

# Fast Food NATION

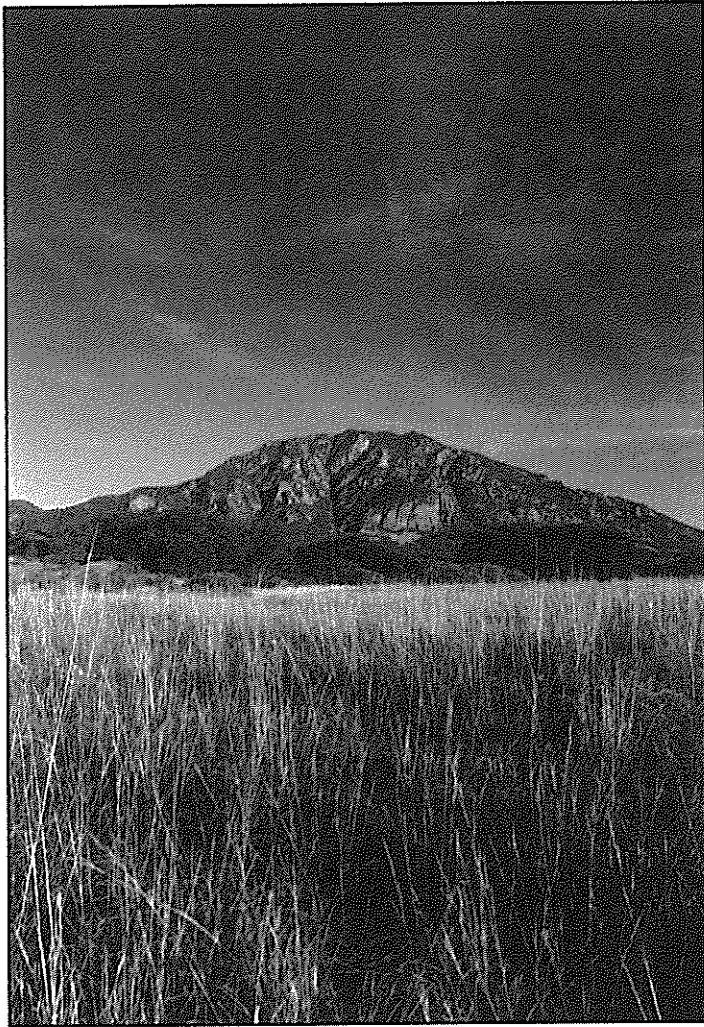
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the dark side of the all-american meal

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## introduction

**C**HEYENNE MOUNTAIN SITS on the eastern slope of Colorado's Front Range, rising steeply from the prairie and overlooking the city of Colorado Springs. From a distance, the mountain appears beautiful and serene, dotted with rocky outcroppings, scrub oak, and ponderosa pine. It looks like the backdrop of an old Hollywood western, just another gorgeous Rocky Mountain vista. And yet Cheyenne Mountain is hardly pristine. One of the nation's most important military installations lies deep within it, housing units of the North American Aerospace Command, the Air Force Space Command, and the United States Space Command. During the mid-1950s, high-level officials at the Pentagon worried that America's air defenses had become vulnerable to sabotage and attack. Cheyenne Mountain was chosen as the site for a top-secret, underground combat operations center. The mountain was hollowed out, and fifteen buildings, most of them three stories high, were erected amid a maze of tunnels and passageways extending for miles. The four-and-a-half-acre underground complex was designed to survive a direct hit by an atomic bomb. Now officially called the Cheyenne Mountain Air Force Station, the facility is entered through steel blast doors that are three feet thick and weigh twenty-five tons each; they automatically swing shut in less than twenty seconds. The base is closed to the public, and a heavily armed quick response team guards against intruders. Pressurized air within the complex prevents contamination by radioactive fallout and biological weapons. The buildings are mounted on gigantic steel springs to ride out an earthquake or the blast wave of a thermonuclear strike. The hallways and staircases are painted slate gray, the ceilings are low, and there are combination locks on many of

the doors. A narrow escape tunnel, entered through a metal hatch, twists and turns its way out of the mountain through solid rock. The place feels like the set of an early James Bond movie, with men in jumpsuits driving little electric vans from one brightly lit cavern to another.

Fifteen hundred people work inside the mountain, maintaining the facility and collecting information from a worldwide network of radars, spy satellites, ground-based sensors, airplanes, and blimps. The Cheyenne Mountain Operations Center tracks every manmade object that enters North American airspace or that orbits the earth. It is the heart of the nation's early warning system. It can detect the firing of a long-range missile, anywhere in the world, before that missile has left the launch pad.

This futuristic military base inside a mountain has the capability to be self-sustaining for at least one month. Its generators can produce enough electricity to power a city the size of Tampa, Florida. Its underground reservoirs hold millions of gallons of water; workers sometimes traverse them in rowboats. The complex has its own underground fitness center, a medical clinic, a dentist's office, a barbershop, a chapel, and a cafeteria. When the men and women stationed at Cheyenne Mountain get tired of the food in the cafeteria, they often send somebody over to the Burger King at Fort Carson, a nearby army base. Or they call Domino's.

Almost every night, a Domino's deliveryman winds his way up the lonely Cheyenne Mountain Road, past the ominous DEADLY FORCE AUTHORIZED signs, past the security checkpoint at the entrance of the base, driving toward the heavily guarded North Portal, tucked behind chain link and barbed wire. Near the spot where the road heads straight into the mountainside, the delivery man drops off his pizzas and collects his tip. And should Armageddon come, should a foreign enemy someday shower the United States with nuclear warheads, laying waste to the whole continent, entombed within Cheyenne Mountain, along with the high-tech marvels, the pale blue jumpsuits, comic books, and Bibles, future archeologists may find other clues to the nature of our civilization — Big King wrappers, hardened crusts of Cheesy Bread, Barbeque Wing bones, and the red, white, and blue of a Domino's pizza box.

## what we eat

OVER THE LAST THREE DECADES, fast food has infiltrated every nook and cranny of American society. An industry that began with a handful of modest hot dog and hamburger stands in southern California has spread to every corner of the nation, selling a broad range of foods wherever paying customers may be found. Fast food is now served at restaurants and drive-throughs, at stadiums, airports, zoos, high schools, elementary schools, and universities, on cruise ships, trains, and airplanes, at K-Marts, Wal-Marts, gas stations, and even at hospital cafeterias. In 1970, Americans spent about \$6 billion on fast food; in 2001, they spent more than \$110 billion. Americans now spend more money on fast food than on higher education, personal computers, computer software, or new cars. They spend more on fast food than on movies, books, magazines, newspapers, videos, and recorded music — combined.

Pull open the glass door, feel the rush of cool air, walk in, get on line, study the backlit color photographs above the counter, place your order, hand over a few dollars, watch teenagers in uniforms pushing various buttons, and moments later take hold of a plastic tray full of food wrapped in colored paper and cardboard. The whole experience of buying fast food has become so routine, so thoroughly unexceptional and mundane, that it is now taken for granted, like brushing your teeth or stopping for a red light. It has become a social custom as American as a small, rectangular, hand-held, frozen, and reheated apple pie.

This is a book about fast food, the values it embodies, and the world it has made. Fast food has proven to be a revolutionary force in American life; I am interested in it both as a commodity and as a metaphor. What people eat (or don't eat) has always been determined by a complex interplay of social, economic, and technological forces. The early Roman Republic was fed by its citizen-farmers; the Roman Empire, by its slaves. A nation's diet can be more revealing than its art or literature. On any given day in the United States about one-quarter of the adult population visits a fast food restaurant. During a relatively brief period of time, the fast food industry has helped to transform not only the American diet, but also our landscape, economy, workforce, and popular culture. Fast food and its consequences have become in-

escapable, regardless of whether you eat it twice a day, try to avoid it, or have never taken a single bite.

The extraordinary growth of the fast food industry has been driven by fundamental changes in American society. Adjusted for inflation, the hourly wage of the average U.S. worker peaked in 1973 and then steadily declined for the next twenty-five years. During that period, women entered the workforce in record numbers, often motivated less by a feminist perspective than by a need to pay the bills. In 1975, about one-third of American mothers with young children worked outside the home; today almost two-thirds of such mothers are employed. As the sociologists Cameron Lynne Macdonald and Carmen Sirianni have noted, the entry of so many women into the workforce has greatly increased demand for the types of services that housewives traditionally perform: cooking, cleaning, and child care. A generation ago, three-quarters of the money used to buy food in the United States was spent to prepare meals at home. Today about half of the money used to buy food is spent at restaurants — mainly at fast food restaurants.

The McDonald's Corporation has become a powerful symbol of America's service economy, which is now responsible for 90 percent of the country's new jobs. In 1968, McDonald's operated about one thousand restaurants. Today it has about thirty thousand restaurants worldwide and opens almost two thousand new ones each year. An estimated one out of every eight workers in the United States has at some point been employed by McDonald's. The company annually hires about one million people, more than any other American organization, public or private. McDonald's is the nation's largest purchaser of beef, pork, and potatoes — and the second largest purchaser of chicken. The McDonald's Corporation is the largest owner of retail property in the world. Indeed, the company earns the majority of its profits not from selling food but from collecting rent. McDonald's spends more money on advertising and marketing than any other brand. As a result it has replaced Coca-Cola as the world's most famous brand. McDonald's operates more playgrounds than any other private entity in the United States. It is responsible for the nation's bestselling line of children's clothing (McKids) and is one of the largest distributors of toys. A survey of American schoolchildren found that 96 percent could identify Ronald McDonald. The only fictional character with a higher degree of recognition was Santa Claus. The impact of McDonald's on the way we live today is hard to overstate.

The Golden Arches are now more widely recognized than the Christian cross.

In the early 1970s, the farm activist Jim Hightower warned of "the McDonalidization of America." He viewed the emerging fast food industry as a threat to independent businesses, as a step toward a food economy dominated by giant corporations, and as a homogenizing influence on American life. In *Eat Your Heart Out* (1975), he argued that "bigger is *not* better." Much of what Hightower feared has come to pass. The centralized purchasing decisions of the large restaurant chains and their demand for standardized products have given a handful of corporations an unprecedented degree of power over the nation's food supply. Moreover, the tremendous success of the fast food industry has encouraged other industries to adopt similar business methods. The basic thinking behind fast food has become the operating system of today's retail economy, wiping out small businesses, obliterating regional differences, and spreading identical stores throughout the country like a self-replicating code.

America's main streets and malls now boast the same Pizza Huts and Taco Bells, Gaps and Banana Republics, Starbucks and Jiffy-Lubes, Foot Lockers, Snip N' Clips, Sunglass Huts, and Hobbytown USAs. Almost every facet of American life has now been franchised or chained. From the maternity ward at a Columbia/HCA hospital to an embalming room owned by Service Corporation International — "the world's largest provider of death care services," based in Houston, Texas, which since 1968 has grown to include 3,823 funeral homes, 523 cemeteries, and 198 crematoriums, and which today handles the final remains of one out of every nine Americans — a person can now go from the cradle to the grave without spending a nickel at an independently owned business.

The key to a successful franchise, according to many texts on the subject, can be expressed in one word: "uniformity." Franchises and chain stores strive to offer exactly the same product or service at numerous locations. Customers are drawn to familiar brands by an instinct to avoid the unknown. A brand offers a feeling of reassurance when its products are always and everywhere the same. "We have found out . . . that we cannot trust some people who are nonconformists," declared Ray Kroc, one of the founders of McDonald's, angered by some of his franchisees. "We will make conformists out of them in a hurry . . . The organization cannot trust the individual; the individual must trust the organization."

One of the ironies of America's fast food industry is that a business so dedicated to conformity was founded by iconoclasts and self-made men, by entrepreneurs willing to defy conventional opinion. Few of the people who built fast food empires ever attended college, let alone business school. They worked hard, took risks, and followed their own paths. In many respects, the fast food industry embodies the best and the worst of American capitalism at the start of the twenty-first century — its constant stream of new products and innovations, its widening gulf between rich and poor. The industrialization of the restaurant kitchen has enabled the fast food chains to rely upon a low-paid and unskilled workforce. While a handful of workers manage to rise up the corporate ladder, the vast majority lack full-time employment, receive no benefits, learn few skills, exercise little control over their workplace, quit after a few months, and float from job to job. The restaurant industry is now America's largest private employer, and it pays some of the lowest wages. During the economic boom of the 1990s, when many American workers enjoyed their first pay raises in a generation, the real value of wages in the restaurant industry continued to fall. The roughly 3.5 million fast food workers are by far the largest group of minimum wage earners in the United States. The only Americans who consistently earn a lower hourly wage are migrant farm workers.

