España* (The true history of the conquest of New Spain), the Maya were

44. J. Terukina Yamauchi, *El Imperio de la virtud* (London: Tamesis Publishing, 2017), 20–42.

45. Alonso Carrio y Vandera, *El Lazarillo de Ciegos Caminantes* (Caracas: Biblioteca Ayacucho, 1985).

far more mobile than the more centralized Aztecs.⁴⁶ Thus, Mayan resistance to the Conquest was much more consistent and sustained. Mayan peoples erected and removed dwellings at will, with an infuriating tendency to “disappear into the forest.” That occurrence was amusingly noted again by late seventeenth-century pirate and botanist William Dampier in his writings on Yucatan.⁴⁷ This “flexible urbanism” made it hard for the Crown to concentrate the Maya in “missions,” as was done with the Guarani peoples of South America. It also made stamping out Mayan medical practices doubly difficult. The towns that seemingly disappeared from one day to the next could send refugees to urban centres such as Mayapan, where they would blend in with the local population and bring their medical knowledge with them.

The Maya and the Andean peoples were certainly not immune to diseases transmitted through contact with Europeans. But neither of them suffered consequences as extreme as the contagions that struck Mexico City throughout the colonial period. In a sanitary sense, the Spanish architecture that Balbuena had lauded fell short, particularly when contrasted with the lower densities and superior irrigation of Andean and Mayan urban spaces.⁴⁸ Urban spaces are conducive to faster dissemination of knowledge, and to more rapid rates of infection. The “phusis” of cleanliness was an aspect of colonial urban life that was supposed to mitigate exposure to disease, yet colonial Mexico City lagged behind Andean and Mayan models. Colonial architecture did not actually provide phusis in the sense of health or hygiene.

Nonetheless, as was proved tragically in Lima in 1687, European colonial architecture did not have the geodesic resistance to earthquakes that Indigenous structures possessed. The stepped pyramids of the Maya, and the trapezoidal bases of Andean structures, resisted earthquakes more successfully than European-style architecture. European colonial architecture, however impressive, had not taken into account the volatile geological circumstances of its New World locations. It replicated the plaza-cathedral-market structure

46. Bernal Diaz, *The True History of the Conquest of New Spain*, by Captain Bernal Diaz del Castillo, *Written in the Year 1568 and Translated from the Original Spanish by Maurice Keating Esq* (Charleston, SC: Bibliobazaar, 2010).

47. William Dampier, *Dos viajes a Campeche con facsimil de la edición inglesa de 1705* (Mexico City: Miguel Angel Porrua, 2004), 131.

48. Bernardo Balbuena, *Grandeza Mexicana* (1602), notes and ed. Luis Inigo Madrigal (Madrid: Biblioteca Nueva, 2012), 30–35.

of the typical Iberian town, so as to better facilitate the mass conversion of the Native peoples to Christianity, via erasure of pre-existing “pagan” spatial and urban organization. But colonial architecture could not resist earthquakes as effectively as Native American “pagan” urban spatiality.⁴⁹

In the context of Hispanic conquest and colonization, only Europeans would have benefitted from the “thesis-phusis” health equation, the Europeans having supposedly created the improved phusis. Yet when those of European descent began perishing from urban-spread infectious diseases, such as yellow fever and malaria in the late seventeenth century, the health theories so beloved of chroniclers like Balbuena came undone in urban spaces. The deaths from large-scale plague outbreaks of prominent Mexicans of European background, such as author and nun Sor Juana Ines de la Cruz in 1695, challenged the imperial vision of health embodied by thesis-phusis.⁵⁰ Sor Juana was celebrated in her own time as the “Phoenix” of New World letters, and she is an emblematic symbol of the baroque in Latin America. Her death in the plague of 1695 came as a shock. God, it appeared, was no longer favouring the newer Hispanic cities and their populations, over their “pagan” antecedents, in terms of physical immunity.

If the Mayan and the Andean peoples did not die in numbers as great as those of Aztecs and Europeans from smallpox, malaria, measles, and plague, it had more to do with cleanliness and more available access to water within the colonial cities in which they lived. Cases in point are Peru’s wide and heavily-plied sea coast, where ritual bathing and libations existed alongside commerce routes, and Central America’s underground springs, *los dzonot* (cenotes). The cenotes were not only ritual centres for tossing offerings to Chak, the water deity. For the Maya, the cenotes presented daily opportunities for bodily and domestic hygiene, a facet of life quite scarce in the more crowded and landlocked Tenochtitlan/Mexico City.

49. The horrific earthquakes that rocked Mexico City in 1985 and 2017; the “Great Earthquake” of Lima in 1687; and the destruction wrought by Hurricane Isidore in Yucatan, 2002, are all well-known examples, in Latin America, of how Native American architecture outlasts natural disasters. In all these cases, the buildings that survived were Pre-Colombian; modern and colonial structures did not fare as well.

50. Joan Larkin and Jaime Manrique, eds., *Sor Juana’s Love Poems* (Madison: University of Wisconsin Press, 2003). Sor Juana is famous, and notorious, for the erotic and spiritual quality of her verse; her death was mourned by the major Spanish and Mexican intellectuals of the time, including Carlos de Sigüenza y Gongora. Dying in a plague did not seem to be a just end for a woman who dedicated her life to God.

