Chopsticks

A CULTURAL AND CULINARY HISTORY

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"Bridging" food cultures in the world

> Real Chinese food is delicate and rare; supposed to be tasted rather than eaten, for the number of courses is stupendous. If really to the manner born, you reach into one general dish with your chop-sticks; it is a clean and delicate way to dine. Unless you go in for too much bird's nest soup and century-old eggs, the prices are reasonable. Bird's nest soup is delicious, but anyone can have my share of the heirloom hen fruit.
>
> Harry Carr, *Los Angeles: City of Dreams* (New York, 1935)

> If you do not take your courage in hand, click your chopsticks together a few times to satisfy sceptical Chinese dinners that you can operate them, and plunge head first, so to speak, into real Chinese food, you cannot say that you have understood and savoured the taste of China.
>
> George McDonald, *China* (Thomas Cook guide book) (Peterborough, 2002)

Chopsticks are pronounced the same as "bridge" in Japanese, as mentioned previously. Since the mid-nineteenth century, after Asia became incorporated into the modern world, the eating tool has indeed played such a part in bridging food cultures in that continent and those around the globe. As Chinese food moves from "China to Chinatown," to borrow the title of J. A. G. Roberts's recent book, chopsticks have also traveled along the pathway to regions outside the chopsticks cultural sphere of Asia. For a non-Asian customer, using chopsticks to convey food, perhaps, is the culmination and crystallization of the dining experience in a Chinese/Asian restaurant. To cater to and cultivate such interest, many Chinese restaurant owners also use "chopsticks" to name their restaurants outside China, for example "Golden Chopsticks" and "Bamboo Chopsticks" are popular.[1] Of course,

[1] The finding is drawn on a keyword search in Google.

chopsticks are not only found in Chinese restaurants, they are also provided for customers at Japanese, Korean, Vietnamese and sometimes Thai restaurants. As such, chopsticks use adds to the global appeal of Asian foods. If chopsticks are a "bridge," they bring together food cultures not only between Asians and non-Asians but also among Asians.

In the modern world, chopsticks have a global image because they are readily noticeable for anyone traveling to the chopsticks cultural sphere in Asia. From the sixteenth century when Europeans began visiting Asia, they quickly discovered that chopsticks use was a unique way of eating food among the Chinese and their neighbors and duly recorded the custom in their journals and travelogues. One of the earliest mentions of chopsticks appears in the journal written by Galeote Pereira, a Portuguese mercenary who went to South China via India between 1539 and 1547. Pereira's account updated Europeans' knowledge about China after Marco Polo's legendary book of the thirteenth century. (Marco Polo, incidentally, did not to mention the Chinese use of chopsticks, just as he omitted their drinking of tea.) Pereira finds the Chinese dietary custom both clean and civil, for their use of chopsticks. He writes:

> All the people of China, are wont to eat their meat sitting on stools at high tables as we do, and that very cleanly, although they use neither table-cloths nor napkins. Whatsoever is set down upon the board, is first carved, before that it be brought in: they feed with two sticks, refraining from touching their meat with their hands, even as we do with forks, for the which respect, they less do need any table-cloths.[2]

Since chopsticks users did not touch food with their hands, the Europeans noticed, Asians did not even need to wash their hands before meals. Louis Fróis (1532–1597), a Portuguese Jesuit, and Lourenço Mexia, his traveling companion to Japan at the time, came up with a list of things they observed that differentiated Asians from Europeans. Asians, or the Japanese whom they encountered in this case, not only ate rice instead of bread, but their eating habits also diverged: "We wash our hands at the beginning and at the end of the meal; the Japanese, who do not touch their food with their hands, do not find it necessary to wash them."[3] This was because, observed Francesco Carletti (1573–1636), an Italian merchant visiting Japan in the later part of the century, "With these two sticks [chopsticks], the Japanese are able to fill their mouths with marvelous swiftness and agility. They can

[2] Boxer, *South China in the Sixteenth Century*, 14.

[3] Quoted in Donald F. Lach, *Japan in the Eyes of Europe: The Sixteenth Century* (Chicago: University of Chicago Press, 1968), 688.

pick up any piece of food, no matter how tiny it is, without ever soiling their hands."[4]

Thus, when first encountering chopsticks, Europeans were quite curious and intrigued (Plate 17). They found dining with chopsticks neat and clean, for the food would not dirty the hands. This might suggest that while forks and knives were believed to be already in use among Europeans by that time, there were still occasions when they transported foods with fingers, hence the need for napkins and tablecloths. In those early days of discovery, Matteo Ricci (1552–1610), the founding figure of the Jesuit mission to China, gave the most positive impression of chopsticks use. Compared with the accounts of his contemporaries, Ricci provides the most detailed descriptions of the dietary customs in Ming China for Europeans. While others simply called chopsticks "two sticks," he describes how the eating device was made: "These sticks are made of ebony or of ivory or some other durable material that is not easily stained, and the ends which touch the food are usually burnished with gold or silver." Ricci also comments that in China banquets were "both frequent and very ceremonious," because the Chinese considered the banquet the "highest expression of friendship." And at banquets, observes Ricci,

> They [the Chinese] do not use forks or spoons or knives for eating, but rather polished sticks, about a palm and a half long, with which they are very adept in lifting any kind of food to their mouths, without touching it with their fingers. The food is brought to the table already cut into small pieces, unless it be something that is soft, such as cooked eggs or fish and the like, which can be easily separated with the sticks.[5]

Though impressed by their usefulness, Matteo Ricci did not mention whether he had tried to dine with chopsticks and, if he had, whether he used them as adeptly as did the Chinese. Indeed, of the various accounts left by European missionaries and other travelers from the sixteenth to the nineteenth centuries, few recorded if they were curious and tempted enough to try to use chopsticks, despite the otherwise quite adventurous spirit displayed in their accounts. The difficulty in wrapping their fingers around chopsticks and learning to use them might have thwarted their attempts.

Yet to some Europeans, while the ability to use chopsticks was striking, this eating style remained unappealing, for it was seen at times as

[4] Quoted in Giblin, *From Hand to Mouth*, 44.

