

How the Fork Got Its Tines

The eating utensils that we use daily are as familiar to us as our own hands. We manipulate knife, fork, and spoon as automatically as we do our fingers, and we seem to become conscious of our silverware only when right- and left-handers cross elbows at a dinner party. But how did these convenient implements come to be, and why are they now so second-nature to us? Did they appear in some flash of genius to one of our ancestors, who yelled “Eureka!” or did they evolve as naturally and quietly as did the parts of our bodies? Why is Western tableware so alien to Eastern cultures, and why do chopsticks make our hands all thumbs? Are our eating utensils really “perfected,” or is there room for improvement?

Such questions that arise out of table talk can serve as paradigms for questions about the origins and evolution of all made things. And seeking answers can provide insight into the nature of technological development generally, for the forces that have shaped place settings are the same that have shaped all artifacts. Understanding the origins of diversity in pieces of silverware makes it easier to understand the diversity of everything from bottles, hammers, and paper clips to bridges, automobiles, and nuclear-power plants. Delving into the evolution of the knife, fork, and spoon can lead us to a theory of how all the things of technology evolve. Exploring the tableware that we use every day, and yet know so little about, provides as good a starting point for a consideration of the interrelated natures of invention, innovation, design, and engineering as we are likely to find.

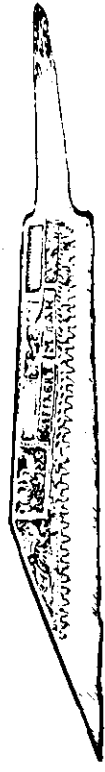
Some writers have been quite unequivocal about the origins of things. In their *Picture History of Inventions*, Umberto Eco and

G. B. Zorzoli state flatly that "all the tools we use today are based on things made in the dawn of prehistory." And in his *Evolution of Technology*, George Basalla posits as fundamental that "any new thing that appears in the made world is based on some object already there." Such assertions appear to be borne out in the case of eating utensils.

Certainly our earliest ancestors ate food, and it is reasonable to ask how they ate it. At first, no doubt, they were animals as far as their table manners were concerned, and so we can assume that the way we see real animals eat today gives us clues as to how the earliest people ate. They would use their teeth and nails to tear off pieces of fruits, vegetables, fish, and meat. But teeth and nails can only do so much; they alone are generally not strong enough or sharp enough to render easily all things edible into bite-sized pieces.

The knife is thought to have had its origins in shaped pieces of flint and obsidian, very hard stone and rock whose fractured edges can be extremely sharp and thus suitable to scrape, pierce, and cut such things as vegetable and animal flesh. How the efficacious properties of flints were first discovered is open to speculation, but it is easy to imagine how naturally fractured specimens may have been noticed by early men and women to be capable of doing things their hands and fingers could not. Such a discovery could have occurred, for example, to someone walking barefoot over a field and cutting a foot on a shard of flint. Once the connection between accident and intention was made, it would have been a matter of lesser innovation to look for other sharp pieces of flint. Failing to find an abundance of them, early innovators might have engaged in the rudiments of knapping, perhaps after noticing the naturally occurring fracture of falling rocks.

In time, prehistoric people must have come to be adept at finding, making, and using flint knives, and they would naturally also have discovered and developed other ingenious devices. With fire came the ability to cook food, but even meat that had been delicately cut into small pieces could barely be held over a fire long enough to warm it, let alone cook it, and sticks may have come to be used in much the same way as children today roast marshmallows. Pointed sticks, easily obtained in abundance from nearby trees and bushes, could have been used to keep an individual's fingers from being cooked with dinner. But larger pieces of meat, if not the whole animal, would more likely first have been roasted on a larger stick.



This damascened blade of a thousand-year-old Saxon scramasax is inscribed, "Gebereht owns me." Early knives were proud personal possessions and they served many functions; the pointed blade not only could pierce the flesh of an enemy but also could spear pieces of food and convey them to the mouth. This knife's long-missing handle may have been made of wood or bone.

Upon being removed from the fire, the roast could be divided among the diners, perhaps by being scored first with a flint knife. Those around the fire could then pick warm pieces of tender meat off the bone with pointed sticks, or resort to their fingers.

From the separate implements of sharp-edged flint for cutting and sharp-pointed stick for spearing evolved the single implement of a knife that would be easily recognized as such today. By ancient times, knives were being made of bronze and iron, with handles of wood, shell, and horn. The applications of these knives were multifarious, as tools and weapons as well as dining implements, and in Saxon England a knife known as a "scramasax" was the constant companion of its owner. Whereas common folk still ate mostly with their teeth and fingers, tearing meat from the bone with abandon, more refined people came to employ their knives in some customary ways. In the politest of circumstances, the dish being sliced might have been held steady by a crust of bread, with the knife being used also to spear the morsel and convey it to the mouth, thus keeping the fingers of both hands clean.

