Entangled Itineraries

Materials, Practices, and Knowledges across Eurasia

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In memory of Ronald E. Smith (1931–2018),
whose love still journeys with me

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Chapter 7

The Itinerary of Hing/*Awei*/Asafetida across Eurasia, 400–1800

Angela Ki Che Leung and Ming Chen

The focus of this chapter is on the global itinerary of asafetida as a drug, spice, and plant, tracing the processes and contact zones where knowledge around it was generated, transmuted, altered, disseminated, or disregarded from the fifth to the nineteenth century. Asafetida's long global history was inextricably entangled with the movements of peoples, money, rumors, religious activities, medical and culinary practices, and scientific inquiries across regions and continents in different periods. Asafetida was a malleable and mobile material, creating and depositing values and meanings in some—but not all—relational fields along its temporal and spatial trajectories. Its history reveals erratic and open-ended processes of knowledge integration and disintegration centering on the material that did not, however, add up to the formulation of any straightforward definitions of a single, discrete material. These processes demonstrate, instead, how asafetida "reflected an attitude about the vitality of the world" in contact zones where it was ascribed special properties or "cultural logics" as a drug, a food, or a plant.[1]

Asafetida is described in modern European pharmacopeia as the dried latex (gum resin) from the root of several species of the Ferula herb of the umbelliferous family, grown wild in dry, stony, mountainous regions in Central Asia, including regions between Lar and Yazd in today's Iran, in the Qandahar region of southeastern Afghanistan, and in southern Uzbekistan. The product is also widely known in English literature as hing (of Sanskrit or Hindu origin).[2] Having a strong stench, the gum-resin was used for centuries both as a spice and as a drug in Asia and in Europe. In Europe it was compared to and sometimes equated with silphium, which was believed to have been introduced to Europe from North Africa in the fourth century

BC during the conquest of Alexander the Great and was used in ointments by ancient Greek doctors. The material was then believed to have become rare until its "reemergence" as a plant in the sixteenth century. From then on, the plant producing the resin became an object of great interest for European naturalists.[3] By the mid-nineteenth century, the resin was still used in Europe "as a stimulant and antispasmodic in chronic bronchitis, hysteria and tympanitis."[4] Little is known of its global circulation during the entire medieval and premodern period, however, partly because Western literature has paid little attention to the history of this Central Asian product in the rest of the world and especially in East Asia where it had a brilliant career in the premodern period.

Around the time that asafetida "reemerged" as a plant in Europe toward the end of the sixteenth century, Li Shizhen (李時珍, 1518–1593) in China compiled the monumental and globally translated *Bencao gangmu* 本草綱目 (Systematic materia medica 1596), in which asafetida was given lengthy descriptions as a drug coming from Central Asia or India. Under the heading *awei* (阿魏), as the drug was then commonly called in China, Li provided a list of Chinese transcriptions of foreign terms designating what was considered the same material: *ayü* (阿虞), *xingyu* (*xingqu*, 興渠[䞐], *hing-yu*, 形虞), and *haxini* (哈昔尼).[5] Berthold Laufer clarified in 1915 that *ayü* in fact transcribes the Persian term *anguza(d)*, *xingyu* transcribes the Sanskrit term *hiṅgu*, and *haxini* transcribes Ghazni, a city in today's Afghanistan. None of these terms, according to Laufer, was the origin of *awei*. For him *awei* is a phonetically exact transcription of *ankwaṣ(ḍ)*, a word in Tokharian B—a now defunct Indo-European language spoken north of the Tarim Basin (northern Xinjiang) from the sixth to the eighth century.[6] This transcription suggests that the traders who introduced the product to China were probably a Tokharian-speaking people. Kuchen traders active in the Tarim Basin region between present Afghanistan and China in the seventh and eighth centuries were the most likely candidates.[7]

Li Shizhen's rich historical account of awei sums up the resin's written history in China until the late sixteenth century when it was widely known in East Asian materia medica, bearing witness to its great mobility in the global market. The focus of this chapter is on awei's itinerary as a material and on the ways in which knowledge was constructed around it as a resin or as a plant. Three characteristics of the substance are highlighted: its materiality as a drug, spice, and plant; the significance of the resin's defining yet intangible

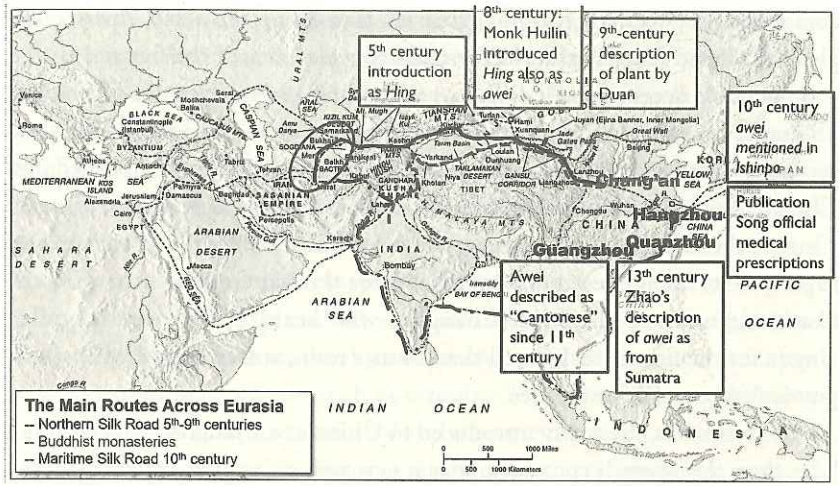

FIGURE 7.1. Map of the main routes across Eurasia, showing the itineraries of *awei*/hing/asafetida (after Hansen, *The Silk Road*, 6–7). The map shows Chang'an as a hub where, between the fifth and ninth centuries, the first Chinese names of asafetida emerged, the first book on materia medica including *awei* was published, the first description of the plant was written down, and it appeared in recipe books. Then in Quanzhou and Hangzhou during the tenth to twelfth centuries *awei* was imported in bulk, publications of official recipe books included *awei*, and the stench of *awei* helped construct new pharmaceutical knowledge and a new interpretation of *qi*.

stench; and its elusive authenticity and identity as a global commodity and as an object of scientific enquiry (see figure 7.1).

Awei as Name, Material, and Knowledge in East Asia, Fifth–Tenth Centuries

Awei left Central Asia and India and began its new journey in China as *xingqu* (a transcription of *hiṅgu*) in one of the first Buddhist vinaya translated from Sanskrit into Chinese in the fifth century, *Shi song lü* 十誦律 (*Sarvāstivāda-Vinaya*, Ten recitations Vinaya). This text was read and translated orally before being transcribed into Chinese by a team including Central Asian Buddhist monks such as Puṇyatara (弗若多羅) from Kasmira and the great Kuchean translator Kumārajīva (鳩摩羅什, 344–413), in the city of Chang'an, capital of the non-Sinitic (of Qiang ethnicity) state of Later Qin (265–450), a great patron of Buddhism.[8] The reading of the vinaya in Sanskrit by Puṇyatara followed by the translation into Chinese was attended by more than three thousand monks and novices at Xiaoyao yuan (逍遙園), a huge

complex where Kumārajīva organized his translation projects.[9] This incomplete translated text introduced the term *xingqu* as one of the five resins that a monk could accept from a donor, as a Buddhist code of practice for monks. The same passage also introduced new knowledge on other foods including syrups, greases, root plants, fruits, soups, most of which were transcribed into Chinese phonetically from Sanskrit as they had no existing Chinese names.[10] Xingqu, thus designating a common material in Indian Buddhist culture also expressed its foreignness in China. The three thousand monks attending the historic translation session in Chang'an, who heard of the material called xingqu for the first time, learned that it was a resin, without any idea about its physical appearance or nature.

The resin was physically introduced to China as a tributary trade item not later than the seventh century, under a new name, *awei*, as recorded by the official history of the Sui dynasty (581–618). This book was published in the 620s, and in the chapter on Central Asia (called in Chinese *xiyu*, the western territories) it is reported that the material awei was one of several crops and products of the tributary State of Cao (漕, known in Sanskrit as Jaguda, and Zabul in Arabic), which occupied the territory of today's Afghanistan.[11] By this time, the knowledge of the resin and of the State of Cao as a major producer was already well known in the Eurasian Buddhist world.[12] From this point on, the term *awei* became the most common to designate the resin in Chinese texts of various genres, eclipsing all other coexisting Sanskrit, Persian, Arabic, and Mongolian terms including the first Chinese transcription *xingqu*.

The reception of the material awei as a medical ingredient in China was immediate. It was included in the first Chinese compendium of materia medica, *Xinxiu bencao* 新修本草 (The new compilation of materia medica), published in 657 with imperial endorsement. For the first time in China, the knowledge about awei as a drug was crystallized in writing. It was recorded here as a drug of middle medicinal quality, spicy in taste, without poison but with a repelling smell. It was considered to be an effective vermifuge, useful in dissolving lumps and masses in the abdomen, dissipating bad *qi* (from the body) and protecting the patient against ghosts and bad spirits.[13] It was said to be made from the "juice" of the root of a plant said to look like the indigenous Chinese plant *baizhi* (*Angelica dahurica Benth.et Hook*, another umbelliferous plant), after it is sun-dried and ground into a powder. But an inferior type consisting of segmented roots was also in use. Finally, without specifying the

native place of this drug, the compiler of the compendium, Su Jing, highlighted the paradoxical and defining character of awei: having an unusual stench, it was efficacious in getting rid of foul smell.[14]

Awei's unique stench and ascribed efficacy as a vermifuge and its paradoxical effect of stopping foul smell flagged it as an occult drug in China in the eighth and ninth centuries. It was included in medicinal recipes in this period mostly for banishing disease-causing evil spirits and ghosts. Awei was sometimes made into pills that were burnt to fumigate the patient diagnosed to be possessed by bad spirits.[15] Doctors also advised patients to take awei pills to prevent disease transmission by malicious *qi* emitted from corpses.[16] It was used to exterminate vermin such as creeping bugs since the seventh century in recipes treating leprosy, believed to be caused by bugs pullulating inside the body.[17] One of the first doctors to introduce such recipes, Sun Simiao (孫思邈, 581–682), attributed this therapeutic use of awei to an Indian origin.[18] Sun was also one of the first to include awei in composite recipes for dissolving lumps and masses inside the abdomen, establishing a long Chinese tradition of such use in subsequent centuries.[19]