[5] Matteo Ricci, *China in the Sixteenth Century: The Journals of Matthew Ricci: 1583–1610*, trans. Louis J. Gallagher (New York: Random House, 1953), 66, 64.

unrefined. Martin de Rada (1533–1578), a Spanish Augustinian who went to Asia from Mexico and landed first in the Philippines and later in South China, also noticed that the Chinese ate meals with chopsticks, which rendered tablecloths and napkins unnecessary. Yet unlike Galeote Pereira and Matteo Ricci, de Rada is less impressed by the custom. "At the beginning of a meal they eat meat without bread," he writes, "and afterwards instead of bread they eat three or four dishes of cooked rice, which they likewise eat with their chopsticks, even though somewhat hoggishly."[6] It appeared hoggish to him perhaps because the Chinese lifted the rice bowl and pushed the rice into the mouth, as a way to prevent rice grains from falling from the chopsticks.

Peter Mundy (1600–1667), an English traveler who went to South China from India in the seventeenth century, was equally impressed with the skillful handling of chopsticks by the Chinese he encountered. Yet his description of the dining method also smacks of disapproval. In his multivolume book, which details his trips to several Asian regions as well as to continental Europe, Mundy provides an illustration, portraying how the Chinese used chopsticks to eat a meal, in which the man raised the bowl close to his mouth and thrust the food into it hastily. Mundy's description goes as follows:

> Hee [a boatman on the Grand Canal] taketh the stickes (which are about a foote longe) beetweene his Fingers and with them hee taketh uppe his Meat, being first cut smalle, as saltporcke, Fish, etts., with which they relish their Rice (it being their common Foode). I say first taking upp a bitt of the Meatte, hee presently applies to his Mouth a smalle porcelane [bowl] with sodden Rice. Hee thrusts, Crammes and stuffes it full of the said Rice with the Chopsticks in exceeding hasty Manner until it will hold No more. . . . The better sort eat after the same Manner, butt they sitt at tables as we Doe.

Mundy also mentions that "Then brought they us some henne cut in smalle peeces and Fresh porcke Don in like Manner, giving us Choppsticks to eat our Meat, butt wee knew not how to use them, soe imployed our Fingers."[7] Though amazed by the deftness of the Chinese in using chopsticks, which he was unable, possibly also unwilling, to imitate, Mundy did not approve of their eating style in general; he was a bit surprised by the fact that the upper-class Chinese dined in the same style.

[6] Boxer, *South China in the Sixteenth Century*, 287.

[7] Richard Carnac Temple, ed., *The Travels of Peter Mundy, in Europe and Asia, 1608–1667* (Liechtenstein: Kraus Reprint, 1967), vol. 3, 194–195. The illustration is on 165.

Though unimpressed by the Chinese use of chopsticks, Peter Mundy might be the first Englishman who recorded "chopsticks" as the name for the utensil. ("Chopsticks" also appeared in Martin de Rada's earlier account but it was a translation; de Rada might have simply used "*palillos*" or "sticks" as chopsticks are called in Spanish today.) Could Mundy claim the credit for coining the term in English? It is possible but it is also likely that someone else did it before him. The word's etymology reveals that "chopsticks" are pidgin Chinese English, combining "chop" ("quick" in Cantonese) as a prefix with "sticks." It was probably the result of some collaboration between an English person and a Cantonese-Chinese. When Mundy described their use, it sounded as if the term already existed in his time.

About three decades later, William Dampier (1651–1715), another English traveler who circumnavigated the world three times, mentions chopsticks in his *Voyages and Descriptions* (1699): "They [the utensil] are called by the English seamen Chopsticks." It was during the course of the seventeenth century, therefore, that "chopsticks" became coined in English to refer to the dining tool. By comparison, the term "sticks" has persisted in other European languages. Chopsticks, for example, are known as *baguettes* in French and *palillos* in Spanish (as in de Rada's account), both meaning "sticks." In German, chopsticks are called *Eßstäbchen*, or "eating sticks," whereas in Italian, *bacchette per il cibo*, and in Russian, *palochki dlia edy*, both meaning "sticks for food." An interesting exception is that in Portuguese, chopsticks are referred to as *hashi*, the same as in Japanese, reminding one of the Jesuit mission in Asia back in the sixteenth century.

From the eighteenth century, buoyed by the growth of capitalism, Europeans' overall interest in Asia increased notably, as the continent was perceived as a potential market for manufactured European goods. Yet their interest in Asian civilization and culture, and in the custom of chopsticks use in particular, declined. Lord George Macartney (1737–1806), the English diplomat who led an official embassy to pry open China's doors from the tight grip of the Qing dynasty (1644–1911), expressed the wish that the Chinese would soon learn to adopt the use of forks and knives instead. While in China, Macartney was greeted by two Chinese officials, or "mandarins," whom he described as "intelligent men, frank and easy in their address, and communicative in their discourse." Upon his invitation, he wrote, "they sat down to dinner with us, and though at first a little embarrassed by our knives and forks, soon got over the difficulty, and handled them with notable

dexterity and execution upon some of the good things which they had brought us."[8]

If Macartney was complimentary about the Chinese mandarins, his compliment perhaps had more to do with the fact that, in his mind, the English eating custom was superior, or more civilized; as such, he hoped the Chinese would follow suit. Compared with his fellow countryman Peter Mundy over a century earlier, Macartney was little interested in, much less impressed by, the fact that the Chinese, and the Manchus (whom he called Tartars), were able to employ chopsticks to transport food. Contrary to the previous missionaries' accounts, Macartney made the following observation about the dietary practice in Qing China:

> At their meals they use no towels, napkins, table-cloths, flat plates, glasses, knives nor forks, but help themselves with their fingers, or with their chopsticks, which are made of wood or ivory, about six inches long, round and smooth, and not very cleanly.

In other words, the Chinese eating customs were less civilized as they did not use a set of cutlery and other accessories as Europeans did. Even if they did use chopsticks, these were not so clean. "Our knives and forks, spoons," Macartney wrote with hope and pride, "and a thousand little trifles of personal conveniency were singularly acceptable to everybody, and will probably become soon of considerable demand . . ."[9]

Lord Macartney failed in his mission to open China's doors to European trade; his requests were rejected outright by the Qing Emperor Qianlong (r. 1735–1796) because the Emperor upheld the traditional notion that China was the "Middle Kingdom" and the hub of all civilizations in the world. However, only about half a century after Lord Macartney's failed visit, the English succeeded in forcing the Qing dynasty to come to terms with them. In the aftermath of the Qing's defeat in the Opium War (1839–1842), the dynasty signed the Treaty of Nanjing, which for the first time allowed Europeans and Americans to reside and trade in China. A watershed moment, the Opium War ushered in a new era in history in that European and Asian cultures were to come into contact with each other on a much more frequent basis.