**Undoing colonialist health assumptions:
the cases of the Andes and Mayan territories**

During the first centuries of the Colony (1492–1650), Spanish soldiers repeatedly petitioned the authorities to be sent to Mexico rather than Peru, since the Indians in Peru, and later the majority of its mestizo and Black populations, were militarily difficult to subdue. But issues of health changed that. The Incas had provided for the ill to be taken care of, as the sick were exempted from all tribute.⁵¹ Peruvian colonial society also appeared to deal more successfully with health crises.⁵² Lima's higher altitude and closeness to the coast provided an easier avenue to "dissipate contagion" (*esparcir los malos aires*) than did Mexico City, hunkered down in a valley surrounded by powerful ash-spewing volcanoes. Sadly, El Popocatepetl, Mexico's emblematic volcano, continues to shower Mexico City with unhealthy vapors as it has been doing since prior to the Aztec settlement of 1325.

Meanwhile, the medical and botanical knowledge of the peoples of the Andes survived, despite persecution, as researcher Ana Sanchez has proven with her inquiries into seventeenth-century Inquisitorial trials in Peru's Chancay region. Even Indigenous botanical doctors accused of "heresy" could be allowed to continue practising once sufficient penance (either torture or extreme social ostracism) was complied with. Despite Indigenous medicine being considered "witchcraft," the herbal cures that Indigenous doctors possessed were simply too intrinsic to the health of the white and mestizo populations (as well as to the Indigenous peoples) to be discounted.⁵³

51. Maria Longhena and Walter Alva, *The Incas and Other Ancient Andean Civilizations* (New York: Barnes and Noble, 2007), 75: "only the sick or invalid were allowed to exempt themselves from agricultural work and to receive help and subsidies."

52. Adam Warren, *Medicine and Politics in Colonial Peru: Population Growth and the Bourbon Reforms* (Pittsburgh: University of Pittsburgh Press, 2010), 40, [dx.doi.org/10.2307/j.ctt5vkf6w](https://doi.org/10.2307/j.ctt5vkf6w). Speaking of the 1687 earthquake, Warren stresses: "The earthquake, however, also transformed hospitals, piety, charity and the practice of religious medicine in ways that would eventually be productive [...] it provided authorities the opportunity to redesign and reorganize facilities, finances and operations according to changing Bourbon models" (40).

53. Ana Sanchez, *Amancebados, hechiceros y rebeldes: Chancay, Perú Siglo XVII* (Cusco: Archivos de Historia Andina, Centro de Estudios Regionales Bartolome de Las Casas, 1991), 52–56.

Many Europeans also extolled the use of the coca leaf, and an active trade in medicinal coca plants characterized the colonial Andes.⁵⁴ Coca was also employed for disinfecting rancid wounds, usually suffered by Europeans upon their first contact with Andean mountain flora and fauna. Coca leaves at present are taken as an infusion, and coca tea is used to regulate arterial pressure when tourists arrive in Cuzco from the much lower altitude of Lima.

At the close of the 1700s, Lima had become the preferred destination of the Spanish elite searching for cures for their ailments. This improved hygiene was due to the hydraulic waste disposal system of the original Ychma Indians, which Spanish colonial authorities, as noted earlier, preserved intact. Peruvian scholar Pedro Espinoza Pajuela asks the question: Why did colonial authorities not brand the Ychma hydraulic system as “witchcraft” as they did subsequently with Ychma botanical medicines?⁵⁵ It is obvious that the immediate benefit of a functional irrigation and sewage system outweighed theological considerations. Native medicine, and Native hydraulic structures, had multiple applications in urban spaces that aided Europeans as well, regardless of religious connotations. In Central America, this pragmatism would later tip the scales against European conceptions of epilepsy as a Satanic affliction and increase receptivity to Mayan treatments.

The issue of epilepsy

The medicinal knowledge of the Maya was dealt a severe blow by the bonfire of Mayan manuscripts conducted by Franciscan bishop Diego de Landa in 1562 in Mani, Yucatan. Many of these texts dealt with botanical cures for physical maladies. This excess of religious zeal was criticized by his superior Francisco de Torales, who had him removed from his position and sent to Spain for trial. Landa was later, unsurprisingly, exonerated by King Phillip II.

54. Longhena and Alva, 79: “During their first encounters with the indigenous peoples, the Spaniards learnt of a special plant [...] coca [...] it had been grown in the hot, wet areas for many centuries before the Inca civilization and its properties were much appreciated. When the leaves of the coca plant are chewed and mixed with lime of potash, narcotic substances are released which suppress hunger and fatigue.”

55. Pedro Espinoza Pajuelo, “Los Ichma: una sociedad representativa de Lima prehispánica; parte 1,” *Proyecto Integral Mateo Salado* (2020), qhapaqnan.cultura.pe/sites/default/files/articulos/Los%20Ichma%20-%20Sociedad%20Representativa%20Lima%20Prehisp%3%a1nica%20I.pdf.