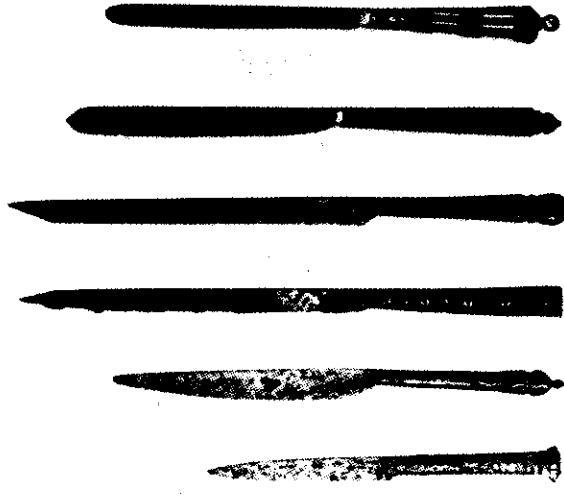
I first experienced what it is like to eat with only a single knife some years ago in Montreal, in a setting that might best be described as participatory dinner theater. The *Festin du Gouverneur* took place in an old fort, and a hundred or so of us sat at long bare wooden tables set parallel to three sides of a small stage. At each place were a napkin and a single knife, with which we were expected to eat our entire meal, which consisted of roast chicken, potatoes, carrots, and a roll. It was relatively easy to deal with the firm carrots and potatoes, for pieces of them could be sheared off with the knife blade, speared on its point, and put neatly in the mouth. However,

I had considerable trouble just cutting off pieces of chicken. At first I tried to steady it with my roll, but it was soft to begin with and soon became crumbly and soggy. I had to resort to eating the chicken with my fingers. What I remember most about the experience was how greasy my fingers felt for the rest of the evening. How convenient and more civilized it would have been at least to have had a second knife.

My only other experience eating with a single knife occurred at a barbecue restaurant popular with the students and faculty of Texas A & M University. I had been visiting the campus, and for a light dinner before I caught my plane back to North Carolina one of my hosts thought I might enjoy trying what he described as real barbecue—Texas beef instead of the pork variety I had come to know and love in the Southeast. I ordered a small portion of the house specialty, and the waitress brought me several slices of beef brisket, two whole cooked onions, a fat dill pickle, a good-sized wedge of cheddar cheese, and two slices of white bread, all wrapped in a large piece of white butcher paper, which when opened up served as both plate and place mat. On the paper was set a very sharply pointed butcher knife with a bare wooden handle.

I followed the lead of the Aggies I was with and picked up a piece of brisket with the point of the knife and laid it atop a piece of bread. (In medieval times, the piece of bread, called a “trencher,” would have been four days old to give it some stiffness and body, the better to hold the meat and sauce.) We proceeded to cut off bite-sized pieces of this open-faced sandwich, and everything else set before us, and it all was delicious. The single knife worked well, because it was very sharp and could be pressed through the firm food, which itself did not slip much on the paper. However, I was quite distracted throughout the meal by my host, who used his knife so casually that I feared any minute he would cut his lip or worse. He also kept me a bit uneasy with his jokingly expressed hope that no one would come up behind us and give us a good pat on the back just as we were putting our knives into our mouths.

Eating a meal with two knives might seem to have been doubly crude and dangerous, but in its time it was thought of as the height of refinement. For the most formal dining in the Middle Ages, a knife was grasped in each hand. For a right-handed person the knife in the left hand held the meat steady while the knife in the right hand sliced off an appropriately sized piece. This piece was then



Knives, like all artifacts, have over time been subject to the vagaries of style and fashion, especially in the more decorative aspects of their handles. These English specimens date (left to right) from approximately 1530, 1580, 1580, 1630, and 1633, and they show that in one form or another the functional tip of the knife remained a constant feature until the introduction of the fork provided an alternate means of spearing food.

spared and conveyed to the mouth on the knife's tip. Eating with two knives represented a distinct advance in table manners, and the adept diner must have manipulated a pair of knives as readily as we do a knife and fork today.

By using one knife to steady the roast in the middle of the table while the other knife cut off a slice, the diners could help themselves without touching the common food. But a sharp, pointed knife is not a very good holding device, as we can easily learn by trying to eat a T-bone with a steak knife in each hand. If the holding knife is to press the steak against the plate, we must use some effort to keep it in place, and this can become tiring; if the holding knife is to spear the steak, we will soon find it rotating in place like a wheel on an axle. As a result, using the fingers to steady food being cut was not uncommon.

