

## 2 Spain and New Spain

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They will raise so much silk here that it will be one of the richest places in the world, and become the heart of the silk trade, because there are already many plantations of mulberries here. With these and the planting and raising in many other parts of New Spain, in a few years, more silk will be raised in New Spain than in all of Christendom.

Fray Toribio de Benavente ('Motolinía'), 1540<sup>1</sup>

### **Introduction: East and West, c.1480–1560**

The first silkworms known to have been subjected to an Atlantic crossing were procured by Doctor Sancho Ortiz de Matienzo from the kingdom of Granada. In 1503, this canon of the cathedral of Seville, in his capacity as treasurer of the Casa de Contratación (the brand-new royal agency created by Queen Isabella I of Castile to superintend Spanish-American colonisation), arranged for the eggs to be carefully packed, and loaded into the hold of one of two ships on the nearby dockyards.<sup>2</sup> Soon, they were dispatched down the Guadalquivir, the only great navigable river in Spain, from which they sailed out into the Gulf of Cadiz, and set a course for Hispaniola, the first island to have been settled by Columbus in 1492, after his flagship ran aground on Christmas Day. At some point in the intervening 3,000 miles of ocean, the silkworm eggs hatched, and, stifled for air and bereft of food, they died. It was a fate that would be shared by many thousands of their peers in the centuries to come, no matter how much care was lavished on their oceanic storage. The half an ounce of spoiled seed went virtually unnoticed amongst the heavier merchandise that was eagerly awaited

<sup>1</sup> Motolinía, 'Historia de Los Indios de La Nueva España', in *Colección de documentos para la historia de México*, ed. Joaquín García Icazbalceta, vol. 1 (Mexico City: Librería de J. M. Andrade, 1858), 239.

<sup>2</sup> Libro de cargo y data, Archivo General de Indias (hereinafter AGI), Contratación 4674, 19v.

by early colonists, valued at more than a million *maravedis* (Spanish currency).<sup>3</sup>

Despite this inauspicious first voyage, the sixteenth century would witness a remarkable rise of silk production in the Spanish Empire, as Iberian conquistadors and caterpillars converged upon Meso-American Indians and mountain forests. By the 1560s, amidst the brutal extraction of gold and silver, silk production blossomed into one of the Americas' first post-Columbian cash crops, and for a time it sustained a manufacturing industry that helped satiate the growing markets of a Latinising America. Perhaps strangely, this first colonial attempt at establishing silk cultivation across the Atlantic would prove unquestionably the most successful of all those in the Americas, linking the victims of the European *Reconquista* with those of the American *Conquista*: a Moorish speciality became a Mixtecan Indian opportunity. But it was a function of the dramatic pace of global interconnection in the sixteenth century that, within four decades of the first harvesting of American raw silk in the 1540s, the first Asian raw silk in bulk arrived in America from the other direction, across the Pacific. A commercial battle followed between the valuable fibrous proteins emitted by the silkworms of Granada (in Spain and New Spain), and those of their long-distant ancestors in China. Its result, the collapse of raw silk production in New Spain, was heavily influenced by the decline of Indian populations and the paranoia of the Spanish Crown in terms of protecting its peninsular interests.

It was no coincidence that the first Atlantic silkworms were procured from the kingdom of Granada. Lying in the far south-east of the Iberian Peninsula, the region was the first point at which Islam, and with it, sericulture had reached mainland Europe via North Africa. Protected by the Sierra Nevada Mountains, the Nasrid dynasty proved to be the last bastion of Muslim resistance to the Christian *Reconquista*, crumbling only in 1491 in the face of the concerted pressure of the united Catholic Monarchs. The capitulation of Granada, even at the time, was recognised as a major historical turning point, though the anticipated onwards surge of Christian European sovereignty into Islamic North Africa proved less significant than the subsequent unleashing of consolidated Iberian energy, capital, and militarism into the Atlantic and into mainland Europe. In 1492, at the stroke of a pen by the terms of the Treaty of

<sup>3</sup> Miguel Angel Ladero Quesada, *El primer oro de América: Los comienzos de la casa de la contratación de las Yndias, 1503–1511* (Madrid: Real Academia de la Historia, 2002), 25, 92. For comparison, a pig was worth approximately 400 and a cow 2,000 *maravedis*. David Satava, 'Columbus's First Voyage: Profit or Loss from a Historical Accountant's Perspective', *Journal of Applied Business Research* 23, no. 4 (16 January 2011).

Granada, the emirate's substantial population of silk producers and its flourishing urban silk industry were added to those already controlled by the Crowns of Castile and Aragon, in Andalusia and several eastern provinces. Castilian and foreign merchants were quick to arrive to try to secure a slice of the wealthy trade out of Granada's famous silk market (the *alcaiceria*), joining the Genoese cabal that had been permitted to operate under the Nasrid sultans. Further up the Mediterranean coast, long-standing Islamic domination of the region's silk industries, once buttressed by Jewish trade networks, had already been eroded in the fifteenth century by the creeping infiltration of Italian trading and manufacturing interests, with Genoese influences spreading into north-eastern port cities, gaining traction by virtue of their commercial links and technical distinction in silk working. Once famed for its workshops and geometric designs, Granada had increasingly become a supplier of raw materials for manufacture in other cities – Genoa, Montpellier, Florence, and Lucca – and the number of weaving units in the major centres of Granada, Almería, and Málaga had fallen somewhat.<sup>4</sup>

Silk, then, was one of the most significant prizes secured in the capture of Granada, and one of the reasons Catholic victors were initially hesitant to pursue the kinds of repressive measures that would follow in later decades. The skills and materials associated with sericulture had been embedded for generations in the people and the landscape, dispersed amongst the rural Arabic-speaking peasantry with their hillside mulberry stocks. The mulberry harvesting took place from late March and early April, when the leaves were collectively stripped and then divided up amongst the workers, with the trees' owners receiving a large share. The least profitable and least centralised work of silkworm raising and cocoon reeling, in particular, fell disproportionately to Granadan women, though they were also involved in more advanced stages, and perhaps particularly so during the late Nasrid period. Firmly rooted in the countryside by the late fifteenth century, the silk industry then branched into networks of exchange, manufacture, and trade that generated extensive tax revenue which reflected both the commodity's value and its dominance in nearby

<sup>4</sup> Elizabeth Woodhead Nutting, 'Vivir por la seda: Morisca Women, Household Economies, and the Silk Industry in the Kingdom of Granada, 1400–1570' (MA thesis, University of Texas at Austin, 2010), 20–1; David Coleman, *Creating Christian Granada: Society & Religious Culture in an Old-World Frontier City, 1492–1600* (Ithaca, NY: Cornell University Press, 2003), 29–30; Paulino Iradriel Murugarren and Germán Navarro Espinach, 'La seda en Valencia en la edad media', in *España y Portugal en las rutas de la seda*, ed. Comisión Española de la Ruta de la Seda (Barcelona: Universitat de Barcelona, 1996), 190–3; Germán Navarro Espinach, *El despegue de la industria sedera en la Valencia del siglo XV* (Valencia: Generalitat Valenciana, 1992), 37–8, 63–85.

markets, especially in the western Mediterranean and the Maghreb.<sup>5</sup> The iconic success of silk production was such that when Nasrid Granada was finally taken, its Christian rulers sought to ensure as much continuity and as little disruption as possible – doing little more than rediverting tax revenue to Castile, and leaving in place the guild officers, commercial practices, and Arabic terminology of the silk industry.<sup>6</sup> Over the coming decades, they sought to manage the paradox of eradicating Islam while benefiting from the high efficiency and profitability of traditional Moorish silk production.

In 1501, the Catholic Monarchs issued orders in line with ‘ancient practice and custom,’ insisting that all silk business be conducted through the *alcaicerías* of Granada, Malaga, and Almería. Over the next decade, they rolled out Spanish legislation that encoded earlier Muslim practices – amongst them, claiming a 10 per cent levy on all silk sales, an extra tariff on exports, and reissuing instructions for the many charges and practices associated with the commodity’s regulation.<sup>7</sup> The widespread availability of black mulberries (*morales*) throughout Granada, and especially in mountainous locales, meant that there was initially little need or will to engineer a replacement of one species with the other (white mulberries, usually *moreras*).<sup>8</sup> Indeed, such was the high esteem of established nurseries that in 1520 Granada prohibited the planting of imported white mulberries and demanded the felling of those that had been brought from Messina, Murcia, and Valencia, the ordinance bemoaning the tendency to ‘respect that which has quantity and not quality’ – and betraying a conservatism which has variously been imputed to either rural Morisco lobbyists, livestock farmers eager for pasture lands, or

<sup>5</sup> José Enrique López de Coca Castañer, ‘La seda en el reino de Granada (siglos XV y XVI)’, in *España y Portugal en las rutas de la seda*, 34–7; Nutting, ‘Vivir por la seda’, 32–4.

<sup>6</sup> Royal decree of May 1492, in Rafael Marín López, *Documentos para la historia de la seda en el reino de Granada (Siglos XV–XVIII)* (Granada: Universidad de Granada, 2008), 42–4. Arabic terms for silk-industry officers regulating weights and quality included the *geliz* (city government officer), *motalefe* (quality controller of raw silk skeins), and *hafiz* (master of seals). López de Coca Castañer, ‘La seda en el reino de Granada’, 44–5. For similar continuities in preserving the infrastructure of silk production earlier in the *Reconquista*, see Espinach, *El despegue de la industria sedera*, 29, 34–5, 121.

<sup>7</sup> The most comprehensive compilation of such measures was the ‘Arancel de los derechos Moriscos de la seda del reino de Granada’, 21 November 1505, alongside others showing continuity in Marín López, *Documentos para la historia de la seda*, 45–54 (quote on 46).

<sup>8</sup> Vincent Lagardère, ‘Mûrier et culture de la soie en Andalus au moyen age (Xe–XIVe siècles)’, *Mélanges de la Casa de Velázquez* 26, no. 1 (1990): 97–111; José Enrique López de Coca Castañer, ‘Morales y moreras en la sericultura’, in *La Andalucía medieval: Actas, I jornadas de historia rural y medio ambiente (Almonte, 23–25 Mayo 2000)*, ed. Javier Pérez-Embid Wamba (Huelva: Universidad de Huelva, 2002), 453–70.

Christian authorities keen not to disrupt profits.<sup>9</sup> While encouraging continuity in the internal aspects of silk production, Castilian rulers did, however, early signal their intent to change the external dimensions of the silk trade to maximise on their new asset. From 1500, Granada's access to foreign raw materials (in silk skein, thread, or cocoon form) was abruptly stopped, not just from North Africa but also southern Italy and the Levant.<sup>10</sup> Forced to subsist on local raw materials, the looms of the silk emirate that had long faced east found themselves reorientated, like the Catholic kingdoms that had finally conquered them, towards the west.<sup>11</sup>

As more and more 'Old Christian' immigrants (with many from Andalusia and Toledo, as well as Italians) filled the workshops and market stalls of departing Moors, Granada became the centrepiece of Castile's silk trade, and was soon shipping large quantities of finished goods throughout Spain and out across the Atlantic to hungry new colonial societies. Under Christian control, the *alcaicería* and the panoply of artisans linked to the silk trade fell under the oversight of officials appointed to the Casa del Arte de la Seda (1511). Acting as the customs house for the whole kingdom, and rendering taxation on all silk sales and exports (mostly via Malaga to Valencia and to Italian mercers), it would go on to contribute substantial sums to the Crown treasury, in the process helping to subsidise the lavish costumes of the court. In the middle of the sixteenth century, Pedro de Medina reported that almost all of the city of Granada's 'common people make their living by silk', with the harvest bringing some 50,000 ducats in taxation; only there was such municipalised vertical integration possible, culminating in the production especially of damasks, velvets, and taffetas.<sup>12</sup>

The demographics of sericulture in Granada were less transformed than those of silk manufacturing in the first half of the sixteenth century:

<sup>9</sup> Cited in Manuel Garzón Pareja, *La industria sedera en España: El arte de la seda de Granada* (Granada: Archivo de la Real Chancillería, 1972), 135–6. This understanding of the relative suitability of white and black mulberries would be reversed by the early nineteenth century. López de Coca Castañer, 'La seda en el reino de Granada', 52–3.

<sup>10</sup> 'Pragmática de los reyes católicos prohibiendo la entrada de seda en Madeja, Hilo, Capullo, pero si en Cedazos', 20 August 1500, Marín López, *Documentos para la historia de la seda*, 45.

<sup>11</sup> Eloy Martín Corrales, 'Comercio de la seda entre España y Mediterráneo', in *España y Portugal en las rutas de la seda*, 160–79 esp. 160, and see also *ibid.*, 84–5, 122. Much silk trade continued to longstanding markets in North Africa (such as Oran, Tunis, and Fez) from Andalusia and Granada, some of it in return for slaves, horses, or ransomed captives, but increasingly carried by Italian interlopers.

<sup>12</sup> Pedro de Medina, *Libro de grandezas y cosas memorables de España* (Seville: Domenico de Robertis, 1548), cxlv. Using Pierre Marteau's historical currency conversion tool, this crudely translated to £20,000 sterling: [www.pierre-marteau.com/currency/converter.html](http://www.pierre-marteau.com/currency/converter.html).

Morisco women continued to be enormously important, albeit their historical visibility declined substantially with the transition to Christian records.<sup>13</sup> One report in the summer of 1514 highlighted that silkworm seed was fetching a good price, but that as a consequence, the ‘New Christians’ were mixing fine eggs with defective ones – causing an estimated loss of a third of the silk that might otherwise have been raised.<sup>14</sup> Regional techniques, materials, and commercial practices changed comparatively little, though there were significant structural changes to sericulture’s organisation. Licensed inspectors (*veedores*) prowled the reels that drew cocoon filaments into yarn from 1513, checking ‘that all the silk that they reel is clean and in much perfection’. Silk workers were subject from the 1520s to tightening quality control, as Castilian authorities sought to calibrate their output to ensure that Castile’s finished textiles could compete with the best European industry standards. From 1535, cocoon reelers (*hiladores*) had to pass an examination that monitored the consistency of their raw silk, hire trainee assistants, and receive a set rate of cash payment for their work. These measures followed earlier attempts to prevent unlicensed materials from circulating in the market: inconsistent raw silk, dyes that did not hold, yarn that did not last, and other flaws and frauds that ultimately cost manufacturers.<sup>15</sup> They bespoke a slight but perceptibly growing contrast between the more outward-looking and prescriptive world of city artisans (with a high Old Christian component) and the more inward-looking and flexible world of rural households (with a high Morisco component). By 1560, one official estimated that Granada’s sericulture spanned 336 towns and places, involved 40,000 silk raisers, and generated 135,000 lb of raw silk per year.<sup>16</sup>

The turning of Granada’s silk from east to west brought it ever higher repute amongst the aristocracy of the Iberian Peninsula, whose appreciation of silk fabrics (and failure to restrict their consumption) can be measured by the array of sumptuary laws issued and reissued across the sixteenth century.<sup>17</sup> Success also brought closer scrutiny by the Crown and an increasing tax burden – being one fifth, in 1505, of what it would

<sup>13</sup> Nutting, ‘Vivir por la seda’, 38–41, 50. For evidence that Christian immigrants were involved in sericulture from the 1520s, and allegedly given preferential treatment by officials, see: ‘Real cédula de Carlos I ordenando que la tasación del capullo de seda sea igual para los cristianos nuevos y los viejos’, 1526, in Marín López, *Documentos para la historia de la seda*.

<sup>14</sup> Registro General Sello, August 1514, cited in López de Coca Castañer, ‘La seda en el reino de Granada’, 47.

<sup>15</sup> Marín López, *Documentos para la historia de la seda*, 56–7, 71–3, 119–20.

<sup>16</sup> Contaduría Mayor de Cuentas, cited in López de Coca Castañer, ‘La seda en el reino de Granada’, 50.

<sup>17</sup> Juan Sempere y Guarinos, *Historia del luxo, y de las leyes suntuarias de España* (Madrid: Imprenta Real, 1788).

become in 1561, by which time the export of raw silk had also been prohibited.<sup>18</sup> The sense that sericulture was an industry that offered high yield to sovereign powers was doubtless one of its attractions as a 'New World' prospect in the same period. It was one of the lessons of the wider *Reconquista* of Al-Andalus, completed in 1492, that silk production was an undertaking that could bring wealth even to dusty and forbidding subtropical landscapes. Silk offered a way to morph the labour of non-Christian peoples into a vehicle of Christian glory, and to act as an engine of economic and technical development. It was associated with colonisation programmes, usually in a second wave as feudal landholders graduated from military appointees to agricultural consolidators and entrepreneurs – neatly captured in the phrase *señoríos de la seda* (lordships of silk).<sup>19</sup> And by the 1540s, even the growing quality and quantity of Granada's silk was not enough to meet spiralling demand, with raw silk being siphoned off to feed other Castilian silk industries, particularly through Genoese agents, and finished cloths being exported to Italy, Portugal, and Flanders and across the Atlantic. More capacity was required, which focused elite and commercial attention upon securing overseas sources of raw silk, and enlarging domestic supply – if needs be through experimentally and covertly introducing white mulberries, a practice which gathered momentum and controversy in Granada in the 1550s.<sup>20</sup>

Besides Granada, other neighbouring Spanish territories and islands expanded their silk production in the sixteenth century, often at the independent behest of the Aragonese nobility, though the quality and scale of Granada's raw silk set it apart, as shown in the province's prohibition in 1512 of the import of silks from Valencia and Murcia to avoid reputational contamination.<sup>21</sup> Andalusia and Valencia had long-standing traditions of silk production and extensive silk-raising regions,

<sup>18</sup> Kenneth Garrad, 'La industria sedera granadina en el siglo xvi y en conexión con el levantamiento de las alpujarras (1568–1571)', *Miscelanea de estudios Árabes y Hebraicos* 5 (1956): 91–2; Marín López, *Documentos para la historia de la seda*, 19. The annual Venetian *muda* (Mediterranean convoy of galleys) continued to bring away from Granada various kinds of semi-finished silks and non-filament silk waste known as *cadarzo*, which were traded in North Africa. López de Coca Castañer, 'La seda en el reino de Granada', 54–5.

<sup>19</sup> Teresa Pérez Picazo and Guy Lemeunier, 'El caso murciano', in *España y Portugal en las rutas de la seda*, 104.

<sup>20</sup> López de Coca Castañer, 'Morales y moreras en la sericultura', 456–65.