The Maya, whose eight-hundred-character alphabet had been forbidden by Landa, then began—ironically under Landa’s influence—to record their medical and spiritual thought using Latin letters. Mayan use of the Western writing system facilitated the preservation of the epic texts noted earlier that were re-transcribed from hieroglyphic sources in the sixteenth to eighteenth centuries, such as the *Popul Vuh*.⁵⁶ Hispanic translations and publications also perpetuated the medical techniques contained in the Yucatec *Ritual de los Bacabes* and the *Libro del Judío*. While the Inquisition, and the Franciscan order more generally, labelled Indigenous herbal medicine as “diabolical,” other Spanish intellectuals, including a doctor based in Mexico City, Pedro de Horta, found value in Indigenous medical theories. A more tolerant attitude proved vital for a better comprehension of one of the least understood afflictions of the time: epilepsy.

For centuries inhabitants of Central America, the Maya peoples had used the bark of the ceiba tree to help epileptic sufferers. The disease was called *Tut-tub-ik-akal* in Yucatec Mayan, meaning “the person who suffers from bad wind and breathing” (a reference to epileptic fits).⁵⁷ The Maya did not believe that epilepsy was contagious, but Spanish colonial authorities did think so. As late as the 1750s, authorities in Mexico City were shutting epileptic sufferers in convents. It was thought that nuns would be impervious to the illness, due to their closeness to God; yet this was not the case, since nun after nun fell prey to this ailment which, to the Catholic Reformation church, looked suspiciously like “demonic possession.”

Attitudes towards health and urban spaces in the Spanish Americas underwent a notable transformation with the 1763 publication of Pedro de Horta’s *El Informe Médico Moral de la Epilepsia* (The medical moral account on epilepsy). De Horta’s treatise was written in Mexico City and published in Spain, during a time of pandemics in both places that were aggravated by bad sewage and horse-based fecal material.⁵⁸ After analyzing cases of epilepsy in different Mexican convents, Pedro de Horta became convinced of the rightness

56. Dennis Tedlock, ed., *Popul Vuh: The Mayan Book of the Dawn of Life*, rev. ed. (New York: Simon and Schuster, 1996).

57. Oscar Campbell-Araujo and Ana Figueroa-Duarte, “La visión de la epilepsia a través de la historia,” *Bol Clin Hosp Infant Edo.* 32.2 (2015): 87–101, 91.

58. Pedro de Horta, *El informe médico-moral de la penosísima y rigurosa enfermedad de la epilepsia* (Madrid: Oficina de Domingo Fernandez, 1763).

of ideas circulating in Yucatan and Guatemala. Such ideas extended beyond the Mayan areas into Mexico City. In de Horta's time, Mayan *curanderos* (traditional herbal doctors) were in high demand among Mexico's mestizo and white populations as well as in their own areas.

Epilepsy, Pedro reasoned, was not in any way contagious. Instead, it could be caused by a lack of certain nutrition to the brain. While we may quibble with this medically, it was certainly an advance over the theories of "urban contagion" of epilepsy. Religious authorities were claiming that epilepsy multiplied in cities owing to the fact that people lived in close physical proximity. Eschewing European notions of demonic possession, the Maya gave epileptic sufferers tea from the ceiba tree. In many cases, this ceiba tea alleviated the more severe symptoms of epileptic seizures. For urban Hispanic doctors like de Horta who were somewhat familiar with Enlightenment ideas, nutrition and the benefits of ceiba bark tea were more compelling medical explanations than Satanic possession. Many of them had gone to New Spain to escape the provincialism of medicine in Spain, which had steadily worsened after Philip II prohibited Spaniards from studying medicine abroad, with deleterious consequences for the medical profession.⁵⁹

Through contemporary botanical research, we now know that the bark of the Mayans' sacred ceiba tree, the symbol of the centre of the Mayan cosmos, contains high amounts of magnesium. Lack of magnesium has been identified as a possible cause for one of the five identifiable variants of epilepsy, hence the traditional Mayan cure for epilepsy would have proven effective in certain cases.⁶⁰ By the eighteenth century, Spanish doctors in Mexico like Pedro de Horta and many of his contemporaries could observe the work of Indigenous healers and were beginning to ignore the dictates of the Inquisition regarding "acceptable medicine." The immediate needs of sick patients dictated evolving

59. Linda A. Newson, "Medical Practice in Early Colonial Spanish America: A Prospectus," *Bulletin of Latin American Research* 25.3 (2006), 367–91, dx.doi.org/10.1111/j.0261-3050.2006.00203.x. "Then in 1559 Philip II banned Spaniards from studying abroad, thus cutting them off from the main European centres of medical education at Bologna, Padova [...] the conservative intellectual climate [...] encouraged those of a more progressive persuasion to develop their careers elsewhere, including Spanish America" (372).

60. Alan Yuen and Josemir Sanders, "Can Magnesium Supplementation Reduce Seizures in People with Epilepsy? A Hypothesis," *Epilepsy Research* (June 2012): 152–56, dx.doi.org/10.1016/j.eplepsyres.2012.02.004.

practice more than theological teachings particularly as pandemics broke out in colonial cities.