Yet Macartney's hope that the Chinese, or East Asians in general, were to turn to the use of forks and knives as did Europeans failed to materialize.

[8] George Macartney, *An Embassy to China: Being the Journal Kept by Lord Macartney during His Embassy to the Emperor Ch'ien-lung, 1793–1794*, ed. J. L. Cranmer-Byng (London: Longmans, republished, 1972), 71.

[9] Ibid., 225–226.

In fact, through the nineteenth century, as more and more European merchants went to China, perhaps swayed by the hospitality and insistence of their local hosts, they found themselves more and more attracted and adaptive to Asian food and the Asian dining style. Indeed, just as Peter Mundy had been asked by the Chinese to learn to use chopsticks, Western merchants in nineteenth-century China often had a similar experience. Prior to the outbreak of the Opium War, foreign merchants needed to sell their merchandise through their Chinese counterparts. As such, they worked with Chinese merchants and officials. W. C. Hunter, an American businessman, recalled that he and his fellow merchants on occasion were treated to "chopsticks dinners" by their Chinese partners. As the name indicates, these dinners were in the Chinese style, or as Hunter puts it, "no foreign element would be found in it." Since "these feasts," in Hunter's words, "were very enjoyable," one could imagine that he and other Westerners probably also tried using chopsticks to eat the food.[10]

After the Treaty of Nanjing, China became more and more accessible to Westerners, who traveled there from both Europe and America. When invited by the locals to use chopsticks, some adventurous travellers began to experiment with the eating device. Laurence Oliphant (1829–1888), a British author, traveler and diplomat who served as private secretary to the Earl of Elgin, the British plenipotentiary to China in the mid-nineteenth century, was an early example. Oliphant records such an experience in these words:

> We refreshed ourselves after the fatigues of our exploration at a Chinese restaurant, where I made my first experience in Chinese cookery, and, in spite of the novelty of the implements, managed, by the aid of chopsticks, to make a very satisfactory repast off eggs a year old preserved in clay, sharks' fins and radishes pared and boiled into a thick soup, *bêche de mer* or sea-slugs, shrimps made into a paste with sea-chestnuts, bamboo roots, and garlic, rendered piquant by the addition of soy and sundry other pickles and condiments, and washed down with warm samshu in minute cups. Dishes and plates were all on the smallest possible scale, and pieces of square brown paper served the purpose of napkins.[11]

As these words reveal, Oliphant obviously enjoyed the exotic Chinese dishes at the restaurant. Moreover, he appeared quite delighted that he managed to employ chopsticks in transporting them. So much so that

[10] W. C. Hunter, *The "Fan Kwae" at Canton: Before Treaty Days, 1825–1844* (London: Kegan Paul, Trench, & Co., 1882; reprinted in Taipei, 1965), 40–41.

[11] Laurence Oliphant, *Elgin's Mission to China and Japan*, with an introduction by J. J. Gerson (Oxford: Oxford University Press, 1970), vol. 1, 67–68.

when he had another dining experience in China, invited that time by a Chinese local official, Oliphant makes the following comments, in which he states that the Chinese eating custom was "more elegant," as chopsticks were "refined" whereas the knife and fork were "rude":

> I was glad to have an opportunity at Shanghai of renewing my acquaintance with the Taoutai [Daotai, Intendant], whom I found to be a person of considerable intelligence and enlightenment. One day I dined with him, and partook not of a flimsy refection, such as those usually offered on such occasions, but of a good substantial repast, beginning with bird's-nest soup, followed by shark's fins, *bêche de mer*, and other indescribable delicacies, as *entrées*, then mutton and turkey, as *pièces de resistance*, carved at a side-table in a civilised manner, and handed round cut up into mouthfuls, so that the refined chopstick replaced throughout the rude knife and fork of the West. We may certainly adopt with advantage the more elegant custom of China in this respect; and as we have ceased to carve the joints in dishes, make the next step in advance, and no longer cut up slices of them in our plates.[12]

In contrast to Lord Macartney, Laurence Oliphant perhaps was one of the earliest Europeans who considered the Chinese use of chopsticks a more civilized eating manner. He too was impressed by the fact that the Chinese prepared food items in bitable morsels, readily delivered by chopsticks.

It is hard to imagine, though, that Oliphant was the only Westerner then who took on the challenge of dining with chopsticks in China. In 1935, an American woman named Corrinne Lamb published one of the first recipe books on Chinese cookery in English, *The Chinese Festive Board*. While offering fifty recipes of Chinese dishes, Lamb, who apparently had extensive traveling experience in China, also comments aptly and candidly on the dietary customs and eating etiquette as well as a number of proverbs relating to food and food culture in the country. At the outset of the book, by way of proving her expertise on Chinese food, Lamb corrects some of the well-known misconceptions possibly held by her readers, such as that rice was the only grain staple for the Chinese and that rat was consumed by them on a daily basis. She points out that in addition to rice, which was eaten by two fifths of the people, wheat, barley and millet were staple grains for the rest of the population. As for rat, she writes that the Chinese in South China did eat snake, but not rat.

Like Oliphant and others, Lamb notes that all food served in China was previously "sliced, carved, minced or reduced to proportions which need

[12] Ibid., 215.

no further dissection." As a result, chopsticks alone become quite sufficient in carrying food items, and effective. Lamb describes:

In the first instance, the service of food involves none of the complications of foreign table etiquette. What we know as chopsticks are really called in China *k'uai tzu* [*kuaizi*], which, in turn, may be freely translated as "quick little boys." This term is applied to them on account of their nimbleness and speed when once in action and it is a most appropriate name. One pair of *k'uai tzu* constitutes the entire cutlery equipment per person, unless by some chance a small porcelain spoon is available or called for to contend with a soup or other thin liquid. One bowl per person completes the table service. Many weary American housewives might well wish that their dishwashing worries could be reduced to such a minimum. Table linen there is none, thus eliminating another unnecessary item.[13]

From her enthusiastic endorsement, it is easy to see that Lamb herself might have mastered the skill of using chopsticks, just as she did of cooking the Chinese dishes described in her book. Using chopsticks to eat Chinese food, indeed, was recommended for the patrons of Chinese restaurants in the United States, for "it is a clean and delicate way to dine," so stated a 1935 pamphlet about the city of Los Angeles.[14]

What is interesting is that Corrinne Lamb's enthusiasm for chopsticks use came at a time when the Chinese themselves began to reflect critically on the dietary custom. Through the course of the twentieth century, the Chinese made consistent efforts to modernize their society. Some of the Chinese took the name "Sick Man of the East," by which their country was disparagingly referred to at the time, to heart and tried to improve the health of their compatriots. In Japan, similar attempts had been made from the late nineteenth century. For instance, the idea of "hygiene" was first introduced to Japan and dubbed *eisei* 衛生 by the Japanese. Borrowing an existing term from ancient Chinese texts, these two Chinese compound words connote the meaning of "guarding life," which emphasizes the importance of hygiene for people. The Chinese have also used them, pronounced *weisheng*, to discuss the idea of "hygiene," despite some reservations.[15] It seems that they had strong reasons to adopt the Japanese translation because

[13] Corrinne Lamb, *The Chinese Festive Board* (Hong Kong: Oxford University Press, 1985; originally published in 1935), 14–15.