Wang Tao's (王燾) compilation of recipes based on his research in the imperial library, *Waitai miyao fang* 外臺秘要方 (Secret essentials from the imperial collection, ca. 752) was the first medical book to provide a series of recipes using awei for occult purposes such as expelling evil spirits. Together with another newly introduced resin from Central Asia, benzoin (安息香), and sometimes mixed with cow's milk (a substance rarely used in Chinese medicinal recipes), awei was an ingredient in medicines to be taken for the ousting of evil spirits including ghosts and fox spirits that took the form of beautiful women and caused hallucinations such as intercourse with the spirits. Sometimes awei was mixed with toxic elements such as arsenic and various types of animal hair and bones into pills for fumigation to banish bad spirits from a patient or to prevent epidemics in a locality; the pills could also be hung in houses or carried on journeys as a charm to ward off bad spirits.[20] The occult use of awei also appeared in Japanese pharmacopeia not later than the tenth century. *Ishinpō* 醫心方 (Essential medical recipes, 982), one of the earliest and most influential Japanese medical texts by Tanba Yasuyori (丹波康賴, 912–995) based on Chinese medical classics, recorded the use of awei mixed with alcohol in a recipe for the prevention of postmortem contamination (*zhu*).[21]

Buddhist monks working in Chang'an probably played the key role in disseminating knowledge on awei in the early period. Other than their transla-

tion projects, several prominent Chinese Buddhist monks traveling between Central Asia and China continued to bring back new knowledge on the resin to their audiences in Chang'an. One of them was Monk Huiri (慧日, 680–748) whose discussion on xingqu shows the unique sensitivity toward the resin as a taboo in Indian culture.[22] Another was Huilin (慧琳737–820), a linguist who had worked in major monasteries in Chang'an.[23] In his major linguistic study, *Yiqie jing yin yi* 一切經音義 (The sound and meaning of the Tripitaka), he explains that "xingqu (*hiṅgu*) is a 'tree juice' that people in the western region (India) put in food. It is what we [the Chinese] now call the drug awei."[24] Huilin here enriched the knowledge on awei by clarifying the distinction between hing as a food in India (with the name *xingqu* transcribing the Sanskrit term) and awei as a medicine in China. His interest in the resin had much to do with his role as a Buddhist monk: the resin was not only a well-known taboo food in Indian Buddhism but also a common drug stored in monasteries along the route he traveled between India and China, via the Kingdom of Khotan, on the southern edge of the Taklamakan Desert in the Tarim Basin. Chinese archaeological findings show that one of the common medicines stored in Buddhist monasteries in the Khotan region was awei.[25] A document listing market prices of awei in the Turfan region in the year 743 illustrates the material's full integration as an accessible commodity by this time in China's medical culture: one *liang* (around 1.3 ounces) of superior quality awei powder was worth eight copper coins, and middle quality and inferior awei cost seven and six coins respectively, which were of the same value as the much-sought-after native ingredient the dried *poria* fungus.[26]

Knowledge of the plant that produced awei, however, was not recorded in writing until the ninth century. Thanks to the curiosity of the literatus Duan Chengshi (段成式, 803–863) who interviewed Central Asian and Persian travelers sojourning in Chang'an, capital of Tang China (618–907), where he spent time as an official and a retiree, the plant was described in writing for the first time. In his influential jottings, Duan indicated the ingredient's geographic origin: Persia and northern India, with the Persian name of the plant *anguzad*. Duan told his readers that the "awei tree could be as tall as 8–9 *zhang* [almost three meters]," with a yellow-greenish bark. "In the third month of the year it develops leaves that look like rat's ears, but no flowers nor fruits. If one breaks the branches a tasty juice will come out that will, after a while, solidify as *awei*."[27] Duan informs his readers that this information was given to him by a Melkite monk from Central Asia, whereas Indian monks

told him that the juice of the plant was mixed with rice and beans to make awei.[28] Duan's text has to be appreciated in the context of the cosmopolitan culture of the Tang capital at the eastern terminus of the Silk Road infrastructure at its prime. Chang'an evolved from a religious (Buddhist) center in the fifth century to a political and commercial hub of the Chinese Empire unified under the Tang dynasty from the seventh century, a setting that facilitated the global circulation of knowledge of all kinds, to and from Central Asia, by traders, monks, diplomats, and other sojourners who interacted freely with resident doctors, scholars, and officials.

By the ninth century, then, awei as a medical material was known in writings and was commonly used in China. The material knowledge constructed through it circulated along the Silk Roads, from today's Afghanistan and northern India, via the Tarim Basin to western China, turning up finally at Chang'an at the eastern end, in monasteries, marketplaces, and imperial offices. From this cosmopolitan center, the resin was made known to all East Asian regimes, as *awei* in China, *agi* in Japan, *awi* in Korea, and *a ngui* in Vietnam. However, this knowledge on the material—kept in temples, sold in markets in the form of a powder or segmented dried roots, or in various mixtures—remained fragmented and elusive. No writer on the substance actually witnessed the herb or tree that produced the substance or the production process of the various forms of the material found in marketplaces. The early domination of the Tokharian B term *awei* for the commodity—eclipsing all other transcriptions (Sanskrit, Persian, or Arabic) that differentiate between the plant, its various parts, the resin, and its derivatives—greatly simplified knowledge construction through the material. It was precisely such fragmented and incomplete knowledge about awei that nourished imaginaries on its native place, physical form, materiality, and therapeutic qualities in the later periods that determined its value as a thing.

Awei as a Popular Medicine in East Asia, Tenth–Fifteenth Century

The importance of awei in Chinese materia medica continued to grow after the tenth century, as it now reached East Asia not only by land but also in increasing bulk by sea via Southeast Asia.[29] By 1141, an imperial regulation allowed awei, along with eighty-six other spices and drugs, to be legally traded on the Chinese market.[30] Historians attribute the explosion of medicinal recipes in this period to the great influx of Central and South Asian drugs via

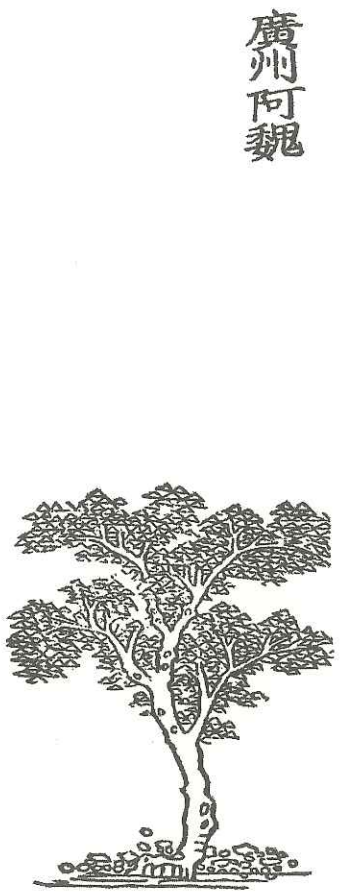

FIGURE 7.2. The *awei* of Canton in materia medica text *Bencao tujing* by Su Song (1061). Public domain.

land and sea. Robert Hartwell, using the data of extant fragments of an early fifteenth-century imperial encyclopedia to measure the medical use of foreign commodities from the seventh to the late thirteenth century, estimated that asafetida was used in 37 percent of recipes treating constipation-related syndromes between the eleventh and the thirteenth centuries (see figure 7.2).[31]

Many such recipes were recorded in official compilations of medicinal recipes, including some state charitable dispensaries, such as the one-hundred-chapter *Taiping shenghui fang* 太平聖惠方 (Recipes of the Imperial Grace during the Great Peace, 992) and the *Taiping huimin heji ju fang* 太平和劑局方 (Recipes of the Charitable Dispensary for Popular Relief during the Great Peace, mid-thirteenth century).[32] Awei's initial occult use in repelling evil spirits and stopping postmortem disease transmission was still common, but its main therapeutic use seems to have become as a dissolvent of blockages, a dissipater of phlegm, bad *qi*, and irregular growths including tumorlike lumps inside the abdomen. Its use was then extended to treating women's reproductive disorders including obstructed menstruation and as an abortifacient. It had acquired a more constructive function by the tenth century when mixed with other ingredients, as shown by the "awei pill" considered to be effective in "boosting the vital *qi* of men, and blood *qi* of women," recorded in the *Taiping shenghui fang* compilation.[33]

The popularity of awei also reflects the global impact of Islamic medicine peaking in the fourteenth century. Similar pharmaceutical uses of the drug can be found in the Arabic tradition, as shown in Ibn Al Baytar's (1197–1248) description of *andjudan* (the Arabic term of the asafetida plant), with a note on the beneficial warming and drying effect of the resin (known as *haltit* in Arabic) on the liver and stomach, and its use in dissolving intumescence produced by heavy foods.[34] A purgative formula from around the twelfth century using asafetida and other ingredients, for instance, is found in the Genizah collection of Egyptian medieval medicine.[35] An early mention of asafetida in English in a late fourteenth-century translation indicated its introduction into Europe.[36] Meanwhile, the first compilation of Islamic medicinal recipes written in China, the *Huihui yaofang* 回回藥方 (Islamic medicinal recipes) published in the fourteenth century, contains recipes based on asafetida. A specialist of this text draws our attention to the similarities, in form and content, between this text and Islamic medical texts such as that by Avicenna (980–1037, known in China as abu Ali).[37] Unlike Chinese medicinal books, this text transcribed *asafetida* not only as *awei* but also in Arabic, Persian, and even Latin terms. The uses of the drug were similar to those recorded in existing imperial compilations of recipes, especially in its use in dissolving phlegm and hard lumps in the abdomen.[38]

The medicinal use of awei was also recorded in other non-Sinitic cultures in East Asia in this period. Some rare texts from the Tangut kingdom controlling parts of western China near today's Xinjiang area between 1038 and 1227 indicated the popular use of awei as a medicine in that short-lived kingdom much influenced by China.[39] The Tibetan medical classic *The Four Tan-*

tras (*rGyud-bzhi*, considered a late eighth century compilation, printed for the first time in 1546) cited the use of awei as a vermifuge and a Wind-dispelling drug, establishing the popular use of the resin in Tibetan medicine. It was in the Tibetan medical tradition that awei acquires an aphrodisiac quality (as in Arabic and Indian cultures) not explicit in other East Asian traditions.[40]

Sources in this period suggest that the product was a highly valued commodity and much appreciated by the imperial court. In the tenth century, the Khotan state offered two valuables to the Song court: white jade and awei. Like jade, awei was part of the lucrative black market trade in this part of Central Asia.[41] One century later, a grandiose tributary mission of the Chola dynasty of southern India in 1077 to the Chinese emperor offered awei together with other valuables such as frankincense, rosewater, cloves, borneol, pearls, and rhino teeth among other precious items.[42] A Chinese scholar official complained in 1045 about the unreasonably high price of awei, which, for him, was only a mediocre and aggressive ingredient whereas milder drugs of finer therapeutic quality were much cheaper.[43] This comment informs us not only about the drug's high value in this period but also the mixed Chinese reception of this foreign thing as a medicinal ingredient. This concern seemed to be growing among experts and would explain the gradual decline of awei's market value in subsequent periods.