Frustrations with knives, especially their shortcomings in holding

meat steady for cutting, led to the development of the fork. While ceremonial forks were known to the Greeks and Romans, they apparently had no names for table forks, or at least did not use them in their writings. Greek cooks did have a "flesh-fork . . . to take meat from a boiling pot," and this kitchen utensil "had a resemblance to the hand, and was used to prevent the fingers from being scalded." Ancient forklife tools also included the likes of hay forks and Neptune's trident, but forks are assumed not to have been used for dining in ancient times.

The first utilitarian food forks had two prongs or tines, and were employed principally in the kitchen and for carving and serving. Such forks pierced the meat like a pointed knife, but the presence of two tines kept the meat from moving and twisting too easily when a piece was being sliced off. Although this advantage must also have been recognized in prehistoric eras, when forked sticks were almost as easy to come by as straight ones for skewering meat over the fire, the fork as an eating utensil was a long time in coming. It is believed that forks were used for dining in the royal courts of the Middle East as early as the seventh century and reached Italy around the year 1100. However, they did not come into any significant service there until about the fourteenth century. The inventory of Charles V of France, who reigned from 1364 to 1380, listed silver and gold forks, but with an explanation "that they were only used for eating mulberries and foods likely to stain the fingers." Table forks for conveying a variety of foods to the mouth moved westward to France with Catherine de Médicis in 1533, when she married the future King Henry II, but the fork was thought to be an affectation, and those who lost half their food as it was lifted from plate to mouth were ridiculed. It took a while for the new implement to gain widespread use among the French.

Not until the seventeenth century did the fork appear in England. Thomas Coryate, an Englishman who traveled in France, Italy, Switzerland, and Germany in 1608, published three years later an account of his adventures in a book entitled, in part, *Crudities Hastily Gobbled Up in Five Months*. At that time, when a large piece of meat was set on a table in England, the diners were still expected to partake of this main dish by slicing off a portion each while holding the roast steady with the fingers of their free hand. Coryate saw it done differently in Italy:

I observed a custom in all those Italian cities and towns through which I passed, that is not used in any other country that I saw in my travels, neither do I think that any other nation of Christendom doth use it, but only Italy. The Italian, and also most strangers that are commorant in Italy, do always at their meals use a little fork when they cut their meat. For while with their knife which they hold in one hand they cut the meat out of the dish, they fasten the fork, which they hold in their other hand, upon the same dish; so that whatsoever he be that sitting in the company of any others at the meal, should unadvisedly touch the dish of meat with his fingers from which all at the table do cut, he will give occasion of offense unto the company, as having transgressed the laws of good manners, insomuch that for his error he shall be at least brow beaten if not reprehended in words. This form of eating I understand is generally used in all places of Italy; their forks being for the most part made of iron or steel, and some of silver, but those are used only by gentlemen. The reason of this their curiosity is, because the Italian cannot by any means indure to have his dish touched with fingers, seeing all men's fingers are not alike clean. Hereupon I myself thought to imitate the Italian fashion by this forked cutting of meat, not only while I was in Italy, but also in Germany, and oftentimes in England since I came home.

Coryate was jokingly called "Furcifer," which meant literally "fork bearer," but which also meant "gallows bird," or one who deserved to be hanged. Forks spread slowly in England, for the utensil was much ridiculed as "an effeminate piece of finery," according to the historian of inventions John Beckmann. He documented further the initial reaction to the fork by quoting from a contemporary dramatist who wrote of a "fork-carving traveller" being spoken of "with much contempt." Furthermore, no less a playwright than Ben Jonson could get laughs for his characters by questioning, in *The Devil Is an Ass*, first produced in 1616,

*The laudable use of forks,
Brought into custom here as they are in Italy,
To the sparing of napkins.*

But the new fashion was soon being taken more seriously, for Jonson could also write, in *Volpone*, "Then must you learn the use and handling of your silver fork at meals."

