

(Rubbish!) is a mother lode of valuable information. Indeed, if the nation's novelists treated their subjects as well as Mr. Rathje and Mr. Murphy have treated theirs, we would be up to our ears in *Anna Kareninas*. There are no flies on this book. —Dave Shiflett, *Wall Street Journal*

"Readers will be impressed by Rathje and Murphy's delightfully fresh take on the human foibles and the garbage heaps of history. . . .engaging." —Kathleen Courier, *Washington Post Book World*

It is from the discards of former civilizations that archaeologists have reconstructed most of what we know about the past, and it is through their examination of today's garbage that William Rathje and Cullen Murphy inform us of our present. *Rubbish!* is their witty and erudite investigation into all aspects of the phenomenon of garbage, told through the authors' involvement with the Garbage Project, a program established two decades ago at the University of Arizona to study America's garbage and its surprising cultural implications. *Rubbish!* reveals how the study of garbage tells us about politics, economics, and the ineradicable quirks of human behavior, as well as about population size, age and sex, ethnic differentials, and buying habits. Most important, *Rubbish!* dispels the most pervasive myths about garbage, myths about fast-food packaging and disposable diapers; about the notion of biodegradable garbage; about the acceleration of the average family's garbage output. *Rubbish!* not only analyzes the trash but also demystifies our current "garbage crisis" and suggests methods for dealing with the garbage we do have. Finally, *Rubbish!* offers a fascinating portrait of garbage and of the society that produces it.

WILLIAM RATHJE is an archaeologist, a professor of anthropology, and the director of the Garbage Project at the University of Arizona. **CULLEN MURPHY** is managing editor of and a frequent contributor to *The Atlantic Monthly*. He lives in Boston, Massachusetts.

HarperPerennial

A Division of HarperCollinsPublishers

Cover design and photo collage
© 1992 by Chip Kidd

USA **\$13.00**
CANADA **\$18.00**

ISBN 0-06-092228-1

5 1300



9 780060 922283

0593P



NATIONAL BESTSELLER

RUBBISH!

THE ARCHAEOLOGY OF GARBAGE

WHAT OUR GARBAGE

TELLS US

ABOUT OURSELVES

WILLIAM RATHJE
& CULLEN MURPHY

"What a delightful book! Who would have thought reading about [garbage] could be so interesting and so much fun? *Rubbish!* transforms this thing disdained by everyone into a fascinating subject filled with insights about how we live." —Patrick T. Readon, *Chicago Tribune*

To the memory of Thomas Price

A hardcover edition of this book was published in 1992 by HarperCollins Publishers.

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First HarperPerennial edition published 1993.

Designed by Ruth Kolbert

The Library of Congress has catalogued the hardcover edition as follows:

Rathje, William

Rubbish! : the archaeology of garbage / William Rathje and Cullen Murphy.—
1st. ed.

p. cm.

ISBN 0-06-016603-7

1. Garbage Project (University of Arizona). 2. Refuse and refuse disposal—
Research—New York (N.Y.). 3. Refuse and refuse disposal—United States—Case
studies. I. Murphy, Cullen. II. Title.

TD793.3.R38 1992

363.728097471—dc20

91-50452

ISBN 0-06-092228-1 (pbk.)

96 97 98 RRD - H 5 4

CHAPTER 2

GARBAGE AND HISTORY

The sixty-second advertisement for AT&T known in the industry by the name "The Dig" was first broadcast on television at the prime time of 8:17 p.m. on October 29, 1989, during the first episode of ABC's made-for-TV movie *The Final Days*, a much-publicized and controversial docudrama recounting Richard Nixon's fall from power. "The Dig" was produced by Ayer Advertising, in New York City, and its debut was seen by some 14.6 million Americans.

Archaeologists watching *The Final Days* probably got a bit of a lump in their throats when the commercial appeared on the screen. Here is what it showed: The foundations of a skyscraper are being dug when cries of discovery suddenly bring work to a halt. A team of archaeologists rushes to the scene, led by a young woman in a yellow hard hat. There follows a stylish, quick-cut sequence: Troweling exposes the wooden skeleton of an old ship; the skeletal frame is transposed to a computer screen, which rotates it like a design on the drawing boards for a new car; finally, dirt is excitedly brushed aside to reveal the ship's figurehead in tarnished splendor. Through it all there are a lot of phone calls. "This is big. Really big," someone

says. The whole episode was exhilarating, and it was also good to see the virtues of conservation being celebrated—even if one knew that the ship's "frame" and the ship's "figurehead" were not real artifacts but rather stage props molded from Styrofoam and painted to look like wood; even, indeed, if one knew that the excavation on which the commercial was based involved a ship that did not have a figurehead.

The real excavation took place at 175 Water Street, in the financial district of Manhattan, in January of 1982, after workers, in advance of a major construction project involving the National Westminster Bank, dug several deep, four-foot by ten-foot exploratory holes at randomly selected places on the site so that archaeologists could check for any significant archaeological remains. (Archaeological testing of this kind is now mandatory in many states and municipalities.) As one of these holes was dug the mud sliding sloughed away and exposed a ship's frame, ten feet below street level.

The archaeologist in charge of the excavation that ensued was Sheli Smith, now the curator of the Los Angeles Maritime Museum. For six semesters she had been one of the Garbage Project's most assiduous garbage sorters, once telling a *Wall Street Journal* reporter that she sorted garbage "to relax." In her capacity as a garbage sorter Smith appeared in 1975 on the television show "To Tell the Truth," and managed to elude discovery by all four of the panelists. Her success had everything to do with a special manicure she arranged for herself before the show: "No one with nails like that would ever sort garbage," the panelist Peggy Cass confidently stated.