A hamburger and french fries became the quintessential American meal in the 1950s, thanks to the promotional efforts of the fast food chains. The typical American now consumes approximately three hamburgers and four orders of french fries every week. But the steady barrage of fast food ads, full of thick juicy burgers and long golden fries, rarely mentions where these foods come from nowadays or what ingredients they contain. The birth of the fast food industry coincided with Eisenhower-era glorifications of technology, with optimistic slogans like "Better Living through Chemistry" and "Our Friend the Atom." The sort of technological wizardry that Walt Disney promoted on television and at Disneyland eventually reached its fulfillment in the kitchens of fast food restaurants. Indeed, the corporate culture of McDonald's seems inextricably linked to that of the Disney empire, sharing a reverence for sleek machinery, electronics, and automation. The leading fast food chains still embrace a boundless faith in science — and as a result have changed not just what Americans eat, but also how their food is made.

The current methods for preparing fast food are less likely to be

found in cookbooks than in trade journals such as *Food Technologist* and *Food Engineering*. Aside from the salad greens and tomatoes, most fast food is delivered to the restaurant already frozen, canned, dehydrated, or freeze-dried. A fast food kitchen is merely the final stage in a vast and highly complex system of mass production. Foods that may look familiar have in fact been completely reformulated. What we eat has changed more in the last forty years than in the previous forty thousand. Like Cheyenne Mountain, today's fast food conceals remarkable technological advances behind an ordinary-looking façade. Much of the taste and aroma of American fast food, for example, is now manufactured at a series of large chemical plants off the New Jersey Turnpike.

In the fast food restaurants of Colorado Springs, behind the counters, amid the plastic seats, in the changing landscape outside the window, you can see all the virtues and destructiveness of our fast food nation. I chose Colorado Springs as a focal point for this book because the changes that have recently swept through the city are emblematic of those that fast food — and the fast food mentality — have encouraged throughout the United States. Countless other suburban communities, in every part of the country, could have been used to illustrate the same points. The extraordinary growth of Colorado Springs neatly parallels that of the fast food industry: during the last few decades, the city's population has more than doubled. Subdivisions, shopping malls, and chain restaurants are appearing in the foothills of Cheyenne Mountain and the plains rolling to the east. The Rocky Mountain region as a whole has the fastest-growing economy in the United States, mixing high-tech and service industries in a way that may define America's workforce for years to come. And new restaurants are opening there at a faster pace than anywhere else in the nation.

Fast food is now so commonplace that it has acquired an air of inevitability, as though it were somehow unavoidable, a fact of modern life. And yet the dominance of the fast food giants was no more preordained than the march of colonial split-levels, golf courses, and man-made lakes across the deserts of the American West. The political philosophy that now prevails in so much of the West — with its demand for lower taxes, smaller government, an unbridled free market — stands in total contradiction to the region's true economic underpinnings. No other region of the United States has been so dependent on government subsidies for so long, from the nineteenth-century con-

struction of its railroads to the twentieth-century financing of its military bases and dams. One historian has described the federal government's 1950s highway-building binge as a case study in "interstate socialism" — a phrase that aptly describes how the West was really won. The fast food industry took root alongside that interstate highway system, as a new form of restaurant sprang up beside the new off-ramps. Moreover, the extraordinary growth of this industry over the past quarter-century did not occur in a political vacuum. It took place during a period when the inflation-adjusted value of the minimum wage declined by about 40 percent, when sophisticated mass marketing techniques were for the first time directed at small children, and when federal agencies created to protect workers and consumers too often behaved like branch offices of the companies that were supposed to be regulated. Ever since the administration of President Richard Nixon, the fast food industry has worked closely with its allies in Congress and the White House to oppose new worker safety, food safety, and minimum wage laws. While publicly espousing support for the free market, the fast food chains have quietly pursued and greatly benefited from a wide variety of government subsidies. Far from being inevitable, America's fast food industry in its present form is the logical outcome of certain political and economic choices.

In the potato fields and processing plants of Idaho, in the ranchlands east of Colorado Springs, in the feedlots and slaughterhouses of the High Plains, you can see the effects of fast food on the nation's rural life, its environment, its workers, and its health. The fast food chains now stand atop a huge food-industrial complex that has gained control of American agriculture. During the 1980s, large multinationals — such as Cargill, ConAgra, and IBP — were allowed to dominate one commodity market after another. Farmers and cattle ranchers are losing their independence, essentially becoming hired hands for the agribusiness giants or being forced off the land. Family farms are now being replaced by gigantic corporate farms with absentee owners. Rural communities are losing their middle class and becoming socially stratified, divided between a small, wealthy elite and large numbers of the working poor. Small towns that seemingly belong in a Norman Rockwell painting are being turned into rural ghettos. The hardy, independent farmers whom Thomas Jefferson considered the bedrock of American democracy are a truly vanishing breed. The United States now has more prison inmates than full-time farmers.

The fast food chains' vast purchasing power and their demand for a

uniform product have encouraged fundamental changes in how cattle are raised, slaughtered, and processed into ground beef. These changes have made meatpacking — once a highly skilled, highly paid occupation — into the most dangerous job in the United States, performed by armies of poor, transient immigrants whose injuries often go unrecorded and uncompensated. And the same meat industry practices that endanger these workers have facilitated the introduction of deadly pathogens, such as *E. coli* O157:H7, into America's hamburger meat, a food aggressively marketed to children. Again and again, efforts to prevent the sale of tainted ground beef have been thwarted by meat industry lobbyists and their allies in Congress. The federal government has the legal authority to recall a defective toaster oven or stuffed animal — but still lacks the power to recall tons of contaminated, potentially lethal meat.

I do not mean to suggest that fast food is solely responsible for every social problem now haunting the United States. In some cases (such as the malling and sprawling of the West) the fast food industry has been a catalyst and a symptom of larger economic trends. In other cases (such as the rise of franchising and the spread of obesity) fast food has played a more central role. By tracing the diverse influences of fast food I hope to shed light not only on the workings of an important industry, but also on a distinctively American way of viewing the world.

Elitists have always looked down at fast food, criticizing how it tastes and regarding it as another tacky manifestation of American popular culture. The aesthetics of fast food are of much less concern to me than its impact upon the lives of ordinary Americans, both as workers and consumers. Most of all, I am concerned about its impact on the nation's children. Fast food is heavily marketed to children and prepared by people who are barely older than children. This is an industry that both feeds and feeds off the young. During the two years spent researching this book, I ate an enormous amount of fast food. Most of it tasted pretty good. That is one of the main reasons people buy fast food; it has been carefully designed to taste good. It's also inexpensive and convenient. But the value meals, two-for-one deals, and free refills of soda give a distorted sense of how much fast food actually costs. The real price never appears on the menu.

The sociologist George Ritzer has attacked the fast food industry for celebrating a narrow measure of efficiency over every other human value, calling the triumph of McDonald's "the irrationality of ratio-

nality.” Others consider the fast food industry proof of the nation’s great economic vitality, a beloved American institution that appeals overseas to millions who admire our way of life. Indeed, the values, the culture, and the industrial arrangements of our fast food nation are now being exported to the rest of the world. Fast food has joined Hollywood movies, blue jeans, and pop music as one of America’s most prominent cultural exports. Unlike other commodities, however, fast food isn’t viewed, read, played, or worn. It enters the body and becomes part of the consumer. No other industry offers, both literally and figuratively, so much insight into the nature of mass consumption.

Hundreds of millions of people buy fast food every day without giving it much thought, unaware of the subtle and not so subtle ramifications of their purchases. They rarely consider where this food came from, how it was made, what it is doing to the community around them. They just grab their tray off the counter, find a table, take a seat, unwrap the paper, and dig in. The whole experience is transitory and soon forgotten. I’ve written this book out of a belief that people should know what lies behind the shiny, happy surface of every fast food transaction. They should know what really lurks between those sesame-seed buns. As the old saying goes: You are what you eat.

## I / the american way



## 1 / the founding fathers

**C**ARL N. KARCHER is one of the fast food industry's pioneers. His career extends from the industry's modest origins to its current hamburger hegemony. His life seems at once to be a tale by Horatio Alger, a fulfillment of the American dream, and a warning about unintended consequences. It is a fast food parable about how the industry started and where it can lead. At the heart of the story is southern California, whose cities became prototypes for the rest of the nation, whose love of the automobile changed what America looks like and what Americans eat.

Carl was born in 1917 on a farm near Upper Sandusky, Ohio. His father was a sharecropper who moved the family to new land every few years. The Karchers were German-American, industrious, and devoutly Catholic. Carl had six brothers and a sister. "The harder you work," their father always told them, "the luckier you become." Carl dropped out of school after the eighth grade and worked twelve to fourteen hours a day on the farm, harvesting with a team of horses, baling hay, milking and feeding the cows. In 1937, Ben Karcher, one of Carl's uncles, offered him a job in Anaheim, California. After thinking long and hard and consulting with his parents, Carl decided to go west. He was twenty years old and six-foot-four, a big strong farm boy. He had never set foot outside of northern Ohio. The decision to leave home felt momentous, and the drive to California took a week. When he arrived in Anaheim — and saw the palm trees and orange groves, and smelled the citrus in the air — Carl said to himself, "This is heaven."

Anaheim was a small town in those days, surrounded by ranches and farms. It was located in the heart of southern California's citrus belt, an area that produced almost all of the state's oranges, lemons,



and tangerines. Orange County and neighboring Los Angeles County were the leading agricultural counties in the United States, growing fruits, nuts, vegetables, and flowers on land that only a generation earlier had been a desert covered in sagebrush and cactus. Massive irrigation projects, built with public money to improve private land, brought water from hundreds of miles away. The Anaheim area alone boasted about 70,000 acres of Valencia oranges, as well as lemon groves and walnut groves. Small ranches and dairy farms dotted the land, and sunflowers lined the back roads. Anaheim had been settled in the late nineteenth century by German immigrants hoping to create a local wine industry and by a group of Polish expatriates trying to establish a back-to-the-land artistic community. The wineries flourished for three decades; the art colony collapsed within a few months. After World War I, the heavily German character of Anaheim gave way to the influence of newer arrivals from the Midwest, who tended to be Protestant and conservative and evangelical about their faith. Reverend Leon L. Myers — pastor of the Anaheim Christian Church and founder of the local Men's Bible Club — turned the Ku Klux Klan into one of the most powerful organizations in town. During the early 1920s, the Klan ran Anaheim's leading daily newspaper, controlled the city government for a year, and posted signs on the outskirts of the city greeting newcomers with the acronym "KIGY" (Klansmen I Greet You).

Carl's uncle Ben owned Karcher's Feed and Seed Store, right in the middle of downtown Anaheim. Carl worked there seventy-six hours a week, selling goods to local farmers for their chickens, cattle, and hogs. During Sunday services at St. Boniface Catholic Church, Carl spotted an attractive young woman named Margaret Heinz sitting in a nearby pew. He later asked her out for ice cream, and the two began dating. Carl became a frequent visitor to the Heinz farm on North Palm Street. It had ten acres of orange trees and a Spanish-style house where Margaret, her parents, her seven brothers, and her seven sisters lived. The place seemed magical. In the social hierarchy of California's farmers, orange growers stood at the very top; their homes were set amid fragrant evergreen trees that produced a lucrative income. As a young boy in Ohio, Carl had been thrilled on Christmas mornings to receive a single orange as a gift from Santa. Now oranges seemed to be everywhere.

Margaret worked as a secretary at a law firm downtown. From her office window on the fourth floor, she could watch Carl grinding feed

outside his uncle's store. After briefly returning to Ohio, Carl went to work for the Armstrong Bakery in Los Angeles. The job soon paid \$24 a week, \$6 more than he'd earned at the feed store — and enough to start a family. Carl and Margaret were married in 1939 and had their first child within a year.

Carl drove a truck for the bakery, delivering bread to restaurants and markets in west L.A. He was amazed by the number of hot dog stands that were opening and by the number of buns they went through every week. When Carl heard that a hot dog cart was for sale — on Florence Avenue across from the Goodyear factory — he decided to buy it. Margaret strongly opposed the idea, wondering where he'd find the money. He borrowed \$311 from the Bank of America, using his car as collateral for the loan, and persuaded his wife to give him \$15 in cash from her purse. "I'm in business for myself now," Carl thought, after buying the cart, "I'm on my way." He kept his job at the bakery and hired two young men to work the cart during the hours he was delivering bread. They sold hot dogs, chili dogs, and tamales for a dime each, soda for a nickel. Five months after Carl bought the cart, the United States entered World War II, and the Goodyear plant became very busy. Soon he had enough money to buy a second hot dog cart, which Margaret often ran by herself, selling food and counting change while their daughter slept nearby in the car.