Putting aside acceptance and custom, what makes the fork work, of course, are its tines. But how many tines make the best fork, and why? Something with a single tine is hardly a fork, and would be no better than a pointed knife for spearing and holding food. The toothpicks at cocktail parties may be considered, like sharpened sticks, rudimentary forks, but most of us have experienced the frustrations of manipulating a toothpick to pick up a piece of shrimp and dip it in sauce. If the shrimp does not fall off, it rotates in the sauce cup. If the shrimp does not drop into the cup, we must contort our hand to hold the toothpick, shrimp, and dripping sauce toward the vertical while trying to put the hors d'oeuvre on our horizontal tongue. The single-tined fork is not generally an instrument of choice, but that is not to say it does not have a place. Butter picks are really single-tined forks, but, then, we do want a butter pick to release the butter easily. Escargot and nut picks might also be classified as single-pronged forks, but, then, there is hardly room for a second tine in a snail's snug spiral or a pecan shell's interstices.

The two-pronged fork is ideal for carving and serving, for a roast can be held in place without rotating, and the fork can be slid in and out of the meat relatively easily. The implement can be moved along the roast with little difficulty and can also convey slices of meat from carving to serving platter with ease. The carving fork functions as it was intended, leaving little to be desired, and so it has remained essentially unchanged since antiquity. But the same is not true of the table fork.

As the fork grew in popularity, its form evolved, for its shortcomings became evident. The earliest table forks, which were modeled after kitchen carving forks, had two straight and longish tines that had developed to serve the principal function of holding large pieces of meat. The longer the tines, the more securely something like a roast could be held, of course, but longish tines are unnecessary at the dining table. Furthermore, fashion and style dictated that tableware look different from kitchenware, and so since the seventeenth century the tines of table forks have been considerably shorter and thinner than those of carving forks.

In order to prevent the rotation of what was being held for cutting, the two tines of the fork were necessarily some distance apart,

and this spacing was somewhat standardized. However, small loose pieces of food fell through the space between the tines and thus could not be picked up by the fork unless speared. Furthermore, the very advantage of two tines for carving meat, their ease of removal, made it easy for speared food to slip off early table forks. Through the introduction of a third tine, not only could the fork function more efficiently as something like a scoop to deliver food to the mouth, but also food pierced by more tines was less likely to fall off between plate and mouth.

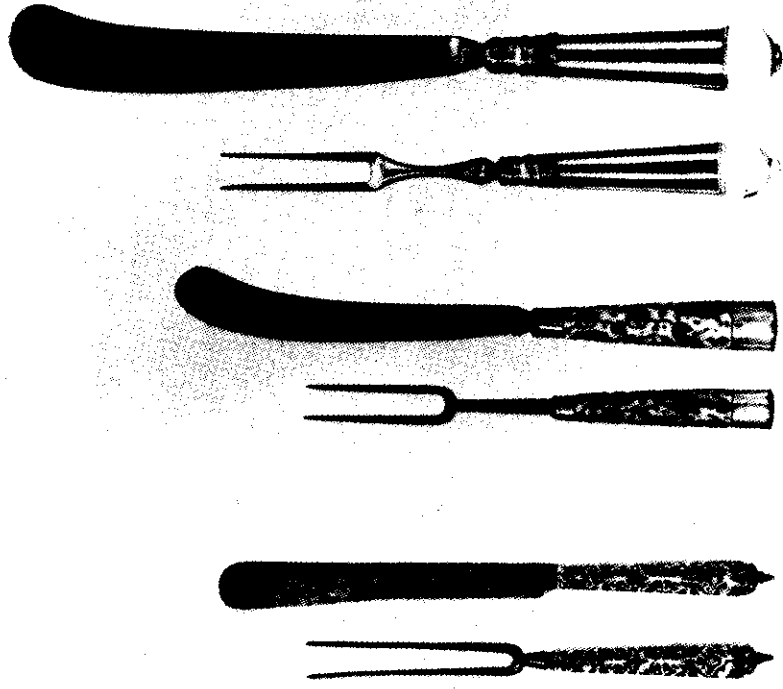
If three tines were an improvement, then four were even better. By the early eighteenth century, in Germany, four-tined forks looked as they do today, and by the end of the nineteenth century the four-tined dinner fork became the standard in England. There have been five- and six-tined forks, but four appears to be the optimum. Four tines provide a relatively broad surface and yet do not feel too wide for the mouth. Nor does a four-tined fork have so many tines that it resembles a comb, or function like one when being pressed into a piece of meat. Wilkens, the German silversmith, does make a modern five-tined dinner fork, but it appears to have been designed more for fashion than function, since the pattern (called *Epoca*) is marketed as being "unique in its entirety and in every detail" and "full of generous, massive strength." The fork's selling point seems to be its unusual appearance rather than its effectiveness for eating. Many contemporary silverware patterns have three-tined dinner forks for similar reasons, but some go so far in rounding and tapering the tines, thus softening the lines of the fork, that it is almost impossible to pick up food with it.