[14] Quoted in Roberts, *China to Chinatown*, 151.

[15] See Ruth Rogaski, *Hygienic Modernity: Meanings of Health and Disease in Treaty-Port China* (Berkeley: University of California Press, 2004), 104–164; and Sean Hsiang-lin Lei, "Moral Community of *Weisheng*: Contesting Hygiene in Republican China," *East Asian Science, Technology and Society: An International Journal*, 3:4 (2009), 475–504.

during the 1930s a tuberculosis crisis occurred in China, making "guarding life" an imminent task. Both Chinese and Western medical professionals attributed the quick spread of the disease in the country partly to the unhealthy daily habits among the Chinese. One of those habits, lo and behold, was that "Food is taken from a common bowl, with the chopsticks conveying it to the individual mouth."[16]

In fact, during the early twentieth century, the Chinese needed to combat not only tuberculosis, but also other gastrointestinal diseases.[17] To prevent the spread of these epidemics, Chinese medical professionals advocated changing the daily habits among their compatriots. This amounted to a challenging task in that cultural traditions and social customs cannot be transformed overnight, for it often takes a long time for them to develop and be accepted among the populace. Granted, the Chinese, and other Asians in general, traditionally were conscientious about the food they consumed; this was also the general impression many Westerners had developed while traveling to the continent. In Chinese tradition, food was regarded as having medicinal effects on the human body, hence deserving high attention. This idea was also accepted and practiced among Koreans, the Japanese, the Vietnamese and other Asians. Yet at the same time, observed some Western missionaries, the Chinese lacked knowledge of "sanitary science," even though their lifestyle was by and large healthful. Indeed, though the Chinese were aware that certain diseases could be contagious and had developed various measures to prevent their spread, they were less concerned about food-sharing as a source of such contagion.[18]

Several years after Corrinne Lamb praised the Chinese use of chopsticks in carrying food, W. H. Auden (1907–1973) and Christopher Isherwood (1904–1986), two British writers, went to wartime China in 1938 and offered a rather colorful description of how primary chopsticks were for the Chinese:

One's first sight of a table prepared for a Chinese meal hardly suggests the idea of eating, at all. It looks rather as if you were sitting down to a competition in

[16] Quoted in Sean Hsiang-lin Lei, "Habituating Individuality: The Framing of Tuberculosis and Its Material Solutions in Republican China," *Bulletin of the History of Medicine*, 84:2 (Summer 2010), 262.

[17] Ka-che Yip, *Health and National Reconstruction in Nationalist China* (Ann Arbor: Association for Asian Studies, Inc., 1995), 10.

[18] Rogaski, *Hygienic Modernity*, 103. And Angela Ki Che Leung, "The Evolution of the Idea of *Chuanran* Contagion in Imperial China," *Health and Hygiene in Chinese East Asia*, eds. Leung & Furth, 25–50.

water-colour painting. The chopsticks, lying side by side, resemble paint-brushes. The paints are represented by little dishes of sauces, red, green, and brown. The tea-bowls, with their lids, might well contain paint-water. There is even a kind of tiny paint-rag, on which the chopsticks can be wiped.

These vivid words show that Auden and Isherwood were quite impressed by the use of chopsticks – they also write that while in China, they tried using chopsticks in conveying food, declining the knives and forks offered to them by their hosts. These two English authors also liked the custom that before a meal, everyone was offered a hot moistened towel to wipe their hands and faces, which in their recommendation should be introduced to the West.[19]

However, their beautiful depiction of the Chinese dietary practice is not so flattering as it appears on first sight. One thing is apparent: as everyone competes with each other for getting food, little concern is shown about passing their germs on to the communal dishes with their chopsticks. Corrinne Lamb also observes in her book that in China once food is put on the table, it is "prey to all present." "There ensues," she continues, "a simultaneous dive of chopsticks into the various dishes, the diners suiting their own fancy as to what they desire to concentrate upon after liberal sampling of the various offerings."[20]

Thanks to the education by medical professionals and government interventions, awareness of the importance of personal and public hygiene has been on the rise in modern China. This awareness helped draw attention to the drawbacks of the age-long practice of communal eating. Wang Li (1900–1986), a renowned Chinese linguist, coined a term *jinye jiaoliu* (exchange of saliva) to describe the fondness of the Chinese for sharing food dishes in the communal eating style. Using gallows humor, he writes as follows:

The Chinese are harmonious towards one another, thanks to the exchange of saliva [in dining]. While there are some who have advocated eating separately, there are always others who would like to share food as much as possible. For instance, when a soup is just brought on to the table, a host often first uses his own spoon to stir and sip it. He will do the same to a dish, with his chopsticks. As for inviting guests to eat, the host does not seem to care if he exchanges his saliva with all the others. ... Before I sat down at the table, I happened to notice that there was too much saliva in the host's mouth. When he opened his mouth to speak or eat, I could see a web of

[19] W.H. Auden & Christopher Isherwood, *Journal to a War* (New York: Random House, 1939), 40. Hot moistened towels are still offered to customers in restaurants in today's China.