Anonymous Mayan medical texts noted earlier, such as *El libro del judío* and *El libro de los Bacabes*, were circulating and being copied constantly in urban centres from Merida to Veracruz to Mexico City itself, despite the disapproval of colonial authorities. Illness was imposing a reality in the Americas with a force that outpaced the limitations imposed by ecclesiastical authorities. And the close contacts of city-dwellers—some casual, some professional, and some illicit—accelerated the possibilities of this knowledge sharing, as well as the possibilities to hide it.

Interestingly, epilepsy remained absent in urban chronicles of Lima, and in fact throughout Peru, until the post-colonial period. Was there less epilepsy in colonial Peru, or were its symptoms less easily recognized? Andean medicine in Spanish urban spaces concentrated on issues that unhinged European health: the respiratory difficulty called “soroche,” caused by the lack of oxygen affecting those who travel in higher altitudes, or the malarial problems of the jungle areas in the Peruvian/Ecuadorian Amazon.⁶¹ It may be that epilepsy did not attract the same attention as soroche or malaria, and was less documented, because it seemed to pose less of a threat to the general population in colonial Peru. Further research may yet uncover documents attesting to epilepsy and its effects in colonial Peru; the question at present is inconclusive.

Incorporation of Mayan and Andean cosmovisions in Spanish colonial medicine

The ethnic “intermingling” (*mestizaje*) continued apace in the urbanized zones of the colonial Americas. It was deplored and condemned regularly by the Spanish creole nobility, who saw it as a threat to their colour-based superiority, as well as being a factor in the “dilution” of Catholic values.⁶² *Mestizaje* was also

61. Oliver Lubrich, “Fascinating Voids: Alexander Von Humboldt and the Myth of Chimborazo,” in *Heights of Reflection: Mountains in the German Imagination*, ed. Sean Ireton and Caroline Schauman (London: Camden House, 2012), 153–75. We read of Humboldt diagnosing his own soroche, including “breathlessness, nausea, headaches and bleeding of his lips, gums and eyes” (162).

62. The term “creole” in Spanish, *criollo*, does not signify mixed origin, as it may do in English and French. It refers explicitly to Spaniards born in the Americas who did not—supposedly—intermingle with people of other ethnicities. See also Bernard Lavalle, *Las promesas ambiguas, Criollismo colonial*

condemned Indigenous chroniclers in the seventeenth century, such as Guaman Poma de Ayala, whose *Nueva Coronica y Buen Gobierno/New Royal Chronicle and Good Government* (1615) viewed mestizo culture as the principal disrupting factor in the Andean life, and stressed the perceived necessity of maintaining the “republic of Indians” separately from the “republic of Spaniards.”⁶³ Cities were viewed by Guaman Poma as dens of iniquity, precisely because they facilitated the ethnic intermingling that created the “mixed-blood” mestizo. This nexus of racial mixing, urbanism, and degeneration would become a commonplace in nineteenth- and twentieth-century eugenic theory.

In New Spain and its Central American dependencies, the official ethnic demarcation line was known as the so-called *trazado* (tracing).⁶⁴ The *trazado* ostensibly served to visually mark the separate zones of residence for whites, mestizos, Natives, Black slaves and freedmen, and foreigners. Unsurprisingly, the *trazado* boundary was practically unenforceable in any colonial city. Even Pedro de Alvarado, scourge of the Maya, lived most of his life with a Tlaxcalan Indian princess, Tlachehauztin, with whom he had legally-recognized children.

Marital and extramarital unions between ethnicities in urban areas constantly flouted the *trazado* in both public and private spheres. In the Andes, the “republics of Indians” as opposed to “republics of Spaniards” had been equally untenable from the outset, even among the new ruling elites. Francisco Pizarro’s half-Inca daughter Francisca was eventually married off to her uncle Hernando, while prominent scions of Spanish aristocracy, such as the Loyolas, touted their Inca spouses in devotional portraits commissioned by ecclesiastical patrons.⁶⁵ The fusion of influences within the domestic space of the home, the determining factor in the subject’s perception of oneself and the “other,” enabled, willy-nilly, the assimilation of notions of medicine that

en los Andes (Ambiguous promises: Colonial creole identity in the Andes) (Pittsburgh: Instituto Internacional de Literatura Latinoamericana, 2000).

63. Guaman Poma de Ayala, *Nueva Coronica y Buen Gobierno* (1615) (Caracas: Biblioteca Ayacucho, 1980). See especially the segment of the book where Guaman Poma exhorts King Philip III to preserve the ethnic separations of whites, Native peoples, and African slaves: *Carta del Autor al Rey Felipe* (8–11).

64. Edmund O’Gorman, *La Invención de América/The Invention of America*, rev. ed. (México City: Fondo de Cultura Económica, 2012), 20–54.

65. Ilona Katzew, *Contested Visions in the Spanish Colonial World* (New Haven: Yale University Press, 2012); see for example the 1680 portrait marking the marriage of Don Martin de Loyola to Dona Beatriz Nusta (267).

were designated as “pagan” by the viceregal administrations of New Spain, the Audience of Guatemala, and Peru. Cities, with their ceaseless human ebb and flow, made such varied ideas more ubiquitous in all facets of life.