This image of awei as a material may also be one of the reasons that it never posed the problem in Chinese Buddhist dietetic practice that it did in India and other non-Sinitic cultures. Believers did not need to avoid awei in meals as it was not an integral part of the Chinese or East Asian culinary tradition. A Chinese Buddhist text of the tenth century stated that of the five spicy herbs forbidden for monks—garlic, chive, green onion, scallion, and xingqu—only xingqu was not a food in China.[44] Despite some sporadic evidence that parts of the awei plant were consumed as a vegetable in western China in the early tenth century, this use did not persist, largely because of its stench.[45] In this regard, the reception of asafetida in China was similar to that in Europe.[46] However, for a brief period in China under Mongolian control from the late thirteenth to the early fourteenth century, awei was used as a condiment and added to various soups and dishes with game and other meat to enhance the taste. An influential book on diet at this time, *Yin shan zhengyao* 飲饍正要 (Essentials of food and drink, 1330) by the Mongol doctor Hu Sihui (忽思慧), was uniquely informative on the question. The spice, called *kasni*, was put in dishes and soups based on mutton, deer, and bear meat to enhance the taste.[47] This practice, however, was at best marginal and ephemeral in the Chinese culinary culture in its long imperial history.

Asafetida in the Construction of Modern Botanical Knowledge, Sixteenth–Nineteenth Centuries

Asafetida's global visibility increased suddenly from the sixteenth century onward, with new transoceanic routes facilitating the circulation of humans and materials and intellectual movements that inspired unprecedented global efforts to retrieve drugs recorded in Dioscorides's classic.[48] Gathering, compiling, and sharing information and materials both heard about and witnessed firsthand, comparing them with those described in classic texts, European travelers and their native collaborators in different parts of the world created new networks of knowledge making.[49] In the process, a new relational field formed, within which asafetida emerged as a plant.

One of the first global travelers interested in asafetida as a plant was the Portuguese Jewish doctor Garcia da Orta (1501–1568). In 1534 he sailed for Portuguese India as chief physician aboard a Portuguese fleet and in 1538 settled in Goa to practice medicine. Based on his Indian experience he authored the *Colóquios dos simples e drogas he cousas medicinais da India*), which reveals his extensive knowledge about Asian drugs and spices. He was one of the first Europeans to point out the different Arabic and Indian names for asafetida resin and for the plant, and he reported especially on the popularity of the resin as a food in India. But he also admitted that, despite his familiarity with the resin, he had never seen the plant, which grew deep inland, and did not know what it looked like. "No people known to me use anything but the gum which is obtained by making cuts in the tree."[50]

It was probably the desire to penetrate this tantalizing myth about asafetida that drove the German doctor Engelbert Kaempfer (1651–1716) to travel all the way to the region of Lar along the Persian Gulf to witness the harvesting of the resin. Kaempfer belonged to a generation of European doctors in the service of European trading companies who traveled far and wide seeking out firsthand information on the natural world.[51] Serving as a physician in the Dutch East India Company, he traveled to Russia, Persia, India, Siam, the East Indies, and Japan during the decade between 1683 and 1693.[52] He published the observations of his travels, *Amoenitatum exoticarum*, in 1712 in which seventeen pages were devoted to observations on asafetida, including detailed drawings of the plant and its parts and an illustration of the harvest-

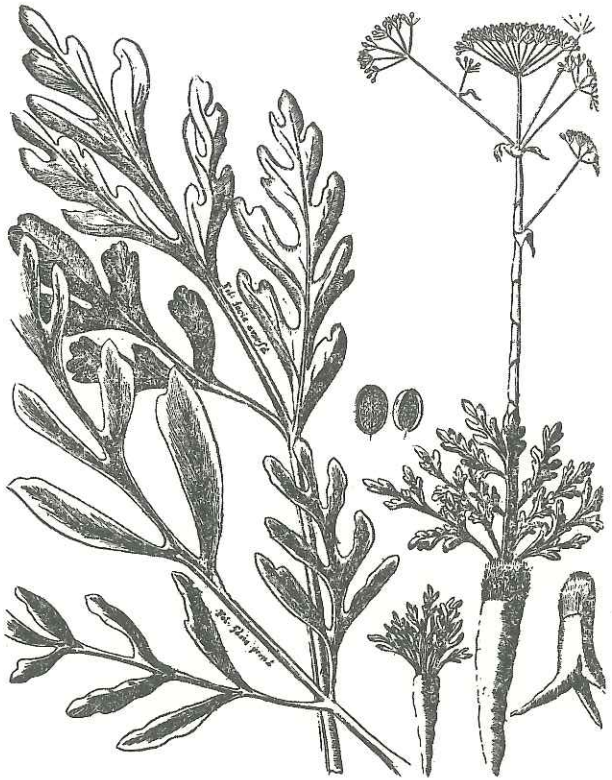

FIGURE 7.3. *Hingiseh* or asafetida plant, in Kaempfer, *Amoemitatum Exoticarum* (1712). Public domain.

ing he witnessed in 1687 (see figure 7.3).[53] R. Carrubba translated those pages from Latin into English for the first time in 1979. From Kaempfer's account, the reader learns that the asafetida plant was part of the umbelliferous family and grew wild in large meadows in remote arid and stony mountains. The gum was generated in the root and harvested in the spring in four phases—mid-April, late May, early June, and early July—by peasants who had to take a night's climb of some fourteen miles to the asafetida fields. They cut the stems and leaves to expose the top of the root in order to collect the liquid coming up in several slicing stages until all the liquid from the root was harvested. The sap collected in the third stage, called Pispaas, was believed to be the best, with the firmest consistency. Kaempfer also noted that, by his time, overharvesting had already left very few older and larger plants (more than twenty years old) that were capable of producing greater quantities of sap.[54]

Kaempfer's identification of the plant and detailed description of the production of the resin formed the basis for subsequent descriptions and for discussions among European naturalists about the asafetida plant itself. Two important figures in this debate were Hugh Falconer (1808–1865) and his friend John Royle (1799–1858), both naturalists with medical training and global travelers as physicians in the British East India Company. Falconer identified Kaempfer's asafetida plant as *Ferula Narthex Boiss.*, a plant that he not only observed in its natural site but also cultivated with seeds brought back from Persia, a common practice by naturalists of that time. John Royle fully recorded Falconer's account of the plant with detailed drawings of the various plant parts. He raised a new point about the fruit or seeds of the plant, imported in India from Persia and Afghanistan under the name Anjoodan and widely employed by Indian physicians.[55] This implies that, contrary to previous belief, other parts of the asafetida plant besides the resin were also used as medicine or food in India.

European botanists continued to study what they believed to be the asafetida plant that was now cultivated in European botanical gardens with seeds brought back from Asia by various naturalists.[56] John Balfour (1808–1884), professor of botany at the University of Edinburgh, in 1841 provided meticulous descriptions of the plants cultivated in Edinburgh, further differentiating the odor of the main plant (strong garlic odor), the flowers (sweetish), ripe fruits (asafetida odor), cotyledons and early leaves (not fetid), young root (bitterish taste).[57]

Such new knowledge on the asafetida plant soon found its way back to East Asia. Japanese Rangaku (Dutch learning) scholars and doctors Otsuki Bansui (1757–1827) and Otsuki Banri (1785–1837) translated various European materia medica and compiled their translations in *Ran'en tekihō* 蘭畹摘芳 (Extracts of Dutch botanical learning, 1815). This work includes a long section on asafetida, comparing knowledge collected by Kaempfer and other European naturalists with that on awei in Chinese materia medica.[58] The Chinese translation of European materia medica, especially John Royle's work of 1876, was undertaken by British missionaries some seventy years later. The translator, while naming the text "Compendium of Western pharmacopeia," admitted that the asafetida from the plant *Narthex Asafoetida* of Falconer was indeed awei in China.[59] However, such knowledge had little impact on contemporaneous Chinese pharmacology and definitely did not placate a growing Chinese concern about the authenticity of the drug that was found on the market.