Southern California had recently given birth to an entirely new lifestyle — and a new way of eating. Both revolved around cars. The cities back East had been built in the railway era, with central business districts linked to outlying suburbs by commuter train and trolley. But the tremendous growth of Los Angeles occurred at a time when automobiles were finally affordable. Between 1920 and 1940, the population of southern California nearly tripled, as about 2 million people arrived from across the United States. While cities in the East expanded through immigration and became more diverse, Los Angeles became more homogenous and white. The city was inundated with middle-class arrivals from the Midwest, especially in the years leading up to the Great Depression. Invalids, retirees, and small businessmen were drawn to southern California by real estate ads promising a warm climate and a good life. It was the first large-scale migration conducted mainly by car. Los Angeles soon became unlike any other city the world had ever seen, sprawling and horizontal, a thoroughly suburban metropolis of detached homes — a glimpse of the future, molded by the automobile. About 80 percent of the population had

been born elsewhere; about half had rolled into town during the previous five years. Restlessness, impermanence, and speed were embedded in the culture that soon emerged there, along with an openness to anything new. Other cities were being transformed by car ownership, but none was so profoundly altered. By 1940, there were about a million cars in Los Angeles, more cars than in forty-one states.

The automobile offered drivers a feeling of independence and control. Daily travel was freed from the hassles of rail schedules, the needs of other passengers, and the location of trolley stops. More importantly, driving seemed to cost much less than using public transport — an illusion created by the fact that the price of a new car did not include the price of building new roads. Lobbyists from the oil, tire, and automobile industries, among others, had persuaded state and federal agencies to assume that fundamental expense. Had the big auto companies been required to pay for the roads — in the same way that trolley companies had to lay and maintain track — the landscape of the American West would look quite different today.

The automobile industry, however, was not content simply to reap the benefits of government-subsidized road construction. It was determined to wipe out railway competition by whatever means necessary. In the late 1920s, General Motors secretly began to purchase trolley systems throughout the United States, using a number of front corporations. Trolley systems in Tulsa, Oklahoma, and Montgomery, Alabama, in Cedar Rapids, Iowa, and El Paso, Texas, in Baltimore, Chicago, New York City, and Los Angeles — more than one hundred trolley systems in all — were purchased by GM and then completely dismantled, their tracks ripped up, their overhead wires torn down. The trolley companies were turned into bus lines, and the new buses were manufactured by GM.

General Motors eventually persuaded other companies that benefited from road building to help pay for the costly takeover of America's trolleys. In 1947, GM and a number of its allies in the scheme were indicted on federal antitrust charges. Two years later, the workings of the conspiracy, and its underlying intentions, were exposed during a trial in Chicago. GM, Mack Truck, Firestone, and Standard Oil of California were all found guilty on one of the two counts by the federal jury. The investigative journalist Jonathan Kwitny later argued that the case was "a fine example of what can happen when important matters of public policy are abandoned by government to the self-in-

terest of corporations." Judge William J. Campbell was not so outraged. As punishment, he ordered GM and the other companies to pay a fine of \$5,000 each. The executives who had secretly plotted and carried out the destruction of America's light rail network were fined \$1 each. And the postwar reign of the automobile proceeded without much further challenge.

The nation's car culture reached its height in southern California, inspiring innovations such as the world's first motel and the first drive-in bank. A new form of eating place emerged. "People with cars are so lazy they don't want to get out of them to eat!" said Jesse G. Kirby, the founder of an early drive-in restaurant chain. Kirby's first "Pig Stand" was in Texas, but the chain soon thrived in Los Angeles, alongside countless other food stands offering "curb service." In the rest of the United States, drive-ins were usually a seasonal phenomenon, closing at the end of every summer. In southern California, it felt like summer all year long, the drive-ins never closed, and a whole new industry was born.

The southern California drive-in restaurants of the early 1940s tended to be gaudy and round, topped with pylons, towers, and flashing signs. They were "circular meccas of neon," in the words of drive-in historian Michael Witzel, designed to be easily spotted from the road. The triumph of the automobile encouraged not only a geographic separation between buildings, but also a manmade landscape that was loud and bold. Architecture could no longer afford to be subtle; it had to catch the eye of motorists traveling at high speed. The new drive-ins competed for attention, using all kinds of visual lures, decorating their buildings in bright colors and dressing their waitresses in various costumes. Known as "carhops," the waitresses — who carried trays of food to patrons in parked cars — often wore short skirts and dressed up like cowgirls, majorettes, Scottish lasses in kilts. They were likely to be attractive, often received no hourly wages, and earned their money through tips and a small commission on every item they sold. The carhops had a strong economic incentive to be friendly to their customers, and drive-in restaurants quickly became popular hangouts for teenage boys. The drive-ins fit perfectly with the youth culture of Los Angeles. They were something genuinely new and different, they offered a combination of girls and cars and late-night food, and before long they beckoned from intersections all over town.

## speedee service

BY THE END OF 1944, Carl Karcher owned four hot dog carts in Los Angeles. In addition to running the carts, he still worked full-time for the Armstrong Bakery. When a restaurant across the street from the Heinz farm went on sale, Carl decided to buy it. He quit the bakery, bought the restaurant, fixed it up, and spent a few weeks learning how to cook. On January 16, 1945, his twenty-eighth birthday, Carl's Drive-In Barbeque opened its doors. The restaurant was small, rectangular, and unexceptional, with red tiles on the roof. Its only hint of flamboyance was a five-pointed star atop the neon sign in the parking lot. During business hours, Carl did the cooking, Margaret worked behind the cash register, and carhops served most of the food. After closing time, Carl stayed late into the night, cleaning the bathrooms and mopping the floors. Once a week, he prepared the "special sauce" for his hamburgers, making it in huge kettles on the back porch of his house, stirring it with a stick and then pouring it into one-gallon jugs.

After World War II, business soared at Carl's Drive-In Barbeque, along with the economy of southern California. The oil business and the film business had thrived in Los Angeles during the 1920s and 1930s. But it was World War II that transformed southern California into the most important economic region in the West. The war's effect on the state, in the words of historian Carey McWilliams, was a "fabulous boom." Between 1940 and 1945, the federal government spent nearly \$20 billion in California, mainly in and around Los Angeles, building airplane factories and steel mills, military bases and port facilities. During those six years, federal spending was responsible for nearly half of the personal income in southern California. By the end of World War II, Los Angeles was the second-largest manufacturing center in America, with an industrial output surpassed only by that of Detroit. While Hollywood garnered most of the headlines, defense spending remained the focus of the local economy for the next two decades, providing about one-third of its jobs.

The new prosperity enabled Carl and Margaret to buy a house five blocks away from their restaurant. They added more rooms as the family grew to include twelve children: nine girls and three boys. In the early 1950s Anaheim began to feel much less rural and remote. Walt Disney bought 160 acres of orange groves just a few miles from Carl's Drive-In Barbeque, chopped down the trees, and started to

build Disneyland. In the neighboring town of Garden Grove, the Reverend Robert Schuller founded the nation's first Drive-in Church, preaching on Sunday mornings at a drive-in movie theater, spreading the Gospel through the little speakers at each parking space, attracting large crowds with the slogan "Worship as you are . . . in the family car." The city of Anaheim started to recruit defense contractors, eventually persuading Northrop, Boeing, and North American Aviation to build factories there. Anaheim soon became the fastest-growing city in the nation's fastest-growing state. Carl's Drive-In Barbeque thrived, and Carl thought its future was secure. And then he heard about a restaurant in the "Inland Empire," sixty miles east of Los Angeles, that was selling high-quality hamburgers for 15 cents each — 20 cents less than what Carl charged. He drove to E Street in San Bernardino and saw the shape of things to come. Dozens of people were standing in line to buy bags of "McDonald's Famous Hamburgers."

Richard and Maurice McDonald had left New Hampshire for southern California at the start of the Depression, hoping to find jobs in Hollywood. They worked as set builders on the Columbia Film Studios back lot, saved their money, and bought a movie theater in Glendale. The theater was not a success. In 1937 they opened a drive-in restaurant in Pasadena, trying to cash in on the new craze, hiring three carhops and selling mainly hot dogs. A few years later they moved to a larger building on E Street in San Bernardino and opened the McDonald Brothers Burger Bar Drive-In. The new restaurant was located near a high school, employed twenty carhops, and promptly made the brothers rich. Richard and "Mac" McDonald bought one of the largest houses in San Bernardino, a hillside mansion with a tennis court and a pool.

By the end of the 1940s the McDonald brothers had grown dissatisfied with the drive-in business. They were tired of constantly looking for new carhops and short-order cooks — who were in great demand — as the old ones left for higher-paying jobs elsewhere. They were tired of replacing the dishes, glassware, and silverware their teenage customers constantly broke or ripped off. And they were tired of their teenage customers. The brothers thought about selling the restaurant. Instead, they tried something new.

The McDonalds fired all their carhops in 1948, closed their restaurant, installed larger grills, and reopened three months later with a radically new method of preparing food. It was designed to increase the speed, lower prices, and raise the volume of sales. The brothers

eliminated almost two-thirds of the items on their old menu. They got rid of everything that had to be eaten with a knife, spoon, or fork. The only sandwiches now sold were hamburgers or cheeseburgers. The brothers got rid of their dishes and glassware, replacing them with paper cups, paper bags, and paper plates. They divided the food preparation into separate tasks performed by different workers. To fill a typical order, one person grilled the hamburger; another "dressed" and wrapped it; another prepared the milk shake; another made the fries; and another worked the counter. For the first time, the guiding principles of a factory assembly line were applied to a commercial kitchen. The new division of labor meant that a worker only had to be taught how to perform one task. Skilled and expensive short-order cooks were no longer necessary. All of the burgers were sold with the same condiments: ketchup, onions, mustard, and two pickles. No substitutions were allowed. The McDonald brothers' Speedee Service System revolutionized the restaurant business. An ad of theirs seeking franchisees later spelled out the benefits of the system: "Imagine — No Carhops — No Waitresses — No Dishwashers — No Bus Boys — The McDonald's System is Self-Service!"

Richard McDonald designed a new building for the restaurant, hoping to make it easy to spot from the road. Though untrained as an architect, he came up with a design that was simple, memorable, and archetypal. On two sides of the roof he put golden arches, lit by neon at night, that from a distance formed the letter *M*. The building effortlessly fused advertising with architecture and spawned one of the most famous corporate logos in the world.

The Speedee Service System, however, got off to a rocky start. Customers pulled up to the restaurant and honked their horns, wondering what had happened to the carhops, still expecting to be served. People were not yet accustomed to waiting in line and getting their own food. Within a few weeks, however, the new system gained acceptance, as word spread about the low prices and good hamburgers. The McDonald brothers now aimed for a much broader clientele. They employed only young men, convinced that female workers would attract teenage boys to the restaurant and drive away other customers. Families soon lined up to eat at McDonald's. Company historian John F. Love explained the lasting significance of McDonald's new self-service system: "Working-class families could finally afford to feed their kids restaurant food."

San Bernardino at the time was an ideal setting for all sorts of cul-

tural experimentation. The town was an odd melting-pot of agriculture and industry located on the periphery of the southern California boom, a place that felt out on the edge. Nicknamed "San Berdoo," it was full of citrus groves, but sat next door to the smokestacks and steel mills of Fontana. San Bernardino had just sixty thousand inhabitants, but millions of people passed through there every year. It was the last stop on Route 66, end of the line for truckers, tourists, and migrants from the East. Its main street was jammed with drive-ins and cheap motels. The same year the McDonald brothers opened their new self-service restaurant, a group of World War II veterans in San Berdoo, alienated by the dullness of civilian life, formed a local motorcycle club, borrowing the nickname of the U.S. Army's Eleventh Airborne Division: "Hell's Angels." The same town that gave the world the golden arches also gave it a biker gang that stood for a totally antithetical set of values. The Hell's Angels flaunted their dirtiness, celebrated disorder, terrified families and small children instead of trying to sell them burgers, took drugs, sold drugs, and injected into American pop culture an anger and a darkness and a fashion statement — T-shirts and torn jeans, black leather jackets and boots, long hair, facial hair, swastikas, silver skull rings and other satanic trinkets, earrings, nose rings, body piercings, and tattoos — that would influence a long line of rebels from Marlon Brando to Marilyn Manson. The Hell's Angels were the anti-McDonald's, the opposite of clean and cheery. They didn't care if you had a nice day, and yet were as deeply American in their own way as any purveyors of Speedee Service. San Bernardino in 1948 supplied the nation with a new yin and yang, new models of conformity and rebellion. "They get angry when they read about how filthy they are," Hunter Thompson later wrote of the Hell's Angels, "but instead of shoplifting some deodorant, they strive to become even filthier."