Chief among these ideas, and intrinsic to our comprehension of the practice of Andean and Mayan medicine, from the late sixteenth century and into the modern period, are the Mayan concept of *sastun* and the Andean duality of *kawsay* and *supay*. As Indigenous medicine and Indigenous practitioners began to appear more frequently even in European-dominated areas in the Americas, it was clear that medicine had practical uses that defied societal prejudice. The increase in Inquisitorial persecutions against the Amerindian healers in Peru and Central America during the seventeenth century can in fact be seen as proof of Indigenous medicine’s increasing popularity. It was seen as a tangible threat, dangerous enough to invite clerical scrutiny.⁶⁶

Yet no amount of preaching or Inquisitorial investigation could discourage the use of herbal potions when they worked. As a result, wealthy Hispanic urban elites sought out Indigenous shamans and healers where possible, and where needed. For many mestizo families, the herbal remedies had been inherited within the family, and their use was proliferating in cities as the mestizo population grew. The world-views inherent in the conceptions of *sastun* and *kawsay/supay* emerged in the Hispanic consciousness gradually through empirical use in heavily populated spaces. Through regular usage, these concepts became part of the urban cosmovision of the inhabitants of colonial cities in Latin America, the majority of whose people ignored, or simply did not care about, the allegedly “pagan” origins of Indigenous medicine.⁶⁷

“Sas-tun” is a combination of two words in the Yucatec and Quiche dialects of the Mayan language.⁶⁸ The word “sas” alternatively means “light”

66. Sanchez, 121–36. Practically all the trials of “witches” in Peru’s Huarochiri area involved use of herbal medicine. See also Elizabeth Davis, *Myth and Identity in the Epic of Imperial Spain* (New York and London: University of Missouri Press, 2000); and Sabine MacCormack, *Religion in the Andes: Vision and Imagination in Early Colonial Peru* (Princeton, NJ: Princeton University Press, 1991).

67. Peter Wade, *Race and Sex in Latin America* (London: Pluto Press, 2009). In a description of a woman placed on trial by the Inquisition for using herbal remedies, in 1624, Wade notes that in her defence she stated that “some of her witchcraft consisted in making cures for his ailments by drawing on African and indigenous knowledge of magic and curing” (81). Cures passed between spouses—and on to children.

68. Guatemala recognizes twenty-one Mayan languages; Mexico includes another eight, and many of those languages have individual dialects as well. But Yucatec and Quiche Maya are the two most

or “mirror.”⁶⁹ “Tun” is a significant term in Mayan usage, meaning alternately “stone” and “time.” Specifically, the “tun” refers to the 360-day Mayan solar year of eighteen months of twenty days. Stones, years, and time were and are inseparable in Mayan thought. The interlocking cycles of sacred 260- and secular 360-day years were engraved on sacred “calendar stones” which were themselves linked to the repeating meta-cycles of 5,125 years. “Tun” cycles were inexorable, and time never ceased. The “tun” remains a powerful component of Mayan thought, since a life—of a person, a town, a city, and a historical epoch—is measured by its use of these sacred and secular cycles.

The “mirror” or “light” has a spiritual rather than magical meaning, starry-eyed New Age stereotypes of the Maya peoples notwithstanding. Mayan shamans, male and female, used the concept of light on water to create a symbolic “mirror” of the cure which they had to search for in order to discover how to alleviate their patients’ suffering. The mirror functioned as an intellectual compass. In the case of botanical medicine, the apprenticeship of the Mayan traditional doctor has always been long and arduous. He/she had to know the medicinal properties of literally hundreds of plants, along with their correct applications. The *sastun*, far from being a magical talisman, was and is borne by the Mayan doctor as a symbol of knowledge acquired through empirical searches for medicinal plants. It is part of Mayan religion, since medical cures are believed to be of divine origin. It certainly is not a demonic appendage, as the sixteenth-century Bishop Landa would have characterized it.⁷⁰

Mayan *sastun* healers became quite well known outside of purely Mayan communities. Their cures, in particular for intestinal parasites and urinary conditions, were sought after in corners where church authorities could not always insinuate themselves easily: namely, in the private homes of the Hispanic and mestizo patrons who called for Indigenous medicine when European medicine proved ineffective. Some of the most famous cures are still in use and have been categorized by the New York Botanical Gardens in their own pharmacopoeia of the natural world. These include what the Maya call *kayabim*, popularly known in Spanish as *tres puntas* and in English by the more descriptive “jackass bitters.”

dominant branches.

69. Arvigo, 183: “sas=light, mirror”; “tun=stone, age”; “sastun=a divining stone used by the Hmen [doctor, priest/priestess] or ‘one who knows.’”

70. James Brady and Keith Prufer, “Caves and Crystallomancy: Evidence for the Use of Crystals in Ancient Maya Religion,” *Journal of Anthropological Research* 55.1 (1999): 129–44.