The evolution of the fork in turn had a profound impact on the evolution of the table knife. With the introduction of the fork as a more efficient spearer of food, the pointed knife tip became unnecessary. But many artifacts retain nonfunctional vestiges of earlier forms, and so why did not the knife? The reason appears to be at least as much social as technical. When everyone carried a personal knife not only as a singular eating utensil but also as a tool and a defensive weapon, the point had a purpose well beyond the spearing of food. Indeed, many a knife carrier may have preferred to employ his fingers for lifting food to his mouth rather than the tip of his most prized possession. According to Erasmus's 1530 book on manners, it was not impolite to resort to fingers to help yourself from the pot as long as you "use only three fingers at most" and you "take

the first piece of meat or fish that you touch." As for the knife, the young were admonished, "Don't clean your teeth with your knife." A French book of advice to students recognized the implicit threat involved in using a weapon at the table, and instructed its readers to place the sharp edge of their knife facing toward themselves, not their neighbor, and to hold it by its point in passing it to someone else. Such customs have influenced how today's table is set and how we are expected to behave at it. In Italy, for example, when one is eating with a fork alone, it is correct to rest the free hand in full view on the table edge. Though this might be considered poor manners in America, the custom is believed to have originated in the days when the visible hand showed one's fellow diners that no weapon was being held in the lap.

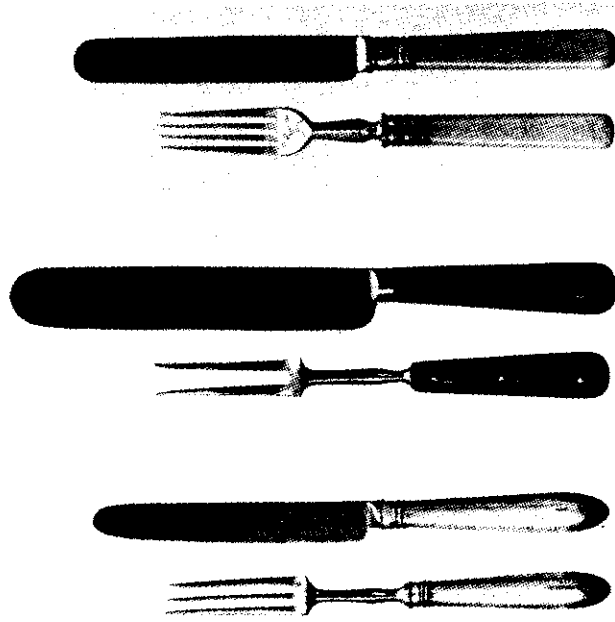
It is said to have been Cardinal Richelieu's disgust with a frequent dinner guest's habit of picking his teeth with the pointed end of his knife that drove the prelate to order all the points of his table knives ground down. In 1669, as a measure to reduce violence, King Louis XIV made pointed knives illegal, whether at the table or on the street. Such actions, coupled with the growing widespread use of forks, gave the table knife its now familiar blunt-tipped blade. Toward the end of the seventeenth century, the blade curved into a scimitar shape, but this contour was to be modified over the next century to become less weaponlike. The blunt end became more prominent, not merely to emphasize its bluntness but, since the paired fork was likely to be two-tined and so not an efficient scoop, to serve as a surface onto which food might be heaped for conveying to the mouth. Peas and other small discrete foods, which had been eaten by being pierced one by one with a knife point or a fork tine, could now be eaten more efficiently by being piled on the knife blade, whose increasingly backward curve made it possible to insert the food-laden tip into the mouth with less contortion of the wrist. During this time, the handles on some knife-and-fork sets became pistol-shaped, thus complementing the curve of the knife blade but making the fork look curiously asymmetrical.

With the beginning of the nineteenth century, English table-knife blades came to be made with nearly parallel straight sides, perhaps in part as a consequence of the introduction of steam power during the Industrial Revolution and the economy of process in forming this shape out of ingots, but perhaps even more because the fork had



Early two-tined forks worked well for holding meat being cut but were not useful for scooping up peas and other loose food. The bulbous tip of the knife blade evolved to provide an efficient means of conveying food to the mouth, with the curve of the blade reducing the amount of wrist contortion needed to use the utensil thus. These English sets date (left to right) from approximately 1670, 1690, and 1740.

evolved into the scooper and shoveler of food, and the knife was to be reserved for cutting. The blunt-nosed straight-bladed knife, which was often more efficient as a spreading than a cutting utensil, remained in fashion throughout the nineteenth century. However, unless the cutting edge of the blade extended some distance below the line of the handle around which the fingers curled, only the tip of the blade was fully practical for cutting and slicing. This shortcoming caused the knife's bottom edge to evolve into the convex shape of most familiar table knives of today. The top edge serves no