[20] Lamb, *Chinese Festive Board*, 15.

saliva forming between the two rows of his teeth. He then used his chopsticks, which had been in and out of the web many times, to clasp and deliver foodstuff into my plate, all deferentially. I could not believe my own tongue: Why did the same sautéed chicken which had been so tasteful when I put it in my mouth by myself become so distasteful when it was delivered by his chopsticks? I must be really unworthy of the host's hospitality.[21]

Full of sarcasm, Wang's description was perhaps not completely divorced from reality in China; it is likely that his description draws on many of his personal experiences. Indeed, before the custom of using serving chopsticks and spoons was introduced to China in the late twentieth century, it had been normal for the Chinese, for showing their kinship, hospitality and generosity, to grasp food contents from the communal dishes and deliver them to others, be they younger family members or invited guests. Yet attacks on such communal dining habits had begun already in the early part of the century. Wang Li's sarcastic criticism of how the Chinese "enjoyed" exchanging saliva is but one example. Many published essays criticized the age-old yet now deemed unhygienic customs practiced among the Chinese. Some identified "communal eating" (*gongshi*) as the number one unhygienic habit on the list, whereas others have sought ways to modify it, such as urging the use of serving chopsticks (*gongkuai* or "public chopsticks" in Chinese).[22]

Yet to forsake communal eating was by no means easy; as discussed in Chapter 5, sharing food with chopsticks in a common bowl or a pot, such as eating a hot pot, had become an entrenched dining habit in China and beyond. And communal eating remains in practice among many Chinese, Vietnamese and Koreans today. When invited to a familymeal in Vietnam, for instance, everyone is given a pair of chopsticks to eat the dishes common for all; it remains quite rare for the Vietnamese to use serving chopsticks. Rice, however, is served into one's own bowl by a female member of the host family using a serving spoon.[23] In Korea, a Chinese visitor finds with surprise that some people use both their spoons and chopsticks to partake of food items in the communal dishes at public

[21] Wang Li, "Quancai" (Feeding), www.hanfu.hk/forum/archiver/?tid-1695.html.

[22] Zhang Yichang, "Guoren buweisheng de exi" (The unhygienic habits of my countrymen), *Xinyi yu shehui jikan* (Journal of new medicine and society), 2 (1934), 156. Tao Xingzhi (1891–1946), a modern educator, asked students in the schools he founded in the 1930s to learn the practice of using a serving pair of chopsticks. Lan, *Kuaizi, buzhishi kuaizi*, 173.

[23] Nir Avieli, "Eating Lunch and Recreating the Universe: Food and Cosmology in Hoi An, Vietnam," *Everyday Life in Southeast Asia*, eds. Kathleen M. Adams & Kathleen A. Gillogly (Bloomington: Indiana University Press, 2011), 218.

gatherings. He notes that on such occasions the Chinese are more likely to use only chopsticks to take food from the common dishes, and apply the utensil rather carefully.[24]

So, a compromise had to be made. Some medical professionals attempted it in the early twentieth century, before the Chinese public was educated about the health risks involved in communal eating. In the late 1910s, Wu Liande (1879–1960), a Cambridge-trained doctor, introduced what he called a "hygienic dining table," otherwise known as the "lazy Susan," to the Chinese, claiming that it was his invention. The most hygienic way to consume a meal, Wu admitted, is to eat individually – everyone only eats the foods served (or self-served using a serving utensil) to his/her own plates or bowls. But this was not the best way to enjoy a Chinese meal, he argued. Then the other way was to let everyone pick up food items in common plates, but ask them to employ a pair of serving chopsticks to first bring the food to his/her rice bowls. To do so, however, could be cumbersome and confusing (some may just forget about switching between the personal and serving chopsticks), killing the fun of eating. Using a lazy Susan, Wu believed, presented a better solution, for it could balance the traditional desire among the Chinese to sample various dishes at a meal and their newly acquired interest in hygienic dining. More specifically, according to Wu's direction, one should place either a serving spoon or a pair of serving chopsticks next to every dish on the platform, reminding diners to use them as they rotate the platform and pick up food from the dishes. That is, using the lazy Susan this way allows diners to continue sharing and savoring the variety of the dishes but at the same time, it stops them from passing their saliva on to the common dishes.[25]

In 1972 US President Richard Nixon paid a historic visit to China. As this was an epoch-making event, it was well covered in the Western media, allowing the outside world to take a peek into how the Chinese had lived on the mainland after the Communists took over power in 1949. The coverage included, interestingly, details of how President Nixon prepared for his trip, such as how he practiced using chopsticks.[26] The time he spent on practicing seems to have paid off, as shown in Margaret Macmillan's description of the banquet the Chinese hosted for the visit:

[24] Tang Libiao, "Han'guo de shili" (Eating etiquette in Korea), *Dongfang shiliao yu baojian* (Food medicine and health care in the East), 9 (2006), 8–9.
[25] Lei, "Habituating Individuality," 262–265.
[26] Ann M. Morrison, "When Nixon Met Mao," Book Review, *Time*, December 3, 2006.

> The band played the Chinese and US national anthems, and the banquet began. The Nixons and top-ranking Americans sat with Chou En-lai [Zhou Enlai, China's Premier] at a table for 20; everyone else was at tables of ten. Each person had an ivory place card embossed in gold English and Chinese characters and chopsticks engraved with his or her name.
>
> The Americans had been briefed on how to behave at Chinese banquets. Everyone had been issued chopsticks and urged to practice ahead of time. Nixon had become reasonably adept, but national-security adviser Henry Kissinger remained hopelessly clumsy. CBS News anchor Walter Cronkite shot an olive into the air. . . .
>
> The lazy Susans spun, laden with duck slices with pineapple, three-colored eggs, carp, chicken, prawns, shark fin, dumplings, sweet rice cake, fried rice, and in a nod toward Western tastes, bread and butter.[27]

Wu Liande's effort to introduce the so-called "hygienic dining table," or lazy Susan, therefore, was not in vain. Over time, the Chinese have indeed realized the importance of adopting a hygienic eating style. While few families, save for some wealthy ones, have a lazy Susan on their dining table, it is quite common to find this round, rotatable platform in restaurants in today's China and across Asia. At formal or state dinners, such as the occasion described at which US President Nixon and his entourage were entertained, a lazy Susan is almost indispensable in that it best displays the variety of the dishes the Chinese have prepared for the guests to sample and savor. Banquets remain "very ceremonious" in China, just as Matteo Ricci discovered in the late sixteenth century.