## burgerville usa

AFTER VISITING SAN BERNARDINO and seeing the long lines at McDonald's, Carl Karcher went home to Anaheim and decided to open his own self-service restaurant. Carl instinctively grasped that the new car culture would forever change America. He saw what was coming, and his timing was perfect. The first Carl's Jr. restaurant opened in 1956 — the same year that America got its first shop-

ping mall and that Congress passed the Interstate Highway Act. President Dwight D. Eisenhower had pushed hard for such a bill; during World War II, he'd been enormously impressed by Adolf Hitler's Reichsautobahn, the world's first superhighway system. The Interstate Highway Act brought autobahns to the United States and became the largest public works project in the nation's history, building 46,000 miles of road with more than \$130 billion of federal money. The new highways spurred car sales, truck sales, and the construction of new suburban homes. Carl's first self-service restaurant was a success, and he soon opened others near California's new freeway off-ramps. The star atop his drive-in sign became the mascot of his fast food chain. It was a smiling star in little booties, holding a burger and a shake.

Entrepreneurs from all over the country went to San Bernardino, visited the new McDonald's, and built imitations of the restaurant in their hometowns. "Our food was exactly the same as McDonald's," the founder of a rival chain later admitted. "If I had looked at McDonald's and saw someone flipping hamburgers while he was hanging by his feet, I would have copied it." America's fast food chains were not launched by large corporations relying upon focus groups and market research. They were started by door-to-door salesmen, short-order cooks, orphans, and dropouts, by eternal optimists looking for a piece of the next big thing. The start-up costs of a fast food restaurant were low, the profit margins promised to be high, and a wide assortment of ambitious people were soon buying grills and putting up signs.

William Rosenberg dropped out of school at the age of fourteen, delivered telegrams for Western Union, drove an ice cream truck, worked as a door-to-door salesman, sold sandwiches and coffee to factory workers in Boston, and then opened a small doughnut shop in 1948, later calling it Dunkin' Donuts. Glen W. Bell, Jr., was a World War II veteran, a resident of San Bernardino who ate at the new McDonald's and decided to copy it, using the assembly-line system to make Mexican food and founding a restaurant chain later known as Taco Bell. Keith G. Cramer, the owner of Keith's Drive-In Restaurant in Daytona Beach, Florida, heard about the McDonald brothers' new restaurant, flew to southern California, ate at McDonald's, returned to Florida, and with his father-in-law, Matthew Burns, opened the first Insta-Burger-King in 1953. Dave Thomas started working in a restaurant at the age of twelve, left his adoptive father, took a room at the YMCA, dropped out of school at fifteen, served as a busboy and a cook, and eventually opened his own place in Colum-

bus, Ohio, calling it Wendy's Old-Fashioned Hamburgers restaurant. Thomas S. Monaghan spent much of his childhood in a Catholic orphanage and a series of foster homes, worked as a soda jerk, barely graduated from high school, joined the Marines, and bought a pizzeria in Ypsilanti, Michigan, with his brother, securing the deal through a down payment of \$75. Eight months later Monaghan's brother decided to quit and accepted a used Volkswagen Beetle for his share of a business later known as Domino's.

The story of Harland Sanders is perhaps the most remarkable. Sanders left school at the age of twelve, worked as a farm hand, a mule tender, and a railway fireman. At various times he worked as a lawyer without having a law degree, delivered babies as a part-time obstetrician without having a medical degree, sold insurance door to door, sold Michelin tires, and operated a gas station in Corbin, Kentucky. He served home-cooked food at a small dining-room table in the back, later opened a popular restaurant and motel, sold them to pay off debts, and at the age of sixty-five became a traveling salesman once again, offering restaurant owners the "secret recipe" for his fried chicken. The first Kentucky Fried Chicken restaurant opened in 1952, near Salt Lake City, Utah. Lacking money to promote the new chain, Sanders dressed up like a Kentucky colonel, sporting a white suit and a black string tie. By the early 1960s, Kentucky Fried Chicken was the largest restaurant chain in the United States, and Colonel Sanders was a household name. In his autobiography, *Life As I Have Known It Has Been "Finger-lickin' Good,"* Sanders described his ups and downs, his decision at the age of seventy-four to be rebaptized and born again, his lifelong struggle to stop cursing. Despite his best efforts and a devout faith in Christ, Harland Sanders admitted that it was still awfully hard "not to call a no-good, lazy, incompetent, dishonest s.o.b. by anything else but his rightful name."

For every fast food idea that swept the nation, there were countless others that flourished briefly — or never had a prayer. There were chains with homey names, like Sandy's, Carrol's, Henry's, Winky's, and Mr. Fifteen's. There were chains with futuristic names, like the Satellite Hamburger System and Kelly's Jet System. Most of all, there were chains named after their main dish: Burger Chefs, Burger Queens, Burgerville USAs, Yummy Burgers, Twitty Burgers, Whataburgers, Dundee Burgers, Biff-Burgers, O.K. Big Burgers, and Burger Boy Food-O-Ramas.

Many of the new restaurants advertised an array of technological

wonders. Carhops were rendered obsolete by various remote-control ordering systems, like the Fone-A-Chef, the Teletray, and the Electro-Hop. The Motormat was an elaborate rail system that transported food and beverages from the kitchen to parked cars. At the Biff-Burger chain, Biff-Burgers were “roto-broiled” beneath glowing quartz tubes that worked just like a space heater. Insta-Burger-King restaurants featured a pair of “Miracle Insta Machines,” one to make milk shakes, the other to cook burgers. “Both machines have been *thoroughly perfected*,” the company assured prospective franchisees, “are of fool-proof design — can be easily operated even by a moron.” The Insta-Burger Stove was an elaborate contraption. Twelve hamburger patties entered it in individual wire baskets, circled two electric heating elements, got cooked on both sides, and then slid down a chute into a pan of sauce, while hamburger buns toasted in a nearby slot. This Miracle Insta Machine proved overly complex, frequently malfunctioned, and was eventually abandoned by the Burger King chain.

The fast food wars in southern California — the birthplace of Jack in the Box, as well as McDonald’s, Taco Bell, and Carl’s Jr. — were especially fierce. One by one, most of the old drive-ins closed, unable to compete against the less expensive, self-service burger joints. But Carl kept at it, opening new restaurants up and down the state, following the new freeways. Four of these freeways — the Riverside, the Santa Ana, the Costa Mesa, and the Orange — soon passed through Anaheim. Although Carl’s Jr. was a great success, a few of Carl’s other ideas should have remained on the drawing board. Carl’s Whistle Stops featured employees dressed as railway workers, “Hobo Burgers,” and toy electric trains that took orders to the kitchen. Three were built in 1966 and then converted to Carl’s Jr. restaurants a few years later. A coffee shop chain with a Scottish theme also never found its niche. The waitresses at “Scot’s” wore plaid skirts, and the dishes had unfortunate names, such as “The Clansman.”

The leading fast food chains spread nationwide; between 1960 and 1973, the number of McDonald’s restaurants grew from roughly 250 to 3,000. The Arab oil embargo of 1973 gave the fast food industry a bad scare, as long lines at gas stations led many to believe that America’s car culture was endangered. Amid gasoline shortages, the value of McDonald’s stock fell. When the crisis passed, fast food stock prices recovered, and McDonald’s intensified its efforts to open urban, as well as suburban, restaurants. Wall Street invested heavily in the fast food chains, and corporate managers replaced many of the early pio-

neers. What had begun as a series of small, regional businesses became a fast food industry, a major component of the American economy.

## progress

IN 1976, THE NEW HEADQUARTERS of Carl Karcher Enterprises, Inc. (CKE) was built on the same land in Anaheim where the Heinz farm had once stood. The opening-night celebration was one of the high points of Carl’s life. More than a thousand people gathered for a black-tie party at a tent set up in the parking lot. There was dinner and dancing on a beautiful, moonlit night. Thirty-five years after buying his first hot dog cart, Carl Karcher now controlled one of the largest privately owned fast food chains in the United States. He owned hundreds of restaurants. He considered many notable Americans to be his friends, including Governor Ronald Reagan, former president Richard Nixon, Gene Autry, Art Linkletter, Lawrence Welk, and Pat Boone. Carl’s nickname was “Mr. Orange County.” He was a benefactor of Catholic charities, a Knight of Malta, a strong supporter of right-to-life causes. He attended private masses at the Vatican with the Pope. And then, despite all the hard work, Carl’s luck began to change.

During the 1980s CKE went public, opened Carl’s Jr. restaurants in Texas, added higher-priced dinners to the menu, and for the first time began to expand by selling franchises. The new menu items and the restaurants in Texas fared poorly. The value of CKE’s stock fell. In 1988, Carl and half a dozen members of his family were accused of insider trading by the Securities and Exchange Commission (SEC). They had sold large amounts of CKE stock right before its price tumbled. Carl vehemently denied the charges and felt humiliated by the publicity surrounding the case. Nevertheless, Carl agreed to a settlement with the SEC — to avoid a long and expensive legal battle, he said — and paid more than half a million dollars in fines.

During the early 1990s, a number of Carl’s real estate investments proved unwise. When new subdivisions in Anaheim and the Inland Empire went bankrupt, Carl was saddled with many of their debts. He had allowed real estate developers to use his CKE stock as collateral for their bank loans. He became embroiled in more than two dozen lawsuits. He suddenly owed more than \$70 million to various banks. The falling price of CKE stock hampered his ability to repay the loans. In May of 1992, his brother Don — a trusted adviser and the president of

CKE — died. The new president tried to increase sales at Carl's Jr. restaurants by purchasing food of a lower quality and cutting prices. The strategy began to drive customers away.

As the chairman of CKE, Carl searched for ways to save his company and pay off his debts. He proposed selling Mexican food at Carl's Jr. restaurants as part of a joint venture with a chain called Green Burrito. But some executives at CKE opposed the plan, arguing that it would benefit Carl much more than the company. Carl had a financial stake in the deal; upon its acceptance by the board of CKE, he would receive a \$6 million personal loan from Green Burrito. Carl was outraged that his motives were being questioned and that his business was being run into the ground. CKE now felt like a much different company than the one he'd founded. The new management team had ended the longtime practice of starting every executive meeting with the prayer of St. Francis of Assisi and the pledge of allegiance to the flag. Carl insisted that the Green Burrito plan would work and demanded that the board of directors vote on it. When the board rejected the plan, Carl tried to oust its members. Instead, they ousted him. On March 1, 1993, CKE's board voted five to two to fire Carl N. Karcher. Only Carl and his son Carl Leo opposed the dismissal. Carl felt deeply betrayed. He had known many of the board members for years; they were old friends; he had made them rich. In a statement released after the firing, Carl described the CKE board as "a bunch of turncoats" and called it "one of the saddest days" of his life. At the age of seventy-six, more than five decades after starting the business, Carl N. Karcher was prevented from entering his own office, and new locks were put on the doors.

The headquarters of CKE is still located on the property where the Heinz family once grew oranges. Today there's no smell of citrus in the air, no orange groves in sight. In a town that once had endless rows of orange and lemon trees, stretching far as the eye could see, there's not an acre of them left, not a single acre devoted to commercial citrus growing. Anaheim's population is now about three hundred thousand, roughly thirty times what it was when Carl first arrived. On the corner where Carl's Drive-In Barbeque once stood, there's a strip mall. Near the CKE headquarters on Harbor Boulevard, there's an Exxon station, a discount mattress store, a Shoe City, a Las Vegas Auto Sales store, and an off-ramp of the Riverside Freeway. The CKE building has a modern, Spanish design, with white columns, red brick arches, and dark plate-glass windows. When I visited recently, it was cool and

quiet inside. After passing a life-size wooden statue of St. Francis of Assisi on a stairway landing, I was greeted at the top of the stairs by Carl N. Karcher.

Carl looked like a stylish figure from the big-band era, wearing a brown checked jacket, a white shirt, a brown tie, and jaunty two-tone shoes. He was tall and strong, and seemed in remarkably good shape. The walls of his office were covered with plaques and mementos, with photographs of Carl beside presidents, famous ballplayers, former employees, grandchildren, priests, cardinals, Mikhail Gorbachev, the Pope. Carl proudly removed a framed object from the wall and handed it to me. It was the original receipt for \$326, confirming the purchase of his first hot dog cart.