The Defining Stench and Elusive Authenticity

Stench

The distinctive and defining stench of asafetida shapes its diverse careers as a food or as a medicine in different cultural contexts along its long spatial and temporal trajectories. The foul smell of the material was often the first thing that Chinese and European writers remarked on in their writings. Chen Cheng (陳誠, ca. 1365–1457), a diplomat sent to Central Asia by the Ming government (1368–1644) around 1415, provided the first Chinese eyewitness description of the plant. He found "in the city of Shahrokia, more than 500 *li* east of Sarmarqand, a stinking herb . . . of about one *chi* in height. Its branches and leaves resemble an umbrella. It thrives in the spring and dies in the autumn. The stench is unbearable. The juice taken from it while it is still alive can be made into a paste that we call *awei*."[60] Similarly, Garcia da Orta wrote in 1563 that "The nastiest smell in the world for me is Assa-Fetida." The Portuguese, he continues, called the resin "the food of devils," whereas the Indians "have become accustomed to it." It was also known as "Devil's Dung" in Europe.[61] John Royle told his readers that the "intolerable aliaceous odour" was what distinguished asafetida.[62]

The East Asian and European aversion to its strong smell explains the material's failure to enter their culinary traditions, differing from its long history as a condiment in India and Persia. We have seen that it was not a taboo food for Chinese Buddhists as it was for the Indians, because it did not tempt the Chinese at all as a food. Lucien Leclerc who translated Ibn Al Baytar's thirteenth-century description of asafetida also commented, in the early twentieth century, that the "Orientals" (meaning Indians and Persians) had different types of *andjodan* for alimentary uses, whereas Europeans did not, as the odor was too strong.[63]

However, it was precisely this stench that defined awei's unique value in Chinese pharmacopeia. Strong odors of Central and Southeast Asian drugs introduced in China deeply influenced the ways in which Chinese experts analyzed and classified pharmaceuticals. Kou Zongshi (寇宗奭), the twelfth-century official responsible for procuring drugs for the Song government, in his influential book *Bencao yanyi* 本草衍義 (Augmented materia medica 1116) began to redefine the "*qi*" quality of drugs as their "odor"—rather than as their "nature," as had previously been the case. Before this work, drugs were

divided into five tastes (acid, salty, sweet, bitter, and spicy) and four "*qi*" (cold, hot, warm, cool). But Kou reinterpreted the meaning of "*qi*" as "odor," divided also into four categories: fragrant, stinking, fishy, urine-like. He reinterpreted the four previous categories of "*qi*" as four "natures" (*xing*) of drugs. Awei, together with garlic, salty fish, and sweat-soaked socks were listed as examples of "stinking" matters.[64]

More important, the "stench" of a drug was directly related to its specific therapeutic efficacy.[65] Before the popular fourteenth-century saying on the value of awei pointed directly to its stench ("There is true awei amid much fake; that which stinks and removes stinking is the most precious"), awei's healing power had already been explained in a twelfth-century recipe book, the *Sheng ji jing* 聖濟經 (Classic of imperial charity, ca. 1111–1118) attributed to the Song emperor Huizong: "People do not know that the stench [of a drug] has a function . . . salty fish is beneficial to the intestinal organ, as its stench was great enough to scour blood stasis."[66] Awei's stench thus explained why it was efficacious in treating indigestion and lumps in the abdomen.

This reanalysis of the "*qi*" of drugs as odor continued to develop in the late imperial period, and awei continued to represent the category of stench in pharmaceutical handbooks.[67] The influential late Ming doctor Miao Xiyong (繆希雍, 1546–1627) further explained the quality of awei: "Fragrance facilitates the natural flow of Blood and *qi*, whereas stench reverses their flow; thus [to minimize the abrasive effect of reversed *qi*], one needs to reinforce the weak stomach and spleen of the patient first before *awei* is taken to dissolve lumps and stagnations."[68] The standard way of processing awei by Chinese apothecaries also revealed the concern of the stench as being an indication of abrasiveness: after being ground into fine powder in a clean bowl, it had to pass over a liquor heater to take up the aroma.[69]

Asafetida's unique stench was also a key to identifying the material in European medical culture. For centuries it was considered a variety of or a substitute for the ancient and highly valued Cyrenaic silphium, a superior resin in thought to have become extinct. Nineteenth-century botanists attempted to fix its identity by quoting the Roman botanist Dioscorides (ca. 40–90), and the Islamic physician Avicenna (980–1037) who both thought there were two kinds of resin, one with a strong stench from Persia and another with a lesser smell from Cyrene.[70] However, since the defining stench was intangible and could not be measured and since most East Asian and European users and writers on the material had seen neither the plant nor the processing of the

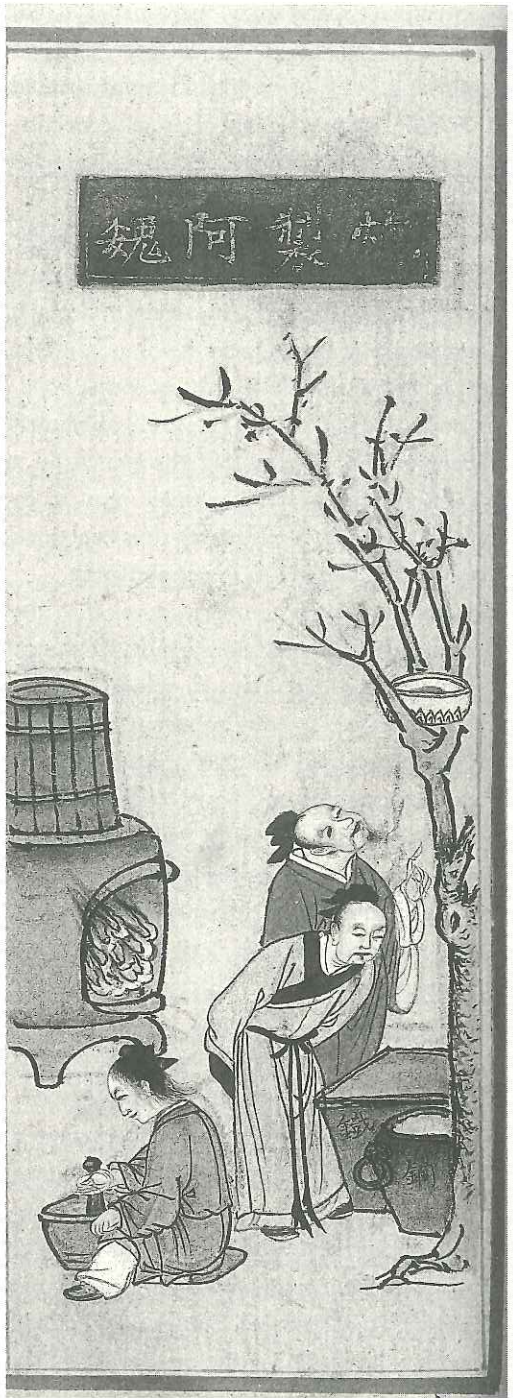

FIGURE 7.4. Authenticity testing of *awei* in the anonymous text *Buyi Leigong paozhi bianlan* (1591). Public domain.

ingredient, the authenticity of the material remained elusive and became a perennial issue for both the consumer and the botanist.

Rumors and Authentication

The elusiveness of the "true" identity of awei was an issue for the Chinese as soon as it was introduced as xingqu. A fifth-century Buddhist sutra translated from Sanskrit contained this verse: "When one consumes xingqu, one should take the authentic (*zhenshi*, lit. "true, real") product. If one consumes the fake and abandons the authentic, no good will be done. A thousand doctors would not be able to save such an idiotic person."[71] In other words, the problem of hing's authenticity was known to the Indians and, through them, to the Chinese at the very beginning of the thing's journey in East Asia. The problem worsened after the resin became a global commodity in the seventh century under the dominating term *awei*, which did not distinguish the plant and its parts from the resin, reaching a first crisis in the eleventh century when its use in medical recipes was rapidly expanding in East Asia. Materia medica books from then on sometimes illustrated awei with a nondescript treelike plant called "Guangzhou awei," suggesting that Guangzhou, the global port, was now taken to be the native place of the plant; others claimed that the plant also grew in Southeast Asia, southwestern China, and even the Yangzi region.[72] Moreover, sources did not agree on the exact part of the plant that contained the resin, whether it was the stem, the leaves, or the root. The only thing that everyone agreed upon was the stench. The crisis soon generated techniques to verify the drug's authenticity (see figure 7.4). Three methods were described: putting the product in a copper container overnight, and the copper would turn silver white if the thing was authentic; putting the product in a juice of *wudou* grass overnight, and authentic awei would be blood red in the morning; putting the resin on a pomelo tree and authentic awei would dry up the tree quickly.[73]

Uncertainty about awei's authenticity continued to grow, however, despite all the efforts. A thirteenth-century scholar official, Zhao Rukua (趙汝适), talked to Southeast and Central Asian merchants in Quanzhou (Fujian), a major trading port in southeastern China. He obtained the information that awei sold in China was mostly from Persia via the Samboja kingdom (today the southeast portion of the island of Sumatra). He also heard a widespread rumor that awei was in fact goat meat corrupted by the poisonous resin, which further thickened the shroud of mystery around awei (see figure 7.5). Later

FIGURE 7.5. Illustration of *awei* as poisoned goat meat in the 1885 edition of Li Shizhen, *Bencao gangmu*. Public domain.

experts, including Li Shizhen, found the story unfounded, especially when awei was known to be nonpoisonous.[74] How should this strange rumor be explained? Did it have something to do with the unusual packaging of the most highly priced Kandahari Hing observed in India before its exportation: "it is sewn up in goat skins, forming small oblong bales, with the hair outside . . . with an odor recalling that of garlic and oil of caraways"?[75]

Li Shizhen's contemporary, Chen Jiamo warned consumers that awei on the market was often a counterfeit made of garlic. Others suggested ways to distinguish the good from the inferior, the real from the fake: Miao Xiyong pointed out that one should judge the quality of awei by its color. The superior resin should be yellowish, while inferior stuff was black. Chen Shiduo of the early seventeenth century told his readers that true awei would float midway in water, while the fake would simply sink.[76] The discussions on awei continued to focus on the verification of its true identity. Sometime before the late sixteenth century, another popular saying was formulated to highlight the difficulty of obtaining "true" awei, comparing this with the ease of getting true *huangqin* (scutellaria root, *Radix Scutellariae*).[77] Awei had by then become almost synonymous with counterfeit.