Despite the detailed description, the Western media did not specify whether or not the Nixons and US officials, while eating at lazy Susans, were provided with a serving spoon or a pair of serving chopsticks to first bring food to their plates. Probably they were not because it was a dignified occasion and waiters would most likely have served the food to their plates; the guests just needed to use their own chopsticks to move the food from the plates to their mouths. But today, most Chinese dining in public would follow Wu Liande's advice, using a serving spoon or a pair of serving chopsticks, or *gongkuai*, to first transport the food items to their own bowls before bringing them to their mouths. Indeed, not only do they

[27] Margaret MacMillan, "Don't Drink the Mao-tai: Close Calls with Alcohol, Chopsticks, Panda Diplomacy and Other Moments from a Colorful Turning Point in History," *Washingtonian*, February 1, 2007. Here MacMillan tries to compliment Nixon's adeptness in using chopsticks, but his success seems to be on relative terms. In his memoir, Dirck Halstead, an American photographer who witnessed the occasion, recalls instead that "We watched as President Nixon made a painful attempt to use his chopsticks on his Peking Duck." "With Nixon in China: A Memoir," *The Digital Journalist*, January 2005.

use *gongkuai* while eating out, but they also use them while entertaining their guests at home. Chopsticks users are now highly aware of the need to practice hygienic dining, even though this means that they have to remember the separate roles (public vs. private) assigned to the chopsticks.

Hygiene awareness has not only modified the communal eating tradition, but it has also changed people's attitudes toward restaurant chopsticks. As mentioned in previous chapters, various sorts of public eateries (inns, lodges, tea-houses, restaurants, etc.) had existed in China for centuries, beginning as early as in the Han period – Ōta Masako actually believed that the tradition for the Chinese to eat out had started during the Warring States period (475–221 BCE) and that it also helped promote chopsticks use among them.[28] If this were the case, then one could expect that as they were inexpensive and easy to make, it would not take long for chopsticks to be offered at those dining places for the convenience of customers. However, since the notion of hygiene was by and large absent in traditional societies, the sanitary condition of those public utensils varied tremendously. Isabella Bird (1831–1904), an English writer and globe-trekker, went to Asia in the second half of the nineteenth century. Her journal records her negative impression of the unsanitary conditions in China. Having witnessed poor laborers (whom she called "coolies") eating meals at a roadside eatery, she writes: "On each table a bunch of malodorous chopsticks occupies a bamboo receptacle. An earthen bowl with water and a dirty rag are placed outside for the use of travellers, who frequently also rinse their mouths with hot water."[29] Clearly, those chopsticks appeared squalid because they were not cleaned on a regular basis.

As people's concern about food hygiene increased, so did their demand for clean chopsticks at public eateries. To meet the demand, restaurants seem to have two solutions. One is to develop a regime to sanitize regularly the chopsticks placed in the receptacles and the other is to let customers use disposable, or one-time-use, chopsticks made of cheap wood. In the latter case, each customer is given a new pair of chopsticks every time s/he comes to eat a meal and these are thrown away after use. As of today, both methods are popular, though disposable chopsticks seem more favored simply because they look new, unused before by others. Disposable chopsticks are usually prepackaged in a paper or plastic sleeve, with two sticks connected together – users need to snap them apart before use. For many,

[28] Ōta, *Hashi no genryū o saguru*, 229–246.

[29] Isabella Bird, *The Yangtze Valley and Beyond* (Boston: Beacon Press, 1985), 193–194.

this requirement ensures that the chopsticks are new and clean. In Chinese, disposable chopsticks are called *yicixing kuaizi* (one-time-use chopsticks), but they are also referred to as *weisheng kuai* (hygienic chopsticks), suggesting they are perceived as sanitary by the public. By comparison, one can always question the cleanness of the chopsticks given by restaurants, even if they look clean, not "malodorous" as Isabella Bird found a century or so earlier.

Disposable chopsticks are a Japanese invention. As described in Chapter 4, the earliest chopsticks found in Japan were made of wood and were discarded, as scholars suspect, after use by construction workers at some ancient sites. According to Isshiki Hachirō, disposable chopsticks, or *waribashi*, first appeared in some seafood restaurants in the mid-Tokugawa period, or the eighteenth century. The name *waribashi* (lit. split chopsticks) describes how they are connected at one end, requiring their users to split them into two sticks before putting them into use. Made usually of wood, sometimes also of bamboo, disposable chopsticks are generally shorter than the reusable ones, such as lacquered wooden chopsticks and, in more recent years, plastic chopsticks. Compared with the reusable varieties, disposable chopsticks are far more popular in Japan; they are present in almost all kinds of eateries, be it a classy restaurant or a street food stand. Throwing away wooden chopsticks after use registered Shintoist influences, as discussed in Chapter 6, but the heightened hygiene awareness of modern times has also reinforced the practice, turning it into a powerful and prevalent trend in Japanese society today.

Over time, the tendency to use disposable chopsticks in public eateries has spilled over to Japan's neighbors; first to South Korea and Taiwan and, from the late 1980s on, to China and, more slowly, Vietnam. Yet the degree of their popularity varies notably. While in Japan disposable chopsticks are used at restaurants of almost all levels, outside Japan, disposable chopsticks tend to be found in smaller cafés and restaurants, such as fast-food chains and takeout places. As of today, disposable chopsticks have the least appeal to the Vietnamese who prefer instead the reusable variety, such as those made of plastic or bamboo. Thanks to the tradition of using metal utensils, Koreans also use fewer disposable chopsticks than do the Japanese and Chinese.[30]

[30] This seems to be the experience of Rachel Nuwer, a *New York Times* reporter who writes: "if you are in the mood for Vietnamese food, you'll probably be dining with the plastic variety [of chopsticks], while Korean restaurants tend to go with metal." "Disposable Chopsticks Strip Asian Forest," *New York Times*, October 24, 2011.

But in China, disposable chopsticks have become ubiquitous. China is also the leading exporter of disposable chopsticks in the world. This ought not to be so surprising, for since the late 1970s when the country reopened its doors to the outside world, it quickly became the "factory of the world," manufacturing almost all the products one can think of and exporting them to countries around the world. The period from the late 1970s onward also witnessed a growing trend among the Chinese to adopt the custom of using disposable chopsticks at restaurants. Disposable chopsticks have also become more commonly found at company and school canteens, dining halls and cafés than their reusable cousins, made either of wood, bamboo or plastic. Needless to say, this switch from reusable to disposable chopsticks reflects the rising interest in hygienic dining among their users. To fight the spread of disease, the Chinese government at once also encouraged the use of disposable chopsticks. The purchase of disposable chopsticks thus skyrocketed in a country where only a few decades ago the reusable variety had been the most common. "Throwaway chopsticks," states one observer, "are now used in all but the poorest and the most expensive restaurants throughout China. The poor ones reuse bamboo chopsticks after cursory washing. The expensive ones prefer sanitized, lacquered-wood chopsticks. All the rest use disposable wooden chopsticks."[31]

The demand for disposable chopsticks therefore is great, and growing. One estimate puts it that "Each year, the equivalent of 3.8 million trees go into the manufacture of about 57 billion disposable pairs of chopsticks in China." Of the 57 billion pairs, half of them are used in China; among the other half, seventy-seven percent are used by the Japanese, twenty-one percent by South Koreans and the remaining two percent by US consumers. Another estimate goes higher: in China alone, 45 billion pairs of disposable chopsticks are used and thrown away every year.[32] The highest figure is also the most recent, put out in March 2013, which states that as many as 80 billion pairs of one-time-use chopsticks are discarded in China every year![33]

Disposable chopsticks also play a major role in popularizing Asian foods, and Chinese food in particular, outside Asia. The global spread of

[31] Yang Zheng, "Chopsticks Controversy," *New Internationalist*, 311 (April 1999), 4.