With the introduction of three- and four-tined forks, the latter sometimes called "split spoons," it was no longer necessary or fashionable to use the knife as a food scoop, and so its bulbous curved blade reverted to more easily manufactured shapes. However, habit and custom persisted at the dinner table, and the functionally inefficient knife was used throughout the nineteenth century by less refined diners for putting food in the mouth. Left to right, these sets date from about 1805, 1835, and 1880.

purpose other than stiffening the blade against bending, and since this has not been found to be wanting, there has been essentially no change in the shape of that edge of the knife for two centuries.

Whereas the shapes of table knives have evolved to remove their existing failings and shortcomings, kitchen knives have changed little over the centuries. Their blades have remained pointed, the shape into which they naturally evolved by successive correction of faults from flint shards. The inadequacy of the common table knife to be all things to all people is emphasized when we eat a food like steak. Since the table knife is generally not sharp-pointed enough to

work its way in tight curves around pieces of gristle and bone, we are brought special implements that are more suited to the task at hand. Cutting up a steak is very much like kitchen work, and so the steak knife has evolved back from the table knife to look like a kitchen knife.

The modern table knife and fork have evolved through a kind of symbiotic relationship, but the general form of the spoon has developed more or less independently. The spoon is sometimes claimed to be the first eating utensil, since solid food could easily be eaten with the bare fingers and the knife is thought to have had its beginnings as a tool or weapon rather than as an eating utensil per se. It is reasonable to assume that the cupped hand was the first spoon, but we all know how inefficient it can be. Empty clam, oyster, or mussel shells can be imagined to have been spoons, with distinct advantages over the cupped hand or hands. Shells could hold liquid longer than cramping hands, and they enabled the latter to be kept clean and dry. But shells have their own shortcomings. In particular, it is not easy to fill a shell from a bowl of liquid without getting the fingers wet, and so a handle would naturally have been added. Spoons formed out of wood could incorporate a handle integrally, and the very word "spoon" comes from the Anglo-Saxon "spon," which designated a splinter or chip of wood. With the introduction of metal casting to make spoons, the shape of bowls was not limited to those naturally occurring in nature and thus could evolve freely in response to real or perceived shortcomings, and to fashion. But even having been shaped, from the fourteenth century to the twentieth, successively round, triangular (with the handle at the apex, sometimes said to be fig-shaped), elliptical, elongated triangular (with the handle at the base), ovoid, and elliptical, the bowl of the spoon has never been far from the shape of a shell.

The use of the knife, fork, and spoon in late-seventeenth- and early-eighteenth-century Europe has influenced some persistent differences in their use by Europeans and Americans today. The introduction of the fork produced an asymmetry in tableware, and the question of which implement a diner's right and left hand held could no longer be considered moot. With identical knives in each hand, the diner was able to cut and carry food to the mouth with either knife, but, whether by custom or natural inclination, righthandedness may be assumed always to have prevailed, and so the knife in the right hand not only performed the cutting, which took

much more dexterity than merely holding the meat steady on the plate, but also speared the cut-off morsel to convey it to the mouth. Because it did not need to be pointed, the left-hand knife was sometimes blunt-ended and used as a spatula to scoop up looser food or slices of meat. When the fork gained currency, it displaced the noncutting and relatively passive knife in the left hand, and in time the function of the knife in the right hand changed. With its point blunted, it was used only as a cutter and shoveler, and the fork held meat that was being cut and speared it for lifting to the mouth, a relatively easy motion with the left hand, even for a right-handed person.

By the eighteenth century, the European style of using utensils had become somewhat standardized, with the knife in the right hand cutting off food and sometimes also pushing pieces of it onto the fork, which conveyed it to the mouth. Since the first forks were straight-tined, there was no front or back to them, but shortcomings of this ambiguous design soon became evident. Whether food was skewered on or placed across the tines of the fork, the fork had to be brought to a near-horizontal position to enter the mouth with the least chance of its tines' piercing the roof of the mouth or the food's falling off. With slightly curved tines, and with food placed on their convex side, the fork handle did not have to be lifted so high to convey the food quickly and safely to the mouth. Furthermore, the arching tines enabled the fork to pierce a piece of meat squarely, yet curved out of the way so that diners could see clearly what they were cutting. By the middle of the eighteenth century, gently curving tines were standard on English forks, thus giving them distinct fronts and backs.