Eight weeks after being locked out of his office in 1993, Carl engineered a takeover of the company. Through a complex series of transactions, a partnership headed by financier William P. Foley II assumed some of Carl's debts, received much of his stock in return, and took control of CKE. Foley became the new chairman of the board. Carl was named chairman emeritus and got his old office back. Almost all of the executives and directors who had opposed him subsequently left the company. The Green Burrito plan was adopted and proved a success. The new management at CKE seemed to have turned the company around, raising the value of its stock. In July of 1997, CKE purchased Hardee's for \$327 million, thereby becoming the fourth-largest hamburger chain in the United States, joining McDonald's, Burger King, and Wendy's at the top. And signs bearing the Carl's Jr. smiling little star started going up across the United States.

Carl seemed amazed by his own life story as he told it. He'd been married to Margaret for sixty years. He'd lived in the same Anaheim house for almost fifty years. He had twenty granddaughters and twenty grandsons. For a man of eighty, he had an impressive memory, quickly rattling off names, dates, and addresses from half a century ago. He exuded the genial optimism and good humor of his old friend Ronald Reagan. "My whole philosophy is — never give up," Carl told me. "The word 'can't' should not exist . . . Have a great attitude . . . Watch the pennies and the dollars will take care of themselves . . . Life is beautiful, life is fantastic, and that is how I feel about every day of my life." Despite CKE's expansion, Carl remained millions of dollars in debt. He'd secured new loans to pay off the old ones. During the worst of his financial troubles, advisers pleaded with him to declare bankruptcy. Carl refused; he'd borrowed more than \$8 million

from family members and friends, and he would not walk away from his obligations. Every weekday he was attending Mass at six o'clock in the morning and getting to the office by seven. "My goal in the next two years," he said, "is to pay off all my debts."

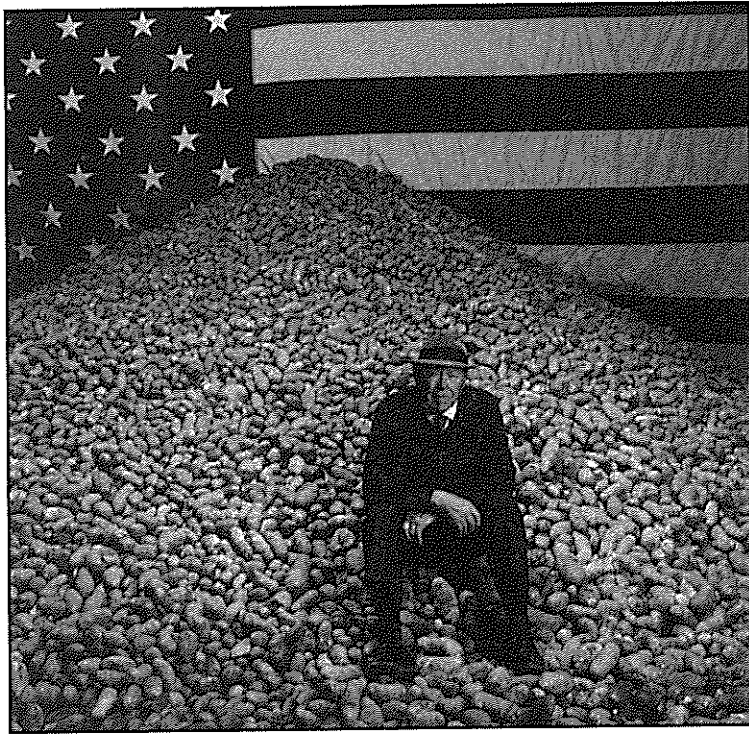
I looked out the window and asked how he felt driving through Anaheim today, with its fast food restaurants, subdivisions, and strip malls. "Well, to be frank about it," he said, "I couldn't be happier." Thinking that he'd misunderstood the question, I rephrased it, asking if he ever missed the old Anaheim, the ranches and citrus groves.

"No," he answered. "I believe in Progress."

Carl grew up on a farm without running water or electricity. He'd escaped a hard rural life. The view outside his office window was not disturbing to him, I realized. It was a mark of success.

"When I first met my wife," Carl said, "this road here was gravel . . . and now it's blacktop."





## 5 / why the fries taste good

**T**O REACH THE J. R. SIMPLOT PLANT in Aberdeen, Idaho, you drive through downtown Aberdeen, population 2,000, and keep heading north, past the half dozen shops on Main Street. Then turn right at the Tiger Hut, an old hamburger stand named after a local high school team, cross the railroad tracks where freight cars are loaded with sugar beets, drive another quarter of a mile, and you're there. It smells like someone's cooking potatoes. The Simplot plant is low and square, clean and neat. The employee parking lot is filled with pickup trucks, and there's a big American flag flying out front. Aberdeen sits in the heart of Bingham County, which grows more potatoes than any other county in Idaho. The Simplot plant runs twenty-four hours a day, three hundred and ten days a year, turning potatoes into french fries. It's a small facility, by industry standards, built in the late 1950s. It processes about a million pounds of potatoes a day.

Inside the building, a maze of red conveyer belts crisscrosses in and out of machines that wash, sort, peel, slice, blanch, blow-dry, fry, and flash-freeze potatoes. Workers in white coats and hard hats keep everything running smoothly, monitoring the controls, checking the fries for imperfections. Streams of sliced potatoes pour from machines. The place has a cheerful, humble, Eisenhower-era feeling, as though someone's dream of technological progress, of better living through frozen food, has been fulfilled. Looming over the whole enterprise is the spirit of one man: John Richard Simplot, America's great potato baron, whose seemingly inexhaustible energy and willingness to take risks built an empire based on french fries. By far the most important figure in one of the nation's most conservative states, Simplot displays the contradictory traits that have guided the economic development of the American West, the odd mixture of rugged individualism and a dependence upon public land and resources. In a

portrait that hangs above the reception desk at the Aberdeen plant, J. R. Simplot has the sly grin of a gambler who's scored big.

Simplot was born in 1909. His family left Dubuque, Iowa, the following year and eventually settled in Idaho. The Snake River Reclamation Project was offering cheap water for irrigation, funded by the U.S. government, that would convert the desert of southern Idaho into lush farmland. Simplot's father became a homesteader, obtaining land for free and clearing it with a steel rail dragged between two teams of horses. Simplot grew up working hard on the farm. He rebelled against his domineering father, dropped out of school at the age of fifteen, and left home. He found work at a potato warehouse in the small town of Declo, Idaho. He sorted potatoes with a "shaker sorter," a hand-held device, nine to ten hours a day for 30 cents an hour. At the boarding house where he rented a room, Simplot met a group of schoolteachers who were being paid not in cash but in interest-bearing scrip. Simplot bought the scrip from the teachers for 50 cents on the dollar — and then sold the scrip to a local bank for 90 cents on the dollar. With his earnings, Simplot bought a rifle, an old truck, and 600 hogs for \$1 a head. He built a cooker in the desert, stoked it with sagebrush, shot wild horses, skinned them, sold their hides for \$2 each, cooked their meat, and fed the horse meat to his hogs through the winter. That spring, J. R. Simplot sold the hogs for \$12.50 a head and, at the age of sixteen, became a potato farmer.

The Idaho potato industry was just getting started in the 1920s. The state's altitude, warm days, cool nights, light volcanic soil, and abundance of irrigation water made it an ideal setting for growing Russet Burbank potatoes. Simplot leased 160 acres, then bought farm equipment and a team of horses. He learned how to grow potatoes from his landlord, Lindsay Maggart, who raised yields by planting fresh seed every year. In 1928, Simplot and Maggart purchased an electric potato sorter; it seemed a remarkable invention. Simplot began sorting potatoes for his friends and neighbors, but Maggart did not want to share the new device with anyone else. The two men fought over the potato sorter and then agreed to settle who owned it with the flip of a coin. J. R. Simplot won the coin toss, got the sorter, sold all his farm equipment, and started his own business in a potato cellar in Declo. He traveled the Idaho countryside, plugging the rudimentary machine into the nearest available light socket and sorting potatoes for farmers. Soon he was buying and selling potatoes, opening warehouses, forming relationships with commodities brokers nationwide. When J. R. Simplot needed timber for a new warehouse, he and his men would just head down to Yellowstone and chop down some trees. Within a

decade, Simplot was the largest shipper of potatoes in the West, operating thirty-three warehouses in Oregon and Idaho.

Simplot also shipped onions. In 1941, he started to wonder why the Burbank Corporation, an outfit in California, was ordering so many of his onions. Simplot went to California and followed one of the company's trucks to a prune orchard in Vacaville, where the Burbank Corporation was using prune dryers to make dehydrated onions. Simplot immediately bought a six-tunnel prune dryer and set up his own dehydration plant in Caldwell, Idaho. The plant opened on October 8, 1941. Two months later, the United States entered World War II, and Simplot began selling dehydrated onions to the U.S. Army. It was a profitable arrangement. The dehydrated onion powder, he later recalled, was like "gold dust."

The J. R. Simplot Dehydrating Company soon perfected a new method for drying potatoes and became one of the principal suppliers of food to the American military during World War II. In 1942, the company had a hundred workers at the Caldwell plant; by 1944, it had about twelve hundred. The Caldwell facility became the largest dehydrating plant in the world. J. R. Simplot used the profits earned as a military contractor to buy potato farms and cattle ranches, to build fertilizer plants and lumber mills, to stake mining claims and open a huge phosphate mine on the Fort Hall Indian Reservation. By the end of World War II, Simplot was growing his own potatoes, fertilizing them with his own phosphate, processing them at his factories, shipping them in boxes from his lumber yards, and feeding the leftover potato scraps to his cattle. He was thirty-six years old.

After the war, Simplot invested heavily in frozen food technology, betting that it would provide the meals of the future. Clarence Birdseye had patented a number of techniques for flash-freezing in the 1920s. But sales of Birdseye's new products were hampered, among other things, by the fact that few American grocery stores, and even fewer households, owned a freezer. The sales of refrigerators, freezers, and other kitchen appliances soared after World War II. The 1950s soon became "the Golden Age of Food Processing," in the words of historian Harvey Levenstein, a decade in which one marvelous innovation after another promised to simplify the lives of American housewives: frozen orange juice, frozen TV dinners, the Chicken-of-Tomorrow, "Potato salad from a package!" Cheese Whiz, Jell-O salads, Jet-Puffed Marshmallows, Miracle Whip. Depression-era scarcity gave way to a cornucopia of new foods on the shelves of new suburban supermarkets. Ad campaigns made processed foods seem better than fresh ones, more space-age and up to date. According to Levenstein,

many restaurants proudly displayed their canned soups, and a chain called Tad's 30 Varieties of Meals featured frozen dinners on its menu. Customers at Tad's cooked the frozen meals at tableside microwave ovens.

Postwar refrigerators came with freezer compartments, and J. R. Simplot thought about the foods that housewives might want to put in them. He assembled a team of chemists, led by Ray Dunlap, to develop a product that seemed to have enormous potential: the frozen french fry. Americans were eating more fries than ever before, and the Russet Burbank, with its large size and high starch content, was the perfect potato for frying. Simplot wanted to create an inexpensive frozen fry that tasted just as good as a fresh one. Although Thomas Jefferson had brought the Parisian recipe for *pommes frites* to the United States in 1802, french fries did not become well known in this country until the 1920s. Americans traditionally ate their potatoes boiled, mashed, or baked. French fries were popularized in the United States by World War I veterans who'd enjoyed them in Europe and by the drive-in restaurants that subsequently arose in the 1930s and 1940s. Fries could be served without a fork or a knife, and they were easy to eat behind the wheel. But they were extremely time-consuming to prepare. Simplot's chemists experimented with various methods for the mass production of french fries, enduring a number of setbacks, learning the hard way that fries will sink to the bottom of a potato chip fryer and then burn. One day Dunlap walked into J. R. Simplot's office with some frozen fries that had just been reheated. Simplot tasted them, realized the manufacturing problems had been solved, and said, "That's a helluva thing."

J. R. Simplot started selling frozen french fries in 1953. Sales were initially disappointing. Although the frozen fries were precooked and could be baked in an oven, they tasted best when heated in hot oil, limiting their appeal to busy homemakers. Simplot needed to find institutional customers, restaurant owners who'd recognize the tremendous labor-saving benefits of his frozen fries.