The bitterness, and effectiveness, of this unpleasant-tasting remedy arises from an active substance, sesquiterpene dialdehyde, which is used in conventional medicine to fight fungus, amoebas, and specifically malarial parasites.⁷¹ Taken in small doses as a tea, it was a more efficacious anti-fungal remedy than other cures extant in the Spanish colonies. Contemporary European remedies for fungus included bleeding and cupping, neither of which have ever alleviated intestinal disease.

The Maya also encouraged an attitude that promoted the patient's spiritual ability to resist and defeat disease, a far cry from Conquest-era theologians who viewed plagues as God's righteous fury. That idea of the furious monotheistic God fit well when most of the victims of New World epidemics were Natives; but the confident notion unravelled as the centuries passed, and Europeans began to die from malaria-based ailments more than Native or mestizo populations. In the eighteenth-century Yucatec *El ritual de los Bacabes*, noted earlier, the healer/shaman curses and mocks the gods who had caused the disease.⁷² This transactional confidence is similar in some ways to late medieval Catholic lay piety in which communities might as often threaten as placate a saint they aimed to influence; yet there were differences.⁷³ The Yucatec healer encouraged the patient to berate and ridicule the gods of disease, a technique that eliminates the spiritual (or what we would call "psychological") paralysis that can affect a patient's very desire to live.⁷⁴ In other words, if the disease is divine will, it doesn't matter. Mayan healers fight their own gods.

This "fighting" attitude regarding health can be traced back to the Mayan *Popul Vuh*, whose spiritual teachings pre-date its sixteenth-century transcription in the Latin alphabet. There, the daughter of one of the gods of disease and

71. Arvigo, 39.

72. De la Garza, *El legado escrito de los mayas*, 96. Referring to these sources, De la Garza describes them as "algunos manuscritos cuyo contenido es exclusivamente médico, que datan de los siglos XVIII y XIX pero que provienen de antiguas fuentes" (some manuscripts whose content is exclusively medical, dating to the eighteenth and nineteenth centuries, but whose provenance is from ancient sources). (My translation.)

73. William Christian's *Religiosidad Local en la España de Felipe II* (Madrid: Editorial Nerea, 1991) shows a similar treatment of saints on a popular level; however, the Maya case differs in severity, since they berate gods, and not saints (who are on a lesser level than god/the gods).

74. Patricia Martel, "La magia de la palabra en el *Ritual de los Bacabs*," *Arqueología Mexicana* 12.69 (2004): 34–39.

later her two hero twin sons (Ixqiq, and Hunahpu and Ixbalamque, respectively) trick, deceive, fight, and partially defeat the gods of sickness and death. Ixqiq and her progeny ensured that life and rebirth, in the personage of the ever-renewing Corn-god, would ultimately triumph over the maladies of the lords of the underworld, Xibalba. Mayan thinkers insisted that the complete disappearance of disease was impossible, but that it could be continually battled against and defeated in every cycle of time.⁷⁵

Meanwhile, Andean cultures developed philosophies of health that often reflected the dualities (mountain/jungle, frost/heat, cities/wastelands) inherent in the vast geography of Tahuantinsuyu. The duality was felt in their history vis à vis European contact. In the early sixteenth century, Andean peoples had succumbed to diseases to which they had no natural resistance, though in lesser numbers than the Aztecs. The Inca emperor Huayna Capac died a victim of smallpox, which had arrived in Tahuantinsuyu before Pizarro did.

As the sixteenth and seventeenth centuries progressed, however, disease-based mortality was just as visible among Europeans in Peru. Spaniards fell in considerable numbers to tropical parasites or high-altitude oxygen thinning, situations for which they, unlike the Andeans, had no natural resistance. Spanish colonists would view the urban setting as a safer one than the unknown quantities of the mountains or the jungles; yet they would also doubt their innate superiority, seeing as the Andean peoples passed between high and low altitudes without incurring high mortality rates. As mestizo unions between Spaniards and Native peoples became the norm, resistance to disease and inherited immunity would also change dramatically, within both the family and the cities.⁷⁶ It was clear that ethnic origin was no protection against illness. In

75. Miguel Angel Asturias, Gorges Raynaud, and Miguel Angel Asturias, *Popul Vuh: El Libro del Consejo* (Mexico City: Universidad Nacional Autonoma de Mexico, 2000), 96–97. The Lords of Disease and the Underworld, Xibalba, are told by the Hero Twins, who have defeated them, and thus defeated the supremacy of illness and death: “vuestra potencia ya no existe, y aunque sin gran derecho a la piedad, vuestra sangre dominará todavía un poco [...] vuestro juego de pelota no sera mas que el hijo de las hierbas, el hijo del desierto” (your power no longer exists, and though you have no right to this piety, your lineage will still reign, but just a little [...] your sacred ball-game will just be that of the son of grass, the son of the desert). The sacred ball game, in Mayan culture, is an ancient and revered sport in which the two teams symbolize the passage of Venus and the Sun through the heavens.