But the fork was a rare item in colonial America. According to one description of everyday life in the Massachusetts Bay Colony, the first and only fork in the earliest days, carefully preserved in its case, had been brought over in 1630 by Governor Winthrop. In seventeenth-century America, "knives, spoons, and fingers, with plenty of napery, met the demands of table manners." As the eighteenth century dawned, there were still few forks. Furthermore, since knives imported from England had ceased to come with pointed tips, they could not be employed to spear food and convey it to the mouth.

How the present American use of the knife and fork evolved does not seem to be known with certainty, but it has been the subject of

much speculation. Without forks, the more refined colonists can be assumed to have handled a knife and spoon at the dinner table. Indeed, using an older, pointed knife and spoon, a "spike and spon," to keep the fingers from touching food may have given us the phrase "spic and span" to connote a high standard of cleanliness. How the blunted spike and spon influenced today's knife and fork has been suggested by the archaeologist James Deetz, who has written of Early American life in his evocative *In Small Things Forgotten*. (The phrase is taken from colonial probate records, where it referred to the completion of an accounting of an estate's items by grouping together the small and trivial things whose individually intrinsic value did not warrant a separate accounting. Forks themselves would never have been lumped with "small things forgotten," but still the way knives, forks, or spoons were actually used seems not to have been recorded.)

According to Deetz, in the absence of forks some colonists took to holding the spoon in the left hand, bowl down, and pressing a piece of meat against the plate so that they could cut off a bite with the knife in the right hand. Then the knife was laid down and the spoon transferred from the left to the generally preferred hand, being turned over in the process, to scoop up the morsel and transfer it to the mouth (the rounded back of a spoon being ill suited to pile food upon). When the fork did become available in America, its use replaced that of the spoon, and so the customary way of eating with a knife and spoon became the way to eat with a knife and fork. In particular, after having used the knife to cut, the diner transferred the fork from the left to the right hand, turning it over in the process, to scoop up the food for the mouth, for the spoonlike scooping action dictated that the fork have the tines curving upward. This theory is supported by the fact that when the four-tined fork first appeared in America it was sometimes called a "split spoon." The action of passing the fork back and forth between hands, a practice that Emily Post termed "zigzagging" and contrasted to the European "expert way of eating," persists to this day as the American style.

In America as elsewhere, however, well into the nineteenth century table manners and tableware remained far from uniform. Though "etiquette manuals appeared in unprecedented numbers," as late as 1864 Eliza Leslie could still declare in her *Ladies' Guide to True Politeness and Perfect Manners* that "many persons hold

silver forks awkwardly, as if not accustomed to them." Frances Trollope described among the diners on a Mississippi River steamboat in 1828 some "generals, colonels, and majors" who had "the frightful manner of feeding with their knives, till the whole blade seemed to enter the mouth." And since the feeding knife was apparently blunted, the diners had to clean their teeth with pocket knives afterward. Just a generation later, the experiences of Mrs. Trollope's son, Anthony, were quite different. Dining in a Lexington, Kentucky, hotel in 1861, he observed not officers but "very dirty" teamsters who nevertheless impressed him by being "less clumsy with their knives and forks . . . than . . . Englishmen of the same rank."

On an American tour in 1842, Charles Dickens noted that fellow passengers on a Pennsylvania canal boat "thrust the broad-bladed knives and the two-pronged forks further down their throats than I ever saw the same weapons go before, except in the hands of a skilled juggler." The growing use of the fork displaced the knife from the mouth, but the new fashion was not without its dissenters, who likened eating peas with a fork to "eating soup with a knitting needle." With its multiplying tines and uses, however, the fork was to become the utensil of choice, and by the end of the nineteenth century a refined person could eat "everything with it except afternoon tea." It was just such a menu of applications for a single utensil that led to specialized descendants like fish and pastry forks, as we shall see later in this book.

European and American styles of eating with knife and fork are not the only ways civilized human beings have solved the design problem of getting food from the table to the mouth. Indeed, as Jacob Bronowski pointed out, "A knife and fork are not merely utensils for eating. They are utensils for eating in a society in which eating is done with a knife and fork. And that is a special kind of society." To this day, some Eskimos, Africans, Arabs, and Indians eat with their fingers, observing ages-old customs of washing before and after the meal. But even Westerners sometimes eat with their fingers. The American hamburger and hot dog are consumed without the aid of utensils, with the bun keeping the fingers from becoming greasy. Tacos may be less easy to eat, but the shell—reminiscent of the first food containers—keeps the greasier food from soiling the fingers, at least in principle. Such foods demonstrate alternative technological ways of achieving the same cultural objective.