Adulterated Commodity

The Chinese concern about awei's authenticity as a commodity was mostly triggered by changing market prices, especially when the ingredient was losing popularity in the East Asian pharmaceutical market. By the late fifteenth century, the official price of the drug was still high, in absolute terms, at two *guan* (about two taels of silver) per catty, but relatively low compared to five for myrrh, and three for ambergris.[78] Garcia da Orta observed in the sixteenth century that the high cost of asafetida was partly caused by the fact that the gum deteriorated quickly and the Indian suppliers manipulated the material to keep up the price.[79] This remark hints at the common practice of adulteration of the raw resin in India before export, later confirmed by Japanese Rangaku authors of the eighteenth-century *Ran'en tekihō*. They informed their readers that the high value of hing in India (where it was used widely as both a medicine and a spice) caused the flooding of fake and adulterated asafetida on the global market.[80] In 1751 the Swedish merchant Peter Osbeck wrote in his travel notes that, in Canton (soon to become the only international trading port in China), "the Chinese get many commodities from several parts of Asia, and in particular parrots, ivory, tortoise shells, and asafetida."[81] Being the only one of the four imports with a questionable identity, asafetida's value was probably maintained as an exotic import.

Nineteenth-century commercial information, including trade statistics from India, shed light on the circulation of the different types of asafetida in the world market that could account for the erratic prices. Such information provides important clues to the circulation of the commodities, which may help us understand, with hindsight, some of the earlier fragmented knowledge about awei in East Asia. Bombay was the world's largest trading hub of asafetida in the nineteenth century, importing all types of resins from Persia and Afghanistan and exporting a part of them to the rest of the world after "manipulation." From 1884 to 1889, 37,297 hundredweight (one hundredweight is about 40–50 kilograms) of hing were imported by sea, while 6,020 hundredweight *hingra* were imported by land from Kabul (*hingra* was the raw material

of asafetida exported to Europe and probably also of awei to East Asia). Of the grand total of imports, only 8,586 hundredweight were exported. This export declined further between 1886 and 1890, when the total import held steady at 37,306 hundredweight, with only 2,014 hundredweight exported. These figures also demonstrate that India was the biggest consumer of hing, taking up roughly two-thirds of the total import. It was also the major "manufacturer" of hingra.[82] Finally, it seems that all imported resins were adulterated in various ways before they were sold on the market.[83]

Under the three main categories of imported "raw" resins in Bombay (hing from *F.alliacea, Boiss.*; *Kandahari hing*; and hingra from *F. foetida, Regel*), there were many categories of adulterated products on the market with great price differences. All the hings, especially the supreme *Kandahari hing*, were more expensive than the hingra that was mostly for export to the West and to East Asia.[84] Good quality hing was worth as much as eighty rupees per hundredweight in the late nineteenth century. The average value was about fifty-five rupees.[85] Hingra from Persia and Afghanistan was significantly cheaper, being valued at only about twenty rupees per hundredweight on the average.[86] The prices were obviously determined largely by the biggest Indian market.

By the 1850s the Chinese were no longer concerned with awei's high prices but were baffled by its unreasonably low prices, which they interpreted as being the outcome of its adulteration. A famous doctor witnessed that, "in the shops, awei was faked with foreign garlic . . . the provinces of Zhejiang and Jiangsu [where the doctor worked] are thousands of miles away from the Western countries [where the drug was produced], yet the price [of this gum] is very low. From this we can tell how much faked resin is being sold."[87] The awei seen by the Chinese doctor was likely the same inferior material as was sold by the Indians to Europe.[88]

Authenticated Plant?

European naturalists traveling widely in different parts of Asia after the sixteenth century searching for the "true" asafetida plant were increasingly frustrated by the difficulties of their quest. Ibn Al Baytar, Garcia da Orta, and John Royle all admitted that there was a great deal of confusion created by the terms in different languages (Sanskrit, Arabic, Latin, Tokharian B, Chinese, and so on) designating the various plants producing the resin, their various parts, and the resin itself.[89] Most European naturalists seemed to agree that there were actually two or more types of asafetida possibly from different

plants, one more fetid than the others, also with different colors. John Fryer (ca. 1650–1733), the British travel writer and doctor who served as a surgeon of the East India Company in the 1670s, went so far as to claim that the asafetida produced in Persia and consumed in Europe was not Indian hing.[90] The search of European naturalists for the plant from the seventeenth to the mid-nineteenth century further complicated the picture, because they could not show exactly which ferula plants furnished the resin sold in the European market.[91] None of them had actually seen the production chain. Balfour's claim in 1860 that asafetida was furnished by Ferula Asafoetida of Linnaeus and Ferula Persica of Willdenow was never substantiated.[92] The resin had had a global circulation since the sixteenth century, but few consumers had seen asafetida in its natural habitat or witnessed its production and export processes.

For European botanists interested in the identity of asafetida, the problem underwent a dramatic turn after the mid-nineteenth century, when fuller records of Indian trade became accessible, and European trader naturalists began to interact more directly in the global network of indigenous merchants, artists, gardeners, and pharmacologists to direct the collection of botanical data to be sent back for analysis in Europe.[93] The French pharmacologist Nicolas Guibourt wrote in 1850 that the Indian asafetida he obtained from a Parisian pharmacologist was very different from what one could find in the European market.[94] By the 1890s it seems a consensus had been reached among European naturalists that the mystery of the identity of the commercial asafetida in Europe was solved. In 1891 the British pharmacologist William Dymock (1834–1892) wrote that, although silphium of Cyrene could no longer be obtained, the gum resin that was sold on the European market—for a long time believed to be Asian (Indian) hing—was in fact something different. He believed that the asafetida in European commerce was indeed not Indian hing (from *Ferula alliacea, Boiss.*) but was what Indians called hingra (from *Ferula foetida, Regel*). The former, with a stronger stench, was from a smaller plant that grew on the hills of Khorasan (modern-day Iran), whereas the latter, as witnessed by Kaempfer in the late seventeenth century, was from a tall plant that grew in western Afghanistan. There were several key figures in the process of identifying the resin, a process that took place in the 1870s and 1880s between India and Europe. Dymock was the British military surgeon in Bombay; Ardeshir Mehrban was a Persian merchant who procured the plant of hing for Dymock; Daniel Hanbury (1825–1875), a British phar-

macologist and botanist, studied the samples sent by Dymock to London; the Swiss botanist Pierre-Edmond Boissier (1810–1885) confirmed the identity of the plant producing hing as *F. allicacea*; and James Aitchison (1836–1898) was the Scottish botanist who identified the plant producing commercial asafetida (hingra) in Europe as *F. foetida*.[95] However, Dymock and George Watt (1850–1930), a British botanist and reporter on economic products with the Government of India, who both claimed that the mystery was solved, remained ambivalent themselves as to the exact types of hing and asafetida hingra that were available in the Indian and European markets. They identified asafetida as "certain species of Ferula yield[ing] either *Hing* or *Hingra*, or both these drugs. . . . [D]ifferent systems of extraction and manipulation, or diversified conditions of climate and soil, produce both *Hing* and *Hingra*."[96] In other words, knowledge constructed by nineteenth-century European merchants and botanists on the Ferula plants and resin justified rather than fully clarified the confusion.

Looking back over the economic and medical itineraries of awei in China from the perspective of this nineteenth-century information, we may want to conjecture that the supply and price of awei have been much determined by the Indian market since the fifth century. It would seem that relatively unadulterated and expensive asafetida from Central Asia could be found in China at the beginning of its importation in the seventh century until perhaps the fourteenth century. This was the period when awei was widely used in many medicinal recipes and, for a short time, in culinary practices. With the global circulation of awei as a commodity, or commodities, from the sixteenth century, a discourse of unverifiable authenticity developed around the material, while its use and value as a drug had already been declining in East Asia.

Conclusion

The long and looping global itinerary of asafetida as a drug/spice/plant begins as an interaction of humans with certain biological, social, and cultural needs with materials of various kinds in multiple temporal and spatial contexts. Asafetida's unusual stench becomes linked to an exceptional transformative power on the human body and spirit and has led to its enduring significance in religious and medical realms.[97] In major hubs such as Chang'an, the material known as hing (xingqu) or awei emerged in a written body of knowledge in culinary and medical contexts that incorporated different cosmic logics in Arabic, South Asian, and East Asian cultures. It was a desired spice, even an

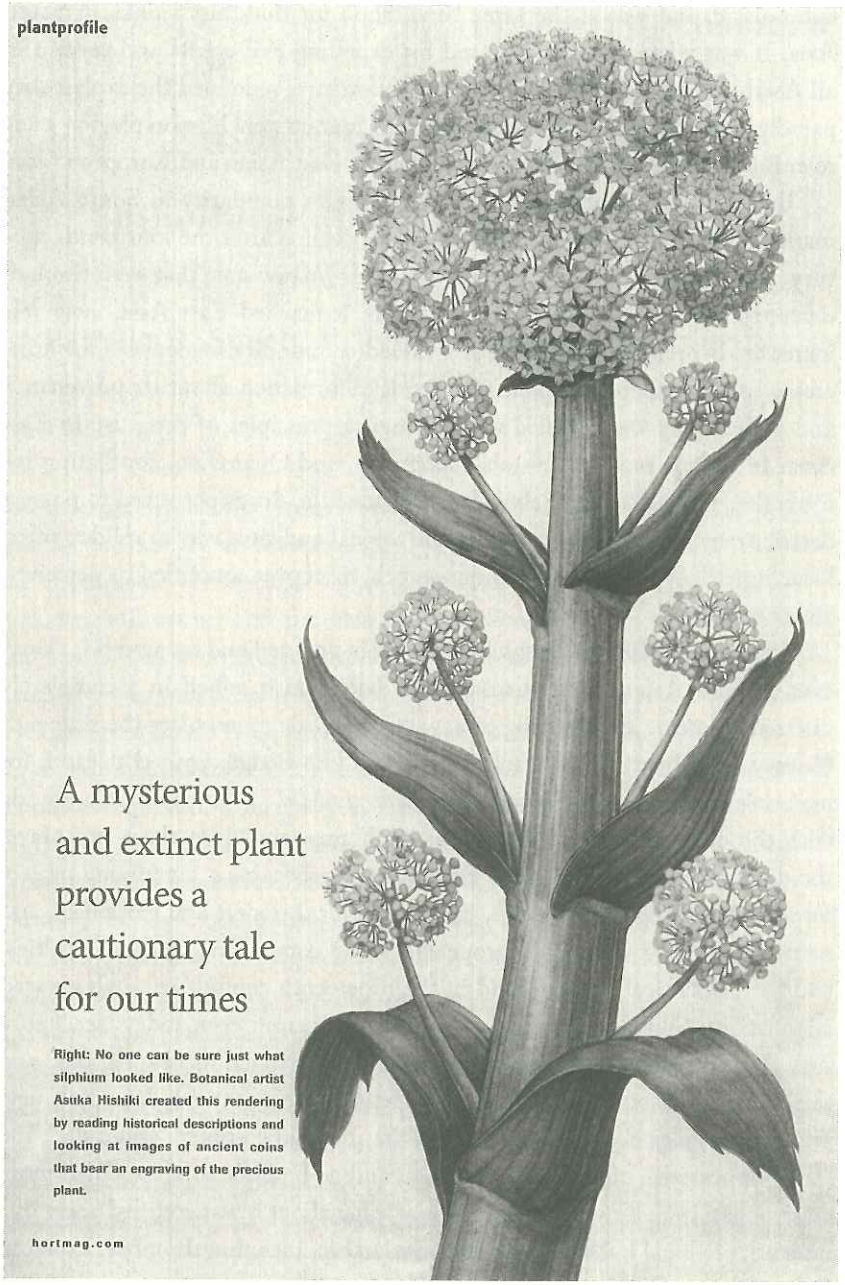

FIGURE 7.6. The search for silphium goes on today. A modern imagined representation of silphium. *Horticulture* (F&W Media, 2010).