76. Leishmaniasis, epidemiologist Carl-Johan Neirud reminds us, is a tragic case in point. In the late colonial period, it appeared in the mestizo cities of the Americas: “When rural migrants bring their domesticated animals to urban settings, often slums, they create favourable conditions for an urban

the late colonial period, the Andean peoples, including the by then burgeoning mestizo population, developed systems of health which focused not on eliminating the agents of disease but on learning to manage and minimize them. In this respect Andean medical thought is very similar to the Mayan: they view maintenance and prevention as the goals, complete eradication often being an impossibility. The aim was to maintain the balance of life in general, and the life of the afflicted individual in particular. These notions were applicable to Native Americans, mestizos, and Spaniards to the same degree, and they spread throughout Peruvian society through the informal personal networks established in urban life. Those networks increased with time, leading to author Ricardo Palma's observation that the rebellions of the nineteenth century benefitted from the clandestine urban "knowledge exchange" which had begun so much earlier.⁷⁷

The Andean health philosophy of *kawsay-supay* had been misinterpreted by colonial era missionaries as "good and evil." The term "*supay*" was usually translated from Quechua to Spanish, erroneously, as "the Devil."⁷⁸ Among mestizo communities in Argentina, Peru, and Ecuador's Andean communities, *supay* represents the forces of chaos, transition, and decay that are the constant counterweight to the forces of balance and health. *Kawsay*, translated as "right living," represents the forces of physical wellbeing and harmony that create structure and order from the *supay* chaos. In order to maintain health, *kawsay* must be recreated constantly, in microcosm, in the life of the community and the individual. *Supay* is often the default state; *kawsay* must be consciously constructed. An individual must recreate *kawsay* on a personal level—in the home, the community, the village, the city, and the larger polity—so as to battle disease, which is seen as a direct effect of chaos and *supay* on a spiritual and physical plane.

transmission." Carl-Johan Neirud, "How Urbanization Affects the Epidemiology of Emerging Infectious Diseases," *Infection, Ecology and Epidemiology* 5.10 (2015), doi: 10.3402/iee.v5.27060.

77. Ricardo Palma, in his multi-volume compendium *Tradiciones peruanas* (Lima: Palma, 1872), one of the seminal works of Peruvian literature, frequently mentioned how the armies of Peruvian independence made use of Indigenous know-how to camouflage their plans from Spanish royalist armies.

78. Sabine Dedenbach-Salazar Saenz, "Deities and Spirits in Andean Belief: Towards Systematization," *Anthropology* 112.2 (2017): 443–53. The author notes the conflating of terms in the colonial universe: "In some communities the *sirena/siren* is equated with [...] a being related to the shadow world and the ancestors and sometimes used as a synonym for *supay*; neither of them was traditionally related to evil, but the Devil of Christianity is translated as *supay*" (446).

Andean thought did not recoil from upsets and cataclysms. Like the Maya, they focused on repeating cycles, and death and rebirth were interlinked. In the Andean case, these ordered cycles were interrupted by the phenomenon known as the *pachacuti*, in Quechua: “the world turning/shaking.”⁷⁹ The *pachacuti* events disturbed the equilibrium of nature, of the community and of the individual. But in Andean thought, these are events with which human beings must learn to live, so as not to be overwhelmed by them.

Some diseases were as quiet and stealthy as a mosquito bite. In treating one such disease, urban Hispanic culture found and disseminated one of the most significant contributions of Andean medicine and the maintenance of physical *kawsay*: the use of quinine, fabricated from cinchona bark from the Ecuadorian Andes, as a cure for malaria. Its spread among the urban elites of the Peruvian vice-regency demonstrates the penetration of Amerindian medicine in Hispanic cities, as well as the interchange between the urban elites and the Amerindian doctors that occurred specifically within those cities. We have previously discussed the Condamine’s observations regarding quinine, but now we must analyze an earlier manifestation of quinine as a cure.

In 1632, Francisca Fernandez de Ribeyra, wife of Peru’s viceroy and Countess of Chinchon, fell ill with a malaria-based malady (*paludismo* in Spanish). Her illness dissipated when Francisca decided to use a popular remedy from Andean medicine, the bark of the *quina* tree. She had received the medicine from Native traditional doctors who acquired it on the vast Qapac Nan. Goods, knowledge, and plant-based cures continued to be exchanged by Native towns and mestizo settlements along the *Qapaq Nan* from Chile to the Columbian highlands. Francisca, who lauded the virtues of quinine to other Europeans, was cured by one of these plants. The tree bark that accomplished the miracle was nicknamed “cinchona” in honour of the Countess of Chinchon, who subsequently patronized its use. It is still the name by which quinine is commonly known throughout Andean villages: “polvo de Cinchona,” or “Countess Cinchon’s powder.”⁸⁰ For over a century after 1638,

79. James Fuerst, *New World Post-Colonial: The Political Thought of Inca Garcilaso de la Vega* (Pittsburgh: University of Pittsburgh Press, 2018), 102, dx.doi.org/10.2307/j.ctv14h5bc: “The indigenous notion for cataclysmic events [...] is *pachacuti*. The Andean sense of past, present and future was constituted by a cyclical movement through, and a possible return of, distinct epochs, with the transitional moments from epoch to epoch being marked by upheavals or *pachacuti*.”