The ship that Smith uncovered at 175 Water Street—now known as the Ronson ship, after Howard Ronson, the developer of the property—was once a proud, three-masted merchantman. It may have been in the tobacco trade for a time, and the presence of certain species of tarado worms in its furring suggests that the ship sailed at least once to the South Seas. But sometime around 1750, her masts gone, the ship was positioned on a tidal flat abutting what was then lower Manhattan's shoreline to become part of a retaining wall. In doing so, it also became part of the process by which Manhattan's shoreline has steadily encroached on surrounding waterways. The ship was filled with ballast and sludge and then heaped with building

debris and assorted garbage, including the castoff leather and tacks of a cobbler, and the castoff cow heads and pig heads of a victualler. "From all those years of sorting garbage," Sheli Smith recalls, "I knew what we had right from the start."

To archaeologists, the Ronson ship was a find of major importance, because the vessel is the first colonial merchant ship to be discovered that they have had the opportunity to preserve and study. To garbageologists, the unearthing of the ship was heralded for an entirely different reason. Its discovery reminds us that, over time, the world of garbage is characterized by continuity. The Ronson ship has obvious forebears, to give but one example, in the wharves that lined the channel connecting the Tiber River and Rome's port of Ostia—wharves made from derelict scows that had been packed with garbage and topped with concrete. And it has obvious descendants in those shoreline extensions of land, built over many years out of hard-packed garbage, that are today the sites of such places as LaGuardia Airport, in New York City, and the John F. Kennedy Library, in Boston.

The examples here may seem trivial, and yet the fact is—look where one may—that the history of garbage consists largely of a relatively few long, simple, durable strands of behavior. Our relentless if understandable present-mindedness often keeps us from seeing that our own practices with respect to garbage are, far from being somehow novel and unique, deeply rooted in the ways of our ancestors—a fact that might at least offer some modest psychological comfort, even if it makes the task of garbage disposal in our own time no easier. That same present-mindedness also blinds us to the ways in which, for better or worse, our latter-day behaviors and practices are unique.

Throughout most of time human beings disposed of garbage in a very convenient manner: simply by leaving it where it fell. To be sure, they sometimes tidied up their sleeping and activity areas, but that was about all. This disposal scheme functioned adequately because hunter-gatherers frequently abandoned their campgrounds to follow game or find new stands of plants (and, of course, because there weren't all that many hunter-gatherers to begin with). When modern

hunter-gatherers, like the aborigines of the Australian outback, are provided with government tract housing, one of the immediate problems they face is that of garbage disposal. Accustomed to simply moving on several times a year for any one of a handful of reasons, including an unendurable accumulation of garbage within the trash perimeter of their temporary camps, some aborigines have been at a loss when encouraged by authorities to settle in a more stable sort of camp—namely, a house. As James F. O'Connell, an American anthropologist who works among the Alyawara tribe in Australia, has noted, "Where housing is permanent, the refuse rather than the people will have to be moved, which means a major readjustment in present behavior patterns."

As such habits suggest, our species faced its first garbage crisis when human beings became sedentary animals. The archaeologist Gordon R. Willey, who in the late 1940s conducted in Peru the first extensive archaeological study of regional settlement patterns over time, has argued (only partly in jest) that *Homo sapiens* may have been propelled along the path to civilization by his need for a degree of organization sufficiently sophisticated, and a class structure suitably stratified, to make possible the disposal of mounting piles of debris.

There are no ways of dealing with garbage that haven't been familiar, in essence, for thousands of years, although as the species has advanced, people have introduced refinements. The basic methods of garbage disposal are four: dumping it, burning it, turning it into something that can be useful (recycling), and minimizing the volume of material goods—future garbage—that comes into existence in the first place (this last is known technically in the garbage field as "source reduction"). Any civilization of any complexity has used all four procedures simultaneously to one degree or another.

The ancient Maya, for instance, deposited much of their organic waste in what we would today call open dumps. These dumps probably experienced the occasional explosion as a result of the methane gas building up inside them, and some of the piles of garbage would have been continually burning or smoldering, making room for more garbage to be dumped. The Maya also recycled inorganic garbage—mainly broken pottery, grinding stones, and cut stone from the fagades of old buildings—by using it as fill in temples or for other

building projects. And the Maya were adept at source reduction. In the Late Postclassic period—after A.D. 1200—they drastically curbed demand for richly ornamented ceramics, ritual paraphernalia, and body ornaments, and thereby achieved a significant savings in scarce or costly resources. They did so (perhaps in the face of economic decline) by the simple expedient of abandoning the practice of burying the dead with new or intact pottery, tools, and jewelry, and burying them instead with objects that were broken. In addition they substituted “fake” for original art—for example, clay beads covered with gold foil instead of beads of solid gold.

Human beings have been deploying the four main weapons against garbage for so long that they are by now well aware of each method's relative convenience. Not surprisingly, a human being's first inclination is always to dump. From prehistory through the present day, dumping has been the means of disposal favored everywhere, including within cities. Archaeological excavations of hard-packed dirt and clay floors—the most common type of ancient living surface—usually recover an amplitude of small finds, suggesting that many bits of garbage that fell on the floor were trampled into the dirt or were brushed into corners and along the edge of walls by the traffic patterns of the occupants. (This dispersal of garbage to the edges of an occupied space is known to archaeologists as the “fringe effect.”) The archaeologist C. W. Blegen, who dug into Bronze Age Troy during the 1950s, found that the floors of its buildings had periodically become so littered with animal bones and small artifacts that “even the least squeamish household felt that something had to be done.” This was normally accomplished, Blegen discovered,

not by sweeping out the offensive accumulation, but by bringing in a good supply of fresh clean clay and spreading it out thickly to cover the noxious deposit. In many a house, as demonstrated by the clearly marked stratification, this process was repeated time after time until the level of the floor rose so high that it was necessary to raise the roof and rebuild the doorway.