aphrodisiac, and was at the same time taboo for Buddhist monks in South Asia. It was a key occult drug used for expelling evil spirits and vermin in all Asian cultures. In East Asia, in particular, awei redefined the explanatory paradigm of healing and medical theory, its unique stench again playing a key role. But the same stench disqualified it as an East Asian and European food.

This changing materiality did not disrupt its popularity in South Asian markets but, in East Asia, caused a gradual decline after the fourteenth century. Being a traveling material with an unknown raw state that went through uncontrollable production processes before it reached East Asia, awei was increasingly brought into doubt as a valued commodity, as demand for it increased from a global market. Confusing information about its provenance and authenticity was coupled with changing principles of drug use in East Asia. In centers such as Canton, Hangzhou, and Quanzhou, conflicting information was particularly abundant. Meanwhile, drugs perceived to possess drastic transformative powers lost their appeal and gave way to milder, often local ingredients. Asafetida's unique stench, moreover, amplified its perceived abrasive nature.

Europeans picked up the global interest in and demand for asafetida, however, as East Asians were turning their backs on it, albeit in a completely different context. The opening of new transoceanic routes after the sixteenth century, combined with a search for ancient knowledge, ignited a search for materials mentioned in Dioscorides's *Materia Medica*. To compare asafetida with the classical material known as silphium—and from there to unravel the differences between various Ferula plants—became a tantalizing project for traveling diplomats, doctors, merchants, local traders and gardeners, and natural historians in major European trading companies, medical faculties, and their botanical gardens, and in the nineteenth century in newly created laboratories. Silphium remains an object of research even today (see figure 7.6). As seeds and plants were exchanged, acclimatized to new regions, and the chemical contents of all types of asafetida were investigated, a whole new set of knowledge accumulated around the material complex "asafetida." The "true" appearance of asafetida, its plant, and its manufacture remained more elusive than ever, however, even as knowledge about it was codified anew in a network of global hubs of trade and scholarship, including Bombay, London, Paris, Geneva, Edinburgh, Edo, and Canton.

Chapter 8

Smoke and Silkworms

Itineraries of Material Complexes across Eurasia

Pamela H. Smith, Joslyn DeVinney, Sasha Grafit, and Xiaomeng Liu

A remarkable sixteenth-century French compilation of mostly practical recipes for various art and technological processes contains much evidence of the movements of materials: both short-span itineraries within Europe—including silkworms and the blue dyestuff woad between southern France and Spain, dyes and pigments from Italy, amber from the Baltic, metals from Germany—as well as long-span pathways of dyestuffs such as turmeric and stick lac from South Asia, cochineal from Central America, and the tree resin, dragon's blood from the Canary Islands and North Africa, techniques of damascening armor from the Near East, and "damasking" cloth by resist dyeing it with "Moresque" templates, likely derived from the Ottoman Empire. Among all this evidence of the movement of materials and techniques across Eurasia, there are two unusual and puzzling recipes which are the focus of this essay, one labeled "Medicine of the orientals against all maladies" and another with the heading "The Work done in Algiers."[1]

The anonymous manuscript in which these recipes appear is a 170-folio first-person account of processes carried out in a workshop, together with recipes and observations collected perhaps on visits to other workshops. Most of the manuscript is written in the same hand, although a scribe seems to have been involved in taking down some parts. The anonymous author is an experienced practitioner but does not appear to have been part of an identifiable trade association. He knows some Latin, although far from perfectly. Perhaps he is the son of a craftsman, trained in a workshop, with grammar school or even some university training, who then went to work for a rich merchant of Toulouse (where the manuscript seems to have been compiled), or for a noble

Kinmond's machine highly because it comes in small sizes and can therefore "meet the requirements of very small estates" (Tea Gazette, *Vade Mecum*, 175).

83. Nitin Varma, "Producing Tea Coolies," 85. Dating back many centuries in China, the cheap, versatile, and extremely effective winnowing-fan spread through Asia and Europe in the seventeenth and eighteenth centuries; Bray, *Science and Civilisation*, 373.

84. Money, *Tea*, 122.

85. Tea Gazette, *Vade Mecum*, 131–67.

86. Tea Gazette, *Vade Mecum*, 162.

87. Tea Gazette, *Vade Mecum*, 167.

88. Behal, "Coolie Drivers," 41. See also Knowles, *Economic Development*, 84; Sharma, "British Science," 430.

89. One reviewer criticizes Crole's bias toward Indian and Ceylonese teas and his rosy-tinted view of labor conditions; he also contests Crole's understanding of the chemistry of tea, while conceding the value for planters of the technical chapters on cultivation and manufacture; Anonymous, "*Text-Book*."

90. Crole, *Tea*, ix (the syllabus is given on p. 114). See Figure 5 at https://francescabray.co.uk/tea/.

91. Crole, *Tea*, 153. Turbines were especially attractive for remote gardens. Robertson notes (see Figure 6 at https://francescabray.co.uk/tea/) that local streams initially powered the factories in the High Range tea gardens, set up around the time Crole was writing; eventually they were connected up to Finlay's central power station (Robertson, *A History*, 1:17–18).

92. Letter quoted in Money, *Tea*, 223; Crole, *Tea*, 62.

93. McEwan, "Tea," 480. For tea machine companies, see Crole, *Tea*, 159, endpapers xvi; Tea Gazette, *Vade Mecum*, 171. For the 1930s, see Antrobus, *Assam Company*, 293; Lutgendorf, "Making Tea," 22.

94. Money, *Tea*, 224; Tea Gazette, *Vade Mecum*, ch. 11.

95. Crole, *Tea*, 60, endpapers vii.

96. Tea Gazette, *Vade Mecum*, 188–93; Anonymous, "*Text-Book*"; Crole, *Tea*, 190.

97. Nitin Varma, "Producing Tea Coolies," 196.

98. Jeffery, "Merchant Capital."

99. Glasgow University Archives, *Guide*. Finlay's also managed extensive tea holdings in Ceylon, with an office in Colombo.

100. Jeffery, "Merchant Capital," 242, Table 2.

101. See Figure 6 and Table 7 at https://francescabray.co.uk/tea/ for Robertson's chaînes opératoires of production and processing. Table 6 shows how the pace of innovation slowed down after 1890.

102. Robertson, *A History*, 2:17–18. "Technological closure" is defined as consensus about desired outcomes and the best technological procedures for reaching them

103. Robertson's notional tea estate is fifteen hundred acres, of which twelve hundred are brought under tea; see Figure 6 at https://francescabray.co.uk/tea/.

104. See Figure 7 at https://francescabray.co.uk/tea/: "50 years of mechanization: 1880–1930."

105. Robertson, *A History*, 2:16.

106. For transplanting seedlings, see Robertson, *A History*, 2:11; also the Tamil-language instructions in Ferguson, *Iṅgē Vā*, 23.

107. Robertson, *A History*, 1:21, 2:13, 16.

108. Bruce, *Report*, 473.

109. Robertson, *A History*, appendix. Iron drag-hoes like the *mamoti* were also the "Universal Tool" across East and Southeast Asia (Bray, *Science and Civilisation*, 207–12). Figure 6.4a–b in this chapter corresponds to Figure 8A and 8B at https://francescabray.co.uk/tea/, where the explanations from Robertson's glossary are also shown.

110. Nitin Varma, "Producing Tea Coolies," 178, citing *Standing Instructions for the Tea Estates Department of Messrs Finlay Muir & Co. Calcutta* (Glasgow 1900).

111. Ferguson, *Iṅgē Vā*, 34.

112. Robertson, *A History*, appendix; Ferguson, *Iṅgē Vā*, 24.

113. Money, *Tea*, 135.

114. Those anxious to develop a modern tea industry in China in the 1930s feared that mechanization was unsuited to Chinese leaf type and the short season. See Gardella, *Harvesting Mountains*, 151.

115. Crole had called for a shift to cuttings, together with research on how to hybridize and graft the tea bushes (*Tea*, 66), but his call went unheard in India, even though the technique of propagation by slips or cuttings was being used elsewhere. It is recorded in parts of China in the eighteenth century and was introduced from Amoy to Taiwan in the 1860s, when a Scottish merchant and an Amoy compradore set up a partnership and launched a local tea industry; see Gardella, *Harvesting Mountains*, 64.

116. Besky, *Darjeeling Distinction*. The Darjeeling tea factories continued to hire seasonal Chinese workers well into the 1950s.

Chapter 7: The Itinerary of Hing/*Awei*/Asafetida across Eurasia, 400–1800

The authors would like to thank Pamela Smith and the two anonymous reviewers of the chapter for their excellent comments and suggestions.