"The french fry [was] . . . almost sacrosanct for me," Ray Kroc wrote in his memoir, "its preparation a ritual to be followed religiously." The success of Richard and Mac McDonald's hamburger stand had been based as much on the quality of their fries as on the taste of their burgers. The McDonald brothers had devised an elaborate system for making crisp french fries, one that was later improved by the restaurant chain. McDonald's cooked thinly sliced Russet Burbanks in special fryers to keep the oil temperature above 325 degrees. As the chain expanded, it became more difficult — and yet all the more important

— to maintain the consistency and quality of the fries. J. R. Simplot met with Ray Kroc in 1965. The idea of switching to frozen french fries appealed to Kroc, as a means of ensuring uniformity and cutting labor costs. McDonald's obtained its fresh potatoes from about 175 different local suppliers, and crew members spent a great deal of time peeling and slicing potatoes. Simplot offered to build a new factory solely for the manufacture of McDonald's french fries. Kroc agreed to try Simplot's fries, but made no long-term commitment. The deal was sealed with a handshake.

McDonald's began to sell J. R. Simplot's frozen french fries the following year. Customers didn't notice any difference in taste. And the reduced cost of using a frozen product made french fries one of the most profitable items on the menu — far more profitable than hamburgers. Simplot quickly became the main supplier of french fries to McDonald's. At the time, McDonald's had about 725 restaurants in the United States. Within a decade, it had more than 3,000. Simplot sold his frozen fries to other restaurant chains, accelerating the growth of the fast food industry and changing the nation's eating habits. Americans have long consumed more potatoes than any other food except dairy products and wheat flour. In 1960, the typical American ate eighty-one pounds of fresh potatoes and about four pounds of frozen french fries. Today the typical American eats about forty-nine pounds of fresh potatoes every year — and more than thirty pounds of frozen french fries. Ninety percent of those fries are purchased at fast food restaurants. Indeed, french fries have become the most widely sold foodservice item in the United States.

J. R. Simplot, an eighth-grade dropout, is now one of the richest men in the United States. His privately held company grows and processes corn, peas, broccoli, avocados, and carrots, as well as potatoes; feeds and processes cattle; manufactures and distributes fertilizer; mines phosphate and silica; produces oil, ethanol, and natural gas. In 1980, Simplot provided \$1 million in start-up funds to a couple of engineers working in the basement of a dentist's office in Boise, Idaho. Twenty years later, his investment in Micron Technology — a manufacturer of computer memory chips and the largest private employer in Idaho — was worth about \$1.5 billion. Simplot is also one of the nation's biggest landowners. "I've been a land hog all my life," Simplot told me, laughing. While still in his teens, he bought 18,000 acres along the Snake River, paying 50 cents an acre for it with borrowed money. His company now has 85,000 acres of irrigated farmland, and Simplot personally owns more than twice that amount of ranchland. He owns much of downtown Boise and a big hillside home

overlooking the city. At home he flies a gigantic American flag on a pole that's ten stories high. In addition to what he owns, Simplot leases more than 2 million acres of land from the federal government. His ZX Ranch in southern Oregon is the largest cattle ranch in the United States, measuring 65 miles wide and 163 miles long. Altogether, Simplot controls a bloc of North American land that's bigger than the state of Delaware.

Despite being a multibillionaire, J. R. Simplot has few pretensions. He wears cowboy boots and blue jeans, eats at McDonald's, and drives his own car, a Lincoln Continental with license plates that say "MR. SPUD." He seems to have little patience for abstractions, viewing religion as a bunch of "hocus-pocus" and describing his potato empire matter-of-factly: "It's big and it's real, it ain't bullshit." Recently Simplot has been slowing down. A bad fall made him give up horseback riding at the age of eighty; in 1999 he turned ninety and quit skiing. He stepped down as the chief executive of his company in 1994, but keeps buying more land and scouting new factories. "Hell, fellow, I'm just an old farmer got some luck," Simplot said, when I asked about the key to his success. "The only thing I did smart, and just remember this — ninety-nine percent of people would have sold out when they got their first twenty-five or thirty million. I didn't sell out. I just hung on."

## the mistake of standing alone

THE PRODUCTION OF frozen french fries has become an intensely competitive business. Although the J. R. Simplot Company supplies the majority of the french fries that McDonald's sells in the United States, two other fry companies are now larger: Lamb Weston, the nation's leading producer of fries, and McCain, a Canadian firm that became the number-two fry company after buying Ore-Ida in 1997. Simplot, Lamb Weston, and McCain now control about 80 percent of the American market for frozen french fries, having eliminated or acquired most of their smaller rivals. The three french fry giants compete for valuable contracts to supply the fast food chains. Frozen french fries have become a bulk commodity, manufactured in high volumes at a low profit margin. Price differences of just a few pennies a pound can mean the difference between winning or losing a major contract. All of this has greatly benefited the fast food chains, lowering their wholesale costs and making their retail sales of french fries even more profitable. Burger King's assault on the supremacy of the Mc-

Donald's french fry, launched in 1997 with a \$70 million advertising campaign, was driven in large part by the huge markups that are possible with fries. The fast food companies purchase frozen fries for about 30 cents a pound, reheat them in oil, then sell them for about \$6 a pound.

Idaho's potato output surpassed Maine's in the late 1950s, owing to the rise of the french fry industry and the productivity gains made by Idaho farmers. Since 1980, the tonnage of potatoes grown in Idaho has almost doubled, while the average yield per acre has risen by nearly 30 percent. But the extraordinary profits being made from the sale of french fries have barely trickled down to the farmers. Paul Patterson, an extension professor of agricultural economics at the University of Idaho, describes the current market for potatoes as an "oligopsony" — a market in which a small number of buyers exert power over a large number of sellers. The giant processing companies do their best to drive down the prices offered to potato farmers. The increased productivity of Idaho farmers has lowered prices even further, shifting more of the profits to the processors and the fast food chains. Out of every \$1.50 spent on a large order of fries at a fast food restaurant, perhaps 2 cents goes to the farmer who grew the potatoes.

Idaho's potato farmers now face enormous pressure to get bigger — or get out of the business. Adding more acreage increases total revenues and allows more capital investment; but the risks get bigger, too. The latest potato harvesting equipment — bright red, beautiful machines manufactured in Idaho by a company called Spudnik — can set a farmer back hundreds of thousands of dollars. It costs about \$1,500 an acre to grow potatoes in Bingham County. The average potato farmer there, who plants about four hundred acres, is more than half a million dollars in the hole before selling a single potato. In order to break even, the farmer needs to receive about \$5 per hundredweight of potatoes. During the 1996–97 season, potato prices fell as low as \$1.50 per hundredweight. That year was a disaster for Idaho potato farmers, perhaps the worst in history. Record harvests nationwide and a flood of cheap imports from Canada created an enormous glut of potatoes. For many farmers, letting potatoes rot in the field would have been more profitable than selling them at such low prices. That was not a viable option, however; rotting potatoes can damage the land. Prices have recovered since then, but remain unusually low. An Idaho potato farmer's annual income is now largely determined by the weather, the world market, and the whims of the giant processors. "The only thing I can really control," one farmer told me, "is what time I get out of bed in the morning."

Over the past twenty-five years, Idaho has lost about half of its potato farmers. During the same period, the amount of land devoted to potatoes has increased. Family farms are giving way to corporate farms that stretch for thousands of acres. These immense corporate farms are divided into smaller holdings for administrative purposes, and farmers who've been driven off the land are often hired to manage them. The patterns of land ownership in the American West more and more resemble those of rural England. "We've come full circle," says Paul Patterson. "You increasingly find two classes of people in rural Idaho: the people who run the farms and the people who own them."

The headquarters of the Potato Growers of Idaho (PGI) is a strip-small office suite, not far from a potato museum in Blackfoot. The PGI is a nonprofit organization that supplies market information to farmers and helps them negotiate contracts with processors. Bert Moulton, a longtime PGI staff member, is a big man with a crew cut who looks like a Goldwater Republican but sounds like an old-fashioned populist. Moulton thinks forming some sort of co-op, an association to coordinate marketing and production levels, may be the last hope for Idaho's potato farmers. At the moment, most farmers live in areas where there are only one or two processors buying potatoes — and oddly enough, those processors never seem to be bidding for potatoes on the same day. "Legally, the processors aren't supposed to be talking to one another," Moulton says. "But you know that they do." Not long ago, the major french fry companies in Idaho were owned by people with strong ties to the local community. J. R. Simplot was highly regarded by most Idaho farmers; he always seemed willing to help carry them through a lean year. Moulton says the fry companies now tend to be run by outsiders, by "MBA's from Harvard who don't know if a potato grows on a tree or underground." The multinational food companies operate french fry plants in a number of different regions, constantly shifting production to take advantage of the lowest potato prices. The economic fortunes of individual farmers or local communities matter little in the grand scheme.

A few years ago, the PGI tried to create a formal alliance with potato farmers in Oregon and Washington, an effort that would have linked producers in the three states that grow most of the nation's potatoes. The alliance was undermined by one of the big processors, which cut lucrative deals with a core group of potato farmers. Moulton believes that Idaho's farmers deserve some of the blame for their own predicament. Long regarded as the aristocrats of rural Idaho, potato farmers remain stubbornly independent and unwilling to join forces. "Some of them are independent to the point of poverty," he says. Today there

are roughly 1,100 potato farmers left in Idaho — few enough to fit in a high school auditorium. About half of them belong to the PGI, but the organization needs at least three-quarters of them as members to gain real bargaining power. The "joint ventures" now being offered by processing companies provide farmers with the potato seed and financing for their crop, an arrangement that should dispel any lingering illusions about their independence. "If potato farmers don't band together," Bert Moulton warns, "they'll wind up sharecroppers."

The behavior of Idaho's potato growers often betrays a type of faulty reasoning described in most college-level economics textbooks. "The fallacy of composition" is a logical error — a mistaken belief that what seems good for an individual will still be good when others do the same thing. For example, someone who stands at a crowded concert may get a better view of the stage. But if everyone at the concert stands up, nobody's view is improved. Since the end of World War II, farmers in the United States have been persuaded to adopt one new technology after another, hoping to improve their yields, reduce their costs, and outsell their neighbors. By embracing this industrial model of agriculture — one that focuses narrowly on the level of inputs and outputs, that encourages specialization in just one crop, that relies heavily on chemical fertilizers, pesticides, fungicides, herbicides, advanced harvesting and irrigation equipment — American farmers have become the most productive farmers on earth. Every increase in productivity, however, has driven more American farmers off the land. And it has left those who remain beholden to the companies that supply the inputs and the processors that buy the outputs. William Heffernan, a professor of rural sociology at the University of Missouri, says that America's agricultural economy now resembles an hourglass. At the top there are about 2 million ranchers and farmers; at the bottom there are 275 million consumers; and at the narrow portion in the middle, there are a dozen or so multinational corporations earning a profit from every transaction.

## food product design

THE TASTE OF McDonald's french fries has long been praised by customers, competitors, and even food critics. James Beard loved McDonald's fries. Their distinctive taste does not stem from the type of potatoes that McDonald's buys, the technology that processes them, or the restaurant equipment that fries them. Other chains buy their french fries from the same large processing companies, use Russet

Burbanks, and have similar fryers in their restaurant kitchens. The taste of a fast food fry is largely determined by the cooking oil. For decades, McDonald's cooked its french fries in a mixture of about 7 percent cottonseed oil and 93 percent beef tallow. The mix gave the fries their unique flavor — and more saturated beef fat per ounce than a McDonald's hamburger.

Amid a barrage of criticism over the amount of cholesterol in their fries, McDonald's switched to pure vegetable oil in 1990. The switch presented the company with an enormous challenge: how to make fries that subtly taste like beef without cooking them in tallow. A look at the ingredients now used in the preparation of McDonald's french fries suggests how the problem was solved. Toward the end of the list is a seemingly innocuous, yet oddly mysterious phrase: "natural flavor." That ingredient helps to explain not only why the fries taste so good, but also why most fast food — indeed, most of the food Americans eat today — tastes the way it does.

Open your refrigerator, your freezer, your kitchen cupboards, and look at the labels on your food. You'll find "natural flavor" or "artificial flavor" in just about every list of ingredients. The similarities between these two broad categories of flavor are far more significant than their differences. Both are man-made additives that give most processed food most of its taste. The initial purchase of a food item may be driven by its packaging or appearance, but subsequent purchases are determined mainly by its taste. About 90 percent of the money that Americans spend on food is used to buy processed food. But the canning, freezing, and dehydrating techniques used to process food destroy most of its flavor. Since the end of World War II, a vast industry has arisen in the United States to make processed food palatable. Without this flavor industry, today's fast food industry could not exist. The names of the leading American fast food chains and their best-selling menu items have become famous worldwide, embedded in our popular culture. Few people, however, can name the companies that manufacture fast food's taste.