Eventually, of course, buildings had to be demolished altogether, the old mud-brick walls knocked in to serve as the foundations of

new mud-brick buildings. Over time the ancient cities of the Middle East rose high above the surrounding plains on massive mounds, called *tells*, which contained the ascending remains of centuries, even millennia, of prior occupation (see Figure 2-A). In 1973 Charles Gunnerson, a civil engineer with the U.S. Department of Commerce's Environmental Research Laboratories, calculated that the rate of elevation due to debris accumulation in Troy was about 4.7 feet per century. If the idea of a city rising above its gradually accumulating fill and debris at this rate seems extraordinary, recall the depth below street level at which Sheli Smith's ship was found. “Street level” on the island of Manhattan today is typically six to fifteen feet higher than it was when Peter Minuit lived there; in some places it is as much as thirty feet higher. Nowadays, needless to say, the fill used in construction on Manhattan is not normally garbage, but Gunnerson calculated that if all of the garbage from Manhattan that is currently sent to Fresh Kills and all the construction and demolition debris from Manhattan that is currently dumped at sea were instead spread out evenly over the island, the rate of accumulation per century would be exactly the same as that of ancient Troy (see Figure 2-B).

At Troy and elsewhere, of course, not all trash was kept indoors. The larger pieces of garbage and debris were thrown into the streets. As structures became multistoried the practice of throwing garbage from upper floors to the ground below became commonplace. Up until relatively modern times, once garbage landed in the streets, semidomesticated animals, usually pigs and dogs, ate up the food scraps. Even after the advent of modern landfills—and even in the United States—the “slopping” of garbage to pigs continued in a major way, though it was done on farms and not in the streets. A survey of 557 American cities in 1930 found that about 40 percent of them still saved their wet garbage for the purpose of slopping—this despite the well-known relationship between trichinosis and garbage-fed pigs. In 1946 postal inspectors in Philadelphia detained three large, foul-smelling packages full of plate scrapings and other food debris. A man named John Wagner, who had mailed the offending parcels to his central Pennsylvania farm, explained that he hated to see good food go to waste, and so had for years been scouring the trash cans behind hotels for provender to fatten his

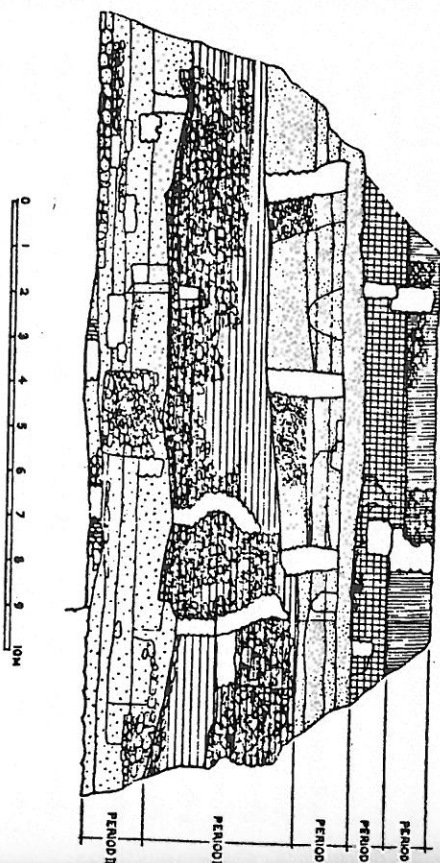


Figure 2-A. A cutaway view of one section of ancient Troy reveals how the city managed, literally, to surmount its garbage problem.

SOURCE: Carl W. Blegen, *Troy and the Trojans* (Prager, 1963). Reprinted by permission of Greenwood Publishing Group, Westport, CT.

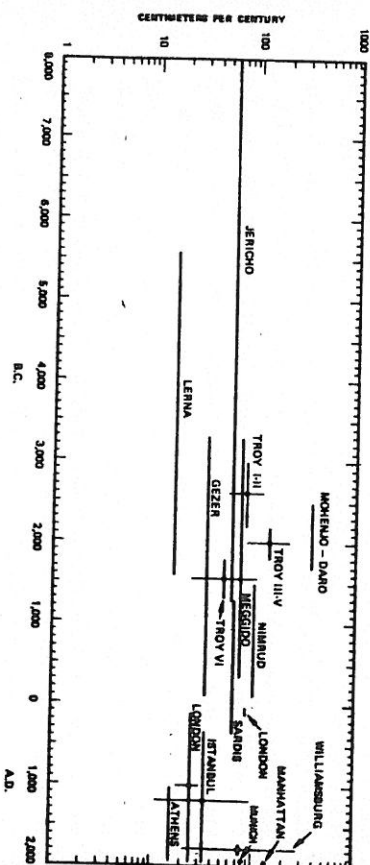


Figure 2-B. A comparison of estimated solid-waste-accumulation rates for various ancient and modern sites.

SOURCE: Charles Gunnerson, "Debris Accumulation," *Journal of the Environmental Engineering Division*, American Society of Civil Engineers, June, 1973

hogs. The slaughter of some 400,000 hogs in the mid-1950s to prevent the spread of a vesicular exanthema epidemic finally moved public-health departments in the United States to prohibit the use of raw garbage as animal feed. It is still legal to use cooked garbage, however, and in various parts of the country, as documented by Orville Schell in his book *Modern Meat*, there are piggeries in which a pig-slopping regime, employing cooked slops, survives.

Needless to say, in ancient times and subsequently, more than food was thrown into the streets. In exchange for the right to sell anything useful that they might find, human scavengers carried much of the inorganic garbage to vacant lots or to the outskirts of a settlement, where it might either be left in piles or burned. In Old Testament times the people of Jerusalem burned some of their garbage in fires emanating from natural gas vents in the nearby Valley of Gehenna, to the south of the city; through a process of association the word Gehenna became a synonym for "hell." If a settlement was occupied for any length of time the piles of refuse, which are known to archaeologists as middens, would naturally become quite large, as layers of newer artifacts were slathered over layers of older ones. Archaeologists realized very early that the strata discernible in middens represented a Rosetta Stone of cultural chronology, and that the information gleaned as a result—about, for example, which styles of pottery were prevalent in what order of succession over time—became a powerful analytical tool. As we have seen, the Garbage Project could use chronological typologies of pull tabs in precisely the same way. The shapes and logo designs on bottles and cans of beer and soda are another useful tool, and they go back much further in time than pull tabs do.