<sup>21</sup> Marín López, *Documentos para la historia de la seda*, 19–20. For proscriptions of importation of Levantine raw silk into the mainland and examples of expansionism to Mallorca, Carles Manera-Joana Escartín, 'La evolución de la manufactura de la seda en Mallorca', in *España y Portugal en las rutas de la seda*, 133, 173.

and the Italianised development of Valencia's silk industry benefited from both Granadan raw silk imports and its own territorial upsurge in the culture of white mulberry trees from the start of the fifteenth century, particularly in well-watered hillside locations like those around Xàtiva, in the districts of Safor and the Ribera Alta, and the immediate environs (Huerta) of the city of Valencia.<sup>22</sup> Murcia began later but enjoyed pronounced expansion in the sixteenth century, bringing localised environmental and social change, especially along the water-rich areas of the Segura River valley, which were to be planted out with white mulberry nurseries.<sup>23</sup> Murcia's raw silk was commercially exported to other places for its processing, for there was little manufacturing to speak of *in situ*; this exchange was famously captured by Miguel de Cervantes in the scene in which his eponymous hero, Don Quixote, falls foul of his hapless horse when trying to challenge six silk traders, who are on the way from Toledo to buy up raw materials in Murcia.<sup>24</sup> Murcian magnates successfully pioneered ways of deploying their control of land to foster silk production amongst the peasantry – offering long leaseholds using detailed contracts that specified labour duties and favourable terms for sericulture, or re-landscaping zones in the aftermath of floods to position the workforce better amongst mulberry nurseries.<sup>25</sup>

Such lessons across south-eastern Spain in how to synchronise political sovereignty, environment, and labour had wider applicability at the dawn of American colonialism. The opportunity to capitalise on high demand for silk, made ever more urgent in light of the introduction of new technology which allowed the manufacturers of Toledo and Seville to improve capacity and quality in their spinning and twisting of silk, would reach out across the Atlantic.<sup>26</sup>

<sup>22</sup> Murugarren and Espinach, 'La seda en Valencia en la edad media', 194–6; Espinach, *El despegue de la industria sedera*, 40–1, 92–4.

<sup>23</sup> Juan Fontes Torres, 'Produccion sedera murciana en la edad media', *Murgetana* 46 (1977): 29–37; Pedro Miralles Martínez, 'Seda, trabajo y sociedad en la Murcia del siglo XVII' (PhD thesis, Universidad de Murcia, 2000); Pedro Olivares Galván, *Historia de la seda en Murcia*, 2nd ed. (Murcia: Editora Regional de Murcia, 2005).

<sup>24</sup> Miguel de Cervantes Saavedra, *Don Quixote*, trans. James H. Montgomery, rev. ed. (Indianapolis: Hackett Pub. Co., 2009), 35.

<sup>25</sup> Teresa Pérez Picazo and Guy Lemeunier, 'El caso murciano', 102–7.

<sup>26</sup> Julián Montemayor, 'La seda en Toledo en la época moderna', in *España y Portugal en las rutas de la seda*, 123–4, 195–6; Miralles Martínez, 'Seda, trabajo y sociedad en la Murcia del siglo XVII', 61.



### The New World of Silk, c.1520–1580

Silk accompanied the earliest voyagers who ventured across the Atlantic, both materially and metaphorically. Amidst the spectacular carnival of encounters that followed European discoveries of landmasses in the Americas, fragile explorers found themselves in desperate need of reassurance about the cultural superiority of their own civilisation. As the pre-eminent prestige Eurasian textile, silk played an important part in staking these claims to sophistication. So where early conquistadors admired the intricate textiles of the indigenous peoples they encountered, they often compared them to silks, as when Hernán Cortés described the cottons arrayed in the great plaza in the Aztec capital city Tenochtitlán in 1520 as having ‘the appearance of the silk-market at Granada’, or the fabric presents of Moctezuma as marvellous ‘even though they were of cotton and not silk’.<sup>27</sup> But given that most straggling, improvisational bands of Iberian adventurers carried few luxuries with them (a fact often remarked upon by American ‘Indians’ unimpressed with their visitors’ gifts), recognition of the value of silk in the Americas would find its most important early expression amidst the fledgling Spanish ports and towns. The organisation of half-conquered territories involved trying to bring order to isolated outcrops of plunder, dysfunctional communities that often degenerated into infighting, civil war, and bloody personal or costly legal reprisals. And as the Spanish impulse not just to claim but also to display civilisational order became more pressing in the early decades of the sixteenth century, likewise possessing the trappings of that order became more necessary. As one of the most identifiable hallmarks of a European ruling elite, and more particularly as a fibre then unknown in the Americas, silk therefore offered a unique signifier of power and respect for precarious colonial authority.<sup>28</sup>

<sup>27</sup> Hernán Cortés, *Letters from Mexico*, ed. John Huxtable Elliott and Anthony Pagden (New Haven: Yale University Press, 2001), 101, 104. See also R. H. Major, *Select Letters of Christopher Columbus* (London: Printed for the Hakluyt Society, 1847), 123; Bartolomé de Las Casas, *Historia de las Indias, escrita por Fray Bartolomé de las Casas* (Madrid: Impr. de M. Ginesta, 1876), 4: 485.

<sup>28</sup> Some writers have posited *Bombyx* silk culture in the Americas predating European arrival in the late fifteenth century, but these are highly dubious contentions given the overwhelming weight of textual, archaeological, and material evidence to the contrary. The counterfactual tenacity of some of this literature can be attributed to the mention of silk in the Book of Mormon. But this is a reflection more of the history of silk influencing the history of religion (Joseph Smith’s rise overlapped with the period of serico-mania in the United States, which is discussed in the epilogue) than of religious works accounting for silk’s origins. For an example of these stretched claims, proposing ‘a cultivated Nephite species ... [that] could have perished from neglect in the post-Cumorah period’, Maurice W. Connell, ‘The Prophet Said Silk’, *The Improvement Era* 65, no. 5 (1962): 324–45. Note: ‘Indians’ is hereinafter used to describe indigenous peoples of the Americas, though recognised as a colonial exonym and misnomer.

Silk was very early and very pointedly used to mark out status in the New World. Widely prohibited to regular colonists, a royal decree in 1501 gave express permission to Nicolás de Ovando (who as governor of the Indies represented the majesty of the monarchy) to dress in coloured brocades, silks, and fabrics with gold, jewels, and precious stones.<sup>29</sup> Ovando's brocaded silks bore testament to his indisputable cultural prestige, much like the Aztec Tlatoani (leader), whom Cortés described as 'dressed . . . very rich in their way and more so than the others', or the Sapa of Tawantinsuyu (emperor of the Incas), whom Guaman Poma explained was clad in specially wrought clothing 'out of material finer than taffeta or silk'.<sup>30</sup> In 1509 and 1513, the Spanish proscriptions were again issued, listing silk goods amongst other expensive apparel as prohibited from wear for ordinary colonists, and prescribing a range of penalties for transgressors.<sup>31</sup> But first on the islands, and then on the mainland, silk clothing began to be authorised to others marked out by royal authority or by economic status.<sup>32</sup> In 1513, a royal decree gave explicit permission to Pedrarias Dávila (the departing governor of Castilla de Oro – a province embracing much of modern-day Nicaragua, Costa Rica, Panama, and northern Colombia) and his wife Isabel de Bobadilla, to dress themselves in silk and gold brocades, so that the Indians would grasp what this rare alien fibre was, though one imagines it was his many years of militantly subduing Moors that proved the most imposing feature of Dávila's oft-maligned New World career.<sup>33</sup> Silk therefore helped to map Old World categories of display across the Atlantic, and its visibility was equally important to the other crucial prong of Spanish colonial activity, the Catholic Church, whose early spaces it soon adorned. As an agent of Christian majesty, silk had long been associated with heavenly spaces and bodies, and given its portability and novel exoticism for Indians (in stark contrast to its familiarity for Moorish aficionados), it served a distinctive

<sup>29</sup> 'Real Cédula a frey Nicolás de Ovando', 22 September 1501, AGI, Indiferente, 418, 1: 52v.

<sup>30</sup> Cortés, *Letters from Mexico*, 84; Guaman Poma, *El primer nueva corónica y buen gobierno* (1615), 302; online digital version of the Royal Library, Copenhagen's *Corónica*, at: [www.kb.dk/permalink/2006/poma/info/en/project/project.htm](http://www.kb.dk/permalink/2006/poma/info/en/project/project.htm).

<sup>31</sup> 'Prohibición de usar prendas de sedas en Indias', 12 November 1509, AGI, Indiferente, 418, 2: 87v–89v; 'Modo en que han de vestir los pobladores de Tierra Firme', 28 July 1513, AGI, Panama, 233, 1: 61r–64r.

<sup>32</sup> 'Real Cédula a Miguel Díaz [de Aux]', [San Juan/Puerto Rico] 22 July 1511, AGI, Indiferente, 418, 3: 141v–142v; 'Orden a Francisco de Garay', [Santiago/Jamaica] 20 July 1515, AGI, Indiferente, 419, 5: 445–447v. Antonio Herrera y Tordesillas, *Historia General de los hechos de los castellanos en las Islas i tierra firme del Mar oceano* (Madrid: Nicolas Rodriguez Franco [orig. pub. 1601–1615], 1730), 3: 151–2.

<sup>33</sup> 'Exención a Pedrarias en las normas sobre vestidos' and 'Preeminencias en el vestir para Pedrarias y su mujer', AGI, Panama, 233, 1: 82v–83r; 139v–140r.

role by veneering cultural claims through lavishly embroidered or brocaded altar cloths, vestments, and furnishings.<sup>34</sup>

As wealth began to flow back from conquistador incursions and the extractive and productive operations that were organised in their wakes, the Spanish Americas developed a particular taste for silk consumption. We can measure it somewhat in the echoes of commercial grievances, as when merchants of Santo Domingo complained in 1545 that the island's authorities imposed unfair extra conditions on their trade in textiles, forcing them to sell silk, cloth, and linen goods (amongst others) at artificially low prices should they fail to dispose of their cargos within six days.<sup>35</sup> Or when Isabel Pérez, an inhabitant of Seville, demanded restitution for 10 lb of silk that had been confiscated in error aboard the *Santiago* in 1558, as she and others were exporting silk goods in growing volume.<sup>36</sup> And as more complex social hierarchies developed in the new settlements spreading across the continent, silk was called upon to help demarcate them. Wealthy, middling, mixed-race, and Indian residents of Cuenca, a provisioning town established in the 1550s near the gold mines of Santa Barbara, soon showed discernment in their silk-trading and -purchasing habits, helping to spawn new sumptuary acts across the Viceroyalty of Peru in 1571 that banned free blacks and mulatto women from wearing silk mantles.<sup>37</sup>

The refinement of cargos and sea routes, and the explosion of traffic that was shuttling between Seville and the Americas, eventually increased the probabilities of getting *Bombyx* larvae successfully across the Atlantic. Sancho de Matienza had been asked in 1504 and again in 1505 to source and speedily package up silkworm eggs, finding them listed amongst the

<sup>34</sup> For examples of silk's use in sacristies in mission churches and chapels: 'Real disposición', 16 October 1595, AGI Indiferente, 426, 28: 224v; Alessia Frassani, 'The Church and Convento of Santo Domingo Yanhuitlan, Oaxaca: Art, Politics, and Religion in a Mixtec Village, Sixteenth through Eighteenth Centuries' (PhD thesis, City University of New York, 2009), 75–6.

<sup>35</sup> 'Real Cédula', 7 February 1545, AGI, Santo Domingo, 868, 2: 229v.

<sup>36</sup> 'Devolución de diez libras de seda a Isabel Pérez; 25 April 1558, AGI, Panama, 236, 9: 261r–262r; 'Devolución de un comiso a Hernando de Torres', 26 November 1573, AGI Panama, 236, 10: 352r–353r. On the few dozen merchants trading in silks for the American market out of Toledo in the sixteenth century, see Julián Montemayor, 'La seda en Toledo en la época moderna', in *España y Portugal en las rutas de la seda* (Barcelona: Universitat de Barcelona, 1996), 122.

<sup>37</sup> Royal Cédula of 11 February 1571, cited in Angel Rosenblat, *La población indígena y el mestizaje en América* (Buenos Aires: Editorial Nova, 1954), 2: 156; Diego Arteaga, 'Vestido y desnudo: La seda en Cuenca (Ecuador) durante los siglos XVI y XVII', *Artesanías de América: Revista Del CIDAP* 58 (2005): 189–205; Elena Phipps, 'Textiles as Cultural Memory: Andean Garments in the Colonial Period', in *Converging Cultures: Art and Identity in Spanish America*, ed. Diana Fane (New York: Harry N. Abrams, 1997), 152.

items requested by the governor – alongside more instrumental resources such as caravels, slaves, and gunpowder; but evidently no solution had yet been found to the problem of sustaining the seed through the voyage.<sup>38</sup> The silkworm eggs were intended for symbiosis with identified trees on Hispaniola, a fact underscored by the absence of requests for Spanish mulberry seed or saplings at this point. It is unclear quite what species the Caribbean target tree was: Ovando's instructions in 1503 reported that 'we are informed there are many mulberries in these islands for making silk', and fifteen years later, Bartolomé de Las Casas claimed there were as many as weeds in the Greater Antilles, and that their bark was used by the indigenous Taínos for cloth and paper. Natives called the trees *guacimas* and Las Casas described them as rougher and thicker versions of *moreras* (white mulberries), with hard black fruit that fattened local pigs. Unless Las Casas was badly mistaken, we may assume that since the fruits are often dispersed by birds, and the trees wind pollinated, either as a consequence of an eastward spread of *M. celtidifolia* from Mexico, or a south-eastward spread of *M. rubra* from what is now the US south-east, the plants appear to have made it to the Caribbean where they were available and recognisable.<sup>39</sup>

Plans to establish sericulture were given added momentum in the late 1510s by the efforts of Las Casas. Las Casas, originally amongst the settlers with Ovando, had returned from the West Indies where he had been disgusted at the barbarity of the treatment of Taíno Indians by the Spaniards under both that governor, and subsequently with new incursions into Cuba. Hoping that silk raising might operate to the benefit of the Indians whose welfare he now began to champion, in 1518 he ranked silk production amongst his earliest remedies for governmental policies under his so-called community scheme. His fifth formal proposition for the Greater Antilles – after measures to entice more white landholders, loosen taxes on gold, limit slavery, and subsidise Christian labour immigration – was to offer a scheme of rewards for the production of 'so many pounds of silk' in each region. He claimed 'it is believed that this is the best land in the world for it' and that taking advantage of the trees could

<sup>38</sup> 'Respuestas a cartas', 27 December 1504 and 27 December 1505, AGI, Indiferente, 418, 1: 142 and 144v.

<sup>39</sup> 'Instrucion secreta para el Gobernador Fray Niculas Dovando', 29 March 1503, in Joaquín Francisco Pacheco, Francisco de Cárdenas y Espejo, and Luis Torres de Mendoza, *Colección de documentos inéditos, relativos al descubrimiento, conquista y organización de las antiguas posesiones españolas de América y Oceanía: Sacados de Los archivos del reino, y muy especialmente del de Indias* (Madrid, 1864), 31: 178; Tao Orion, *Beyond the War on Invasive Species: A Permaculture Approach to Ecosystem Restoration* (White River Junction, VT: Chelsea Green Publishing, 2015), 139; Casas, *Historia de las Indias, Escrita Por Fray Bartolomé de Las Casas*, 4: 324.

effect ‘miracles’.<sup>40</sup> The new young king Charles (soon Habsburg Emperor Charles V) and his regents duly advertised a bounty of 30,000 *maravedis* per year for whosoever should first raise 12 lb of silk in the Indies.<sup>41</sup> This proved to be the first state reward in a 300-year sequence of incentives that straddled European nations and American regions. Las Casas, now recruiting for his much larger vision for the social and economic improvement of the Indies, was expressly instructed to send experts in sericulture and in silk reeling – perhaps an emphasis on technical experience that reflected a perceived shortcoming a dozen years earlier, when such experience had not even been mentioned. But the scheme collapsed when Las Casas, a better writer than organiser, antagonised Castilian nobles and lost royal support, choosing to turn to missionary societies as an alternative vehicle for his aspirations.<sup>42</sup>

It has been assumed that Las Casas’s scheme marked the end of Spanish silk projection in the Greater Antilles, but a few planters continued to pursue ambitions on Hispaniola. In 1538, Diego Caballero was embarking on a range of textile experiments on his extensive hacienda, which boasted a sugar mill and a large population of Spaniards, blacks and Indians spread throughout more than sixty houses of stone and straw. He had them tended to by a priest, and, in the lyrical way that Caballero described it, he offered a sort of progressive sanctuary that could lovingly recycle the labour of Spaniards fleeing from other parts of the New World. He expressly mentioned ‘mulberries for silk’ and dyestuffs in a letter begging an extended land grant from the Crown. Caballero was an arch-opportunist, and could afford to persist in investments where others left off, having already amassed a fortune by plundering Indians from the Nicaraguan coast and forcing them to dive for pearls. The move to prospective textile production, moreover, was a logical step since he had cemented his wealth by adapting to his changing environment, publicly reining in his exploitative slaving and making himself one of the main conduits of manufactured goods flowing into the Spanish Americas. Any material prospects of sericulture, however, dwindled when Caballero returned home to strut around Seville making ostentatious benefactions.<sup>43</sup>

<sup>40</sup> Las Casas, ‘Remedios para las islas Española, Cuba, Sant Juan y Jamaica’, in Pacheco et al., *Documentos Inéditos de Indias*, 7: 107–8.

<sup>41</sup> ‘Real Cédula’, 10 September 1518, AGI, Indiferente, 420, 8: 48v–50. See also J. Sarabia Viejo and Rio Moreno de Del, *Los inicios de la agricultura europea en el nuevo mundo, 1492–1542* (Seville: Caja Rural de Huelva y Caja Rural de Sevilla, 1991), 273.

<sup>42</sup> Rolena Adorno, *Polemics of Possession in Spanish American Narrative* (New Haven: Yale University Press, 2014), 61–98; Woodrow Wilson Borah, *Silk Raising in Colonial Mexico* (Berkeley and Los Angeles: University of California Press, 1943), 2–3.

<sup>43</sup> ‘Informe sobre la merced solicitada por Diego Caballero’, 26 February 1538, AGI, Santo Domingo, 868, 1: 113r. On Caballero’s remarkable career, see Enrique Otte, ‘Diego

It was on the mainland of Central America that the problem of engineering symbiosis between silkworm larvae and mulberry leaf was first resolved. By this second wave of shipments, the Spanish imperial machinery was well attuned to the peculiar demands of transporting the miniature sacks or boxes which contained the ounces of seed from Granada, to the point where authorities issued explicit instructions requiring ‘diligence and care’ and pressed that silkworms be dispatched ‘as urgently as possible’ so that there would be no further losses.<sup>44</sup> It was probably not a coincidence that it was the *first* of many ships to leave Seville for Mexico in 1532 that carried a ‘good quantity of silkworm seed’ – the dormant larvae sharing what must have been a noisy voyage with thirty donkeys and a hundred rams hand-picked for breeding up a new continent’s livestock.<sup>45</sup> For much of the remainder of the century, capacity for silk production would be measured and expressed not by numbers of workers or reels, but by the weight of silkworm seed a community could work up. This was both a throwback to the fragility of Atlantic transshipment and an adaptation of a long-standing Moorish tradition of counting outwards from the weight of initial seed.<sup>46</sup> It is probably fair to say that silkworm larvae ended up having one of the most comfortable and cosseted Atlantic voyages of any living creatures of the early modern era, in a process aiming at dryness and coolness. By one set of meticulous instructions, they were gently placed into lead vessels, each containing no more than 2 lb of seed, then nestled into a wide bag filled with bean flour (*harina de habas*), which in turn was wedged into a barrel filled with cleaned dried straw or bran, which in turn was fitted into a pipe or cask of salt, that was placed somewhere delicate on a part of the ship where it would avoid excess heat, moisture, or direct sunlight, such as the stern cabin, usually occupied by the captain.<sup>47</sup>

One of the salient indicators that silk production went on to become a commercial success in New Spain in the second half of the sixteenth century is that so many individuals sought to take credit for its initial introduction, somewhere between 1525 and 1540. The Crown’s reward of 1518 may have retained some appeal, being claimable throughout the

Caballero, funcionario de la Casa de La Contratación’, in *La Casa de La Contratación y La Navegación Entre España y Las Indias*, ed. Antonio Acosta Rodríguez, Adolfo González Rodríguez, and Enriqueta Vila Vilar (Seville: Universidad de Sevilla, 2003), 315–39.