[32] Nuwer, "Disposable Chopsticks Strip Asian Forest," and Dabin Yang, "Choptax," *Earth Island Journal*, 21:2 (Summer 2006), 6.

[33] Malcolm Moore, "Chinese 'Must Swap Chopsticks for Knife and Fork'," *The Telegraph*, March 13, 2013. The estimate was given at a speech by a delegate to the People's Congress who proposed to ban disposable chopsticks.

Chinese and Asian foods began when Asians emigrated to neighboring regions, first to parts of Southeast Asia and later, from the 1800s, to such faraway continents as Australia, Europe and North and South America. The initial reactions to Asian foods, which were usually found only in the Chinatowns then emerging in port cities (e.g. San Francisco which has the oldest Chinatown in the US), by non-Asians were apathetic and distrustful. But as time went on, especially after World War II, Asian and Chinese foods found more acceptance, serving not only immigrant communities of Asians, but also non-Asians. From the 1960s, according to J. A. G. Roberts, a trend of globalization of Chinese food began to occur – Chinese food gained an unprecedented popularity among consumers in Europe and America.[34] Since then, the trend has not only continued but has risen steadily. In the United States, while the number of authentic Chinese restaurants has increased notably in major cities, small takeout places have also popped up in towns throughout the country, whether they are in New York or New Mexico, Connecticut or Colorado. And when customers pick up their order, a pair or two of disposable chopsticks in paper sleeves are usually stuck inside the food bag. Indeed, in tandem with that in Asia, it has been a growing trend for Asian restaurants around the world to provide disposable chopsticks to their customers. The popularity of Chinese food is also shown in movies and TV series. In such popular hits as *Seinfeld, Friends*, *ER* and *Grey's Anatomy*, one often sees scenes in which characters eat Chinese food from takeout boxes, using disposable chopsticks. If chopsticks are a cultural "bridge" linking Asia to the world, the disposable kind ought perhaps to take the most credit.

However, the rising demand for disposable chopsticks around the world has caused some concern. Indeed, begun as a thrifty way to use wood scraps, disposable chopsticks are now perceived by some as an environmental hazard, causing deforestation not only in Asia but also around the world. According to a report by the United Nations in 2008, 10,800 square miles of Asian forest are disappearing each year. Manufacturers thus have turned to wood resources elsewhere. As early as in 2006, a subsidiary of Japan's Mitsubishi Group was reportedly cutting down centuries-old

[34] In the United States in 1960, there were over 6000 Chinese restaurants, which employed more workers than those working in laundries, the other traditional occupation for Chinese immigrants. By 1980, the number of Chinese restaurants in the United States and Canada had risen to 7796, constituting nearly thirty percent of all the ethnic restaurants. See Roberts, *China to Chinatown*, 164–165. As of today, the number of Chinese restaurants in the US is estimated at 40,000.

aspen groves in western Canada to make 8 million pairs of disposable chopsticks per day. In the United States, a company in Georgia is manufacturing and exporting large quantities of wooden chopsticks to Asia, using its native gumwood.[35]

The main appeal of disposable chopsticks is that they are seen as more sanitary than the reusable variety. Most Japanese, as put pithily by Yuki Komayima, former head of the Canadian Chopstick Manufacturing Company, simply "don't want a chopstick that has been used by someone else." This is both hygienic and spiritual because according to traditional Shinto belief, one's chopsticks carry one's spirit, which cannot be cleaned off by washing.[36] This is particular to traditional Japanese culture. But still, few chopsticks users would use chopsticks unsanitized. In China where concerns about food safety have run high in recent years, many Chinese do not trust restaurant chopsticks to have been washed thoroughly; they would rather choose the disposable type, believing it to be more sanitary.[37] Disposable chopsticks, however, are not always as clean as one thinks. When they are manufactured in factories, they are of course sanitized before being put into individual packages. But ironically, the problem arises in the sanitization process because the usual way to clean and sterilize the chopsticks once they are made is to apply various chemicals, which include paraffin, hydrogen peroxide and insect repellent. And to prevent the sticks from turning yellow, black or moldy, and to help them keep their brand-new look, some manufacturers also use sulfur dioxide to polish them. All these chemicals, needless to say, are harmful to human health, especially if applied without proper supervision. The Chinese government has now set up production standards, forbidding or curtailing the use of those chemicals. However, as disposable chopsticks are made of cheap wood, they need to be bleached and polished in order to have a presentable appearance. Using chemicals is the most economic way. Also, though disposable chopsticks are mass produced nowadays, this does not mean that they are always manufactured in large and well-managed factories that abide by government regulations. Instead, they are more commonly manufactured in

[35] Nuwer, "Disposable Chopsticks Strip Asian Forest" and "Life-Cycle Studies: Chopsticks," *World Watch*, 19:1 (January/February 2006), 2.

[36] Nuwer, "Disposable Chopsticks Strip Asian Forest" and "Life-Cycle Studies: Chopsticks." Citing a Japanese study, Wilson writes that the Japanese have a strong distaste for reusable chopsticks, even if they are cleaned. *Consider the Fork*, 200.