Today, using such technologies as wet-screening and flotation, archaeologists are able to recover a good deal of suggestive organic material from middens, such as tiny fragments or splinters of fish and animal bones, burned seeds, even pollen. But the bulk of what archaeologists find in middens consists of objects made of stone, clay, glass, and metal. Indeed, although "biodegradability" seems sometimes to be held up as a primary characteristic of the garbage of our ancestors—one that, owing to the advent of plastics and other such materials, seems to be increasingly less in evidence today—from the beginning of time nonbiodegradability has been a strikingly con-

stant, even predominant, feature of garbage. Stone tools have remained intact for more than two million years, in every kind of environment. Fired-clay pottery—for cooking, storage, serving, or ceremony—may break into pieces and even discolor a bit, but the pieces themselves are virtually indestructible. Glass is as durable as pottery. Even things that are theoretically biodegradable don't always biodegrade. For example, animal bones decompose in acidic soil, but not all soils are acidic, as is evident from the vast number of bones, human and otherwise, that archaeologists uncover in middens and graves.

Much of the nonbiodegradable matter that turns up in middens, such as intact pottery and utensils, invites speculation as to why it's there in the first place. Those who condemn our own era for its conspicuous consumption and conspicuous waste should at least bear in mind that throwing away perfectly good objects seems to be one of those inexplicable things, like ignoring history, that human beings have always done. David Pendergast, an archaeologist who is a curator at the Royal Ontario Museum, in Toronto, spent seven years studying a Classic Maya site—Altun Ha, in Belize, which was occupied from around 800 B.C. to A.D. 1000—and after examining the contents of various tombs he concluded: "These people would have traded in a Cadillac when the ashtray was full."

How much nonbiodegradable waste did our forebears generate? What proportion of all garbage did it account for? There are, of course, no precise answers to these questions, but certain discoveries give one pause. For example, shell middens—the remnants of countless feasts on clams and oysters by prehistoric Indians—have been discovered by the thousands along the Atlantic coast of North America and along the Gulf of Mexico, and the size of these ancient, unbiodegraded garbage dumps is often startling. There is one, for example, on the Potomac River, at a place called Pope's Creek, Maryland, that covers thirty acres and is an average of ten feet thick. It would take a modern American community of fifty thousand people roughly ten years to fill up an equivalent volume in a landfill. One estimate of the area covered by ancient shell middens in Virginia and Maryland alone is one hundred thousand acres.

Another example from antiquity comes from the results of excavations conducted in Colorado in 1958 and 1960 by the archaeolo-

gist Joe Ben Wheat. During late May or early June in the year 6500 B.C. or thereabouts a band of paleo-Indian hunters and their families stampeded a herd of *Bison occidentalis* into an arroyo 140 miles southeast of what is now Denver, at a place known to archaeologists as the Olsen-Chubbuck site. (The time of year in which the event took place can be determined because of the presence of the bones of young bison calves.) Two hundred of the bison were killed, and of these the hunters butchered 150. By one estimate, the hunters carried off enough meat to feed 150 people for some twenty-three days. Behind them they abandoned the leftovers that archaeologists uncovered 8,500 years later: 18,380 pounds of bones. Compare those 18,380 pounds to the total amount of garbage that, according to the highest estimates put forth by the Environmental Protection Agency, 150 latter-day Americans throw away in twenty-three days: a relatively modest 14,145 pounds, which includes all household food debris and food packaging, all nonfood packaging, all yard waste and other household waste, and all the garbage for which these 150 people are responsible in schools, offices, stores, and restaurants. Left in the open, as the bison carcasses were, much of that 14,145 pounds of modern garbage would rapidly biodegrade.

The comparison here is extreme, of course. Most ordinary household waste consists of material that has somehow been processed, and waste is generated at every transformative stage. That waste never shows up in the data on household waste because it gets dealt with somewhere else—at the factory, say, or at the slaughterhouse, or on the farm. Although many of these waste products themselves have further uses—and are not simply discarded—it remains true that Americans are responsible for many times more garbage than the amount they personally throw away. But the Olsen-Chubbuck story draws attention to the fact that garbage that doesn't biodegrade has long been a fact of life. Indeed, because dogs and pigs were available to eat the organic waste that people threw away, and because the eyes and hands of the poor would have been attentive to thrown-away goods that could be reused, nonbiodegradables probably accounted for a very large portion of the garbage that made it to ancient trash heaps. It is only in relatively recent times, with the advent of a civilization that is based on—utterly dependent upon—paper of all kinds, that potentially biodegradable materials have

come to constitute a majority of everything that finds its way into a dumping ground.

In most of the Third World a stopping-and-scavenging system that Hector and Aeneas might recognize remains in place. In Egypt the scavengers are known as *zabaline*, and are predominantly Coptic Christians. In Mexico the scavengers are called *pepenadores*; they are unionized and powerful. The image of pestiferous "garbage mountains" in the developing world is at once repellent and almost a cliché, but the people who work these dumps, herding their pigs even as they sort paper from plastic from metal, are performing one of the most thorough jobs of garbage recycling and resource recovery in the world. What's an enlightened, right-thinking environmentalist to say? The garbage mountains are a noisome reminder that a truly efficient system for the disposal of garbage is not always compatible with other desirable social ends—economic development, modernization, and human dignity, for example.

By the same token, the generation of large amounts of garbage—in new and ever-mutating forms—is not necessarily a sign of social woe. When William Stewart Halsted, the chief of surgery at Johns Hopkins University Hospital, became, in 1893, the first surgeon to wear a pair of sterile gloves during an operation—unwittingly setting in motion a chain of events that would turn American hospitals into vast dispensaries of disposable rubber and plastic objects—the goal was not, of course, to create more garbage. It was to make surgery safer for patients. In the United States, a garbage problem is in some respects the price we pay for having learned to do some important things very well.