<sup>44</sup> ‘Carta de los oficiales de la Casa de la Contratación’, 8 November 1537, AGI, Indiferente, 1092, 238: 2.

<sup>45</sup> ‘Carta de la reina al presidente y oidores de México’, 20 March 1532, AGI, Mexico, 1088, 2: 27r–30v.

<sup>46</sup> Lagardère, ‘Mûrier et culture de la soie en Andalus au moyen age (xe–xive siècles)’, 101–2.

<sup>47</sup> Las Casas, *Arte nuevo para criar seda*, 231v. Cf. Christopher M. Parsons and Kathleen S. Murphy, ‘Ecosystems under Sail: Specimen Transport in the Eighteenth-Century French and British Atlantics’, *Early American Studies* 10 (2012): 503–29.

Indies (and inheritable), and being more achievable given the discovery of native *M. celtidifolia* trees amongst the forests of Mexico. But it was far from the minds of Hernán Cortés and his followers in their initial frenetic quest for gold in 1520–1 which culminated in the destabilisation, plundering, and then quasi-assumption of the Aztec imperial infrastructure. Only once control was crudely established, with native populations still reeling from the catastrophic impact of smallpox, was attention turned to means of establishing sustainable profit in this richly settled part of the continent – its dense peopling itself reflecting its agricultural fecundity. By early 1524, with the onetime renegade Cortés now acknowledged as an instrument of imperial administration, the territory had been parcelled out into *encomiendas*, by which Spanish settlers and occasional others were ‘entrusted’ with Indian peoples (in practice an exploitative pool of labour and tribute), this legal system sitting awkwardly across traditional fiefdoms and ethnicities.

While this process was underway, around 1523, it seems that Cortés himself made an attempt at raising silk in the palace garden at Coyoacán, which served as the first capital of New Spain until the ruins of Tenochtitlán to its north had been built over. He had written to the king in 1522, emphasising ‘the need for plants of every sort’ to conduct trials, a letter with which he had enclosed copies of ordinances that he had issued, which he felt to be in step with royal power. They included, of course, sumptuary laws that regulated the wearing of velvets, silks, and brocades, or their use for saddles, shoes, and sword-belts.<sup>48</sup> The letter itself did not specify silkworms or mulberry trees, though this claim would be made by the great early-seventeenth-century archivist and historian Antonio Herrera, who wrote a magisterial multivolume history of the Spanish Americas, *Décadas*.<sup>49</sup> When precious silkworm seed arrived the next year from Spain, one writer recalled that Cortés’s silk, however, ‘was raised very loosely, and to no profit’, a lack of knowledge meaning that only enough cocoons were yielded to sustain some leftover stock on the mainland for future trials. Since no *M. nigra* (black) or *M. alba* (white mulberry) trees had yet been planted, this must have been the first time in history that *Bombyx mori* caterpillars successfully fed and self-propagated on American foliage. Hernán Cortés persisted and, after securing a reprieve in Spain from the Crown for various misdemeanours, and newly ennobled as First Marquis of the Valley of Oaxaca, brought a female silk-reeling expert back to Mexico in 1530, who was paid thirty

<sup>48</sup> Cortés, *Letters from Mexico*, 336.

<sup>49</sup> Herrera y Tordesillas, *Historia General*, 3: 92, 93, 123. This first claimed that in 1522 ‘Castillians planted mulberries, and from these silk grew well.’

ducats (approximately fifteen English pounds) to bring fresh silkworm seed with her.<sup>50</sup> In her necessity and in her anonymity, this unnamed woman, like the first transport of eggs, prefigured much that was to come in Atlantic sericulture.

It was in step with Cortés's lifelong habits of womanising and picking fights, that his silk efforts should likewise end with a woman and be disputed by a rival, in this case Diego Delgadillo. Delgadillo was appointed with a handful of others to the first royal *Audiencia*, supposedly tasked with overhauling the disorderly situation in the colony. But upon his group's arrival in New Spain in 1528 they proceeded to dirty their own hands with the political and economic spoils of government, concentrating especially upon the Valley of Oaxaca, whose marquissate was even then being conferred upon Cortés on the other side of the Atlantic. Oaxaca is the Hispanic rendering of an earlier well-fitting Nahuatl phrase for the settlement, meaning 'amongst the trees', though it was renamed Nueva Antequera in 1529 under the first *Audiencia* and accorded the status of a city to protect against Cortés's intrigues upon his return. The Spanish had followed the Aztecs in selecting it as a valuable site from which to control and monitor the large Zapotec and Mixtec settlements in the Valley of Oaxaca, for it was situated across major trade routes, and, as the founding instructions put it, 'is the richest and most populated region' between Mexico City and Guatemala. Like many colonial towns in the Mexican highlands, once definitively refounded by Delgadillo's family, it would comprise of a miniature neat gridded nucleus of Spanish residents surrounded by a large number of Indian settlements.<sup>51</sup>

Delgadillo's indirect battle with Cortés extended beyond the jurisdictional, and in either 1529 or 1530 he too raised silkworms just outside Mexico City, in the garden of his hacienda on the road to Chapultepec. Delgadillo, whom Herrera pointedly notes, 'as a Man of Granada, knew how to raise silk' used a quarter of an ounce of silkworm eggs given to him by Francisco de Santa Cruz that had survived passage from Seville.<sup>52</sup> Delgadillo almost certainly had a better result than Cortés, but it is striking that he too decided not to reel off any silk but to retain all of the crop in the form of silkworm seed. Returning two ounces to Santa Cruz, which was insufficient in the opinion of a subsequent judicial tribunal, Delgadillo either retained or distributed the rest amongst peers keen to invest in sericulture. The overall picture in this chaotic and traumatic period,

<sup>50</sup> Las Casas, *Arte nuevo para criar seda*, 210r; Borah, *Silk Raising in Colonial Mexico*, 6.

<sup>51</sup> Cédula of October 1529, AGI, Justicia, 231, 463v; for a wider discussion of the settlement and region, see John K. Chance, *Race and Class in Colonial Oaxaca* (Stanford, CA: Stanford University Press, 1978), 30–4.

<sup>52</sup> Herrera y Tordesillas, *Historia general*, 3: 181.



then, is of competing powerbrokers, mindful of the tractable labour force and extensive mulberries 'amongst the trees', seeking to gain control over the critical resources for the pursuit: land, seed, and labour.<sup>53</sup>

The interest and patronage of such major figures was an important stimulus. But as it would prove throughout the Americas, in order to give silk production a fighting chance amongst other colonial priorities, and especially to move it from tentative silkworm feeding to effective cocoon reeling, more hands-on expertise and dissemination was needed. Unlike the pointed exaction of cacao, maize, cotton, and cochineal, cultures which had all been practised and formed a component of tribute in the pre-Hispanic period, raw silk had to be bolted on to the productive capacities of indigenous peoples, or at least that is how Spaniards viewed the matter. The *encomienda* system, with its focus on labour and its denial of inheritance (for the lands remained under the disposition of the Crown), was not necessarily a sound vehicle for encouraging long-term estate development or the pursuit of sustainable products. Fortunately for Spanish landholders, the Indians were quick to perceive the benefits for themselves of adapting to this peculiar culture, whose product was so highly valued by Europeans.

The secret of Spanish success in Central America in the sixteenth century lay in the distinctive convergence of three factors that would rarely align in other American zones in the years to come, even zones where indigenous or introduced mulberries seemed to thrive. These were firstly, a pool of available Old World experts able and willing to help surmount the initial difficulties with sericulture, especially in setting out adequate trees and teaching the art of reeling. Secondly, colonial authorities – at times both state and church bodies – reaching for tributary profit and committed to experimentation and diversification. And thirdly, a dense, adaptable, and ambitious labour force with considerable experience in rendering textiles and of seasonally harvesting insects.

The pool of middling Spanish sericultural experts revealed themselves less through vaunted mentions in great histories such as Herrera's, but rather in more mundane snippets of correspondence, contracts, or ruling decrees. In October 1537, a Murcian expert named Hernando Marín Cortés (no relation of the conquistador) formally undertook to plant 100,000 feet of mulberry trees in the space of 15 years in the districts of Huejotzingo, Cholula, and Tlaxcala, major sites just north-west of modern-day Puebla that he felt ideal for sericulture. In the partly torn contract, made in Tenochtitlán, he claimed to have already planted out many trees and to have been the first to raise silk in the kingdom after

<sup>53</sup> Borah, *Silk Raising in Colonial Mexico*, 7–8.

its conquest. He was granted the use of forest mulberries around Cholula, the labour of forty-five Indians along with their wives for reeling, and a dedicated adobe building in which to establish operations. He also requested a grant of *encomienda* for the pueblo of Tepeji (now Tepexi de Rodríguez, Puebla), a town whose population he planned to use to plant out thousands of the trees, the profits of which he would hold exclusively for five years and then divide for a farther fifteen years with the Crown.<sup>54</sup> By the early 1540s, one commentator noted that over half of the promised trees were growing at a rapid pace, five times faster than in Spain.<sup>55</sup> Though the Tlaxcalans, as ever, seem to have done their own thing, Indians at Huejotzingo initially embraced the project and secured good terms of their own to persist, while thousands of the saplings Marín Cortés cultivated in the Valley of Atlixco would go on to be transplanted to form new nurseries.<sup>56</sup> In a similar vein further south, other Murcians in the late 1530s including Juan Marín (and probably two brothers) applied for permission to grow silk in towns in the Mixteca Alta, including the promising pueblo of Texupa, using indigenous mulberries, and were so successful that the latter became something of a centre of diffusion.<sup>57</sup> Inevitably, the preferences of experts like Marín Cortés and the Maríns would shape Meso-American sericulture into a Spanish likeness, and over time there was a shift away from using the rougher indigenous *M. centidifolia* to using imported mulberries—such that those of Eurasian origin provided the major source of leaves by the 1570s. As Herrera put it, writing about the Bishopric of Oaxaca in 1601, ‘they used to raise silk, by the industry of the Castilians, with the mulberries of the land [*morales de la tierra*] . . . and the Castilians planted lots from Castile, which catch hold everywhere’. It is noteworthy, given the debates in Spain and gradual moves towards a preference for white mulberries, that there was little explicit identification or discussion of which Eurasian mulberry cultivars were preferred in New Spain. It may be that planters brought black mulberries when arriving from Granada and white mulberries if from Murcia or elsewhere. They were less likely in the New World to be wedded to cultural assumptions about the relative merits of either tree, though, partly because of the lesser influence of Morisco traditionalists in the Americas, and partly because of the need to experiment and adapt to American soils and climates – which, as in Spain, probably offered better

<sup>54</sup> ‘Plantación de moreras: Huejotcingo, Cholula y Tlascalá’, 6 October 1537, AGI, Patronate, 180: 68r.

<sup>55</sup> Motolinía, ‘Historia de los Indios’, 239.

<sup>56</sup> Borah, *Silk Raising in Colonial Mexico*, 12–13.

<sup>57</sup> Las Casas, *Arte nuevo para criar seda*, xxv–xxvii.

prospects to the more cold-resistant black mulberry at higher altitudes.<sup>58</sup>

What many of these contracts had in common was that they were approved and licensed by Antonio de Mendoza, a shrewd appointment as first Viceroy of New Spain in 1535, whose fifteen years in office solidified Crown control of an unruly region. Unlike many of the early conquistadors, who came from the rugged terrain of Extremadura, Mendoza (like Delgadillo) was himself from southern Andalusia, a part of Castile where silk was a prominent feature of the economy. His oversight would see the culture of silk cemented as a major part of the economic world of Indians and *encomenderos*, and his main contribution was in securing the pool of Old World expertise and helping it to thrive.<sup>59</sup> Even as Murcians were rationalising mulberry nurseries in the uplands, foothills and valleys of Mexico and Oaxaca, Mendoza's proactive approach to hiring Granadan specialists left a bill to be resolved by the Casa de Contratación, who were ordered to pay for the costs of the oceanic passage of 'the two sugar-makers and the two reelers of silk solicited by the viceroy' in 1537, the specialists having also spent six *ducados* on tools and equipment.<sup>60</sup> The original quest actually sought out 'two or three reelers' with the critical adjunct that they were not to be Moriscos and, if married, their wives could accompany them, another tacit recognition of the traditional importance of female labour and expertise.<sup>61</sup> A later letter instructed the Viceroy to keep up the good progress he had been making in planting out 'mulberries for raising silk', and in the accompanying trials.<sup>62</sup> Mendoza responded by licensing all *encomenderos* to deploy their Indian labourers in sericulture, with immediate effects, and at the same time, the Viceroy extended shrewd and well-intentioned protection to Indian communities, for instance in special grants to native silk-growers at Jaltepec and Camotlán, where local Spaniards were hindering uptake.<sup>63</sup>

As experts in moriculture and reeling sailed with their mulberry plants and silkworm seed for the entry port of Veracruz, encouraged by the

<sup>58</sup> Antonio Herrera y Tordesillas, *Descripción de las Indias Occidentales* (Madrid: Nicolas Rodriguez Franco [orig. pub. 1601], 1730), 20. On the expansion of Old World mulberries in New Spain, see also Las Casas, *Arte nuevo para criar seda*, 210v. On developments in Spain, López de Coca Castañer, 'Morales y moreras en la sericultura', 468–9.

<sup>59</sup> Borah, *Silk Raising in Colonial Mexico*, 10.

<sup>60</sup> 'Armamento de la armada de Blasco Núñez Vela y otros asuntos', 30 April 1538, AGI, Indiferente, 1962, 6: 52–3.

<sup>61</sup> The ship master was to be paid upon delivery by officials in New Spain. 'Construcción de fortaleza en La Habana y otros asuntos', 20 March 1538, Indiferente, 1962, L.6, f.27v–28.

<sup>62</sup> 'Real Disposición', 13 May 1538, AGI, Mexico, 1088, 3: 77.

<sup>63</sup> Las Casas, *Arte nuevo para criar seda*, 210; Borah, *Silk Raising in Colonial Mexico*, 14, 42.

Viceroy, favourable winds also bore down on interior populations, in the form of the active encouragement of religious orders. The first bishop-elect of Mexico, the Franciscan Juan de Zumárraga, like las Casas before him, sought to use silk as a means of improving the economic and social conditions of the Indians, of whom he was styled 'Protector' from 1528. He commissioned the writing of a pamphlet (which has not survived) by a church Precentor, Alonso de Figuerola, intended to 'instruct the Indians from silk raising to dyeing'. Zumárraga also urged the Council of Indies early on to send Moriscos from Granada to acculturate Indians in silk techniques, though as noted this was expressly prohibited in 1538, in line with the policy of keeping a notional distinction between the pure-blood Spanish settlers and Indians of the Americas. Dominican friars, though ardently opposed to the *encomienda* system, also claimed agency in encouraging sericulture amongst indigenous communities, especially in places where they were able to concentrate activity, as at the town of Teposcolula (a hundred miles north-west of Oaxaca) in the early 1540s. Their net impact was undoubtedly positive, though some religious figures claimed that silkworm feeding caused Indians to neglect prayers and devotion during Lent, and at least one friar later ordered the destruction of a large number of mulberry trees in the valley of Meztlán.<sup>64</sup>

With stocks of silkworm eggs regularly available, native mulberry trees and, increasingly, introduced species being planted, grafted, and relocated into accessible nurseries with adequate hydration, and experts spreading techniques and technologies from Murcia and Granada, several of the necessary prerequisites were in place to transfer sericulture to the New World. Nonetheless, had native communities shown either recalcitrance or ineptitude – qualities that Europeans were not slow to accuse them of – its potential might well have remained unrealised. Instead, the impressive speed with which harvests of raw silk grew from the early 1540s was a tribute to indigenous resilience, ingenuity, and adaptability in the face of astonishing and unprecedented cultural pressures. The race to find a single smoking gun – a Spaniard to claim the king's 30,000 *maravedís* – has too often detracted from attention to silk's thousands of real pioneers: the women, children, and men amongst

<sup>64</sup> Aranda suggests that the arrival of Murcian experts may have been prompted by a Dominican request, in Las Casas, *Arte nuevo para criar seda*, xvi–xvii. On mendicant support and the Flemish Augustinian, Fray Nicolás de San Pablo (Witte), Robert Ricard, *The Spiritual Conquest of Mexico: An Essay on the Apostolate and the Evangelizing Methods of the Mendicant Orders in New Spain, 1523–1572* (Berkeley: University of California Press, 1974), 144–5; Borah, *Silk Raising in Colonial Mexico*, 9–10, 25. Viceroy Mendoza also blamed some religious sceptics for slowing enthusiasm by complaining about respect of Lent and preaching disdain for 'worldly goods'. Pacheco et al., *Documentos Inéditos de Indias*, 6: 491–2.

the Nahua, Otomi, Tarascan, Zapotec, and above all Mixtec Indians who got to grips with these worms from another world.

One of the most beautiful and revealing testaments to the diffusion of silk production across parts of New Spain is the *Códice Sierra Texupán* (see Plate 2). It is the surviving account book for the years 1551–64 of the community of Santa Catalina Texupa (now Villa Tejupam de la Unión) in the Mixteca Alta, which was initially ruled by a female *cacica* (chieftain) named doña Catalina, though her presence and power seemed to wane as Spanish-style male *cabildos*, priests, and governors assumed more prominence over the years.<sup>65</sup> A precise and continuous series, the codex was compiled using the dual stylings of traditional colourful pictographs and Nahuatl alphabetic text. Entries detail the financial debts of the community, giving a record of payments in cash and kind by way of purchases, tributes, and tithes. In the process, they reveal how great was the scale of Catholic subsidy borne by such native districts, which went far beyond daily maintenance: over half the total that Indians laid out was for church goods, food and wine for the priests, and religious feasts. The community paid, for instance, for fancy silken vestments such as a red satin chasuble and a stole for the local cleric, for twelve *varas* (yards) of red velvet to decorate the local church, and for a white damask cape for the bishop, edged with red velvet, which was sent to Oaxaca.