The flavor industry is highly secretive. Its leading companies will not divulge the precise formulas of flavor compounds or the identities of clients. The secrecy is deemed essential for protecting the reputation of beloved brands. The fast food chains, understandably, would like the public to believe that the flavors of their food somehow originate in their restaurant kitchens, not in distant factories run by other firms.

The New Jersey Turnpike runs through the heart of the flavor industry, an industrial corridor dotted with refineries and chemical

plants. International Flavors & Fragrances (IFF), the world's largest flavor company, has a manufacturing facility off Exit 8A in Dayton, New Jersey; Givaudan, the world's second-largest flavor company, has a plant in East Hanover. Haarmann & Reimer, the largest German flavor company, has a plant in Teterboro, as does Takasago, the largest Japanese flavor company. Flavor Dynamics has a plant in South Plainfield; Frutarom is in North Bergen; Elan Chemical is in Newark. Dozens of companies manufacture flavors in the corridor between Teaneck and South Brunswick. Indeed, the area produces about two-thirds of the flavor additives sold in the United States.

The IFF plant in Dayton is a huge pale blue building with a modern office complex attached to the front. It sits in an industrial park, not far from a BASF plastics factory, a Jolly French Toast factory, and a plant that manufactures Liz Claiborne cosmetics. Dozens of tractor-trailers were parked at the IFF loading dock the afternoon I visited, and a thin cloud of steam floated from the chimney. Before entering the plant, I signed a nondisclosure form, promising not to reveal the brand names of products that contain IFF flavors. The place reminded me of Willy Wonka's chocolate factory. Wonderful smells drifted through the hallways, men and women in neat white lab coats cheerfully went about their work, and hundreds of little glass bottles sat on laboratory tables and shelves. The bottles contained powerful but fragile flavor chemicals, shielded from light by the brown glass and the round plastic caps shut tight. The long chemical names on the little white labels were as mystifying to me as medieval Latin. They were the odd-sounding names of things that would be mixed and poured and turned into new substances, like magic potions.

I was not invited to see the manufacturing areas of the IFF plant, where it was thought I might discover trade secrets. Instead, I toured various laboratories and pilot kitchens, where the flavors of well-established brands are tested or adjusted, and where whole new flavors are created. IFF's snack and savory lab is responsible for the flavor of potato chips, corn chips, breads, crackers, breakfast cereals, and pet food. The confectionery lab devises the flavor for ice cream, cookies, candies, toothpastes, mouthwashes, and antacids. Everywhere I looked, I saw famous, widely advertised products sitting on laboratory desks and tables. The beverage lab is full of brightly colored liquids in clear bottles. It comes up with the flavor for popular soft drinks, sport drinks, bottled teas, and wine coolers, for all-natural juice drinks, organic soy drinks, beers, and malt liquors. In one pilot kitchen I saw a dapper food technologist, a middle-aged man with an elegant tie beneath his lab coat, carefully preparing a batch of cookies with white

frosting and pink-and-white sprinkles. In another pilot kitchen I saw a pizza oven, a grill, a milk-shake machine, and a french fryer identical to those I'd seen behind the counter at countless fast food restaurants.

In addition to being the world's largest flavor company, IFF manufactures the smell of six of the ten best-selling fine perfumes in the United States, including Estée Lauder's Beautiful, Clinique's Happy, Lancôme's Trésor, and Calvin Klein's Eternity. It also makes the smell of household products such as deodorant, dishwashing detergent, bath soap, shampoo, furniture polish, and floor wax. All of these aromas are made through the same basic process: the manipulation of volatile chemicals to create a particular smell. The basic science behind the scent of your shaving cream is the same as that governing the flavor of your TV dinner.

The aroma of a food can be responsible for as much as 90 percent of its flavor. Scientists now believe that human beings acquired the sense of taste as a way to avoid being poisoned. Edible plants generally taste sweet; deadly ones, bitter. Taste is supposed to help us differentiate food that's good for us from food that's not. The taste buds on our tongues can detect the presence of half a dozen or so basic tastes, including: sweet, sour, bitter, salty, astringent, and umami (a taste discovered by Japanese researchers, a rich and full sense of deliciousness triggered by amino acids in foods such as shellfish, mushrooms, potatoes, and seaweed). Taste buds offer a relatively limited means of detection, however, compared to the human olfactory system, which can perceive thousands of different chemical aromas. Indeed "flavor" is primarily the smell of gases being released by the chemicals you've just put in your mouth.

The act of drinking, sucking, or chewing a substance releases its volatile gases. They flow out of the mouth and up the nostrils, or up the passageway in the back of the mouth, to a thin layer of nerve cells called the olfactory epithelium, located at the base of the nose, right between the eyes. The brain combines the complex smell signals from the epithelium with the simple taste signals from the tongue, assigns a flavor to what's in your mouth, and decides if it's something you want to eat.

Babies like sweet tastes and reject bitter ones; we know this because scientists have rubbed various flavors inside the mouths of infants and then recorded their facial reactions. A person's food preferences, like his or her personality, are formed during the first few years of life, through a process of socialization. Toddlers can learn to enjoy hot and spicy food, bland health food, or fast food, depending upon what the people around them eat. The human sense of smell is still not fully

understood and can be greatly affected by psychological factors and expectations. The color of a food can determine the perception of its taste. The mind filters out the overwhelming majority of chemical aromas that surround us, focusing intently on some, ignoring others. People can grow accustomed to bad smells or good smells; they stop noticing what once seemed overpowering. Aroma and memory are somehow inextricably linked. A smell can suddenly evoke a long-forgotten moment. The flavors of childhood foods seem to leave an indelible mark, and adults often return to them, without always knowing why. These "comfort foods" become a source of pleasure and reassurance, a fact that fast food chains work hard to promote. Childhood memories of Happy Meals can translate into frequent adult visits to McDonald's, like those of the chain's "heavy users," the customers who eat there four or five times a week.

The human craving for flavor has been a largely unacknowledged and unexamined force in history. Royal empires have been built, unexplored lands have been traversed, great religions and philosophies have been forever changed by the spice trade. In 1492 Christopher Columbus set sail to find seasoning. Today the influence of flavor in the world marketplace is no less decisive. The rise and fall of corporate empires — of soft drink companies, snack food companies, and fast food chains — is frequently determined by how their products taste.

The flavor industry emerged in the mid-nineteenth century, as processed foods began to be manufactured on a large scale. Recognizing the need for flavor additives, the early food processors turned to perfume companies that had years of experience working with essential oils and volatile aromas. The great perfume houses of England, France, and the Netherlands produced many of the first flavor compounds. In the early part of the twentieth century, Germany's powerful chemical industry assumed the technological lead in flavor production. Legend has it that a German scientist discovered methyl anthranilate, one of the first artificial flavors, by accident while mixing chemicals in his laboratory. Suddenly the lab was filled with the sweet smell of grapes. Methyl anthranilate later became the chief flavoring compound of grape Kool-Aid. After World War II, much of the perfume industry shifted from Europe to the United States, settling in New York City near the garment district and the fashion houses. The flavor industry came with it, subsequently moving to New Jersey to gain more plant capacity. Man-made flavor additives were used mainly in baked goods, candies, and sodas until the 1950s, when sales of processed food began to soar. The invention of gas chromatographs and mass spectrometers — machines capable of detecting vol-

atile gases at low levels — vastly increased the number of flavors that could be synthesized. By the mid-1960s the American flavor industry was churning out compounds to supply the taste of Pop Tarts, Bac-Os, Tab, Tang, Filet-O-Fish sandwiches, and literally thousands of other new foods.

The American flavor industry now has annual revenues of about \$1.4 billion. Approximately ten thousand new processed food products are introduced every year in the United States. Almost all of them require flavor additives. And about nine out of every ten of these new food products fail. The latest flavor innovations and corporate realignments are heralded in publications such as *Food Chemical News*, *Food Engineering*, *Chemical Market Reporter*, and *Food Product Design*. The growth of IFF has mirrored that of the flavor industry as a whole. IFF was formed in 1958, through the merger of two small companies. Its annual revenues have grown almost fifteenfold since the early 1970s, and it now has manufacturing facilities in twenty countries.

The quality that people seek most of all in a food, its flavor, is usually present in a quantity too infinitesimal to be measured by any traditional culinary terms such as ounces or teaspoons. Today's sophisticated spectrometers, gas chromatographs, and headspace vapor analyzers provide a detailed map of a food's flavor components, detecting chemical aromas in amounts as low as one part per billion. The human nose, however, is still more sensitive than any machine yet invented. A nose can detect aromas present in quantities of a few parts per trillion — an amount equivalent to 0.000000000003 percent. Complex aromas, like those of coffee or roasted meat, may be composed of volatile gases from nearly a thousand different chemicals. The smell of a strawberry arises from the interaction of at least 350 different chemicals that are present in minute amounts. The chemical that provides the dominant flavor of bell pepper can be tasted in amounts as low as .02 parts per billion; one drop is sufficient to add flavor to five average size swimming pools. The flavor additive usually comes last, or second to last, in a processed food's list of ingredients. As a result, the flavor of a processed food often costs less than its packaging. Soft drinks contain a larger proportion of flavor additives than most products. The flavor in a twelve-ounce can of Coke costs about half a cent.

The color additives in processed foods are usually present in even smaller amounts than the flavor compounds. Many of New Jersey's flavor companies also manufacture these color additives, which are used to make processed foods look appealing. Food coloring serves many of the same purposes as lipstick, eye shadow, mascara — and

is often made from the same pigments. Titanium dioxide, for example, has proved to be an especially versatile mineral. It gives many processed candies, frosting, and icing their bright white color; it is a common ingredient in women's cosmetics; and it is the pigment used in many white oil paints and house paints. At Burger King, Wendy's, and McDonald's, coloring agents have been added to many of the soft drinks, salad dressings, cookies, condiments, chicken dishes, and sandwich buns.

Studies have found that the color of a food can greatly affect how its taste is perceived. Brightly colored foods frequently seem to taste better than bland-looking foods, even when the flavor compounds are identical. Foods that somehow look off-color often seem to have off tastes. For thousands of years, human beings have relied on visual cues to help determine what is edible. The color of fruit suggests whether it is ripe, the color of meat whether it is rancid. Flavor researchers sometimes use colored lights to modify the influence of visual cues during taste tests. During one experiment in the early 1970s, people were served an oddly tinted meal of steak and French fries that appeared normal beneath colored lights. Everyone thought the meal tasted fine until the lighting was changed. Once it became apparent that the steak was actually blue and the fries were green, some people became ill.

The Food and Drug Administration does not require flavor companies to disclose the ingredients of their additives, so long as all the chemicals are considered by the agency to be GRAS (Generally Regarded As Safe). This lack of public disclosure enables the companies to maintain the secrecy of their formulas. It also hides the fact that flavor compounds sometimes contain more ingredients than the foods being given their taste. The ubiquitous phrase "artificial strawberry flavor" gives little hint of the chemical wizardry and manufacturing skill that can make a highly processed food taste like a strawberry.

A typical artificial strawberry flavor, like the kind found in a Burger King strawberry milk shake, contains the following ingredients: amyl acetate, amyl butyrate, amyl valerate, anethol, anisyl formate, benzyl acetate, benzyl isobutyrate, butyric acid, cinnamyl isobutyrate, cinnamyl valerate, cognac essential oil, diacetyl, dipropyl ketone, ethyl acetate, ethyl amylketone, ethyl butyrate, ethyl cinnamate, ethyl heptanoate, ethyl heptylate, ethyl lactate, ethyl methylphenylglycidate, ethyl nitrate, ethyl propionate, ethyl valerate, heliotropin, hydroxyphenyl-2-butanone (10 percent solution in alcohol),  $\alpha$ -ionone, isobutyl anthranilate, isobutyl butyrate, lemon essential oil, maltol, 4-methylacetophenone, methyl anthranilate, methyl benzoate, methyl cinnamate, methyl heptene carbonate, methyl naphthyl ke-



tone, methyl salicylate, mint essential oil, neroli essential oil, nerolin, neryl isobutyrate, orris butter, phenethyl alcohol, rose, rum ether,  $\gamma$ -undecalactone, vanillin, and solvent.

Although flavors usually arise from a mixture of many different volatile chemicals, a single compound often supplies the dominant aroma. Smelled alone, that chemical provides an unmistakable sense of the food. Ethyl-2-methyl butyrate, for example, smells just like an apple. Today's highly processed foods offer a blank palette: whatever chemicals you add to them will give them specific tastes. Adding methyl-2-peridylketone makes something taste like popcorn. Adding ethyl-3-hydroxybutanoate makes it taste like marshmallow. The possibilities are now almost limitless. Without affecting the appearance or nutritional value, processed foods could even be made with aroma chemicals such as hexanal (the smell of freshly cut grass) or 3-methyl butanoic acid (the smell of body odor).