1. See Anderson, Dunlop, and Smith, "Introduction," in their edited volume, *The Matter of Art*, 2–12; Rodgers, "Cultures in Motion," esp. 8–12. See also one of the pioneer works on traveling commodities, Appadurai, *The Social Life of Things*.

2. Yule et al., *Hobson-Jobson*, 418.

3. Dalby, *Dangerous Tastes*, 110–12; Balfour, *Asafoetida Plants*, 367.

4. Dymock, Warden, and Hooper, *Pharmacographia Indica*, vol. 2, p. 148.

5. Li Shizhen, *Bencao gangmu*, Taibei ed., ch. 34, p. 35.

6. Laufer, "Three Tokharian Bagatelles." Ming Chen revises Laufer's proposition by suggesting *ankwas(t)* as the Tokharian word that *awei* transcribed, which was a word with some affinity to the Persian term *anguzad*.

7. On the complex history and ethnicity of the Tokharians, see Hansen, *The Silk Road*, 70–80 (esp. 79–80). Basing her work on earlier works by Eric Trombert, Hansen confirms the role of Kuchen traders in turning Kucha into a trading center of the time.

8. On the importance of Kumārajīva's translation in Chinese culture, see Hansen, *The Silk Road*, 56–70.

9. The story of this path-breaking translation enterprise is recorded in the Chinese Buddhist text *Chu Sanzang ji ji* 出三藏記集 (Compilation of notes on the translation of the Tripitaka, ca. 502–519), chs. 2 and 3 (Chinese Buddhist Electronic Text Association [hereafter CBETA], T55, no. 2145, p. 11, a25–27; p. 20, a21–b21).

10. *Shi song lü*, ch. 21 (CBETA, T23, no. 1435, p. 157, a1–3), ch. 26 (CBETA, T23, no. 1435, p. 194, a12–14).

11. *Sui shu* 隋書 (Official history of the Sui dynasty), 83:1857.

12. The Tang monk and translator Xuanzang (Hvenasāmga, 602–664) recorded his seventeen-year travel in India and Central Asia in his famous *Da Tang Xiyu ji* 大唐西域記 (Great Tang record on the Western Regions, 646) in which he mentioned the State of Cao as having a distinct language and being a producer of many herbs and flowers, including the famous *xingqu* herb (CBETA, T51, no. 2087, p. 939, b17–25).

13. The word is *chong* (literally "creeping bugs"), which could imply in this period both insects and bugs or disease causing bugs inside the human body.

14. Okanishi Tameto, *Chongji xinxiu bencao*, 231–32. Su Jing compiled this compendium based on an extant sixth-century text that did not include awei.

15. See, for example, chapter 3 of the eighth-century medical text by Wang Tao, *Waitai miyao*.

16. Sun Simiao, *Qianjin yifang*, 232. On the ancient notions of disease transmission in China, see Leung, "Evolution," 31–32; Li Jian-min, "They Shall Expel Demons."

17. Leung, *Leprosy in China*, 54–55.

18. Sun Simiao, *Qianjin yifang*, 250–51. The recipe was called "Qipo's recipe for the malicious disease." Qipo was the Chinese name for Jīvaka the Ayurveda doctor; Ming Chen claims that awei was used by both Chinese and Indian doctors to exterminate bugs, detoxify, warm the body, and cure coughs. See Ming Chen, *Yindu fanwen yidian*, 62–64.

19. Sun Simiao, *Beiji qianjin yaofang*, 310. The recipe is based principally on garlic with awei and other constituents newly introduced into China such as milk and pepper (*fructus piperis longi*).

20. Wang Tao, *Waitai miyao*, 131–32, 164, 366, 369.

21. Tanba Yasuyori, *Ishinpò*, 560.

22. For his biography, see Huijiao, *Gaoseng zhuan*, ch. 29, pp. 890–92. Other Buddhist writers who wrote on the resin include Atigupta, who translated the *Dhāraṇīsamuccaya* sutra in 654, and Yijing (625–713), in *Nanhai jigui neifa zhuan*.

23. Huilin, *Yiqie jing yin yi*, ch. 1 (CBETA, T54, no. 2128, p. 311 a3–b8, b11; p. 312, a4); Zanning, *Song gao seng zhuan* (CBETA, T50, no. 2061, p. 738, a22–b5).

24. Huilin, *Yiqie jing yin yi*, ch. 67 (CBETA, T54, no. 2128, p. 750, b04). Unless otherwise noted, all translations from the original are our own.

25. Ming Chen, *Yindu fanwen yidian*, 63.

26. "Tianbao er-nian Jiaohe jun shigu an." It was considerably cheaper than clove, another imported ingredient (thirty-five coins for one *liang* of superior quality).

27. One zhang was about 360 centimeters. Eight zhang was about 2.9 meters.

28. Duan Chengshi, *Youyang zazu*, 101. Diego Santos argues that Duan's informant, the "Fulin" monk Wan, was probably a Melkite Christian who introduced plant knowledge in China in Greek-Syriac-Arabic-Persian vocabularies. Santos, "A Note."

29. Robert Hartwell estimated that international commerce at Chinese sea ports amounted to around 1.7 percent of GNP, or 10–20 percent of national nonagricultural income. See Hartwell, "Foreign Trade," 453–54.

30. Lin Tianwei, *Songdai xiang yao maoyi shigao*, 199–228. By 1133 there were already more than two hundred types of spices that reached the port of Quanzhou in southern Fujian. See Li Yukun, "Song-Yuan shiqi," 58.

31. Hartwell, "Foreign Trade," 478.

32. Hinrichs and Barnes, *Chinese Medicine and Healing*, ch. 4.

33. Wang Huaiyin ed., *Taiping shenghui fang*, 3163. The other ingredients include *Angelica Sinensis*, Cassia bark, dried orange skin, several rhizomes (white *atractylodes*, *qiongxiong*, *turtschaninovii coydalis*), *Aucklandia root*, aconite, *curcuma zedonary*, *evodia rutaecarpa*.

34. Leclerc, *Traité des simples*, 143.

35. *T-S Ar.39.458* (recto) in Lev and Chipman, *Medical Prescriptions*, 52–54.

36. Robert Carrubba, "First Report," 456. The 1360 text was translated from Latin to English by John Trevisa in 1398.

37. Song Xian, introduction to *Huihui yaofang kaoshi*, vol. 1, ch. 1, pp. 1–31. See also Schottenhammer, "Transfer of *Xiangyao*," 128.

38. Other than *awei*, transcriptions of Arabic words such as *sikbínaj*, *sakhínaj* (*sāghā fyín*), *Sagapenum*, *hiltit*, *anjudhan*, *al-kasakibanaj*, *alpiltiti* are used in this Chinese text. Some of the terms seem to indicate the roots of the plant. Recipes are found mostly in chapters 12, 30, 34, three of the extant chapters of the book. See volume 2 of Song Xian's *Huihui yaofang kaoshi*.

39. Nie Hongyin, "Xixia 'Tiansheng lü ling'"; Li Yingcun, Li Jintian, and Shi Zhenggang, "E cang Dunhuang"; Wang Shizhen, "E cang wenxian."

40. *Sibu yidian*, 57. For aphrodisiac use in Tibetan, Arabic, and Indian cultures, see Gyatso and Hakim, *Essentials of Tibetan Traditional Medicine*, 137.

41. *Song shi*, ch. 490, p. 14107; Yan Guirong, "Qian yi Songdai Long."

42. *Song shi*, ch. 489, p. 14099.

43. Huang Shu (1019–1058), *Fa tan ji*, ch. 2, ff. 16b–17b. The moral lesson that Huang drew from this fact was that poisonous drugs were in demand as most people consulted a doctor only when the illness was already well developed, requiring more aggressive treatment. He compared this to policies that were efficient in the short run but ruinous to the body politic in the long run.

44. The biography of Monk Huiri (seventh–eighth centuries), in Huijiao, *Gaoseng zhuan*, ch. 29, pp. 890–92.

45. In a Dunhuang manuscript "Zaji shi yaoyong zi," awei was listed under the category "Vegetables," and its root was listed as a medicine, showing that awei was consumed both as a vegetable and as a medicine in western China in this period. The medical text *Sheng ji jing* (ca. 1111–1118), attributed to the emperor Zhao Ji, claimed that the stench of awei disqualified it as a food. The author referred to Confucius's *Analects* in which food with a strong bad smell was considered not fit for consumption (*Sheng ji jing*, ch. 10, p. 179).

46. Leclerc, who translated and annotated Ibn Al Baytar's pharmacopeia of the thirteenth century, noted the particular use of asafetida as a condiment by the "Orientals," which was never the case in Europe because of its fetid odor (*Traité des simples*, 144–45).

47. For an appraisal of the impact of Mongolian cuisine in China, see Allsen, *Culture and Conquest*, esp. 131 on the use of spices. See also Hu Sihui, *Yinshan zhengyao*, 20, 21, 29, 35, 251–52, and the annotated translation of this text by Buell, Anderson, and Perry, *A Soup for the Qan*, 106, 159, 272, 287. For the discussion on the short-lived Mongolian culinary culture in China, see Mote, "Yuan and Ming," 207–27.

48. Whyte, Geest, and Hardon, introduction to *Social Lives*, esp. 7.

49. See Raj, *Relocating Modern Science*, esp. ch. 1.

50. Garcia da Orta, Seventh Colloquy, in *Colóquios dos simples e drogas he cousas medicinais da India*, 47. Garcia da Orta's contemporary Cristóvão da Costa (1515–1594) added that the resin was used as an aphrodisiac in Arabic regions and India. The German adventurer Johann A. von Mandelslo (1616–1644) who traveled in Persia and India in the late 1630s noted that the "Hingh" mostly came from Persia. See Laufer, *Sino-Iranica*, vol. 15, no. 3, p. 356, quoting Cristóvão da Costa's *Tractado de las drogas, y medicinas de las Indias orientales* (Burgos, 1578), 357.

51. For the background of Kaempfer, see Haberland, *Engelbert Kaempfer*, and especially the chapter by Roelof van Gelder, "Nec semper feriet quodcumque minabitur arcus—Engelbert Kaempfer as a Scientist in the Service of the Dutch East India Company" (Haberland, *Engelbert Kaempfer*, 211–25).