[37] Jane Spencer, "Banned in Beijing: Chinese See Green over Chopsticks," *The Wall Street Journal*, February 8, 2008.

small workshops with a problematic environment, at least according to news reports.[38]

While significantly contributing to the popularization of Asian foods around the world, disposable chopsticks therefore have their undeniable drawbacks: one is the issue about their cleanliness and the other is the environmental problem, or deforestation, to which their popularity may have contributed. There is not much dispute about how to ensure their sanitization; closely monitoring the manufacturers and making sure that a safe method is applied in the process is the best way. With respect to whether disposable chopsticks have exacerbated deforestation, however, there have been differing opinions. China has become the largest producer of disposable chopsticks because the disposable-chopsticks industry has contributed to the country's economic boom, employing over 100,000 people, mostly in Northeast China. "The chopsticks industry," says Lian Guang, founder and president of the Wooden Chopsticks Trade Association in Heilongjiang Province, "is making a great contribution by creating jobs for poor people in the forestry regions." Besides the economic benefit, Lian adds, the industry does not chop down valuable trees to make the chopsticks that are used and discarded within thirty minutes of a usual mealtime. Instead, disposable chopsticks are typically made from such fast-growing woods as birch and poplar, as well as bamboo, which is an abundant plant. In other words, like their predecessors in early Japan, today's disposable chopsticks are made of leftover wood that is not useful for other industries.[39]

Be that as it may, the environmental cost remains a concern for some because of the high demand for chopsticks around the world. Environmentalists estimate that if China (only) consumes 45 billion pairs of disposable chopsticks per year, 25 million trees must fall each year to meet the demand – not only birch and poplar but also cottonwood, spruce and aspen. Up till 2006, as the world's leading producer, China had shipped 180,000 tons of disposable chopsticks to other countries, with Japan being the most favored destination. Yet compared with Japan, which boasts a forest coverage rate of sixty-nine percent, the highest in the world, China is short of trees; its forest coverage rate is less than fourteen percent. Of course, the rapid pace of deforestation in China is

[38] Nuwer, "Disposable Chopsticks Strip Asian Forest"; "Life-Cycle Studies: Chopsticks"; and Yuan Yuan, "Yicixing kuaizi tiaozhan Zhongguo guoqing" (Disposable chopsticks challenge China as a country), *Liaowang zhoukan* (Outlook weekly), 33 (August 13, 2007).

[39] Spencer, "Banned in Beijing: Chinese See Green over Chopsticks."

caused by the country's overall modernization; it cannot and should not be attributed solely to the making of disposable chopsticks. But the ubiquity of disposable chopsticks in the country has spurred some of its citizens, including a few pop stars, to action, calling for a return to the reusable type. Other green activists have started the BYOC (Bring Your Own Chopsticks) movement, asking consumers to use their own utensils while eating out. A similar campaign – "Let's Carry Our Own Chopsticks" – is being waged simultaneously in Japan. The Chinese government imposed a tax on wooden chopsticks in 2007.[40]

At the end of 2011, hoping to raise public awareness of timber waste in making disposable chopsticks, 200 college students in China who were members of Greenpeace East Asia collected 82,000 pairs of them and made a "disposable forest" that consisted of four large trees, each sixteen feet high. These chopsticks trees stood in a busy shopping mall, while the students asked for signatures from spectators on a petition for banning the disposable utensil nationwide – such major cities as Shanghai and Beijing have already asked their restaurants to replace disposable chopsticks with reusable ones. In Japan, many restaurant owners nowadays no longer automatically provide disposable chopsticks to their customers; instead they are only given when asked for. And if eating in, customers are encouraged to use the reusable variety, stashed in a receptacle on the table. Japanese companies' canteens have also gradually replaced throwaway chopsticks with the reusable type.[41]

At the same time, serious attempts are made among Asians to recycle throwaway chopsticks. As they are made of wood, disposable chopsticks, once collected, can be turned into other useful items. Several Japanese companies are doing exactly that by making paper, facial tissues and particleboard from throwaway chopsticks.[42] Some scientists have experimented with ways to gasify waste disposable wooden or bamboo chopsticks to generate synthesis gas and hydrogen energy. Others have attempted to extract glucose from them to help produce ethanol as well as to recycle their fiber into making polylactic acid (PLA), a widely useful polyester in industry and medicine. At present, these

[40] Moore, "Chinese 'Must Swap Chopsticks for Knife and Fork'"; Nuwer, "Disposable Chopsticks Strip Asian Forest" and "Life-Cycle Studies: Chopsticks."

[41] Spencer, "Banned in Beijing: Chinese See Green over Chopsticks"; "Chopped Chopsticks," *The Economist*, 316:7665 (August 4, 1990); and Nuwer, "Disposable Chopsticks Strip Asian Forest."

[42] Nuwer, "Disposable Chopsticks Strip Asian Forest."

ideas have not gone beyond the experimental stage.[43] But they are certainly noteworthy and with significant potential. As 1.5 billion people use chopsticks to convey food on a daily basis and many of them (still) use the disposable type, there is no shortage of chopsticks to industrialize any of the experiments, benefitting people in Asia and around the world. Once that happens, or once ways of reusing waste chopsticks are effectively and broadly adopted, our story of chopsticks will come full circle: through history, chopsticks have become a popular dining tool because they are convenient and economical. They can retain and expand on these two essential features to better serve people in the years to come.

[43] Kung-Yuh Chiang, Kuang-Li Chien & Cheng-Han Lu, "Hydrogen Energy Production from Disposable Chopsticks by a Low Temperature Catalytic Gasification," *International Journal of Hydrogen Energy*, 37:20 (October 2012), 15672–15680; Kung-Yuh Chiang, Ya-Sing Chen, Wei-Sin Tsai, Cheng-Han Lu & Kuang-Li Chien, "Effect of Calcium Based Catalyst on Production of Synthesis Gas in Gasification of Waste Bamboo Chopsticks," *International Journal of Hydrogen Energy*, 37:18 (September 2012), 13737–13745; Cheanyeh Cheng, Kuo-Chung Chiang & Dorota G. Pijanowska, "On-line Flow Injection Analysis Using Gold Particle Modified Carbon Electrode Amperometric Detection for Real-time Determination of Glucose in Immobilized Enzyme Hydrolysate of Waste Bamboo Chopsticks," *Journal of Electroanalytical Chemistry*, 666 (February 2012), 32–41; Chikako Asada, Azusa Kita, Chizuru Sasaki & Yoshitoshi Nakamura, "Ethanol Production from Disposable Aspen Chopsticks Using Delignification Pretreatments," *Carbohydrate Polymers*, 85:1 (April 2011), 196–200; Yeng-Fong Shih, Chien-Chung Huang & Po-Wei Chen, "Biodegradable Green Composites Reinforced by the Fiber Recycling from Disposable Chopsticks," *Materials Science & Engineering: A*, 527:6 (March 2010), 1516–1521.