In the Far East, chopsticks developed about five thousand years ago as extensions of the fingers. According to one theory of their origin, food was cooked in large pots, which held the heat long after everything was ready to be eaten. Hungry people burned their fingers reaching into the pot early to pull out the choicest-looking morsels, and so they sought alternatives. Grasping the morsels with a pair of sticks protected the fingers, or so one tradition has it. Another version credits Confucius with advising against the use of knives at the table, for they would remind the diners of the kitchen and the slaughterhouse, places the "honorable and upright man keeps well away from." Thus Chinese food has traditionally been prepared in bite-sized pieces or cooked to sufficient tenderness so that pieces could be torn apart with the chopsticks alone.

Just as Western eating utensils evolved in response to real and perceived shortcomings, so a characteristic form of modern chopsticks, rounded at the food end and squarish at the end that fits in the hand, no doubt evolved over the course of time because rounded sticks taken from nature left something to be desired. Whereas any available twigs may have served well the function of grasping food from a common pot, they would not have seemed so appropriate for dining in more formal settings. The obvious way to imitate twigs to make better chopsticks would be to form wood into straight, round rods of the desired size. But such an apparent improvement might also have highlighted shortcomings overlooked in the cruder implements. Finely shaped chopsticks that were of the same diameter at both the food and the finger ends might prove to be too thick to tear apart certain foods easily, or too thin to be comfortable during a longish meal. Thus, it would have been an obvious further improvement to make the sticks tapered, with the different ends becoming fixed at compromise sizes that made them function better for both food and hand. Whether uniform or tapered, however, round chopsticks would tend to twist in the fingers and roll off the table, and so squaring one end eliminated two annoyances in what is certainly a brilliant design.

Putting implements as common as knife and fork and chopsticks into an evolutionary perspective, tentative as it necessarily must be, gives a new slant to the concept of their design, for they do not spring fully formed from the mind of some maker but, rather, become shaped and reshaped through the (principally negative)

experiences of their users within the social, cultural, and technological contexts in which they are embedded. The formal evolution of artifacts in turn has profound influences on how we use them.

Imagining how the form of things as seemingly simple as eating utensils might have evolved demonstrates the inadequacy of a “form follows function” argument to serve as a guiding principle for understanding how artifacts have come to look the way they do. Reflecting on how the form of the knife and fork has developed, let alone how vastly divergent are the ways in which Eastern and Western cultures have solved the identical design problem of conveying food to mouth, really demolishes any overly deterministic argument, for clearly there is no unique solution to the elementary problem of eating.

What form does follow is the real and perceived failure of things as they are used to do what they are supposed to do. Clever people in the past, whom we today might call inventors, designers, or engineers, observed the failure of existing things to function as well as might be imagined. By focusing on the shortcomings of things, innovators altered those items to remove the imperfections, thus producing new, improved objects. Different innovators in different places, starting with rudimentary solutions to the same basic problem, focused on different faults at different times, and so we have inherited culture-specific artifacts that are daily reminders that even so primitive a function as eating imposes no single form on the implements used to effect it.

The evolution of eating utensils provides a strong paradigm for the evolution of artifacts generally. There are clearly technical components to the story, for even the kind of wood in chopsticks or the kind of metal in knives and forks will have a serious impact on the way the utensils can be formed and can carry out their functions. Technological advances can have far-reaching implications for the manner of manufacture and use of utensils, as the introduction of stainless steel did for tableware, which in turn can affect their price and availability across broad economic classes of people. But the stories associated with knives, forks, and spoons also illustrate well how interrelated are technology and culture generally. The form, nature, and use of all artifacts are as influenced by politics, manners, and personal preferences as by that nebulous entity, technology. And the evolution of the artifacts in turn has profound influences on manners and social intercourse.

But how do technology and culture interact to shape the world beyond the dinner table? Are there general principles whereby all sorts of things, familiar and unfamiliar, evolve into their shapes and sizes and systems? If not in tableware, does form follow function in the genesis and development of our more high-tech designs, or is the alliterative phrase just an alluring consonance that lulls the mind to sleep? Is the proliferation of made things, such as the seemingly endless line of serving pieces that complement a table service, merely a capitalist trick to sell consumers what they do not need? Or do artifacts multiply and diversify in an evolutionary way as naturally as do living organisms, each having its purpose in some wider scheme of things? Is it true that necessity is the mother of invention, or is that just an old wives’ tale? These are among the questions that have prompted this book. In order to begin to answer them, it will be helpful first to look beyond a place setting of examples to rules, and then to illustrate them by an omnivorous selection of further examples. Thus is the design problem of this literary artifact.