Although the community's earnings are not broken down explicitly in the codex until the final four years, there is no question that their yield often included raw silk. There are repeated purchases documented of both silkworm eggs and mulberry plants, alongside payments to a Spaniard who came to demonstrate how best to raise the worms. By 1561, the entry for the tributes and tithes of Texupa represented silk as of paramount importance to the community, showing a glyph with a Spaniard wearing a hat, tying the raw silk up for transport to Mexico City. As this image suggests, silk played its part in the transformation of exchange in Central America, as loaded lone mules picking their way through the rugged Mixteca became pack trains. By the 1560s, most native long-distance traders (*tay cuica*) had been outmuscled by Spanish merchants running indigenous goods along the more profitable routes

<sup>65</sup> Digitised by the Biblioteca Digital Mexicana at <http://bdmx.mx/documento/codice-sierra-texupan>. Matthew Restall, Lisa Sousa, and Kevin Terraciano, *Mesoamerican Voices: Native-Language Writings from Colonial Mexico, Oaxaca, Yucatan, and Guatemala* (Cambridge: Cambridge University Press, 2005), 82–93; Borah, *Silk Raising in Colonial Mexico*, 48–50; Kevin Terraciano, *The Mixtecs of Colonial Oaxaca: Nudzahui History, Sixteenth through Eighteenth Centuries* (Stanford, CA: Stanford University Press, 2001), 186–90.

which branched into the trunk line connecting Guatemala and Mexico City, though at the local level a mixture of petty traders operated.<sup>66</sup>

The Texupa community bought their silkworm seed at a price of between 23 and 28 pesos per pound, and their largest supplier seems to have been Juan de Villafañe of Mexico City (perhaps from his father's *encomienda* at Jaltepec). They paid to maintain a Spaniard 'who cultivates the silk here, because we agreed to it this way', which suggests that Spanish silk expertise had featured continuously in the town since the arrival of the Marín brothers who had brought 3 lb of eggs in 1538, from which they generated 225 lb of raw silk.<sup>67</sup> Payments were also recorded in the codex for dedicated buildings and equipment for raising and reeling: 'iron for the silk spinning wheel and other things' (62 pesos, presumably including cauldrons), wood 'needed there for the silk house' (162 pesos, perhaps for shelving and fuel), and 'reeds from Tuctlan . . . all needed for the silk house' (22 pesos, perhaps for decking for the cocoons). That such investments later brought rewards is demonstrated in the 1561 outlay of over 41 pesos for 'rope, mats, packframes, and palm baskets' to pack up the harvest, and 'food for all those who carried it' north-west to Mexico. Although the value in pesos is sometimes disfigured in the codex, a sense of the quantity of raw silk is nonetheless apparent in the representations of each load delivered, and silk accounted for nearly three quarters of the community's income in the last four years documented, when the yield averaged around 400 lb, each lb worth 4.2 pesos. Ten specified 'people who take care of the silk' were given 10 pesos each in 1561, totalling 100 pesos, suggesting that while the harvest was viewed as a community effort, and drew on community labour (*mitño*), some individuals warranted particular payment, presumably for the scale and skill of their efforts in reeling.<sup>68</sup>

One of the important attractions of sericulture for Central American populations was that, though able to absorb significant labour input at peak seasonal moments and furnish work across gender and age divides, it was not labour-intensive throughout the year. The microbes that had accompanied Europeans from the 1520s brought such heavy mortality that it was impossible to sustain impressive pre-conquest projects such as the extensive terracing of Meso-American hills and their accompanying irrigation. The siphoning off of labourers (especially men) to fulfil Spanish-imposed quotas likewise undermined, sometimes literally, earlier land-use practices. Yet there was no dramatic rush to sell off lands to

<sup>66</sup> Terraciano, *The Mixtecs of Colonial Oaxaca*, 245–7.

<sup>67</sup> Las Casas, *Arte nuevo para criar seda*, xxvii.

<sup>68</sup> Restall, Sousa, and Terraciano, *Mesoamerican Voices*, 88, 90, 91, 93; Borah, *Silk Raising in Colonial Mexico*, 49; Terraciano, *The Mixtecs of Colonial Oaxaca*, 201–9, 234.

Spanish settlers, especially outside the agricultural hinterlands of the Valleys of Mexico and Puebla, and though much acreage was donated to religious establishments (particularly Dominicans and Jesuits), leasing only became popular in the later seventeenth century. For Indians in the mid-sixteenth century, the establishment of mulberry plantations and silk-raising operations on either household or community lands could therefore provide a flexible resource. They offered the capacity to ride out moderate fluctuations in patterns of labour availability, and production of a commodity that was in high demand, while also non-perishable, and lightweight – explaining in part the prevalence of such operations, especially in areas such as the Mixteca Alta and Valley of Oaxaca, which were distant from major Spanish markets. Whereas ‘few native communities’ chose to cultivate wheat, another Spanish introduction popular amongst *encomenderos*, many Indian communities flocked to silk.<sup>69</sup>

Besides the good environmental fit between the concentration of mulberry trees and patterns of land availability, the native populations themselves possessed specific characteristics and experiences that were readily transferable to the new pursuit – traits which went beyond the wider trade, transport, and cultural integration of the region that eased parasitic Spanish colonialism. Most importantly, it is no coincidence that silk became most firmly and profitably established amongst the Meso-American groups who held the most impressive portfolio of pre-conquest textiles. As one Dominican friar put it, ‘even though silk was unknown in this country, the people were extremely skilled in weaving, embroidering, and painting cotton cloth’.<sup>70</sup> The Mixtecs were quintessentially experts in creating luxury cloth, their reputation apparent in their symbolic representation on codices, and in the complex weaving patterns required of them as Aztec tribute. Working mostly with cotton fibres acquired along coastal regions, they had established an efficient gendered infrastructure that held female labour paramount and made use of the household unit to specialise, with spinning and weaving technology widely dispersed, and complemented by processes of trading, finishing, and marketing of yarn, woven goods, and other related materials.<sup>71</sup>

<sup>69</sup> Terraciano, *The Mixtecs of Colonial Oaxaca*, 234.

<sup>70</sup> Diego Durán, *The History of the Indies of New Spain*, ed. Doris Heyden (Norman, OK: University of Oklahoma Press, 1994), 203.

<sup>71</sup> Patricia Rieff Anawalt, *Indian Clothing before Cortés: Mesoamerican Costumes from the Codices* (Norman, OK: University of Oklahoma Press, 1981), 95–146; María Romero Frizzi, *Economía y vida de los españoles en la mixteca alta: 1519–1720* (Mexico: Inst. Nacional de Antropología e Historia, 1990), 148–50; Richard J. Salvucci, *Textiles and Capitalism in Mexico: An Economic History of the Obrajes, 1539–1840* (Princeton, NJ: Princeton University Press, 1987), 48.

One related dyestuff in particular, cochineal, had been mastered by these Meso-American producers, and would go on to revolutionise European consumption from the mid-sixteenth century, not least because of its particularly robust adherence to the protein fibres of silk. In time, cochineal would go on to become Mexico's second most profitable export after silver in the seventeenth and eighteenth centuries. The long-standing seasonal harvesting of cochineal meant that Indians of the Mixteca (and neighbouring regions) were familiar with the peculiar demands of textile-related entomological agriculture. The cochineal insects, which feed parasitically on particular host *nopal* cacti, require careful oversight to generate an effective yield of their red dye. Meso-American Indians had mastered the symbiosis of these plants and insects, along with practices of selective breeding, protecting from predators, adapting to moments of seasonal intensity, and adopting methods of killing the creatures most effectively at the appropriate point in their lifecycles, by boiling, steaming, or baking. All of these experiences made the conceptualisation and the carrying through of *Bombyx* sericulture a more feasible adaptation, one that required minimal expense and did not demand wholesale Spanish involvement. The raw silk, in effect, followed the cochineal to Spanish merchants clustered in urban centres. It would invite much investment and economic pressure from *encomenderos*, but would become for a time a preoccupation of embattled indigenous communities – in Antonio Garrido Aranda's neat formulation, 'silk became the gold of the Indians'; they were a comparatively cheap, partly willing, and highly skilled and adaptable labour force with strengths in key areas.<sup>72</sup>

The neighbouring settlement to the south-east of Texupa was Yanhuitlán, which was another site of considerable Oaxacan silk production and had furnished its own distinctive source, this time in the European mode. Yanhuitlán was the centre of a significant *encomienda*, which in the late 1540s had a tributary population of some 16,000, and by the 1560s would extend its influence to encompass 26 dependent pueblos mostly to the south-east, when it was labelled an 'encomienda muy buena'. The energetic *encomendero* since 1546 had been Gonzalo de Las Casas, the descendant of one of Hernán Cortés's first cousins from

<sup>72</sup> Carlos Marichal, 'Mexican Cochineal and the European Demand for American Dyes, 1550–1850', in *From Silver to Cocaine: Latin American Commodity Chains and the Building of the World Economy, 1500–2006*, ed. Steven Topik, Carlos Marichal, and Zephyr Frank (Durham, NC: Duke University Press, 2006), 76–92; Luca Molà, *The Silk Industry of Renaissance Venice* (Baltimore, MD: Johns Hopkins University Press, 2000), 120–1, 130–1; Raymond L. Lee, 'Cochineal Production and Trade in New Spain to 1600', *The Americas* 4, no. 4 (April 1948): 449–73; Las Casas, *Arte nuevo para criar seda*, xxviii.



Trujillo, and Gonzalo took up numerous local official roles in the Mixteca and would go on to more prominent roles, ultimately being elected municipal magistrate (*alcalde ordinario*) of Mexico City. In 1581 Las Casas published the first-ever surviving silk manual for the Americas: an original work of agricultural improvement rooted in experience and informed by theory, entitled *Arte nuevo para criar seda* that he had compiled in New Spain in the mid-1570s, and had printed in Granada. Las Casas spent some of the opening passages retracing silk's early arrival in New Spain, and was especially keen to link Spanish women to silk culture's origins, as when he claimed that it was his mother, Lady Maria de Aguilar, who had launched sericulture in the Mixteca by propagating a pound of silkworm seed – given to her by no less than Hernán Cortés himself – in the 1530s. Las Casas also dedicated the first edition of his manuscript to doña Catalina de Galvéz, who had been in Guatemala where her husband was president of the *Audiencia* between 1570 and 1573, and who, like his mother, had shown a special interest in the pioneering of silk. Between the local quantitative drawings from the Indian community of Texupa and the qualitative textual musings from the *encomendero* of Yanhuitlán, much of the shape of New Spanish silk production can be inferred.<sup>73</sup>

Sericulture in New Spain exhibited many features that linked it to its Spanish and Moorish origins. These included preferred processes such as the frequent reeling of cocoons with the larvae still alive inside (known as *verde*, not *ahogado*), techniques such as the use of the hands (instead of whisk-like implements) to pick out the next bobbing cocoon to attach to the thread, and technical terms such as *embojarse*, whose provenance was unclear even to experienced New World silk raisers.<sup>74</sup> But there remained a number of distinctive elements. Even though the proportion of American trees declined with the growing reliance upon imported mulberries, American sericulture was at the mercy of American conditions, and allowance had to be made for different seasonal timings. In the Mixteca, silkworms were retrieved from storage in early February (two months earlier than in Granada), often being blessed during the Catholic 'Feast of the Purification of the Virgin' on 2 February, which appropriately involved their ritual cleansing with water and preparation for

<sup>73</sup> Las Casas, *Arte nuevo para criar seda*, xvii–xx, xxiv–xxv, 210.

<sup>74</sup> This term described the point at which silkworms had reached their fullest and began to mount and locate sites for cocooning. Las Casas suspected 'it is taken from the name of the broomstick that you put up, which in some parts of Spain is called "boja"'. Other terms such as *azarja* (reeling machine) or *azache* (floss silk) can be traced to Granada and its Morisco heritage. Las Casas, 225v, 226–226v; Juan Martínez Ruiz, *Inventarios de bienes moriscos del reino de Granada (siglo XVI): lingüística civilización* (Madrid: Consejo Superior de Investigaciones Científicas, 1972), 40, 62.

hatching. Sensible silk raisers, however, waited before fully exposing the eggs to the necessary heat (via sun or skin) until an adequate number of local mulberries were leafing, usually later in the month; one observer emphasised the need to wait also for a new moon (following Pliny).<sup>75</sup>

Besides the season being earlier in the calendar in Central America, practitioners needed to guard against particular local dangers, which ranged from fires to leaf-munching livestock (especially goats), caterpillar-eating lizards, and even iniquitous human predators, as when Gonzalo de Las Casas warned that 'not only will the Indians steal them to take advantage of the cocoons, but also to eat the worm, which they know how to roast like shrimps'. He advised the use of traps and poison, but not the acquisition of cats, to cope with the threats from troublesome Mexican rodents and lizards. Materials also differed, with the improvisation of adobe and pine building structures, and baskets (*paneras*) for the growing silkworms made of thatched straw, hair, or hemp. Meso-American silk raisers sometimes burned copal, a Nahuatl-derived term for aromatic tree resin, which was used as incense, to revive, or to warm silkworms. Likewise when they destroyed chrysalids, because they could not guarantee reeling before these hatched out, the silk raisers sometimes drew on steam suffocation techniques or the use of Indian sweat lodges (*temazcal*). Defective cocoons were dexterously removed from hot-water basins using *una puya de maguey*, the sizeable thorn on a local agave, most likely *Agave americana* var. *oaxacensis*. Las Casas, clearly schooled in the humoral understanding of living beings and their life cycles, spent long portions of his treatise advising how to counter the greater moisture found in Mexico and the problems it presented compared to the drier conditions in Granada. He recommended the selection of higher and drier lands for the pursuit, and frequent exposure of growing silkworms to the sun, or natural fire (of wood or charcoal).<sup>76</sup>

Practices in sericulture also evolved distinctive qualities, in spite of efforts to follow Granadan traditions, that reflected the different organisational features of the labour force and the different physical and resource environments. Las Casas warned Spanish entrepreneurs of the imperative of knowing or learning indigenous languages, so that employers could pass on information, guard against damaging idiosyncrasies, and monitor levels of diligence and efficiency amongst their workers. Meso-American communities operated along what might be described as

<sup>75</sup> For accounts of this timing: Las Casas, *Arte nuevo para criar seda*, 218v–220; Motolinía, 'Historia de Los Indios', 239. Spanish domestic sericulture typically saw silkworm hatching begun on the Feast of St Mark, 24 April, and running through to the end of June.

<sup>76</sup> Las Casas, *Arte nuevo para criar seda*, 211, 212, 214v, 217, 225v, 226v; Borah, *Silk Raising in Colonial Mexico*, 58.

either collective or diffusional models. By the first, as at Texupa, resources were pooled from the purchase (or hatching) of silkworm eggs onwards, and activities centralised using collective nurseries and silk houses, leading one scholar to describe it as ‘a sort of paternalistic socialism’ guarding against the predation of either Spanish or native powers. This system, along with the large silk houses constructed by *encomenderos* and entrepreneurs, involved an unusually high proportion of sizeable enterprises when compared with older Mediterranean silk-raising patterns. It reflected the creative economic practices – especially in relation to labour and space – that accompanied Atlantic colonialism, while remaining not too demanding in terms of capital outlay. The gravitation towards economies of scale pushed these operations into the kinds of efficiencies that Las Casas described in his treatise: large multipurpose buildings, long elaborate shelving, standardised reels of oak or sapodilla wood (*ruedas*), and contracted specialists.<sup>77</sup>

The less common diffusional model, as practised at Jaltepec, involved the parcelling out of silkworm seed to individual households. There the worms were raised by families, most likely using baskets rather than shelving, who delivered up the cocoon harvest or sold it to traders or entrepreneurs to be disposed of and reeled. Though Borah ridiculed this method as preserving a ‘farcical equality’ and being ‘blundering, [and] wasteful’ since ‘one would have to hunt far to find a worse raiser than the individual peon’, there seems little evidence to affirm that the quality of the silk was inferior.<sup>78</sup> Indeed, assuming a base level of proficiency instead of a base opinion of the workers, there were certain advantages in spreading risk and assuring future stocks of seed, and this method of quota distribution and return by a local peasantry was closer to contemporary practices in many Old World silk-raising regions. It perhaps lent itself particularly well to districts where the mulberry trees used for leaves were somewhat spread out, or of the indigenous variety. Long after the nucleated or collective approach had disappeared, occasional Indian households and hamlets continued to raise cocoons for local use into the seventeenth and eighteenth centuries, drawing on the seasonal spread of experience and stocks that had been a function of the diffusional model.

Some features of Gonzalo de Las Casas’s treatise revealed less about the nature of New Spanish sericulture than about contemporaries’ theoretical appreciation of what forces were acting upon their caterpillar charges. The fact that he was operating in an extra-European and

<sup>77</sup> Las Casas, *Arte nuevo para criar seda*, xxxiii, 216v, 225v; Borah, *Silk Raising in Colonial Mexico*, 45 (quote).

<sup>78</sup> Borah, *Silk Raising in Colonial Mexico*, 46.

improvisational setting meant that the Spaniard – like the French and Anglo-American commentators who would follow in centuries to come – was emboldened to test older theories or propose new ones. This creativity and open-mindedness applied both in scientific terms and when it came to the tendency to anthropomorphise the silkworms. Las Casas was adamant that constant monitoring of the silkworms' appearances and behaviours, particularly through their colouration, could lead to swift diagnoses and responses on the part of their human carers. Since the silkworms were changeable, chromatic and translucent creatures, he reasoned that 'at any time it holds its colour according to its mood, complexion, or quality' and therefore any threatening humoral imbalances could be offset by deducing whether to apply heat or cold in response. On the basis of experience, he dissented from conventional views, as when he criticised Italian humanist and historian Raffaello Maffei of Volterra ('Bolaterrano') for claiming in his selective description of animals and plants in the early sixteenth century that silkworms enclosed themselves in their cosy cocoons because they felt cold. Las Casas also showed considerable conviction in the power of astrological forces, not least the sun, which he held to have restorative powers, partly because its heat and dryness could counteract excessive moisture and cold. He believed the silkworms passed through vaguely defined stages of sleep, fear, love, and sadness, and that they only developed visual awareness when they metamorphosed.<sup>79</sup>

Las Casas would also blaze a trail in using the fragile silkworms as a way of reflecting on the physical and metaphysical impact of transatlantic relocation: what happens when a species is transferred from one part of the globe to another? He believed that silkworm eggs had lost something of their essence in their removal from the Old World to the New. 'Having traded and transferred things in the past from some lands to others', he opined, 'while in their first locale they remain complete, where they are transplanted they do not, retaining only the principal part'. Silkworm eggs differed from place to place even in the Iberian Peninsula, with some parts of highly valued Granada deemed to be better than others, and anything secured around the Guadalquivir River, to his mind, being 'vile fruit'. Ultimately, Las Casas felt that Mexican raw silk was somewhat inferior as a product, and the insect labourers more prone to disease, a fact we now should most likely ascribe to the spatial concentration and genetic narrowness of the silkworm population. But Las Casas felt that there was no need to persist with trying to perfect the seed coming from

<sup>79</sup> Las Casas, *Arte nuevo para criar seda*, xxxiv, 215v, 217v–218. Cf. Raffaello Maffei, *Commentariorum rerum urbanarum octo et triginta libri* (Rome, 1506) esp. book 24.