The 1960s were the heyday of artificial flavors. The synthetic versions of flavor compounds were not subtle, but they did not need to be, given the nature of most processed food. For the past twenty years food processors have tried hard to use only "natural flavors" in their products. According to the FDA, these must be derived entirely from natural sources — from herbs, spices, fruits, vegetables, beef, chicken, yeast, bark, roots, etc. Consumers prefer to see natural flavors on a label, out of a belief that they are healthier. The distinction between artificial and natural flavors can be somewhat arbitrary and absurd, based more on how the flavor has been made than on what it actually contains. "A natural flavor," says Terry Acree, a professor of food science at Cornell University, "is a flavor that's been derived with an out-of-date technology." Natural flavors and artificial flavors sometimes contain exactly the same chemicals, produced through different methods. Amyl acetate, for example, provides the dominant note of banana flavor. When you distill it from bananas with a solvent, amyl acetate is a natural flavor. When you produce it by mixing vinegar with amyl alcohol, adding sulfuric acid as a catalyst, amyl acetate is an artificial flavor. Either way it smells and tastes the same. The phrase "natural flavor" is now listed among the ingredients of everything from Stonyfield Farm Organic Strawberry Yogurt to Taco Bell Hot Taco Sauce.

A natural flavor is not necessarily healthier or purer than an artificial one. When almond flavor (benzaldehyde) is derived from natural sources, such as peach and apricot pits, it contains traces of hydrogen cyanide, a deadly poison. Benzaldehyde derived through a different process — by mixing oil of clove and the banana flavor, amyl

acetate — does not contain any cyanide. Nevertheless, it is legally considered an artificial flavor and sells at a much lower price. Natural and artificial flavors are now manufactured at the same chemical plants, places that few people would associate with Mother Nature. Calling any of these flavors "natural" requires a flexible attitude toward the English language and a fair amount of irony.

The small and elite group of scientists who create most of the flavor in most of the food now consumed in the United States are called "flavorists." They draw upon a number of disciplines in their work: biology, psychology, physiology, and organic chemistry. A flavorist is a chemist with a trained nose and a poetic sensibility. Flavors are created by blending scores of different chemicals in tiny amounts, a process governed by scientific principles but demanding a fair amount of art. In an age when delicate aromas, subtle flavors, and microwave ovens do not easily coexist, the job of the flavorist is to conjure illusions about processed food and, in the words of one flavor company's literature, to ensure "consumer likeability." The flavorists with whom I spoke were charming, cosmopolitan, and ironic. They were also discreet, in keeping with the dictates of their trade. They were the sort of scientist who not only enjoyed fine wine, but could also tell you the chemicals that gave each vintage its unique aroma. One flavorist compared his work to composing music. A well-made flavor compound will have a "top note," followed by a "dry-down," and a "leveling-off," with different chemicals responsible for each stage. The taste of a food can be radically altered by minute changes in the flavoring mix. "A little odor goes a long way," one flavorist said.

In order to give a processed food the proper taste, a flavorist must always consider the food's "mouthfeel" — the unique combination of textures and chemical interactions that affects how the flavor is perceived. The mouthfeel can be adjusted through the use of various fats, gums, starches, emulsifiers, and stabilizers. The aroma chemicals of a food can be precisely analyzed, but mouthfeel is much harder to measure. How does one quantify a french fry's crispness? Food technologists are now conducting basic research in rheology, a branch of physics that examines the flow and deformation of materials. A number of companies sell sophisticated devices that attempt to measure mouthfeel. The TA.XT2i Texture Analyzer, produced by the Texture Technologies Corporation, performs calculations based on data derived from as many as 250 separate probes. It is essentially a mechanical mouth. It gauges the most important rheological properties of a food — the bounce, creep, breaking point, density, crunchiness, chewiness, gumminess, lumpiness, rubberiness, springiness, slipper-

ness, smoothness, softness, wetness, juiciness, spreadability, spring-back, and tackiness.

Some of the most important advances in flavor manufacturing are now occurring in the field of biotechnology. Complex flavors are being made through fermentation, enzyme reactions, fungal cultures, and tissue cultures. All of the flavors being created through these methods — including the ones being synthesized by fungi — are considered natural flavors by the FDA. The new enzyme-based processes are responsible for extremely lifelike dairy flavors. One company now offers not just butter flavor, but also fresh creamy butter, cheesy butter, milky butter, savory melted butter, and super-concentrated butter flavor, in liquid or powder form. The development of new fermentation techniques, as well as new techniques for heating mixtures of sugar and amino acids, have led to the creation of much more realistic meat flavors. The McDonald's Corporation will not reveal the exact origin of the natural flavor added to its french fries. In response to inquiries from *Vegetarian Journal*, however, McDonald's did acknowledge that its fries derive some of their characteristic flavor from "animal products."

Other popular fast foods derive their flavor from unexpected sources. Wendy's Grilled Chicken Sandwich, for example, contains beef extracts. Burger King's BK Broiler Chicken Breast Patty contains "natural smoke flavor." A firm called Red Arrow Products Company specializes in smoke flavor, which is added to barbecue sauces and processed meats. Red Arrow manufactures natural smoke flavor by charring sawdust and capturing the aroma chemicals released into the air. The smoke is captured in water and then bottled, so that other companies can sell food which seems to have been cooked over a fire.

The Vegetarian Legal Action Network recently petitioned the FDA to issue new food labeling requirements for foods that contain natural flavors. The group wants food processors to list the basic origins of their flavors on their labels. At the moment, vegetarians often have no way of knowing whether a flavor additive contains beef, pork, poultry, or shellfish. One of the most widely used color additives — whose presence is often hidden by the phrase "color added" — violates a number of religious dietary restrictions, may cause allergic reactions in susceptible people, and comes from an unusual source. Cochineal extract (also known as carmine or carminic acid) is made from the desiccated bodies of female *Dactylopius coccus* Costa, a small insect harvested mainly in Peru and the Canary Islands. The bug feeds on red cactus berries and color from the berries accumulated in

the females and their unhatched larvae. The insects are collected, dried, and ground into pigment. It takes about 70,000 of them to produce one pound of carmine, which is used to make processed foods look pink, red, or purple. Dannon strawberry yogurt gets its color from carmine, as do many frozen fruit bars, candies, fruit fillings, and Ocean Spray pink-grapefruit juice drink.

In a meeting room at IFF, Brian Grainger let me sample some of the company's flavors. It was an unusual taste test; there wasn't any food to taste. Grainger is a senior flavorist at IFF, a soft-spoken chemist with graying hair, an English accent, and a fondness for understatement. He could easily be mistaken for a British diplomat or the owner of a West End brasserie with two Michelin stars. Like many in the flavor industry, he has an Old World, old-fashioned sensibility which seems out of step with our brand-conscious, egocentric age. When I suggested that IFF should put its own logo on the products that contain its flavors — instead of allowing other brands to enjoy the consumer loyalty and affection inspired by those flavors — Grainger politely disagreed, assuring me such a thing would never be done. In the absence of public credit or acclaim, the small and secretive fraternity of flavor chemists praises one another's work. Grainger can often tell, by analyzing the flavor formula of a product, which of his counterparts at a rival firm devised it. And he enjoys walking down supermarket aisles, looking at the many products that contain his flavors, even if no one else knows it.

Grainger had brought a dozen small glass bottles from the lab. After he opened each bottle, I dipped a fragrance testing filter into it. The filters were long white strips of paper designed to absorb aroma chemicals without producing off-notes. Before placing the strips of paper before my nose, I closed my eyes. Then I inhaled deeply, and one food after another was conjured from the glass bottles. I smelled fresh cherries, black olives, sautéed onions, and shrimp. Grainger's most remarkable creation took me by surprise. After closing my eyes, I suddenly smelled a grilled hamburger. The aroma was uncanny, almost miraculous. It smelled like someone in the room was flipping burgers on a hot grill. But when I opened my eyes, there was just a narrow strip of white paper and a smiling flavorist.

## millions and millions of fries

AT THE HEIGHT OF the potato harvest, I visited the Lamb Weston plant in American Falls, Idaho. It's one of the biggest fry factories in

the world and makes french fries for McDonald's. It has a production capacity more than three times larger than that of the Simplot plant in Aberdeen. It is a state-of-the-art processing facility where raw commodities and man-made additives are combined to make America's most popular food.

Lamb Weston was founded in 1950 by F. Gilbert Lamb, the inventor of a crucial piece of french fry-making technology. The Lamb Water Gun Knife uses a high-pressure hose to shoot potatoes at a speed of 117 feet per second through a grid of sharpened steel blades, thereby creating perfectly sliced french fries. After coming up with the idea, Gil Lamb tested the first Water Gun Knife in a company parking lot, shooting potatoes out of a fire hose. Lamb sold his company to ConAgra in 1988. Lamb Weston now manufactures more than 130 different types of french fries, including: Steak House Fries, CrissCut Fries, Hi-Fries, Mor-Fries, Burger Fries, Taterbabies, Taterboy Curley QQQ Fries, and Rus-Ettes Special Dry Fry Shoestrings.

Bud Mandeville, the plant manager, led me up a narrow, wooden staircase inside one of the plant's storage buildings. On the top floor, the staircase led to a catwalk, and beneath my feet I saw a mound of potatoes that was twenty feet deep and a hundred feet wide and almost as long as two football fields. The building was cool and dark, kept year-round at a steady 46 degrees. In the dim light the potatoes looked like grains of sand on a beach. This was one of seven storage buildings on the property.

Outside, tractor-trailers arrived from the fields, carrying potatoes that had just been harvested. The trucks dumped their loads onto spinning rods that brought the larger potatoes into the building and let the small potatoes, dirt, and rocks fall to the ground. The rods led to a rock trap, a tank of water in which the potatoes floated and the rocks sank to the bottom. The plant used water systems to float potatoes gently this way and that way, guiding different sizes out of different holding bays, then flushing them into a three-foot-deep stream that ran beneath the cement floor. The interior of the processing plant was gray, massive, and well-lit, with huge pipes running along the walls, steel catwalks, workers in hardhats, and plenty of loud machinery. If there weren't potatoes bobbing and floating past, you might think the place was an oil refinery.

Conveyer belts took the wet, clean potatoes into a machine that blasted them with steam for twelve seconds, boiled the water under their skins, and exploded their skins off. Then the potatoes were pumped into a preheat tank and shot through a Lamb Water Gun

Knife. They emerged as shoestring fries. Four video cameras scrutinized them from different angles, looking for flaws. When a french fry with a blemish was detected, an optical sorting machine time-sequenced a single burst of compressed air that knocked the bad fry off the production line and onto a separate conveyer belt, which carried it to a machine with tiny automated knives that precisely removed the blemish. And then the fry was returned to the main production line.

Sprays of hot water blanched the fries, gusts of hot air dried them, and 25,000 pounds of boiling oil fried them to a slight crisp. Air cooled by compressed ammonia gas quickly froze them, a computerized sorter divided them into six-pound batches, and a device that spun like an out-of-control lazy Susan used centrifugal force to align the french fries so that they all pointed in the same direction. The fries were sealed in brown bags, then the bags were loaded by robots into cardboard boxes, and the boxes were stacked by robots onto wooden pallets. Forklifts driven by human beings took the pallets to a freezer for storage. Inside that freezer I saw 20 million pounds of french fries, most of them destined for McDonald's, the boxes of fries stacked thirty feet high, the stacks extending for roughly forty yards. And the freezer was half empty. Every day about a dozen railroad cars and about two dozen tractor-trailers pulled up to the freezer, loaded up with french fries, and departed for McDonald's restaurants in Boise, Pocatello, Phoenix, Salt Lake City, Denver, Colorado Springs, and points in between.

Near the freezer was a laboratory where women in white coats analyzed french fries day and night, measuring their sugar content, their starch content, their color. During the fall, Lamb Weston added sugar to the fries; in the spring it leached sugar out of them; the goal was to maintain a uniform taste and appearance throughout the year. Every half hour, a new batch of fries was cooked in fryers identical to those used in fast food kitchens. A middle-aged woman in a lab coat handed me a paper plate full of premium extra longs, the type of french fries sold at McDonald's, and a salt shaker, and some ketchup. The fries on the plate looked wildly out of place in this laboratory setting, this surreal food factory with its computer screens, digital readouts, shiny steel platforms, and evacuation plans in case of ammonia gas leaks. The french fries were delicious — crisp and golden brown, made from potatoes that had been in the ground that morning. I finished them and asked for more.