It was the threat of disease, finally, that made garbage removal at least partially a public responsibility in Europe and the United States. One obstacle these days to a calm and measured approach to garbage problems is a collective memory restricted to the human lifespan of about seventy-five years. It is difficult for anyone alive now to appreciate how appalling, as recently as a century ago, were the conditions of daily life in all of the cities of the Western world, even in the wealthier parts of town. "For thousands of years," Lewis Mumford wrote in *The City in History*, "city dwellers put up with defective,

often quite vile, sanitary arrangements, wallowing in rubbish and filth they certainly had the power to remove." The stupefying level of wrack and rejectamenta in one's immediate vicinity that was accepted as normal from prehistory through the Enlightenment was raised horribly by the Industrial Revolution, which drew millions of people into already congested cities and at the same time increased the volume of consumer goods—future throwaways—by many orders of magnitude.

Life magazine fashionably heralded the advent of the "throwaway society" in 1955, but it was a century behind the story. During the late 1960s the archaeologist Daniel Ingersoll undertook the excavation of a waterfront site in the Puddle Dock section of Portsmouth, New Hampshire. The portion of dockage he investigated was built between 1830 and 1840, and over the years a great deal of debris accumulated in and around the adjacent cove. In the 1890s the era of haphazard accumulation of garbage was brought to an end when deliberate efforts were made to fill in the area completely with garbage. Reporting on his findings in 1971 in the journal *Man in the Northeast*, Ingersoll wrote:

The industrial revolution . . . was supplying the consumer with hundreds of disposable containers and materials by the end of the nineteenth century. The estimated 25,000 cubic yards of fill deposited in the upper portion of Puddle Dock show that the age of the throw-away world began not in the twentieth century but during the nineteenth.

The nineteenth century is the one that gave us tin cans, corrugated cardboard, ready-made clothes, commercial packaging, and factory-cut lumber and other mass-produced construction materials—all familiar constituents of America's landfills to this day. As the historian Martin Melosi has noted in his authoritative book *Garbage in the Cities* (1981), one of the ironies of unbridled laissez-faire capitalism was that it gave rise to a kind of "municipal socialism" as cities were forced to shoulder responsibility for such duties as public safety and sanitation.

Benjamin Franklin instituted the first municipal streetcleaning service in the United States in 1757, in Philadelphia, and it was around this time that American households initiated the practice of digging

refuse pits, as opposed to just throwing garbage out of windows and doors. In his book *In Small Things Forgotten* the archaeologist James Deetz sees this newly fastidious behavior in the context of other instances of a late-eighteenth-century craving for order, and he ingeniously ties them all to the waning power of religion and a sense that many aspects of life were increasingly out of control. Be that as it may, a recognizably modern approach to urban sanitation had to await the late nineteenth century and the pioneering efforts of Colonel George E. Waring, Jr., "the Apostle of Cleanliness." Waring, a Civil War veteran and a protégé of the landscape architect Frederick Law Olmsted, was named to the position of Street Cleaning Commissioner of the City of New York in 1895, during one of New York's periodic spasms of reform, and he set up the first comprehensive system of public-sector garbage management in the country. Waring and his two thousand white-clad employees—they were known as the "White Wings"—cleared the streets of rubbish and offal and carted off their cullings to dumps, incinerators (known then as "cremators"), and, until the affluent owners of shorefront property in New Jersey complained, to the Atlantic Ocean. Some garbage was subject to "reduction," a technique imported from Europe in which wet garbage and dead animals were stewed in large vats in order to retrieve various byproducts.

Although Waring was ousted by a revitalized Tammany Hall in 1898, his powerful image as the commander of legions and protector of the public health influenced communities everywhere. In 1880, according to data gathered by the historian Melosi, fewer than a quarter of America's cities could boast a municipally run system for disposing of garbage. By 1910, eight cities out of ten could. Though it is often forgotten amid the well-publicized worries about our present situation, taking the long view generally brings home the fact that ever since governments began facing up to their responsibilities, the story of the garbage problem in the industrialized world has been one of steady amelioration, of bad giving way to less bad and eventually to not quite so bad. To be able to complain about the garbage problems that persist—and, indeed, to harbor the hope, even the expectation, that they will one day, somehow, be addressed, though that day may not be tomorrow—is yet one more luxury that Americans are unaware they enjoy.

The advent of systematic waste collection did not put an end to scavengers or to the significant recycling function that scavengers performed, but it did decisively shift the locus of scavenging from the personal level (in many places it was a familiar and accepted feature of daily life) to the commercial. As the operations at dumps and landfills grew increasingly vast and mechanized, the presence of ordinary people became a nuisance (and an invitation to lawsuits stemming from injuries). The owners of disposal sites began declaring their properties off limits to casual scavenging, thereby helping to put an end in many parts of the country to a widespread social and economic ritual: the Sunday afternoon excursion to drop off the family's garbage and perhaps pick up some gossip and a discarded item or two. In a famous essay in *The Atlantic Monthly* in 1959 Wallace Stegner recalled the town dump in his youth (in Whitemud, Saskatchewan), observing that "it contained relics of every individual who had ever lived there, and of every phase of the town's history." He went on to rhapsodize about the abandoned bed-springs, the old books, the broken dishes and rusty spoons:

There were also old iron, old brass, for which we hunted assiduously, by night conning junkmen's catalogues and the pages of the *Enterprise* to find out how much wartime value there might be in the geared insides of clocks or in a pound of tea lead [used in the lining of tea chests] carefully wrapped in a ball whose weight astonished and delighted us. Sometimes the unimaginable outside world reached in and laid a finger on us. I recall that, aged no more than seven, I wrote a St. Louis junk house asking if they preferred their tea lead and tinfoil wrapped in balls, or whether they would rather have it pressed flat in sheets, and I got back a typewritten letter in a window envelope instructing me that they would be happy to have it any way that was convenient for me. They added that they valued my business and were mine very truly.