Spain, since 'it is better and more healthy to be in one's natural environment, as seen in livestock, which always do best where they are raised'. He advocated a mixture of risk-averting strategies, including guarding, conserving, and diversifying stock in the Americas, and refreshing it frequently from Europe.<sup>80</sup>

Though the output of colonial sericulture between 1540 and 1580 is difficult to gauge statistically, its rise to prominence can be easily vouched for by triangulating a mixture of sources with those above. Perhaps the first indications of increase lay in the collection of tithes (*diezmos*) and tributes by Spanish authorities. Back in 1501, Ferdinand and Isabella had creatively compiled a list of tithes for Hispaniola, in which they stipulated that, as in Granada, one silk cocoon in every ten should be reserved to the Catholic Church (whose tithes they were authorised to dispose of). Like a drifting caiman, these ambitions resurfaced when sericulture edged into view as a realistic prospect for fiscal predation. In 1539, Spanish settlers were ordered to pay this tenth on any silk their raised or obtained as tribute.<sup>81</sup> In 1544, though Indians were exempted from tithes on native crops grown for subsistence, a royal decree insisted that New Spain's indigenous communities pay their tithes in silk, livestock, and wheat to the archbishop and the *cabildo* of Mexico, forbidding the subcontracting of this collection to exploitative landlords.<sup>82</sup> A like decree was still active in Panama forty years later, stipulating that Indians should pay their tithes in cattle, wheat, and silk, and that neither the bishops nor anyone else should send proxies (tax farmers) to collect them, in case of the likely wrongs that could accompany this.<sup>83</sup> The awkward solution brokered in the silk-raising regions was that diocesan authorities either directly or via trustworthy Indians collected the tithes in the form of raw silk or cocoons, where necessary conceding some ground to religious orders.<sup>84</sup>

<sup>80</sup> Las Casas, *Arte nuevo para criar seda*, xxxvi, 228v, 229v. On likely silkworm diseases and infections, with 'grasserie' a particularly strong candidate – a gruesome nuclear polyhedrosis virus (also known as the *Borrelina* virus) which kills larvae in 12 to 15 days and involves jaundicing, wilting, and internal liquefaction, and is known to attack several species of wild Central and North American insects, being transmittable by skin or effluence, see Yoshinori Tanada, *Insect Pathology* (San Diego: Academic Press, 1993), 173–95; Borah, *Silk Raising in Colonial Mexico*, 63–5.

<sup>81</sup> 'En la Nueva España se pague diezmo de la seda que se cogiere en ella como en el reino de Granada', August and October 1539, Pacheco et al., *Documentos inéditos de Indias*, 20: 183.

<sup>82</sup> Real Cédula, 8 August 1544, AGI, Indiferente, 427, 30: 31r–31v.

<sup>83</sup> 'Carta de la Audiencia de Panamá', 4 June 1584, AGI, Panamá, 13, 23: 161; for similar attention to hoped-for silk returns elsewhere, 'Tributos y diezmos de los indios de Perú', 5 December 1557, AGI, Lima, 567, 8: 299r–300r.

<sup>84</sup> Borah, *Silk Raising in Colonial Mexico*, 81–3.

As far as labour obligations went, *encomenderos* were likewise swift to capitalise on raw silk production, with one observer recounting that in the 1540s many had seven or eight dedicated silk-raising buildings of significant proportions, 'more than two hundred feet long and very wide and very high' which held thousands of feet of shelves and trays to house the silkworms.<sup>85</sup> Cortés's personal efforts were increasingly concentrated on his estates south of the Valley of Mexico, using a central mulberry nursery at Cuernavaca tended by another expert (Cristóbal de Mayorga) from which thousands of saplings were transplanted to new satellite groves to facilitate Indian leaf-collection. Operations began in earnest in 1546 by which time a customised silkworm rearing house had been constructed and equipped, being 204 feet long by 30 feet wide, of adobe reinforced by wood, stone, and lime.<sup>86</sup> The scale and grievances associated with this kind of expansion and centralisation brought a new royal decree of 1549, instructing the New Spanish government to ensure that labour obligations imposed on the Indians in relation to silk, as well as tributes expected of them, must be fair.<sup>87</sup> Gonzalo de Las Casas was one of the culprits in 1550, when he was reprehended for abuses in relation to his tributes, though unsurprisingly he omitted to mention this in his pioneering tract.<sup>88</sup>

The sorts of abuses generated by Spanish exploitation of Indian labour in raising silk are shown in an episode that occurred in Metztlán, a district north-east of Mexico City about midway to the Gulf of Mexico (now northern Hidalgo). Thanks to its defensible mountainous terrain and limited economic appeal, this pugnacious Otomi region had narrowly avoided subjugation to the Aztec empire. By the early sixteenth century it had become something of a refuge for Meso-American dissidents, but could not hold out against the new European power. In 1552, it was under the shared control of three powerful *encomenderos* spearheaded by Alonso de Mérida, whose brutal maltreatment of their workers and notorious exactions became the subject of a controversial investigation by a royal commission headed by Diego Ramírez. The paperwork generated by this power struggle between metropolitan and local Spanish powers, in the context of an Indian community with a particularly strong tradition of resistance, swept up the kind of historical dust and dirt that usually lies hidden beneath layers of colonial oppression. One of the unsavoury

<sup>85</sup> Motolinía, 'Memoriales', in *Colección de documentos para la historia de México*, ed. Joaquín García Icazbalceta, vol. 1 (Mexico City: Librería de J. M. Andrade, 1858), 11.

<sup>86</sup> Borah, *Silk Raising in Colonial Mexico*, 18–19; William B. Taylor, *Landlord and Peasant in Colonial Oaxaca* (Stanford: Stanford University Press, 1972), 113–16.

<sup>87</sup> 'Real Cédula', 22 June 1549, AGI, Mexico, 1089, 4: 80r–80v.

<sup>88</sup> Las Casas, *Arte nuevo para criar seda*, xix.

episodes that Ramírez aired was the whipping to death of an Indian, Martín Ozumatl, a few years earlier. Ozumatl had doggedly refused to acquiesce to Spanish demands that he and his fellow labourers must water the trees in a nursery of imported mulberries that de Mérida had illegally seized on native lands. In response, the *encomendero* and his enslaved black had apparently tied Ozumatl to a tree, and inflicted such fierce punishment that he expired some days later, leaving two orphaned young children. After a long battle to establish jurisdiction, Ramírez ordered de Mérida to pay compensation to a guardian on behalf of these victims, and theoretically stripped him of his *encomienda* for a wide range of other exploitative behaviours, but the mulberry tyrant seems to have evaded the punishment.<sup>89</sup>

The decline of the *encomienda* system in many parts perhaps alleviated some of the more direct exploitation, which had prompted at least one exasperated cleric to wonder why Spaniards chose to abuse the labour of ‘those poor Indians, whom they should take care of like silkworms’.<sup>90</sup> The first district in the Mixteca Alta to revert to the Crown, Teposcolula, used its silk to furnish thousands of pesos by way of annual royal taxation in the early 1560s.<sup>91</sup> But as with *encomenderos*, entrepreneurs, and occasional native authorities, the success of communities raising silk made them a primary target for the Spanish officials (*alcades mayores*) who acted as tribute collectors. Though formally barred from trading in their dominions, officials nonetheless orchestrated the flow of many raw, finished, and semi-finished textile materials to suit their private interests. Their wide range of powers allowed them especially to pressurise female textile activity and to appropriate labour and production illegally, as when the Indians from Achiutla complained in 1601 of being forced to work silk, spin cotton, and weave cloth for the profit of the *alcalde mayor*.<sup>92</sup>

Indian grievances therefore accompanied the rise of silk production, frequently reaching the higher echelons of government, and helping to generate growing regulation of the industry in the final quarter of the

<sup>89</sup> María Justina Sarabia Viejo, *Don Luis de Velasco, virrey de Nueva España, 1550–1564*, Publicaciones de La Escuela de Estudios Hispano-Americanos de La Universidad de Sevilla (Seville: Escuela de Estudios Hispano-Americanos, 1978), 368–71; Walter V. Scholes, ‘The Diego Ramírez Visita in Meztlán’, *The Hispanic American Historical Review* 24, no. 1 (1944): 30–8; Francisco del Paso y Troncoso and Silvio Arturo Zavala, *Epistolario de Nueva España, 1505–1818*, 16 vols. (Mexico: Antigua librería Robredo, 1939), 7: 99–102, 121, 182–3; 9: 19.

<sup>90</sup> Motolinía, ‘Historia de Los Indios’, 115.

<sup>91</sup> María Romero Frizzi, *Economía y vida de los españoles en la mixteca alta: 1519–1720* (Mexico: Inst. Nacional de Antropología e Historia, 1990), 73. Gonzalo de Las Casas reported that this town produced ‘the best silk, and more clean than other communities’ in the early 1570s. Las Casas, *Arte nuevo para criar seda*, 226.

<sup>92</sup> Terraciano, *The Mixtecs of Colonial Oaxaca*, 240–1.

sixteenth century, as viceroys found themselves trapped between Indian producers' protests against interference on the one hand and urban Spanish manufacturers' calls for professionalisation of the quality of raw silk on the other. In 1579, for instance, Viceroy Martín Enríquez, who three years before had issued extensive instructions to regulate silk production, received a complaint from two Indians in the town of Tilantongo. They complained against the magistrate, Juan de Bazán, who had imprisoned, whipped, and banished them from the town for their having refused to render up a mule load of silk. The viceroy ordered Juan de Bazán to allow the expelled Indians to return and instructed that he should take no reprisals against them, under penalty of suspension of his office. Similar protections were secured for silk-producing Yanhuitlán Indians in 1591–2 under Viceroy Luis de Velasco, who granted a general licence to those living under the rule of *cacique* Gabriel de Guzmán to trade in Castilian merchandise, and expressly named ten native men and five women whose textile activities were not to be impeded. Velasco insisted in 1592 that the profits of silk production were not to be channelled to communities but rather 'that each Indian may profit for themselves'.<sup>93</sup> Such discussions of 'profit' from raw silk, and the underhand attempts to appropriate it, demonstrate that *Bombyx* sericulture had successfully transferred to New Spain – having eventually fulfilled the prerequisites discussed in the opening chapter relating to materials, climate, expertise, and labour. The transfer had been eased by the depth of experience in Spanish territories in the Old World, and the opportune fit to indigenous populations in these parts of the New World, which were sedentary, dense, and skilled in interconnected areas. These distinctive advantages had helped outweigh the challenges apparent in the transoceanic passage, the problems of coordinating symbiosis, and the embryonic nature of the market for the raw product.

### Consolidation

The rise and consolidation of sericulture from the 1540s was borne out not just in taxation and protective measures, but in the observations of residents and travellers through New Spain. Motolinía wondered at the speed with which mulberry plantations were transforming parts of Oaxaca, being 'that which makes these lands most rich'. He estimated that more than 15,000 lb of silk were being harvested in 1541, its quality

<sup>93</sup> Hortensia Rosquillas Quilés, 'El sello de la seda en la mixteca alta', *Restuara: Revista electrónica de conservación* 1 (2000): 1–10. For other interventions to assist Indian silk raisers in the face of exploitative authorities, Borah, *Silk Raising in Colonial Mexico*, 49, 72–3; Frassani, 'The Church and Convento of Santo Domingo Yanhuitla', 82.



comparable or superior to that of Granada, and marvelled that production could take place through ‘all seasons of the year’, anticipating that it would soon expand into the environs of Puebla.<sup>94</sup> Juan Lopez de Zárate, the bishop of Antequera (Oaxaca), noted in 1544 that the community of Teposcolula was raising 2,000 lb of raw silk (worth 900 pesos). This being some years before the bishopric was receiving the woven silk goods and expensive support mentioned in the Texupan codex, he complained that Mixtecan relations were topsy-turvy, for ‘contrary to what ought to be the situation, the natives are rich and well-treated, and the Spaniards the poorest and most restless’.<sup>95</sup> The same year, Bartolomé de Zárate, a municipal representative (*regidor*) of Mexico City, estimated that the output of the Mixteca Alta and Valley of Oaxaca totalled 9,000 lb of ‘reeled silk’ that came mostly from indigenous mulberries.<sup>96</sup> Outside the heartland of Oaxaca, sources document extensive mulberry plantations in the decade after 1545 in an array of locations, including concentrations in Guerrero, Colima, Mexico, Michoacán, Nayarit, Guadalajara, Huasteca, Hidalgo, Yucatán, and Puebla.<sup>97</sup> Joining these historical dots, groves, and profits shows silk raising initially spreading through central and southern Mexico, before contracting back to a core area rooted in the temperate highlands of the Mixteca Alta. Whereas the north and west were increasingly dedicated to silver mining from the late 1540s and the tropical lowlands favoured the cultures of cacao and indigo, silk production maintained a significant presence in between. Its retreat to districts that were buttressed by geographic and demographic advantages followed a similar pattern to that which prevailed in Murcia.<sup>98</sup>

Atlantic colonialism brought a distinctive combination, however, when it came to the relationship between raw silk production and manufacturing. Given the wealth wrung out of the New World and the desire to attain social improvement that was a motivation for migration for many Spaniards, it was not long before the major urban locales in Spanish America began to serve as sites of manufacture as well as conduits of Atlantic trade. But New Spain did not exhibit the characteristics of earlier new sites in silk’s great sweep westward, whereby the industry tended to arrive in reverse, with weaving workshops paving the way for greater interest in and demand for raw materials. Rather, the leap across the

<sup>94</sup> Motolinía, ‘Historia de Los Indios’, 8, 236–8.

<sup>95</sup> Letter from Mexico City, 30 May 1544, Pacheco et al., *Documentos inéditos de Indias*, 7: 551.

<sup>96</sup> Las Casas, *Arte nuevo para criar seda*, xxvi.

<sup>97</sup> Las Casas, *Arte nuevo para criar seda*, xxviii.

<sup>98</sup> Borah, *Silk Raising in Colonial Mexico*, 26–7; Pérez Picazo and Lemeunier, ‘El caso murciano’, 103.

Atlantic prompted development from the bottom up: the initial innovation and expansionism was in relation to the production of raw materials, and processing and manufacturing centres followed in their wake, being largely emulative and limited.

The preamble to the first-ever measures to regulate a silk industry in the Americas, issued by Viceroy Mendoza in Mexico City in 1542, explicitly justified the ordinances on the grounds that ‘this city and all its lands began to raise and work up silk’.<sup>99</sup> As this suggests, sericulture stimulated manufacturing, and the basket-laden carriers winding their way into the city in the late spring, congregating from near and far, with raw silk from *encomiendas* and Indian communities alike, presented an obvious entrepreneurial opportunity. Silk had arrived in the Americas as a novelty that marked out class and fairly quickly also become an available raw product: the region had not first, as had happened in earlier spreads of the commodity, gradually acclimatised to the new fibre (in finished or semi-finished form), then organically integrated it with dress cultures, then adapted to its use with local textile interests to stimulate a new manufacturing industry, then finally pursued and refined raw silk production. The 1542 regulations, which largely remained in shape for the duration of New Spain’s production of silk, were put together by a silk raiser (Jerónimo Ruíz de la Mota) and an administrative veteran from Granada (Gonzalo de Salazar), and the shadow of the Spanish domestic industry loomed large. Mexico’s silk industry was explicitly to emulate the kind of industry restrictions that were operational in Granada, which held primacy in matters of Spanish silk manufacturing and later secured an export monopoly on silk goods to the New World.<sup>100</sup>

To follow the trickle of such specialists as Ruíz de la Mota who migrated from Spanish silk centres to set up operations in New Spain offers a useful measure of this distinctive relocation of the cycle of industry. The scattered pattern of licences by royal decree shows the arrival of many expert silk raisers and reelers, followed by throwers and dyers, alongside weavers who congregated in the cities of New Spain. This was a logical progression through the stages of silk manufacture, but not one that had typically characterised earlier regional or transnational relocations. In 1557, a Gabriel López of Toledo was allowed to travel to the Indies, though no strings were attached to this ‘silk reeler’ who was leaving a region that one contemporary described in 1561 as having ‘felled its black mulberries and relocated its silk-raisers’. In February of 1563,

<sup>99</sup> ‘Ordenanzas de Antonio de Mendoza sobre géneros de seda’, 7 February 1542, AGI, Patronato, 181, 2–3.

<sup>100</sup> Borah, *Silk Raising in Colonial Mexico*, 32–3; Sarabia Viejo and Moreno de Del, *Los inicios de la agricultura europea en el nuevo mundo, 1492–1542*, 298.

Juan de Madrid was permitted to take his wife, children, and sister to New Spain so long as they practised 'the art of silk'. Further permissions were granted a week later to Francisco de Escobar (along with his wife, children, and one María Ruiz), listed as 'reeler of silk', and in April to Mateo de Benavente. The preponderance of travelling wives, women, and children amongst these silk-raising or silk-reeling licensees contrasts with contemporary listings of male silk artisans known to have left wives in Spain (such as the two dozen listed by Bishop Zumárraga).<sup>101</sup>

Mendoza's 1542 regulations generously granted a monopoly to the capital city where early migrant artisans concentrated, making it the sole location with the right to employ silk looms. Soon silk producers and merchants in Mexico City were recruiting silk throwers and weavers under contract from Spanish silk-manufacturing centres, who brought looms and introduced a broadening range of products. They expanded from thread and narrow-ware to satins, taffetas, and velvets, in large part stimulated by what Salazar described as 'the abundance of silk that is being raised'.<sup>102</sup> The capacity of the Mexican looms to absorb raw material ensured that domestic silk producers could find robust market prices for their output, and that only diminutive amounts of Mexican raw silk were licensed to be exported to Peru, Guatemala, or back across the Atlantic to the manufacturers of Seville. By 1547, an official inspector from the Council of Indies, Francisco Tello de Sandoval, commented that the local reserves of silk ('granjería de la seda') played a major role in the city's activities, 'maintaining a great number of people, with Spaniards as well as Indians profiting'.<sup>103</sup>

It was another signal of the importance of local sericulture to this fledgling manufacturing that over the next decade, the two cities closest to silk-raising centres and Mexican raw silk trading routes, Puebla de los Ángeles (1548) and Antequera (1555), successfully overturned Mexico City's monopoly and won the privilege to dye and weave silks. Fortified with guilds, these three cities became the focal points for the purchase of Indian-raised American silk for the remainder of the sixteenth century. They also served a useful function by effectively creating a legal and racial

<sup>101</sup> Luis Hurtado cited by Montemayor, 'La seda en Toledo en la época moderna', 121. 'Real Cédulas' or 'Licencia de Pasajeros' AGI, Indiferente, 1965, 13: 458; 1966, 14: 324v, 328, 367v; 1967, 16: 11v; 1968, 20: 263v. For Zumárraga's list of wifeless weavers, see Borah, *Silk Raising in Colonial Mexico*, 32.

<sup>102</sup> Cited in Borah, *Silk Raising in Colonial Mexico*, 33.

<sup>103</sup> 'Fragmento de la visita de Tello de Sandoval', Joaquín García Icazbalceta, *Colección de documentos para la historia de Mexico*, 2 vols. (Mexico, 1858), 2: 136–7. Decline of exports to Seville mentioned in Bernardo de Ulloa, *Restablecimiento de las fabricas, y comercio español* (Madrid: Por A. Marin, 1740), 233. For licences for American trade, see Borah, *Silk Raising in Colonial Mexico*, 139n52, 140n53.

barrier to many of the artisan vocations. The very first Mexican ordinances of 1542 had barred enslaved people (both Indian and other) from apprenticing in or practising silk weaving, a restriction that was extended twenty years later to exclude free blacks and those of mixed race from dyeing and weaving. Mendoza had not deemed it sensible to lock out the prospect of Indian specialists, but Spanish artisans nonetheless prevented their access to technology and training. The upshot was a system whereby cheap Indian labour could be mobilised and Indian skills exploited from mulberry planting as far as the silk-reeling stage, whereupon Spanish artisans clustered in the three cities commandeered the subsequent processes from throwing to weaving.