52. Carrubba, "First Report," 456.

53. Brief biography of Kaempfer in Carrubba, "First Report." Kaempfer's description of asafetida can be found in observation 5 of Kaempfer, *Amoemitatum exoticarum*, 535–52.

54. Carrubba, "First Report," 451–61.

55. Royle, *Xiyao dacheng*, 462–66.

56. An account of such naturalists is in Balfour, *Asafoetida Plants*, 361–63.

57. Balfour, *Asafoetida Plants*, 366–68.

58. Otsuki Bansui and Otsuki Banri, *Ran'en tekihō*.

59. Royle, *Xiyao dacheng*, ch. 5, pt. 2.

60. Chen Cheng, *Xiyu fan guo zhi*, 69. See Rossabi, "A Translation." Samarqand is in present-day southern Uzbekistan.

61. Garcia da Orta, *Colloquies*, 45–46, 48; Carrubba, "First Report," 455.

62. Royle, *A Manual*, 467.

63. Leclerc, *Traité des simples*, 144.

64. Kou Zongshi, *xuli* (introduction) to *Bencao yanyi*.

65. This significant change is discussed in Unschuld's "Traditional Chinese Pharmacology."

66. Zhao Ji, *Sheng ji jing*, see ch. 10, p. 180n47, the interpretation was provided by Li Ti, contemporary annotator of the book. For the fourteenth-century saying, see Li Shizhen, *Bencao gangmu*, Taibei ed., ch. 34, p. 35.

67. Such as Chen Jiamo's *Bencao mengquan*, ch. 1, p. 8. About the changes in the discussions on the nature of drugs in late imperial Chinese recipe books, see Bian He, "Assembling the Cure," 94.

68. This quality was described in some detail in the Ming doctor Miao Xiyong's *Shennong bencao jing shu*, 190.

69. Tang Shenwei, *Zhenglei bencao*, 253. See also Anonymous, *Buyi Leigong paozhi bianlan*, ch. 4, p. 632.

70. On Dioscorides's claim, see Dymock, Warden, and Hooper, *Pharmacographia Indica*, vol. 2, p. 141; on Avicenna's view, see Balfour, *Asafoetida Plants*, 367; Royle, *A Manual*, 461.

71. Guṇabhadra *Yang que moluo jing*, ch. 2 (CBETA, T02, no. 120 p. 530, a16–19).

72. Early bencao books with "Guangzhou awei" illustrations include Su Song, *Bencao tujing* (1061; and its 1159 edition), and Liu Wentai, *Bencao pinhui jingyao* (1505). Li Shizhen's entry on awei indicated the various Chinese localities that some claimed to be the native place of awei. See Li Shizhen, *Bencao gangmu*, Taibei ed., ch. 34, p. 35.

73. Anonymous, *Buyi Leigong paozhi bianlan*, 4:630–31.

74. Zhao Rukua, *Zhu fan zhi jiaoshi*, 198; Li Shizhen, *Bencao gangmu*, Taibei ed., ch. 34, p. 35.

75. Dymock, Warden, and Hooper, *Pharmacographia Indica*, vol. 2, p. 151.

76. Chen Jiamo, *Bencao mengquan*, ch. 4, pp. 262–63; Miao Xiyong, *Xianxing zhai*, 767; Chen Shiduo, *Bencao milu*, 187.

77. One example is the famous early seventeenth-century jottings on miscellaneous matters, the *Wu za zu*, by scholar Xie Zhaozhi (born 1567), ch. 10. Xie mistook the plant *huangqin* for "gold" (*huanjin*), and the saying "true gold" overshadowed "true scutellaria root" after the seventeenth century.

78. Tang Kaijian and Tian Yu, "Wanli sishiwu nian," 131.

79. Garcia da Orta, *Colloquies*, 46–47.

80. Otsuki Bansui and Otsuki Banri, *Ran'en tekihō*, ch. 1, 29a–b.

81. Osbeck, *A Voyage to China*, 1:257.

82. Dymock, Warden, and Hooper, *Pharmacographia Indica*, vol. 2, pp. 147, 152; Watt, *Dictionary*, 3:331.

83. According to Dymock, Warden, and Hooper, *Pharmacographia Indica*, vol. 2, pp. 147, 149, 151, hing usually contained undue portion of the root and was adulterated with gum Arabic or sliced potato. The normal hingra contained some portion of

the root, whereas the most expensive Kandahari hing was adulterated with red clay. Adulteration with wheat flour, small stones, and other cheap oleoresin is still practiced today; see Shah and Zare, "Asafoetida (heeng)," 33.

84. As Dymock, Warden, and Hooper described *Kandahari hing*: "very high-priced Asafoetida obtained by wounding the leaf-bud of the plant which produces ordinary Asafoetida; our article is generally mixed with numerous leaf-buds . . . its price is also much higher than that of any other kind." (*Pharmacographia Indica*, vol. 2, p. 151).

85. Dymock, Warden, and Hooper, *Pharmacographia Indica*, vol. 2, p. 147; Watt, *Dictionary*, 3:333. Eighty rupees correspond to around 1,760 euros of today's value, or at least 35 euros per kilogram. See 1890 Indian Rupee to Euro (INR to EUR) currency converter: http://www.likeforex.com/currency-converter/indian-rupee-inr_eur-euro.htm/1890 (accessed April 12, 2014).

86. Watt, *Dictionary*, 3:333.

87. Lu Yitian, *Lenglu yihua*, 138.

88. Watt, *Dictionary*, 3:332. Indian trade statistics show that Bombay was the port that "supplies Europe and China."

89. *Andjodan* (or *anjuden*, *anjoodan*, etc.) for example was said to designate the tree, the fruit, or the leaves; *altiht* (or *haltit*) could indicate the tree, the seed, or the resin. There was no agreement among the naturalists.

90. Fryer, *A New Account*, vol. 2, p. 195–96.

91. This last point was raised by Yule et al. in the 1903 glossary, under the term "hing" as "asafetida": "This product affords a curious example of the uncertainty which sometimes besets the origin of drugs which are the objects even of a larger traffic" (*Hobson-Jobson*, 418).

92. Balfour, *Asafoetida Plants*, 361.

93. See Raj, *Relocating Modern Science*, 38–59. The same process occurred in Canton, China, where "gardener-collectors and trader-naturalists collected new plants, curiosities, and other scientific data and transported them back to Britain" (Fan Fa-ti, *British Naturalists in Qing China*, 26).

94. Guibourt, *Histoire naturelle*, 3:223.

95. Dymock, Warden, and Hooper, *Pharmacographia Indica*, vol. 2, pp. 143–48; Watt, *Dictionary*, 3:329–30.

96. Watt, *Dictionary*, 3:330.

97. On the discussion of medicines as specific mobile materials, see Whyte, Geest, and Hardon, *Social Lives*, esp. 5–8.

Chapter 8: Smoke and Silkworms

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1. Ms Fr. 640, available at http://gallica.bnf.fr/ark:/12148/btv1b10500001g/f1.image/, with the library title "Recueil de recettes et secrets concernant l'art du mouleur, de l'artificier et du peintre," held by the Bibliothèque nationale in Paris (BnF). For research on this manuscript, see "The Making and Knowing Project" at www.makingandknowing.org.

2. The binding stamped and gilded with the arms and device of Philippe de Béthune (1565–1649) indicates that the manuscript was part of the bequest of the Béthunes to the royal library (now the BnF).

3. Female authorship of BnF Ms. Fr. 640 is not impossible but appears unlikely in light of the manuscript's script and its accounts of travel.

4. The term *godet* has been translated as "bowl" (of a pipe); see Randle Cotgrave, "godet," in *A Dictionarie*. For a later use of *godet* as a pipe, see *The Athenæum Journal, 1844*, 873. Thanks to Joel Klein for this reference.

5. Fol. 77r, "Contre les rougeurs du visage" and "Terre graisse" respectively.

6. Fol. 77r, "Fais secher du rosmarin au moys de may." Rosemary is often picked in May, when the herb produces flowers, and is commonly distilled then for perfume. See Lockwood, "Perfumes," 859.

7. Fol. 77r, "puys emplis ce godet de pouldre diceluy Et mects un charbon allume dessus."

8. Fol. 77r, "Et recois la fumee par la bouche bien serree Et une partye te sortira par le nes Mays si tu veulx purger la teste sarre aussy le nes Contre morfondiments rheumes & aultres malladies."

9. For various definitions of smoke, see *Oxford English Dictionary*, s.v., "smoke"; and of "inhale" as "to breathe in; to draw in by breathing; to take into the lungs," s.v., "inhale."

10. Stolberg, "You Have No Good Blood," 69–70. Stolberg uses the term "catarrh." Cotgrave defines "rheume" as "catharre" (*A Dictionarie*, s.v., "rheume").

11. *An Herbal*, 69 (known as the "Banckes Herbal" for its original printer).

12. According to Stolberg, dyers used "infection" to mean the tinging of clear water with a small amount of dye. Michael Stolberg, October 31, 2016, Skype lecture, Columbia University, New York.

13. Dugan, *Ephemeral History*, 102–3.

14. Fol. 102v, "anthos ou rosmarin"; "c'est pour les vieulx." *Anthos* is Greek for "flower" and was also used to denote rosemary itself. Steam distillation is thought to have been the discovery of the Persian alchemist and physician Avicenna (980–1037). See Kate Fox, *The Smell Report*. In the entry for "Atr" ("perfume"), the *Encyclopædia Iranica* states: "In Europe, Arnold of Villeneuve (1235–1312) had isolated rosemary oil and used it in an alcoholic solution as a medicine" (Aubaile-Sallenave, "Atr").

15. For memory, see Meyer, Trueblood, and Heller, *The Great Herbal*, 447. Also see *An Herbal*, 70. For rosemary's global medicinal uses, see Lev and Amar, *Practical Materia Medica*, 266–67; Oliver Kahl, *Sābūr ibn Sahl's Dispensatory*.

16. Leach and Fried, *Standard Dictionary*, 957.

17. Larkin, "Virtues of Rosemary."

18. Leach and Fried, *Standard Dictionary*, 957.