The kind of enchantment that Stegner evokes can still be encountered in rural (and, for the most part, illegal) dumps, where the right to scavenge is almost as sacred as the right to bear arms. But it has virtually vanished everywhere else, and landfill owners are vigilant. According to the *Philadelphia Inquirer*, in December, 1979, just before Christmas, in Cheraw, South Carolina, a garbageman named

Raymond Sandberry, Jr., the father of seven children, was arrested for removing from a landfill nine pairs of shoes, forty items of clothing, and a woman's handbag. Incidents like that one have had a chilling effect on individual scavenging.

In contrast, corporate scavenging—the retrieval and marketing of what are known as “secondary materials” (scrap metal, for instance: everything from junk cars and trucks to “white goods” such as used refrigerators and stoves)—remains a big business to this day, with its own trade associations (the most prominent is the Institute of Scrap Recycling Industries, known as ISRI), its own annual conventions, its own distinct sociology. At a time of chronic U.S. trade deficits, scrap metal is a significant American money-maker, accounting for three-quarters of all the ocean-borne bulk cargo that leaves the Port of New York and New Jersey—1.6 million long tons a year, most of it bound for Korea, India, and Taiwan. At the turn of the century, though, the commodity of choice for professional garbage scavengers was rags, which were used in the manufacture both of low-cost garments and of paper. The collection of newsprint and cardboard for recycling was also considerable. Without the slightest encouragement from Friends of the Earth or the Committee for a Better Tomorrow—which, like most environmental organizations, did not exist at the time—a significant portion of discarded rags and paper was being recycled in the United States in the early 1900s. The reason was economic. Measured in 1990 dollars, the price per ton of rags was \$350, which is not much below what aluminum, one of the most lucrative of modern recyclables, fetches today. A ton of waste paper could be sold for about \$160, which in many places is about \$160 more than waste paper can be sold for now. New York State, which at the time was the nation's largest producer of newsprint, recycled almost 15 percent of its waste paper in 1900. By the 1920s, however, wood-processing technology had matured and rail links to the forests of the Northwest had been secured, and wood replaced rags and used paper as a fiber source. The rag trade was dealt a final blow by the Wool Products Labeling Act of 1939, which required products made out of recycled wool and cotton fibers to be so labeled, the effect of which was to devalue products by implying inferior quality. The implication did not need belaboring. Woolens made at least in part out of previously used wool had been known

as “shoddy,” and this noun quickly evolved into an adjective with pejorative connotations.

The vagaries of the secondary-materials markets underscore yet another fundamental garbage reality: desirable things happen to garbage mainly when someone stands to earn money by making desirable things happen. Good intentions alone don't count for much. Despite what people profess in opinion polls as to what they would “be willing” to do with their garbage or what they would “be willing” to pay, the truth is that high-mindedness often stops at the garbage can's rim.

A century of avid, painstaking archaeology on six continents by thousands of scholars has yielded some after some in which the secrets held by ancient discards have been revealed. The contents of the household garbage of our own time, in contrast, remain largely a mystery. Americans are, admittedly, exquisitely sensitized to the existence of something called “litter,” and they know full well the nature of the objects that litter tends to consist of. But litter makes up an infinitesimal fraction of the garbage that this country produces, and Americans don't have a clear idea at all about what the garbage that isn't litter actually contains.

This should not really be surprising. Unlike the evidence of many another problem, be it a social one, such as poverty, or an aesthetic one, such as bad architecture, the evidence of specific pieces of household garbage disappears from one day to the next. People put their garbage in the garbage can under the kitchen sink, in the bathroom, in the den, and then someone collects it all and *takes it out*. The garbage that is taken out is eventually left at the curb or in the alley, and very soon it is gone. All of this garbage is quickly replaced by other garbage. Garbage passes under our eyes virtually unnoticed, the continual turnover inhibiting perception. One of the handful of things that every American does every day—throw garbage away—is among the least likely of all acts to register. The cliché about garbage we've all heard is: “Out of sight, out of mind.” Yet even when it's in sight garbage somehow manages to remain out of mind. That individual failure to perceive has its counterpart in American society at large. No one in this country really knows how much

garbage Americans produce. No one knows what kinds of hazards we will face in decades to come from the garbage, some of it toxic, that is already buried in the ground. And no one really has a firm grasp on the totality of behaviors—what archaeologists call “formation processes”—that result in the creation and discard of this kind of garbage or that. Ignorance is one of the biggest handicaps we face when it comes to deciding, as a society, whether and how to throw various kinds of garbage away.

What we have so far been calling “garbage” sanitation professionals call solid waste. There are many categories of solid waste, and the most significant categories of all—those associated with manufacturing, mining, agriculture, and so on—are the ones we tend to think least about, although together they constitute more than 98 percent of the twelve billion tons of material in America that in some sense get discarded every year. The solid waste we’re all most familiar with—the kind on which present-day concerns about garbage disposal are centered, and the kind on which the Garbage Project has concentrated its attention—is the solid waste that comes from the households and institutions and small businesses of towns and cities: “municipal solid waste” (MSW). Professionals talk about the municipal solid waste that we throw away as entering the “solid-waste stream,” and the term is an apt figure of speech. Waste flows unceasingly, fed by hundreds of millions of tributaries. While many workaday activities come to a halt on weekends and holidays, garbage flows on. Indeed, days of rest tend to result in the largest waves of garbage. Christmas is a solid-waste tsunami.