From the 1560s expansion and specialisation in these urban centres yielded guilds or regulated subdivisions of silk ribbon makers (*listomeros*), embroiderers (*bordadores*), taffeta weavers, cap makers (*gorreros*), and others. Nonetheless, the wide availability of raw silk and the possibilities of working up waste silk gave rise to significant pockets of Indian manufacturing, especially of craft goods. These have sometimes been unfairly disdained by scholars looking, as it were, through Spanish or European eyes. Home-raised yarn, mixed-fibre weaving, and Meso-American embroidery may not have challenged the growing Spanish silk hegemony in urban artisanry, but they were not necessarily 'aside[s]' that held little meaning or 'never developed great skill'.<sup>104</sup> Indeed, these were the first of many occasions in pockets of the Atlantic world when the creative repurposing and adaptation of local silk production and exchange would become meaningful: commercial 'failures' could nonetheless become sources of aesthetic, personal, and communitarian pride. Regulation, consistency, and profitability may have ruled in silk industries and silk literature, but other criteria could determine value in localities less inured to them.

Silk manufacturing in New Spain benefited in the 1560s from the tribulations that were imposed on the industry back in Spain and on its infrastructure and labour force. The city and silk districts of Granada experienced a disastrous collapse in the wake of Philip II's renewed campaigns against the Moriscos, which saw his heavy taxes on silk contributing to the Alpujarras rebellion in the late 1560s, and culminated in the brutal deportation of much of the specialised labour force to the rest of Castile and Aragon – in spite of Crown attempts to authorise hundreds of 'women for raising and reeling the silk' to remain. Granada's collapse, which lasted for decades and as a result of which the sector never returned to pre-rebellion levels, even after a recovery in the early seventeenth

<sup>104</sup> Las Casas, *Arte nuevo para criar seda*, xxix; Borah, *Silk Raising in Colonial Mexico*, 34–6 (quote on last).

century, saw capacity decline precipitately, with the number of looms dropping from 4,000 to less than 400 in the space of five years, while the cost of generating a pound of raw silk had more than quadrupled by 1572. Workshops stood empty, merchants disappeared in droves, and the relocations reinforced manufacturing in other towns such as Córdoba, Toledo, and Valencia – just as the later external expulsion of Moriscos from 1609 would boost production in the cities of North Africa.<sup>105</sup>

The upheaval clearly had ramifications for Atlantic trade and manufacture, for Granada held an export monopoly in the trade of silk textiles that it was in merchants' interest to bypass. Contraband activity had prompted a royal decree in 1569, which reminded viceroys and other officials to abide by the terms of an agreement with one Hernando Díaz de Alcocer, licensing him the sole privilege of 'the sale of silk of the kingdom of Granada . . . and of the export of silk to the Indies'.<sup>106</sup> A letter jointly written by several royal officials in Nombre de Dios, which had become the great Atlantic transshipment port on the Isthmus of Panama, complained of fraud in the silk trade in 1581, amongst other problems arising in the conduct of commerce. They wrote that 'no silks travel here from Granada, the merchants have no need of it, preferring to sustain their trade by bypassing the regulations secretly, as last year's fleet showed they had done and some admitted . . . they don't pay any notice to strictures'; they requested a clearer system of licensing.<sup>107</sup> Granada's ineffective supply of semi-finished or finished textiles from the 1560s represented an opportunity for Mexican silk manufacturers and, soon after, Pacific traders, and in 1591 its monopoly was finally officially removed at the behest of Sevillean merchants.<sup>108</sup>

<sup>105</sup> Coleman, *Creating Christian Granada* 8, 185; David E. Vassberg, *Land and Society in Golden Age Castile* (Cambridge: Cambridge University Press, 1984), 177–9, 181; A. Katie Harris, *From Muslim to Christian Granada: Inventing a City's Past in Early Modern Spain* (Baltimore, MD: Johns Hopkins University Press, 2007), 12–14, 24–6; Garrad, 'La industria sedera granadina en el siglo xvi y en conexión con el levantamiento de las Alpujarras (1568–1571)', 74–5; Garzón Pareja, *La industria sedera en España*, 249 (quote); López de Coca Castañer, 'La seda en el reino de Granada', 57; Martín Corrales, 'Comercio de la seda entre España y Mediterráneo', 161.

<sup>106</sup> For examples of fraudulent trading practices in silk textiles, 'Autos de Lope Ruiz de Lecea [Loja, Peru] . . . y Francisco García [Potosí, Peru]', in 'Autos entre partes,' 1570 and 'Autos fiscales', 1596, AGI, Contratacion, 712, 11; 5731a, 4. Final quote from 'Real Cédula de ejecutorias a los virreyes y demás autoridades', 10 July 1569, AGI, Indiferente, 426, 25: 13–13v. On the effect of the Granada monopoly on Toledo and illicit trade with the Americas between 1569 and 1591, Montemayor, 'La seda en Toledo en la época moderna', 128.

<sup>107</sup> 'Cartas y expedientes de oficiales reales: Panama y Portobelo', 27 May 1581, AGI, Panama, 33, 122: 7.

<sup>108</sup> Eufemio Lorenzo Sanz, *Comercio de España con América en la época de Felipe II* (Valladolid: Servicio de Publicaciones de la Diputación Provincial de Valladolid, 1980), 440–1.

A final stage in the consolidation of a comprehensive silk industry in New Spain was the standardisation of practices of regulation and inspection in the 1570s and 1580s, which focused particularly on two critical determinants of raw silk's quality: the adeptness of the cocoon reeling and the generational hardiness of the stock of silkworm eggs. Silk was a frequent subject of discussion in the letters home of the diligent Viceroy Martín Enríquez de Almanza, as he sought guidance on royal policy amidst the transformative years of the 1570s, when the Atlantic world came to terms with a nascent Pacific trade and commercial routes were recalibrated according to shifting patterns of population growth, mineral extraction, and commodity production. In 1572, he wrote 'in regard to that which touches on the profit of silk, it neither flourishes nor declines', the year later that the silk 'could be up to 20,000 pounds, in which case it is neither growing nor diminishing', and in 1574 that 'there is no great agitation'.<sup>109</sup> All of which suggests a fairly stable and impressive output in the early 1570s. In April 1576, Enríquez appointed 'two experts' to improve the yield of silk, confirming them as silk inspectors (known at times as *jueces de la seda* and *veedores*). The responsibilities officially designated to these new inspectors give detailed insights into the high level of specialisation and standardisation that had already evolved in the silk industry, and were repeatedly promulgated into the early seventeenth century.<sup>110</sup> Despite some fraud occurring during the term of the Count of Coruña, which involved the two inspectors being replaced for a time by a single judge (one *licenciado* Melchor de Vargas y Cordona), by 1587 the inspectors had been reinstated. The new viceroy, the Marquis of Villamanrique, reported then that 'in the previous year in many towns in the Mixteca' there was a fine yield of silk, 'in good quantity', and that he felt the judge unnecessary but the inspectors essential, and less expensive, in the efforts to counter the likelihood of 'great dangers and clandestine frauds in silk'.<sup>111</sup>

<sup>109</sup> 'Cartas del virrey Martín Enríquez', c.1572, 11 June 1573, and 23 October 1574, AGI, Mexico, 19, 74: 24v, 116: 3 and 142: 17.

<sup>110</sup> 'Testimonio de los nombramientos e instrucción que se hicieron por el Virrey Martín Enríquez para jueces de la seda', 12 April 1576, AGI, Mexico, 21, 19: 95–95v; 'Copia de un nombramiento e instrucción que dio el virrey, conde de Coruña, para veedor de la seda', 22 September 1581, AGI, Mexico, 21, 19: 91–2; 'Relación de los despachos remitidos por el marqués de Villamanrique', 13 November 1587 (confirmation in letter of 20 October), AGI, Mexico, 21, 16: 2v. Repeated in 1600 by Viceroy Gaspar de Zúñiga, adding the appointment of José de Arranzola in place of Tristán de Luna y Arellano as keeper of the seal of the Mixteca Alta, on which see Rosquillas Quilés, 'El sello de la seda en la Mixteca Alta.'

<sup>111</sup> 'Carta del virrey marqués de Villamanrique', 20 July 1587, AGI, Mexico, 21, 19: 13–13v. The identification of Melchor de Vargas y Cordona as the *licenciado* is on account of his inventory, which listed him as a sometime 'corregidor y juez de la seda del partido de Nochistlán en la Mixteca Alta'. 'Inventario de bienes: Vargas y Cardona, Melchor de', 16 July 1622, AGI, Mexico, 262, 258. Cf. Borah, *Silk Raising in Colonial Mexico*, 75. Another man listed as an inspector in the 1590s was Luis de Morales Beltrán ('oficial del

The package of measures first set up by Enríquez sought to improve relations between the merchants who purchased raw silk and Meso-American producers, and to iron out inconsistencies in practices of production, collection, manufacture, and sale. Indian raisers and reelers (known as *rescatadores* and *hiladores*) were commanded to be more diligent in separating and sorting cocoons such that fine ones and mediocre ones were not reeled off together. This had been a problem reported by Gonzalo de Las Casas in his treatise, when he spitefully observed that ‘particular Indians, friends of deceit’, had included defective cocoons, silk floss, and conjoined cocoons in their skeins, ‘as they are in the habit of behaving in all such cases’.<sup>112</sup> Enríquez sought further quality control by mandating that floss or waste silk (*escobilla* or *desperdicio*) was not to be worked into the yarn, but rather ‘removed to spin separately’. Reelers were ordered to maintain the same tally of cocoons unwound together throughout the skein, and to ‘avert fraud . . . so that the yarn is equal and does not come out in a sticky or heaped way’, presumably because such features reflected either careless reeling or, potentially, deliberate efforts to increase weight and therefore sales value to the detriment of actual quality.

The two *veedores*, Lorenzo Marroquín and Damián de Torres Zorrilla, had lived in the provinces of Yanhuitlán and Teposcolula, and were affirmed by Enríquez and later viceroys to be the most knowledgeable in silk culture. Enríquez conferred a seal to them and warned that no one should dare sell or work up silk without receiving this seal of authorisation (stamped upon the cords binding the skeins), under pain of confiscation of the product, though the resolutions did not always deter Indians from attempting to market their silk without registration, nor Spaniards from attempting to exploit the trade, as we have seen. Later on, the viceroy gave instructions to the overseers to visit the producers to help them bring the output to perfection, threatening to punish them and remove them from office if they did not comply. Besides this quality control at the point of reeling, which was to be paid for by Spanish merchants and traders, guild inspectors were appointed to ensure that the throwers and weavers in the manufacturing cities purchased only from these recognised suppliers, and to stamp out illicit trade via Indians, enslaved people of African origin, mulattoes, or others.<sup>113</sup>

arte de la seda’) in a lawsuit, ‘Bienes de Difuntos: Francisco de Palma y Luis Morales’, c.1590–1, AGI, Contratación, 923, 18.

<sup>112</sup> Las Casas, *Arte nuevo para criar seda*, 226.

<sup>113</sup> Viceregal act of 4 March 1576, confirmed a month later. Rosquillas Quilés, ‘El sello de la seda en la Mixteca Alta’, 6; Juan Barrio Lorenzot Francisco del, *El trabajo en Mexico durante la epoca colonial* (Mexico: Secretaría de gobernación, 1920), 48–9.

The flourishing state of Mexican silk manufacturing actually showed that consumer demand for silks in the New World far exceeded the supply of raw silk. Trying to keep pace with high local consumption and the orders coming in from each part of the Americas as they expanded (especially Peru and Guatemala), the silk artisans of Mexico City, Puebla, and Antequera competed not only within the regulatory framework, but also often outside it to secure raw materials with which to work.

The involvement of the state in brokering the various stages in silk production was in step with the Spanish Crown's increasingly systematic approach to information, science, environment, and colonial efficiency under Philip II. In 1577, the king commissioned detailed surveys of his holdings in the Indies, and in reply to the fifty-item questionnaires, local officials across the Viceroyalty of New Spain produced over 150 responses, the *Relaciones Geográficas*. Invited explicitly in the questionnaire to describe the extent of sericulture, they indicated in 1581 that silk constituted a principal commercial product in some areas, 'the trade and engagement of those naturals in all of this Mixteca province' according to one Oaxacan magistrate.<sup>114</sup> The Spanish raw silk traders who purchased so much of this product had to register their stocks, bring them to Spanish towns, and put them on public sale, from 1558 dividing the costs of carriage with the artisans who bought it up and who were obliged to work it up without stockpiling. Under other circumstances, such a restrictive system may have been a disincentive to merchants, but the ability to masquerade as silk producers (which allowed better terms), comparatively light taxes (compared to Spain), and the continuing rises in the price of raw silk meant that their activity was profitable. The sketchy information on raw silk prices suggests that the commodity's value increased, probably peaking in the decade between 1575 and 1585, before falling away dramatically by the start of the seventeenth century.<sup>115</sup>

<sup>114</sup> Rodolfo Pastor, *Campesinos y reformas: La Mixteca, 1700–1856* (Mexico: Colegio de México, 1987), 139; Howard F. Cline, 'The Relaciones Geográficas of the Spanish Indies, 1577–1586', *The Hispanic American Historical Review* 44, no. 3 (1964): 361; René Acuña, *Relaciones Geográficas Del Siglo XVI*, 10 vols. (Mexico: Universidad Nacional de Mexico, 1982), 1: 29 (wording of questions on silk and fruit trees), 2: 145, 158, 369, 4: 64–5.

<sup>115</sup> Silk exported from Granada paid taxes in the region of 15 per cent. Mexican silk was subject only to the export *almojarifazgo* (of 2.5 per cent on leaving New Spain and 5 per cent on entering other colonies) and the sales *alcabala* (of 2 per cent on commodities exchanged, including Mexican and imported silks), beside the tithe. Borah, *Silk Raising in Colonial Mexico*, 76–9.



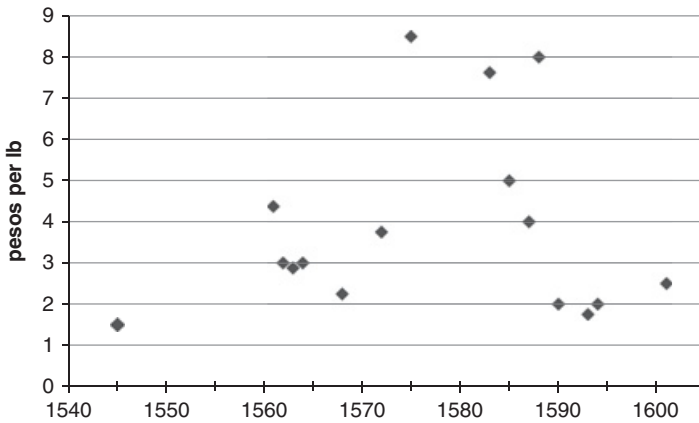


Figure 2.1 Oaxacan raw silk prices (c.1550–1600). Derived from figures from: Gonzalo de Las Casas, *Arte nuevo para criar seda*, 209, *Código Sierra Texupan*, ‘Libro de cargo y descargo del mayordomo’, 1563–1604, MS in Archivo de la Catedral, Oaxaca (cited in Borah, *Silk Raising in Colonial Mexico*, p. 91), converted into pesos. I have assumed that the figure Las Casas gives for ‘today’s price’ is for 1575, and that the value of 1.5 pesos that he gives for ‘back then’ in the district of ‘Tipuzque’ refers to 1544, when widespread production was mentioned in another source

### Pacific Challenge and Collapse, c.1580–1640

By 1605, the crop of Mixtecan silk that viceroy Enríquez had estimated at 20,000 lb in 1573 had fallen to less than 1,500 lb.<sup>116</sup> Spanish-American silk production was dropping at a precipitate rate, alongside prices, and it would never recover. What had gone wrong? The collapse in the last two decades of the sixteenth century arose from a set of exogenous shocks, any one of which would probably have constituted a mortal blow. Firstly there was an acceleration in the succumbing of Mixtecan and other producers to disease, which hampered the availability of labour, and its flexibility and sustainability. Secondly – and perhaps related to the first – recent findings in environmental history give evidence of extreme weather in this period, with global cooling linked to some major volcanic eruptions around the Pacific Rim. Lastly, and perhaps most critically of all, the regularisation of trade between Spanish America and China would serve to undercut

<sup>116</sup> King to Marquis of Montesclaros, Valladolid, 6 June 1605, AGN, *Boletín*, VI, 843–4, cited in Borah, *Silk Raising in Colonial Mexico*, 87.

Mixtecan silk's commercial viability and would compromise political support for silk production. When raw silk failed in New Spain, then, it failed because of largely exogenous factors: pathogens, climate change, and rapid commercial reconfiguration, which all undermined competitiveness and viability. Unlike later attempts by Europeans in the Americas, this was more a question of a successful endeavour being interrupted than a gradual discovery of internal flaws in silk projection.

The colonial production of all commodities in the Americas, of course, was constantly pressurised by the phenomenon of the native population succumbing to waves of disease, a situation unprecedented in the history of the world let alone the history of sericulture. In the Mixteca Alta alone, the Indian population dropped in the century after 1520 from around a third of a million to just 35,000. Falls of this magnitude across Native American populations had colossal consequences for cultures and economies, proving unfathomable to contemporaries and, in different ways, historians. The continual decline of the silk raisers disrupted any sense of equilibrium between supply and demand, and affected quality and quantities of raw silk. But the 1570s in particular brought great plagues that scythed down Meso-American producers (measles, typhus, smallpox, and in 1576 a severe epidemic known as *cocoliztli*, which was likely a viral haemorrhagic fever).<sup>117</sup> Agreed tributes or schedules for silk were soon out of date and out of reach, placing an unanticipated and even unintentional squeeze on native workers, and ensuring that the terms of exchange moved from those favourable to Indians to those favourable to the Spanish by around the 1580s. In 1583, for example, Tilantongo found its official quota of silkworm eggs reduced from 6 to 4 lb, partly reflecting the fall in the town's population (to somewhere above 1,000) and the consequent strain on labour availability during the peak period of leaf gathering and feeding. Falling population contributed to many of the local and regional disputes discussed above over trade, treatment, and regulation. Knowledge of the difficult art of reeling cocoons may have spread to a large degree, but the fact that proficiency remained concentrated amongst a few individuals even within Indian communities – something preferred by Spanish authorities – left reeling particularly vulnerable to the scourge of pestilence.<sup>118</sup>

<sup>117</sup> Rodolfo Acuna-Soto, Leticia Calderon Romero, and James H. Maguire, 'Large Epidemics of Hemorrhagic Fevers in Mexico 1545–1815', *American Journal of Tropical Medicine and Hygiene* 62, no. 6 (2000), 733–9.