80. P. Priya, “Medicine and Modernity: A Case Study of Malaria in Wayanad,” *Proceedings of the Indian History Congress 77* (2016): 597–611. Priya states “The cinchona of which there are numerous spices,

the Spanish empire held the monopoly over use of quinine. It was subsequently appropriated by the British and the French for use in their colonial expeditions in sub-tropical Africa. Andean medicine in the Americas, by the time of Latin American independence (1812–34), had long ceased to be a small village-based phenomenon. It had spread between cities and villages equally; but it was the adoption of Andean medicine by urban elites, such as those represented by the Countess of Chinchon, which assured its acceptance among the wider population in the Americas, and eventually, in Europe and Asia.

Increasing acceptance of Indigenous medicine by the modern urban elites of Mexico, Guatemala, Ecuador, and Peru has spurred interest in Amerindian medical tradition. The University of Cuenca in Ecuador has pioneered the incorporation of Indigenous techniques in its health manuals in the last ten years; and this, in turn, has served as a model for the incorporation of Indigenous medicine in today's urban hospitals in Latin America. The process is far from uniform, but in these countries studies of colonial medicine have given rise to innovative forms of treatment that feature both European and Amerindian contributions.⁸¹

Conclusion and pathways for further research

Mayan and Andean medicine, in terms of mental and physical well-being, spread throughout urban spaces during the colonial period, where it became, and remains, an integral component in medical usage and research. This article attempts to explicate those aspects of Mayan and Andean medicine which, since the conquests of the sixteenth century and the “reconquests” of the

are natives of South America. Quinine is a corruption of the word ‘quina-quina’ [bark of the barks ...] Europe and the East Indies are indebted to the Countess of Cinchon, the wife of the Viceroy of Peru and her Jesuit friends for the introduction of the drug into Europe in 1640; and it was long known as ‘Countess powder’” (604).

81. This process began at the turn of the last century in Peru, with the figure of Hermilio Valdizon, and spread to other countries in the region. Edward Chauca notes that Valdizon and his followers “sought to demonstrate a capacity for the production of medical knowledge in Peru that was not derivative of European science [...] he traced the foundations of Peruvian medicine in traditional indigenous healing practices, in medical practices from colonial times, and also in contemporary urban folk medicine” (133). See Edward Chauca, “Indigenous Medicine and Nation Building-Hermilio Valdizon’s Medical Project,” in *Geopolitics, Culture and the Scientific Imaginary in Latin America*, eds. Maria del Pilar Blanco and Joanna Page (Gainesville: University of Florida Press, 2020), 133–48.

seventeenth and eighteenth centuries, have been defined vis-à-vis the vision of medicine implanted by Spain in the Americas. During Spanish America's long colonial period, cultural fusion in cities, though unequal and systemically hierarchical, accelerated the incorporation of Amerindian components in Hispanic urban settings. This was facilitated by the fact that most of the ethnic mixing taking place in cities consisted of Native women marrying European or mestizo men. Women had always functioned as healers among Mayans and Andeans; medicine was not limited to men. The patroness of healing in Mayan thought was the Moon diety IxChel, and her Andean manifestation Mama Quilla reigned over menstruation and fertility. Women passed on ancestral knowledge in the home.⁸²

Much of Indigenous medical knowledge was denoted as “demonic” or “pagan” by Inquisitorial authorities. Yet the household and family, often including a Spanish father and an Amerindian mother, became the most common nexus for transmission of a medical and botanical corpus. In cities, that knowledge found ample social and intellectual frameworks in which to multiply. With the passage of time, empirical observation often validated Native American observations, as they did in the case of magnesium-rich ceiba bark among the Maya, and the anti-malarial quina/cinchona bark in the Andes.

Why does this connection between medicine and colonial urbanism remain at the margins of research on medical history in the English-speaking world? There is far greater familiarity with and acceptance of the corpus of Indigenous medical research in Latin America, due perhaps to the improved access that Indigenous communities have to social media and electronic communications in general. Quechua, Maya, Mapuche, and Nahuatl (and other) Native language websites disseminate traditional medical practices in Indigenous languages and in Spanish. By contrast, both Spanish- and English-language scholarship remain focused on a largely Western narrative of medical and colonial history.

Is the lack of sufficient attention to the urban transmission of Indigenous medicine due to a systemic discounting both of Amerindian botanical knowledge and pre-Columbian urban development? Archaeological studies are

82. While not a health professional, I do specialize in the history of Mayan and Andean resistance and survival, and in the use of medical Spanish in different cultural settings. My forthcoming book, *An Unholy Rebellion: Mayan and Andean Literary Resistance to Colonialism* (2022), focuses equally on the natural and political worlds. It is from this perspective that this article was born.

upending the notion that Europeans “created” the first real cities of the Americas. Similarly, the increase in translations from Quechua, Mayan, and even Spanish into languages like English, German, and French, which continue to dominate Western medical history, is demonstrating the complexity, dissemination, and effectiveness of Indigenous remedies. Both these developments promise to open avenues for further research into the complex field of urban/rural space and health in the early modern Americas.