It stands to reason that something for which professionals have a technical term of long standing—“solid-waste stream”—should also have, if nothing else, a weight and volume associated with it, but “stands to reason” is a phrase that all too frequently augurs a wrong turn. In this case the fact is that estimates of the amount of garbage produced in the United States every day (or year) vary so widely as to be useful only up to a point. There has, nonetheless, been a great deal of vivid imagery. Katie Kelly, in her book *Garbage* (1973), stated that the amount of municipal solid waste produced in the United States annually would fill five million trucks; these, “placed end to end, would stretch around the world twice.” In 1988 *Newsday* cited a New York State legislative committee estimate that a

year’s worth of America’s solid waste would fill the twin towers of 187 World Trade Centers. That same year the Orlando *Sentinel* estimated that the total annual volume of U.S. solid waste would cover the entire 43,600 miles of the interstate-highway system to a depth of seven and a half inches. The *Baltimore Sun* recently claimed that Baltimore generates enough garbage every day to fill Orioles’ Stadium to a depth of nine feet—a ballpark figure if ever there was one.

Information of this kind is unreliable, and its origins not a little mystifying. Because virtually all the data that exist on solid-waste quantity were, until very recently, rendered in terms of weight, not volume, one has to wonder how weight data were converted to volume data for Kelly’s trucks, *Newsday*’s towers, the *Sentinel*’s highways, and *The Sun*’s stadium. Rough ratios comparing the percentage of landfill contents that various garbage components take up in terms of volume and in terms of weight—plastic (2.5:1), paper (1.1:1), metal (1.6:1), glass (0.2:1), food (0.4:1), and so on—were worked out only in 1990 in a joint effort involving the Garbage Project and the environmental consulting firm Franklin Associates. These would enable us to make a weight-to-volume conversion—taking into account the consequences of compaction, which, as we will see, are severe—for a landfill whose moisture content was average and whose proportional make-up, by type of garbage, was known. But a universal volume-to-weight ratio covering all garbage everywhere is probably impossible to devise. Among other things, the very same types of garbage vary enormously in both weight and volume from place to place. Thanks to rainfall and high humidity, for example, a bag of garbage from New Orleans will at certain times of year weigh half again as much as a bag of exactly the same garbage from New York City. Even if an overall volume-to-weight ratio for garbage did exist, there could still be biases involving weight to distort the calculations. In the years before the First World War it was widely suspected that the weight of the garbage being trucked away from cities was sometimes being inflated in order to bring home to politicians the need for greater sanitation efforts—a mild sin, perhaps, in the service of the common weal. Because payments for carting away garbage and for dumping (“tipping”) at landfills are most frequently based on tonnage, there was also long rumored

to be a parallel tendency among some haulers and landfill managers to err on the high side in their daily tasks.

All of the above aside, what is the word "volume" being taken to mean? Is it the volume of garbage "as discarded" in garbage cans? Is it the volume of garbage as it arrives at the landfill—a fraction of its former size, crushed under a pressure of fifty-two pounds per square inch by the hydraulic ram of a standard "mother hen" compactor truck? Is it the even-further-compressed mass that is squeezed into an end-loader-rolloff at a transfer station? Or the smaller-still volume that results after garbage has been buried for years and years under tons of other garbage in a landfill? The figures that are tossed around almost never make the answer clear. And yet garbage gets so compressed that a cubic yard's worth of it, which might weigh 100 pounds tumbling fresh from the can, turns into a dense package weighing anywhere from 800 to 1,400 pounds by the time it is deposited in its final resting place.

There have been, to be sure, some careful, professional attempts over the years to determine the total amount of municipal solid waste that Americans throw away in a year, though these, too, suffer from flaws. One group of investigations was conducted during the mid-1970s, shortly after the Environmental Protection Agency was created. Another series of investigations has been undertaken within the past five years, in response to a decline in the number of operating landfills. Calculating a figure for the amount of garbage produced annually in the United States is a daunting task if for no other reason than that one cannot, of course, weigh or examine more than a tiny fraction of the whole. All serious studies have had to take short cuts. Some have tried to capture an accurate picture of disposal patterns in, say, twenty towns and cities, and have then gone on to extrapolate the findings to the nation as a whole. Other studies have used what is called the "materials-flows method" to estimate garbage generation, although, ironically, this method doesn't involve examining garbage *per se* at all, but rather examining industrial-production and -consumption records—how much of everything is being made and used. To these data are applied certain assumptions about American discard patterns, and the result is an estimate of the rate at which materials are entering the solid-waste stream.

The materials-flows method is ingenious, but one whose utility is

somewhat undermined by the fact that many of its assumptions are untested. One materials-flows study, for example, assumed that the useful life of major household appliances is twenty years, after which time it was assumed that the appliances would be thrown away. That assumption ignores (as we will see in chapter nine) the substantial underground trade in used durables that supplies many low-income households with washing machines and refrigerators and the like, and that is also a source of parts no longer carried by local dealers. The materials-flows method also takes insufficient account of the collection and export of scrap iron and steel. It is not within the method's power to do better than guess (based on extrapolations from a handful of local studies) at the amounts of food and yard waste that get tossed into the garbage. And the materials-flows studies of landfill contents don't take into account construction and demolition debris, which technically (according to the Environmental Protection Agency's definition) doesn't count as municipal solid waste, but a lot of which ends up in municipal landfills.

Not surprisingly, then, the estimates of the size of the U.S. solid-waste stream range widely. Generation-rate figures are most commonly expressed in pounds discarded per person per day, and various studies from the past decade and a half have arrived at the following rates for municipal solid waste: 2.9 pounds per person per day, 3.02 pounds, 4.24, 4.28, 5.0, and 8.0. (For the record, the figure for the people who killed the Olsen-Chubbuck bison, based on the weight of the discarded bones alone, is about 5.3 pounds.) The two most comparable studies that have been conducted in recent years have been materials-flows studies done for the EPA by, in one case, the agency's Office of Solid Waste Management Programs, in 1977, in conjunction with the consulting firm Franklin Associates, and in the other, in 1986, by Franklin Associates alone. These used the same methodology and the same database, but several of the assumptions employed in the earlier study were revised in the later one. The result is that, for the years covered by both, the later study found garbage production to have been 20 percent less by weight than the earlier study did. All told, estimates of the amount of garbage we generate, individually or as a nation, leave a lot to be desired—a good argument for requiring local communities to conduct regular, standardized waste inventories.