<sup>118</sup> Las Casas, *Arte nuevo para criar seda*, xxviii–xxix, 225v; Borah, *Silk Raising in Colonial Mexico*, 40; Joseph Patrick Byrne, *Encyclopedia of Pestilence, Pandemics, and Plagues* (Westport, CT: Greenwood Press, 2008), 1: 414; J. N. Hays, *Epidemics and Pandemics: Their Impacts on Human History* (Santa Barbara: ABC–CLIO, 2005), 85.

Strong evidence exists to suggest that the final two decades of the sixteenth century also brought environmental pressures that may well have impacted upon vulnerable pursuits such as silk raising in New Spain. Papua New Guinea's Billy Mitchell volcano erupted in 1580, followed by several others, including in Colombia and southern Peru, events which had global impacts: ash in the stratosphere reduced solar radiation substantially, leading to a series of bad years globally – visible in low crop yields, price spikes, famines, and diseases, with heightened death rates apparent even in distant (though well-documented) European regions. The 1590s were the coldest decade of the sixteenth century, and a particularly heavy toll was taken in the Americas through severe drought cycles and low temperatures – wrecking the wine industry of Peru, for instance, as well as maize growing in western North America, and compromising the bedraggled early English colonists in Virginia discussed below. As one survey summarises, on either side of 1600, 'Central Mexico was experiencing the worst multi-decadal climate anomaly of the last millennium.' Such testing conditions put pressure on food supply, and changed the logic of cash crop production and exchange, perhaps helping explain the irregular raw silk harvests and redirection of efforts, as would later occur in the second half of the eighteenth century when producers in the same region opted to turn away from cochineal.<sup>119</sup>

Equally important, within the space of a few decades of the arrival of *Bombyx* silk as a raw product in the Americas, silk's oceanic encirclement of the globe as a trade good had been completed. Mapping out the eastward four-month return passage (*tornaviaje*) of nearly 9,000 miles, from the Philippines to the Pacific coast of the Americas, had cost much in the way of lost Spanish ships and crews. Even after the passage's discovery in 1565, long after the first abortive attempt to cross it in 1522, it remained a perilous and unpredictable journey. In 1574, there seem to have been few indications of any sericultural catastrophe around the corner, for although viceroy Enríquez's letters betrayed the rise of Pacific competition, he stated dismissively that year that the Chinese trade was only worth 'a few silks of very poor quality (most of which are very coarsely

<sup>119</sup> Wolfgang Behringer, *A Cultural History of Climate* (Cambridge: Polity, 2010), 87, 133–5; Brian M. Fagan, *The Little Ice Age: The Prelude to Global Warming 1300–1850* (Boulder: Basic Books, 2000), 90–105; Brian R. Hamnett, 'Dye Production, Food Supply, and the Laboring Population of Oaxaca, 1750–1820', *The Hispanic American Historical Review* 51, no. 1 (February 1971): 51–78; Bradley Skopyk, 'Rivers of God, Rivers of Empire: Climate Extremes, Environmental Transformation and Agroecology in Colonial Mexico', *Environment and History* 23, no. 4 (November 2017): 491–522 (quote on 492).

woven), some imitation brocades, fans, porcelain, writing desks, and decorated boxes'.<sup>120</sup> Gonzalo de Las Casas made no mention of it. But growing regularisation and expansion of trade across La Mar del Sur between Manila and Acapulco demonstrated, beyond all doubt, that Chinese silks were desirable in bulk as cargo: the silks and spices which Columbus had set sail to find were finally viable, and the Manila galleons (*naos de China*) were inaugurated. All of which meant that silk, the fibre until recently unknown to the Americas, was suddenly arriving from the Pacific as well as the Atlantic. From the late 1570s, the imports of finished and raw silk products directly challenged the delicately regulated world of Mexican production and manufacture.<sup>121</sup>

The settlement of Spanish enclaves in the Philippines from the late 1560s – enclaves in which one commentator recorded that soon ‘all, both men and women, [were] clad and gorgeously adorned in silks’ – and the possibilities surrounding Pacific trade sparked extensive discussions and debates amongst Spanish imperial authorities.<sup>122</sup> As far as the silk trade was concerned, policymakers grappled with powerful new overseas forces that included the scale and quality of Chinese production, high consumer demand for Asian silk products (especially in the Americas), and the emerging silk-manufacturing and mercantile interests of New Spain. Domestically, vested interests clamoured equally loudly for attention: the struggling Spanish silk industry sought to protect its threatened position, while export merchants moved to keep hold of markets and clientele, and political economists fretted over the outflow of specie. They were heartened by a royal decree in 1616 which ordered the eastward shipping of as little ‘quantity of silk of China’ as possible, in order not to undermine that which was produced in Spain.<sup>123</sup> Amidst this cacophony of lobbyists, each steeped in different ways in the rhetoric of cultural nationalism, there was little chance of the beleaguered indigenous silk raisers of Central

<sup>120</sup> Letter to the king, 9 January 1574, Emma Blair, James A. Robertson, and Edward G. Bourne, eds., *The Philippine Islands, 1493–1898: Explorations by Early Navigators, Descriptions of the Islands and Their Peoples, Their History and Records of the Catholic Missions, as Related in Contemporaneous Books and Manuscripts*, 53 vols. (Cleveland: A. H. Clark Co., 1903), 3: 226n75.

<sup>121</sup> José Luis Gasch Tomás, ‘Global Trade, Circulation and Consumption of Asian Goods in the Atlantic World: The Manila Galleons and the Social Elites of Mexico and Seville (1580–1640)’ (PhD thesis, European University Institute, 2012).

<sup>122</sup> Antonio de Morga (1609) in Blair, Robertson, and Bourne, *The Philippine Islands*, 16: 143. For other comments on the extensive general and symbolic use of silk textiles in Spanish Manila, see the Italian description (1699) of impressed traveller Giovanni Francesco Gemelli Careri, *Giro del mondo* (Naples: Stamperia di Giuseppe Roselli, Presso Francesco Antonio Perazzo, 1709), 5: 23–4.

<sup>123</sup> ‘Aviso y orden sobre carga de la armada de socorro’, 10 October 1616, AGI, Filipinas, 340, 3: 155.

America getting a hearing. To make matters worse, when the Crown of Portugal joined those of Castile and Aragon united under a Habsburg monarch (Philip II) in 1581, the extensive Portuguese silk-trading infrastructure out of Macao added greater Asian export power to the mix in Manila. Iberian officials in the Philippines tried to make clear through interpreters exactly what kinds of quality and quantity of raw and finished silks they preferred, but whether their messages made any difference or not, they eagerly disposed of what came their way from growing numbers of Chinese traders and ships.<sup>124</sup>

The overland route connecting the new Pacific and old Atlantic shipping lanes ran between Acapulco and Veracruz, via Mexico City, and it would soon be known as the road of China (*camino de China*). It literally and metaphorically cut across New Spain's decades-old indigenous silk trading paths. Uncertainty and vaguely positive statements around the turn of the century, such as Herrera's that 'in this valley of Oaxaca . . . there grows much silk, wheat, and maize' soon turned to scepticism. By 1605, one of the appointed Mexican inspectors of raw silks, Luis Calbacho, whose domestic fees had doubtless been waning dramatically, made the point explicitly that raw silk from China was strangling sericulture in New Spain, undercutting its value.<sup>125</sup> Plenty of commentators have promoted other explanations to a position higher up the chain of causality than they deserve, often fuelled by insistent biases such as anti-Indian, anti-Spanish, or anti-ecclesiastical sentiments, or postcolonial censure – for it is true that both Spanish authorities and some religious orders would go on to reverse their earlier support of silk raising from the

<sup>124</sup> Sanjay Subrahmanyam, 'Holding the World in Balance: The Connected Histories of the Iberian Overseas Empires, 1500–1640', *American Historical Review* 112, no. 5 (2007): 1359–85; Rui D'Avila Lourido, 'The Impact of the Macao–Manila Silk Trade from the Beginnings to 1640', in *The Silk Roads: Highways of Culture and Commerce*, ed. Vadime Elisseff (New York: Berghahn Books, 2000), 209–46; Katharine Bjork, 'The Link That Kept the Philippines Spanish: Mexican Merchant Interests and the Manila Trade, 1571–1815', *Journal of World History* 9, no. 1 (1998): 25–50; Antoni Picazo Muntaner, 'El Comercio sedero de Filipinas y su influencia en la economía de España en el siglo xvii', in *La declinación de la monarquía hispánica. VIIa reunión científica de la fundación española de historia moderna*, ed. Francisco J. Aranda Pérez (Cuenca: UCLM, 2004); Gasch Tomás, 'Global Trade, Circulation and Consumption,' 213–26; Dana Leibsohn, 'Made in China, Made in Mexico', in *At the Crossroads: The Arts of Spanish America & Early Global Trade, 1492–1850*, ed. Donna Pierce and Ronald Y. Otsuka (Denver Art Museum, 2012), 18–19.

<sup>125</sup> Herrera y Tordesillas, *Descripción de las Indias occidentales*, 19. See also 'Carta del virrey conde de Monterrey', 4 August 1597, AGI, Mexico 23, 86: 21. Calbacho cited in Borah, *Silk Raising in Colonial Mexico*, 90–1. For other claims about price differentials, see Muntaner, 'El comercio sedero de filipinas y su influencia en la economía de España en el siglo xvii', 502, though as Gasch notes these are assumed rather than evidenced.

1590s onwards.<sup>126</sup> But indigenous American sericulture, already undermined by Atlantic microbes and weather patterns, was one of the first victims of the dawning of a new global economic system.<sup>127</sup>

Belying Enriquez's initial disparagement, Chinese silk fabrics soon constituted a major component of trade whether determined by volume or by value, as appreciation of the quality and range of Asian silk products became more nuanced. The arrival of the Manila galleons (or singular galleon from 1593) annually transformed the quiet thoroughfares of Acapulco into thronging, swarming markets, with the ships' cargos serving as the bait in a spectacular commercial feeding frenzy starting in late January: mule trains descended from Mexico and merchant vessels from South American ports. Most silks would end up being consumed by peninsular and American-born Spaniards (*criollos*) as well as elite mestizos, especially in Mexico City, though large proportions were also disseminated to major provincial towns in the Viceroyalty of New Spain (such as Puebla and Guadalajara) and down the coast to Peru (especially silver-rich Lima) or across to other Spanish possessions, in spite of the attempts of the Crown to restrict re-exports.<sup>128</sup> Amongst the semi-finished and finished silks arrived large numbers of velvets, satins, damasks, and taffetas, the finest fabrics being tightly packed into half-chests (*medio cajones*), while inferior grades were bundled or baled (*fardos*).<sup>129</sup> Antonio de Morga, a senior official in Manila, recorded the Spanish orders of 'quantities of velvet, some plain, and some embroidered in all sorts of figures, colours, and fashions – others with body of gold, and embroidered with gold; woven stuff and brocades, of gold and silver upon

<sup>126</sup> For recent discussions which outline these different explanations and biases, see: Las Casas, *Arte nuevo para criar seda*, xxix–xxx; Teresa de Campos and Teresa Castelló Yturbide, *Historia y arte de la seda en México: Siglos xvi–xx* (Mexico, D. F.: Banamex, 1990), 34–60; Borah, *Silk Raising in Colonial Mexico*, 87–101.

<sup>127</sup> Debin Ma, 'The Great Silk Exchange: How the World Was Connected and Developed', in *Pacific Centuries: Pacific and Pacific Rim History since the Sixteenth Century*, edited by Dennis Owen Flynn, Lionel Frost, and A. J. H. Latham, 38–65 (London: Routledge, 1999), 52.

<sup>128</sup> William L. Schurz, *The Manila Galleon* (New York: E. P. Dutton & Co., 1939), 362; Borah, *Silk Raising in Colonial Mexico*, 97.

<sup>129</sup> The goods inventory of merchandise traded by one prominent merchant back to Acapulco gives an example of the many different classes of silks. 'Inventario de los bienes de Sande depositados por Diego López', 17 February 1581, AGI, Filipinas, 34, 35. A detailed discussion of the silk and mixed-silk goods was provided in the 1637 memorial by Juan Grau y Malfalcon, noting headdresses and stockings in particular, in Blair, Robertson, and Bourne, *The Philippine Islands*, 27: 184–203. On packing and the nature of goods, Carmen Yuste López, *El Comercio De La Nueva España Con Filipinas, 1590–1785* (Mexico, D. F.: Instituto Nacional de Antropología e Historia, 1984), 25–6; Edward R. Slack Jr., 'Orientalizing New Spain: Perspectives on Asian Influence in Colonial Mexico', *México y La Cuenca Del Pacífico* 15, no. 43 (2012): 97–127; Gasch Tomás, 'Global Trade, Circulation and Consumption', 219.

silk of various colours and patterns'.<sup>130</sup> Little wonder that the Viceroy of Peru informed Philip III that his people lived luxuriously, recording that 'all wear silk, and of the most fine and costly quality', with women's gala costumes more numerous and more excessive than in any other kingdom of the world. These American Hispanic elites were instrumental in the early market shaping of the European consumption of Asian goods that would explode from the late seventeenth century, though its trans-Pacific component stagnated somewhat after the 1630s.<sup>131</sup> But the question remains: to what extent was their flamboyant consumption – detailed in probate inventories and tax records – an unthinking decision when it came to the sourcing of their raw materials?

It is fair to say that the finished silks of China ferried across the Pacific were better appreciated by some consumers than by others. For all their novelty, artistry, and technical brilliance, these Asian imports could and did raise cultural hackles. Complaints about the influx of Chinese fabrics were mounting in the early seventeenth century, when globetrotting Bishop Martín Ignacio de Loyola grumbled that all classes in South America were dressing in the silks of China, above all the poorest people, and that they were used to adorn churches.<sup>132</sup> Another cleric explicitly requested that decorative liturgical materials for Catholic masses be sent to the Philippines all the way from Spain, preferably along with more friars, because 'although there are many ornaments here, they are of false Chinese silk and gold'.<sup>133</sup> Nonetheless, the cargos of silk goods shipped across the Pacific had a dramatic impact, with finished silk garments found in around 40 per cent of Mexico City inventories, and often dominating artistic and cultural depictions of the city.<sup>134</sup> Across the Atlantic, the steady trickle of Asian silk orders from New Spain, spread onwards from Seville as elite gifts to the Castilian aristocracy, suggested a proto-commercial metropolitan appetite for innovative luxury products that was perceptibly growing. In a short time, on the East Asian mainland,

<sup>130</sup> Blair, Robertson, and Bourne, *The Philippine Islands*, 16: 178. Morga explained that the price of both raw and woven silks was settled in silver and reals, and the trading completed by the end of May such that the *nao de China* and most of the Sangley traders could depart for their onwards legs in June and July. *Ibid.*, 182.

<sup>131</sup> For excellent recent analyses: Gasch Tomás, 'Global Trade, Circulation and Consumption'; Elena Phipps, 'The Iberian Globe: Textile Traditions and Trade in Latin America', in *Interwoven Globe: The Worldwide Textile Trade, 1500–1800*, ed. Amelia Peck (London: Thames and Hudson, 2013), 28–45.

<sup>132</sup> 'Carta de Martín Ignacio de Loyola, obispo del Rio de la Plata', n.d. [1607–9], AGI, Filipinas, 35, 47: 823v.

<sup>133</sup> 'Petición del agustino Pedro de Solier de mercedes para agustinos de Filipinas', c. October 1614, AGI, Filipinas, 79, 109: 1–2.

<sup>134</sup> Gasch Tomás, 'Global Trade, Circulation and Consumption', 258, 260; Leibsohn, 'Made in China, Made in Mexico.'

the Chinese were adapting their silk workshops to emulate Spanish tastes and Christian motifs, and this export product adaptability would position them well for the upsurge in the westward-bound Asian textile trade that took place over subsequent centuries.<sup>135</sup>

Just as important as these ready-woven silks, and arguably far more culturally transmissible, were the spiralling shipments of raw silks arriving in New Spain. Long before the arrival of the Spanish, the Philippines had served as an international transshipment point for raw silks, and though Pacific cargos were farther in distance and more concentrated, they fitted with the long-standing pattern of re-export established by the archipelago's Sangley traders to Japan. Historically, raw and semi-processed silk yarns were amongst the most prized offerings brought each year from China by the dozens of trading vessels that arrived in clusters with the monsoon in March (now growing to as many as fifty junks or *somas*).<sup>136</sup> One Spanish official, negotiating precarious early relations with China recorded that 'the great bulk of our purchases' consisted of raw silk.<sup>137</sup> Antonio de Morga, in his inventory of Spanish procurements at Manila, likewise emphasised the 'raw silk in bundles, of the fineness of two strands [*dos cabezas*], and other silk of coarser quality; fine untwisted silk, white and of all colours, wound in small skeins'.<sup>138</sup> Practically the full range of raw silk (*seda cruda*) was therefore catered for, from the cocoon floss that could not be wound as filament (*seda floja*) through to high-quality silk yarn that was virtually ready for dyeing or weaving and suited to either warp (*seda torcida*) or expressly for weft (*seda de tramas*). In 1599, the licenciante in Manila, Hieronimo de Salazar y Salcedo, wrote an extensive report discussing the ins and outs of the silk trade, recommending to the king that raw silk from Manila – because damaging to Atlantic trade – be restricted to five picos per ship, 'which is a very small quantity' but was still liable to make an estimated 400 per cent profit upon sale in Mexico.<sup>139</sup>

<sup>135</sup> Shirley Fish, *The Manila–Acapulco Galleons: The Treasure Ships of the Pacific, with an Annotated List of the Transpacific Galleons, 1565–1815* (Milton Keynes: AuthorHouse, 2011), 440–4; Ma, 'The Great Silk Exchange: How the World Was Connected and Developed', 51–2; Gasch Tomás, 'Global Trade, Circulation and Consumption', 53–6, 65–8, 70–3.

<sup>136</sup> Blair, Robertson, and Bourne, *The Philippine Islands*, 16: 177. 'Instrucción a los procuradores de Manila en la corte', 15 July 1611, AGI, Filipinas, 27, 85. The rich Japanese market itself was destabilised by the arrival of Europeans, as noted by the *procurador general* of the Philippines, Martín Castaño, who lamented the loss of the chance to sell silks there in 1618 because the Spanish had been trumped by the combative Dutch. 'Memoria impresa de Martín Castaño', 1618, Filipinas, 27, 107.

<sup>137</sup> Letter from Hernando de los Ríos Coronel, cited in Blair, Robertson, and Bourne, *The Philippine Islands*, 15: 172.

<sup>138</sup> Blair, Robertson, and Bourne, *The Philippine Islands*, 16: 178.