But what about the question to which we tend to assume the answer must be yes: Are Americans, on a per capita basis, bringing into existence a lot more municipal solid waste than they did twenty, fifty, or a hundred years ago? For the reasons we have just discussed the question cannot be answered with precision, but the answer all the same may very well be no. As one might imagine, not very much comparable data is available on garbage-generation rates during different periods of time, but what little there is does not support the view that per capita rates have greatly accelerated over the years. Garbage Project sorts of large amounts of purely household garbage in Milwaukee during the late 1970s found that households there threw out garbage at a rate of about a pound-and-a-half per person per day. Fortunately, data exist for Milwaukee from a period twenty years earlier—1959, specifically. A study done at the time for a doctoral dissertation by John Bell of Purdue University found that Milwaukee households were throwing away slightly more garbage than the Garbage Project would find: about 1.9 pounds per person per day. Admittedly, these data involve only household waste, not the larger category of municipal solid waste. But household waste is by far the largest category of MSW, and the Milwaukee comparison at least deserves a place in the evidence pile.

Looking at the matter another way, let us assume to be correct the Environmental Protection Agency's estimate (probably too high) that the average American throws out about fifteen hundred pounds of garbage a year. That certainly seems like a lot. History reminds us, however, that many former components of American garbage no longer exist—major components, whose absence does not even register in the collective memory. Thus, we do not see the twelve hundred pounds per year of coal ash that the average American generated from home stoves and furnaces at the turn of the century, and that was usually dumped on the poor side of town. We do not see the more than twenty pounds of manure that each of the more than three million horses living in cities produced every day at the turn of the century, or the hundreds of thousands of dead city horses that once had to be disposed of every year. We do not see all the food that households once wasted willy-nilly because refrigeration and sophisticated packaging were not yet widespread.

Several points should be emphasized. First, some of what used to

be household waste, such as coal ash, is now produced by public utilities, and does not become part of municipal solid waste—but it is still waste, obviously. Coal-fired utilities, though, provide less than a quarter of America's electricity; the ash they produce is disposed of by the utility (usually on site) and is not a culprit in the rapid filling of municipal landfills—the phenomenon that, more than any other, initially provoked garbage-crisis fears. Second, it is undeniable that Americans as a whole are producing more municipal solid waste than they did fifty or a hundred years ago; it should be understood, though, that this is largely because there are more Americans than there were fifty or a hundred years ago. Debates can and do swirl these days about per capita generation rates, and whether they've been going up slightly year by year in recent decades, and by how much, if any. Certainly wars, recessions, and social innovation (for example, the advent of curbside recycling) wreak annual variation on the solid-waste stream, though in ways that economists and social scientists cannot yet successfully describe. But a long view of America's municipal solid waste would suggest that, on a per capita basis, the nation's record is hardly one of unrestrained excess. Indeed, the word that best describes the situation with respect to overall volume may be: stability.

There is a new, radical branch of archaeology—it is called "critical archaeology"—which reminds us of the fact that our own latter-day attitudes, together with the objects with which we're familiar and the techniques we employ to acquire and disseminate knowledge, inevitably introduce a bias into our reconstructions of the past. Sometimes the biases are subtle and treacherous. Sometimes they are crude and readily visible. On the cover of tourist brochures, the tall temples and palaces of the ancient Maya stand limestone-white against the green of the surrounding forest canopy, and in our imaginations we think of them as looking this way in bygone ages, although in fact large parts of them once were painted in bright reds and yellows and blues. Similarly, we think of the Parthenon in Athens as having always stood in blinding purity beneath the azure Mediterranean sky, although it, too, was once rendered garishly. We think of a visit to colonial Williamsburg as a walk back in time—

"where the eighteenth century still lives," the advertisements say—forgetting about the lawnmowers and weed-eaters that have taken the place of chomping cows and sheep; about the nonpeel, water-seal paint that keeps the buildings in a state of unwonted tidiness; about the asphalt that now lies where once were rutted, muddy, manure-laden tracks; about the garbage trucks that rumble through as often as three times a day, carting away what in former times would have festered in redolent piles. A Williamsburg that offered a real taste of eighteenth-century life would be closed down swiftly by public-health officials.

The most extreme among the critical archaeologists would hold that the past can exist *only* as a reflection of the present—much as the ship in the AT&T commercial existed as a reflection not of what it really was but of what the commercial's creators wanted it to be. That is going too far. One can stop well short of this position and yet agree that historical reality presents limits to our kenning—and that the present is a distorting lens through which we have no choice but to look. The ignorance and misconceptions about garbage in history serve as a case in point—and as an object lesson.

CHAPTER 3

WHAT WE SAY, WHAT WE DO



hen Thomas Price took command of the Sanitation Division of the City of Tucson, in 1966, he found a department whose members suffered from high rates of alcoholism and high rates of absenteeism, an unenviable safety record, and exceedingly low morale. Price, a bulky, convivial, immensely competent man, and one who shared the Hispanic roots of most of his employees, focused first on morale. From the University of Arizona's film library he obtained documentaries about the links, via rodents and insects, between uncollected garbage and infectious disease, and he showed these films week after week to remind his workers that they were not simply clock-punchers but agents of public safety. He warned them again and again about the dangers inherent in their work—from microbes and toxic waste in household discards, to some extent, but mostly from the heavy machinery that is involved in every stage of the garbage-disposal process. (According to the Bureau of Labor Statistics, the incidence of occupational injury among sanitation workers in 1986 was 177 injuries per 1,000 workers, compared with an average that year of 77 per 1,000 workers in the entire private-