<sup>139</sup> 'Carta del fiscal Salazar sobre oficios, comercio, Hacienda', 21 July 1599, AGI, Filipinas, 18b, 9, 127: 19–20. A like-minded assault on the loss of silk revenue due to



The report seems to have made little impression: most of the growing quantity of Chinese raw silk continued to be bought up by the rising manufacturing industry in New Spain, which by the early seventeenth century was reportedly employing in excess of 14,000 workers in its three silk cities, where they worked up Chinese skeins, thread, and *trama* into 'velvets, veils, headdresses, passementaries, and many taffetas'.<sup>140</sup> In Mexico, one enthusiastic sailor reported to his father in 1590 that he had earned 2,500 ducats (then around £1,250) from the *nao de China* voyage in spite of the spoilage of one pack of silk by salt water.<sup>141</sup> But such private ventures were small fry compared to the commercial orders, and the officially acknowledged orders were a decreasing proportion of the overall trade, as smuggling and fraud increased substantially into the seventeenth century.<sup>142</sup> Merchants formed close links and sometimes partnerships with silk-manufacturing artisans, as when master silk-weaver Fernando de Padilla agreed to supervise the production of silk at one of the Mexico City stores of wholesaler Juan de Castellet: the former providing the labour and expertise, and the latter the capital.<sup>143</sup> By the early seventeenth century, Chinese petty traders and artisans (*chinos*) clustered into growing ghettos in Mexico City and Puebla, offering competition and expertise in the marketing and finishing functions of the silk trade.<sup>144</sup> In another nod to a world in which silk was breaking free of regional containment, a writer in Manila related that master silk-weavers had been leaving Toledo and Granada to set up workshops (*obrajes*) in New Spain, where they benefited from Asian raw silk.<sup>145</sup> Ironically, the stagnation of their Iberian home industries had also been caused in part by the profusion of Asian silks, because the pesky Dutch and other East Indies Companies were transporting them back westwards in increasing

the organisation of the Manila trade was made by the Dominican missionary Diego Aduarte to the Council of Indies: 'Carta del dominico Diego Aduarte sobre comercio de Filipinas', May 1619, AGI, Filipinas, 85, 34: 1–4.

<sup>140</sup> Memorial of Juan Grau y Malfalcon, 1637, in Blair, Robertson, and Bourne, *The Philippine Islands*, 27: 199.

<sup>141</sup> Sebastian Biscaino to Antonio Biscaino, 20 June 1590, Mexico, cited in Richard Hakluyt, *The Principal Navigations, Voyages, Traffiques, and Discoveries of the English Nation*, 16 vols. (Edinburgh: E. & G. Goldsmid, 1885), 15: 319.

<sup>142</sup> Dennis O. Flynn and Arturo Giráldez. 'Silk for Silver: Manila-Macao Trade in the 17th Century', *Philippine Studies* 44 (1996): 52–68.

<sup>143</sup> Louisa Schell Hoberman, *Mexico's Merchant Elite, 1590–1660: Silver, State, and Society* (Durham, NC: Duke University Press, 1991), 128–31.

<sup>144</sup> Edward R. Slack Jr., 'The Chinos in New Spain: A Corrective Lens for a Distorted Image', *Journal of World History* 20, no. 1 (2009): 42–4, 47.

<sup>145</sup> Blair, Robertson, and Bourne, *The Philippine Islands*, 27: 203.

volume, beginning to undermine long-standing European circuits of production and distribution.<sup>146</sup>

A significant proportion of Chinese raw silk was also ferried onwards across the Atlantic to provide materials for some of the looms of the Iberian Peninsula. There, in a sense the raw materials were culturally whitewashed by being worked up into Spanish fabrics, an apt expression since one of the enduring strengths of Chinese silk that was early recognised was its whiteness or purity and consistency of colour, which meant that it lent itself readily to dyestuffs. Chinese silk began with symbolic novelty value, by which knowledge of the silk's Asian provenance would add to the originality and social reception of fabrics worked up and then sported by Castilian elites.<sup>147</sup> But it soon became a commercial talking point. The Viceroy of Peru, Marques de Montesclaros, identified one important reason to allow the influx of Asian silks to continue in his lengthy contemplations on the Manila trade in 1610. He was by no means an apologist for China silk, warning that saturating the market with Asian silks might 'cease the present industry [in Spain] of the raising of silk, its weaving and trade', and replace sturdy Iberian products with 'what is so much poorer and of so little durability'. He explained that Spaniards in the Indies had discovered 'the harm caused by even a small quantity of silk of this class [i.e. thinner Chinese yarn]', which when mixed 'in almost all the velvets and taffetas brought from Spain' rendered them useless after two days. Yet de Montesclaros accepted that in light of the struggles of Spanish domestic production and the rise of European competition, should the door to Pacific trade be shut, 'the bulk of silk stuffs would have to be brought from France and Flanders', both powers who had proved extremely 'skilful in getting this product away from us' in the Mediterranean and beyond. This was a dangerous prospect indeed, and reason enough to sustain a Pacific silk trade: French and Dutch power could bite, whereas 'the Chinese do us no other harm than to keep the silver', albeit an astonishing quantity of it. Within a decade of Monteclaros's 1610 report, taxed imports of Chinese raw silk to Seville from New Spain had more than tripled, valued at over 60 million *maravedís* in 1618 (or 2,000 times the reward offered to the first Spaniard to produce raw silk 100 years earlier). It was another testament

<sup>146</sup> Occasional Portuguese merchants are recorded bringing raw silk back from India at the very end of the sixteenth century for use by Toledo manufacturers. Montemayor, 'La seda en Toledo en la época moderna', 121; Mariano Bonialian, 'La "ropa de La China" desde filipinas hasta Buenos Aires. Circulación, consumo y lucha corporativa, 1580-1620', *Revista de Indias* 26, no. 268 (2016): 641-72.

<sup>147</sup> See, for examples, small amounts of raw silk recorded in Gasch Tomás, 'Global Trade, Circulation and Consumption', 57-8.

to how quickly Meso-American production had collapsed in the past four decades that de Montescarlos prefaced his discussion of the future of Iberian silk with only the most half-hearted of reminders, that silk ‘may be obtained in great abundance, without begging it from anyone’ in any of Mexico’s provinces and especially the Mixteca.<sup>148</sup>

Rekindling sericulture, in fact, had not been entirely abandoned, and several protagonists in the seventeenth century sought to re-energise it through the Pacific transshipment of Asian silkworm seed. Naturally, the rising appetite for raw, semi-finished, and finished silks in New Spain had led to considerable interest in the nature of Chinese production.<sup>149</sup> In 1609, Hernando de Los Ríos Coronel informed the king that a new and more valuable type of silk was on the market at Lanquin (Nanjing), writing that the seed was very fertile and ‘they have worms whose cocoons are so large that they seem greater than hundreds of others’. He relayed that it was grown at a latitude of forty degrees and that ‘it would be easy to bring this seed . . . and it would be most useful for this kingdom’.<sup>150</sup> He was wrong. In 1610 the governor of the Philippines, Juan de Silva, had been instructed to seek out and send home some of this silkworm seed, with a request not only for the stock but also for insights into how the Chinese raised their silk, but this seemed to come to nothing.<sup>151</sup> Occasional later references also recorded attempts to bring away Chinese silkworm seed. The Dominican friar, Manuel Trigueros, wrote about his trip to Fujian on the south-east coast of China in 1682, during which he sought to procure seed and dispatch it to the Philippines governor Juan de Vargas, like an eastwards variant of Justinian’s mythologised Nestorian monks. Trigueros tormented himself with his attempts to identify the quickest sailing combination to get the eggs to their destination, trying to find the journey that involved the fewest ‘steps for it to reach Manila with dispatch: all is in vain if the Canton ship leaves so late that the worms hatch’. But he and others who attempted to convey the seed in this direction were facing an impossible task, given the travel involved. As he rightly and diplomatically predicted, ‘I fear greatly that time is set against His Majesty’s wishes in this matter’, adding for good

<sup>148</sup> Blair, Robertson, and Bourne, *The Philippine Islands*, 17: 214–212; Flynn and Giráldez, ‘Silk for Silver: Manila–Macao Trade in the 17th Century’, 59–60; Gasch Tomás, ‘Global Trade, Circulation and Consumption’, 100–1 (figures for raw silk imports).

<sup>149</sup> ‘Relación sobre el reino de China de Juan Bautista Román’, 28 September 1584, AGI, Filipinas, 29, 49: 215–29.

<sup>150</sup> ‘Petición de Ríos Coronel sobre variedad de seda de China’, 24 January 1609, AGI, Filipinas, 27, 72: 513r–514v. Briefly mentioned in John N. Crossley, *Hernando de Los Ríos Coronel and the Spanish Philippines in the Golden Age* (Farnham: Ashgate, 2011), 88.

<sup>151</sup> ‘Orden de enviar a España semilla de seda china’, 1 November 1610, AGI, Filipinas, 329, 2: 118r–118v.

measure the disclaimer that the importation had not been his idea: his superior in Macao had charged him with the duty.<sup>152</sup>

Rather like these larvae, Mexican sericulture was left behind as Spanish subjects in the New World adapted Pacific materials to reconstruct the sartorial models of materialism that they had imported across the Atlantic. One writer in 1637 argued that only imports shipped from Manila would suffice in the absence of Mixtecan produce; they complained that by the time Atlantic silks reached Peru from Spain, especially black, brown, and silver-coloured goods, they apparently ‘arrived in bad shape, because the sea rots them’.<sup>153</sup> Gradually, tastes and fashions amongst Spanish *criollos* were embracing new colours, styles, weaves, and creating a hybrid material identity, to the point that occasional European silk textiles at the start of the seventeenth century were even sent back home across the Atlantic, having failed to charm discerning American consumers. Andean peoples also co-opted available silks into their production and fashion cycles, as indigenous groups had done a few decades earlier in New Spain, for example in the use of imported silk wett in the weaving of the shimmering *tornesols* (overspun camelid warp-faced black fabrics) that became highly popular in the southern highlands.<sup>154</sup> Rather than contemplating revived silk-raising projects, silk consumers in South America pressed on several occasions to be allowed to open their own direct trade across the Pacific which might also negate smuggling.<sup>155</sup>

At the national level, the Spanish debate over the pros and cons of suppressing the Manila trade continued. An alarmist six-page pamphlet, printed in Spain in 1628, called for a blanket ban and warned of the pernicious ‘dangers and inconveniences’ which would accrue from

<sup>152</sup> ‘Expediente sobre el comercio con Macao’, 7 January 1682, AGI, Filipinas, 24, 4, 27: 1–2.

<sup>153</sup> Memorial of Juan Grau y Malfalcon, 1637, in Blair and Robertson, *The Philippine Islands, 1493–1803*, 27: 199.

<sup>154</sup> Fish, *The Manila–Acapulco Galleons*, 90. On cultural and material crossover, see: Héctor Rivero Borrell Miranda, *The Grandeur of Viceregal Mexico: Treasures from the Museo Franz Mayer* (Houston, TX: Museum of Fine Arts, Houston, 2002); Gasch Tomás, ‘Global Trade, Circulation and Consumption’, 223 (cargoes returned), 318–29 (adaptation of fashions); Armella de Aspe, ‘Artes asiáticas y novohispanas’, in *El Galeón del Pacífico: Acapulco–Manila 1565–1815*, ed. Fernando Benítez (Mexico City: Biblioteca del Sur, 1992), 203–39; Leibsohn, ‘Made in China, Made in Mexico’, 23–4. Elena Phipps, ‘“Tornesol”: A Colonial Synthesis of European and Andean Textile Traditions’, in *Textile Society of America, Seventh Biennial Symposium, Santa Fe, New Mexico 2000 Proceedings*, ed. Textile Society of America (Earlville, MD: Textile Society of America, 2000), 221–30; Elena Phipps, Johanna Hecht, Cristina Esteras Martín, et al., *The Colonial Andes: Tapestries and Silverwork, 1530–1830* (New York: Metropolitan Museum of Art, 2004), 190–1, 276; Arteaga, ‘Vestido y desnudo’, 202–3.

<sup>155</sup> ‘Autos fiscales’, 1629, AGI, Contratacion, 5737, 6: 3, and 1635, AGI, Contratacion, 650, 5; ‘Los oficiales reales de Quito sobre diversos asuntos’, 11 May 1632, AGI, Quito, 20a, 19; Fish, *The Manila–Acapulco Galleons*, 48–9, 268.

allowing even a limited exchange – up until then, the choice of moderates – that would permit the stealthy penetration of China's 'wild and rough' silk. The pamphlet conveyed a sense of class war, warning of price hikes and the self-interested officials in Spanish America – viceroys, generals, and justices – who had collaborated in the Chinese saturation of the markets there. It lamented the consequences for Spanish silk raisers (*criadores*), and warned that the domestic industry would likely collapse in a few years, crippling populations and revenue streams, especially in Granada. The author walked back through the consequences: the wasted skill, the poverty, and ultimately the death of the mulberry trees for lack of care that would render it impossible to reconstruct the industry in the future.<sup>156</sup>

### Survival, c.1640–1700

By the 1640s, sericulture in Spain's New World possessions was therefore no longer associated with large-scale commercial ambitions. The vast majority of the mulberry trees that had been so carefully planted out in the sixteenth century had either been progressively destroyed or, more commonly, simply neglected. It was telling that there was virtually no discussion of sericulture's revival, even when the Acapulco-Manila trade was at its most insecure, or when Asian raw silk declined in step with the collapse of the Ming dynasty – an event that itself lessened the tide of Chinese silk production and contributed to a contraction in international commerce and the numbers of vessels arriving at Manila.<sup>157</sup> By 1679, when a royal edict formally ordered the physical uprooting of all trees in the Viceroyalty of New Spain 'whose leaves would feed silkworms' it could be safely ignored because it would have virtually no added impact.<sup>158</sup>

But though its extent was vastly reduced, silk raising nonetheless persisted, being embedded particularly in the economic and cultural life of a small number of Mixtecan townships. The output of raw silk was enough in 1608 to warrant an explicit mention in a guild order of the hat and silk workers of Lima which insisted that 'the silk sellers did not combine Mixteca silk with China silk in fringes or other items'.<sup>159</sup> Specialisation brought sensitivity to the origin and quality of raw

<sup>156</sup> 'Razones para no admitir el comercio con China', signed by a Juan Velázquez Madridejos, October 1628, AGI, Filipinas, 40, 5: 1–6.

<sup>157</sup> Hoberman, *Mexico's Merchant Elite, 1590–1660: Silver, State, and Society*, 15.

<sup>158</sup> Borah, *Silk Raising in Colonial Mexico*, 99.

<sup>159</sup> Francisco Quiroz and Gerardo Quiroz, *Las Ordenanzas de Gremios de Lima (s. XVI–XVIII)*, Historia Serie Documental (Lima: s.n., 1986), 19.

materials, and at other points Meso-American silk was clearly in demand on its own, being mentioned explicitly in purchase orders amongst the merchants of Cuenca, who sold it alongside China silk to a range of clients in the 1600s – many of them from the lower orders.<sup>160</sup> The last testament of a wealthy Mixtec merchant from Yanhuitlán in 1621 recorded his trade of silk fabrics from ‘the Mixteca, Tlaxcala, Europe and Asia’.<sup>161</sup> In the early eighteenth century, foreign visitors reported that the province of Oaxaca still ‘affords much Silk’, besides wheat and maize – Edward Cooke described the country as ‘wholesome and pleasant’, adding that it ‘produces much Silk, being full of Mulberry-Trees’.<sup>162</sup> Local raw silk was still being used to pay a small portion of parish tithes in the late eighteenth century in such places as Texupa and Teposcolula, but the quantity was minimal and declining. One view of this persistence has been to characterise it as little more than a slow, lingering death of the pursuit, what Woodrow Borah described as ‘degenerate remnants’ whose value seeped away.<sup>163</sup> Seen in the light of global market integration, and the increasingly transcontinental flows of goods and technologies, this view has its merits.

However, the fact that for a century or more, Mixtecan raw silk lapsed into a niche commodity produced and traded by Indians, also highlights a profound Atlantic adaptation and a sort of reclamation. Even if figures permitted (which they don’t), we could not infer qualitative cultural value in the same way we might chart quantitative output, but there are a few signs that suggest Mixtecan’s exclusive ownership of their silk raising was highly significant to them. Caciques placed high symbolic value upon silk vestments, as recorded in the will of Don Gabriel de Guzmán who wanted a Yanhuitlán silk item returned that had been loaned out to the cacique of Mistepec and passed on to the governor of Tlaxiaco.<sup>164</sup> One seventeenth-century historian recorded that the most important items ritually exchanged as gifts during festival celebrations were silk mantles.<sup>165</sup> And though hard to track definitively, the legacy of this local usurpation of and persistence in silk production is perceived to be of great importance to

<sup>160</sup> These included ‘seda de mixteca floxa y torcida’, and ‘seda colorada floxa de la mixteca’, which were offered to poor janitors and Spanish aristocrats alike. Arteaga, ‘Vestido y desnudo’, 195–7.

<sup>161</sup> Cited in Frassani, ‘The Church and Convento of Santo Domingo Yanhuitla’, 57.

<sup>162</sup> Edward Cooke, *A Voyage to the South Sea, and Round the World Perform’d in the Years 1708, 1709, 1710, and 1711*, 2 vols. (London: Printed by H. M. for B. Lintot and R. Gosling etc., 1712), 1: 393–4.

<sup>163</sup> Borah, *Silk Raising in Colonial Mexico*, 101.

<sup>164</sup> Last will and testament of Don Gabriel de Guzmán, 1591, translated in Restall, Sousa, and Terraciano, *Mesoamerican Voices*, 108.

<sup>165</sup> Francisco de Burgoa, *Geográfica Descripción* (Mexico: Talleres Gráficos de la Nación, 1934), 1: 289.

producers today, who cherish an art that they and their ancestors have nurtured through the ages. They place great emphasis on the fact that their *criollo* silkworms are descended from those brought by the Spanish in the sixteenth century, as opposed to the hybrid Japanese *mejorado* silkworms provided by government programmes.<sup>166</sup>

Spain had offered an effective model of how to bring silk production to the New World, thanks in large part to the substantial involvement of these indigenous collaborators, whose practices persisted. But choreographing projection, production, and exchange had been complicated by diverse forces and discoveries to the point where it was no longer desirable. As for peninsular silk producers in Spain and later Portugal, their fortunes in the long seventeenth century varied somewhat from region to region, pushed and pulled by wider trends that included the upsurge in Asian imports, economic stagnation as silver declined, loss of foreign markets, and growing domestic-market penetration of Italian silk yarn and north-western European manufactured silk and mixed-silk products. The decline in some districts, such as Toledo, was offset by the consolidation of a domestic silk industry chain from moth to cloth, especially in vibrant Valencia and Cataluña, but one which was strong in the middle range and lacked either high quality at the top end or low enough price at the bottom to fend off commercial rivals. The Spanish raw silk export trade, meanwhile, increasingly gravitated northwards to France, with Marseille becoming a favoured destination, until exports were strategically banned in 1699. By that stage, the more northerly European powers had long had their own plans in motion for introducing silk production to their Atlantic empires.<sup>167</sup>

<sup>166</sup> Alejandro de Ávila Blomberg, 'Threads of Diversity: Oaxacan Textiles in Context', in *The Unbroken Thread: Conserving the Textile Traditions of Oaxaca*, ed. K. Klein (Los Angeles: The Getty Conservation Institute, 1997), 87–151; Careyn Patricia Armitage, *Silk Production and Its Impact on Families and Communities in Oaxaca, Mexico* (Ames, IA: Iowa State University, 2008), 50–1.

<sup>167</sup> Martín Corrales, 'Comercio de la seda entre España y Mediterráneo', 162; Carl A. Hanson, *Economy and Society in Baroque Portugal, 1668–1703* (Minneapolis: University of Minnesota Press, 1981), 167–8.