

INTRODUCTION

BY TONY COHAN

A glass pitcher, a wicker basket, a tunic of coarse cotton cloth. . . .

Their beauty is inseparable from their function. . . . Handicrafts belong to a world existing before the separation of the useful and the beautiful.

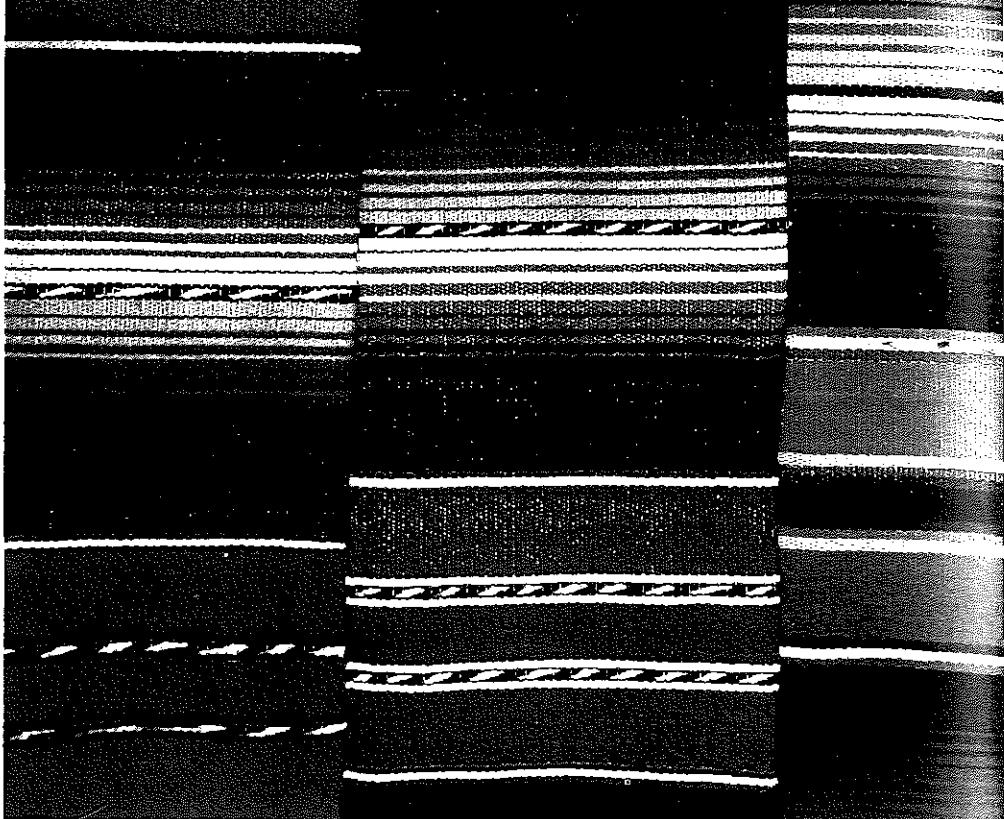
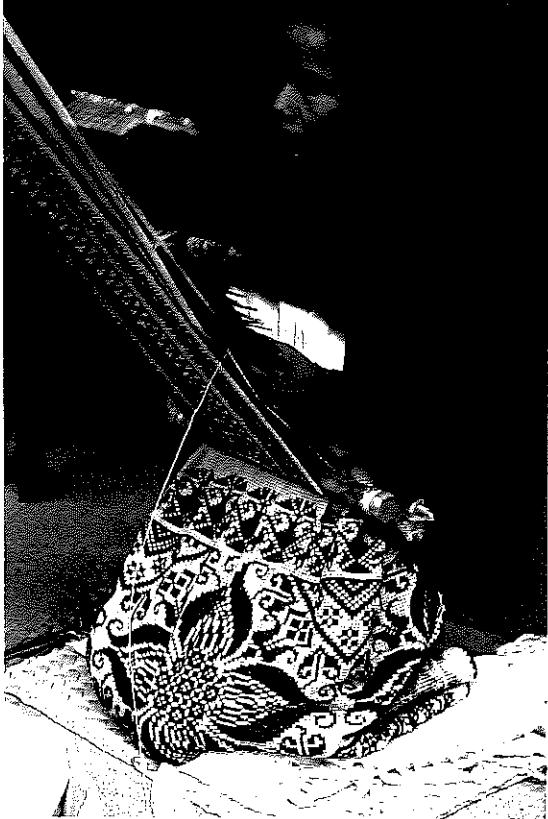
—OCTAVIO PAZ, *Seeing and Using: Art and Craftsmanship*

Every July, indigenous groups from throughout the state descend upon the Mexican city of Oaxaca for the weeklong folkloric festival of Guelaguetza, charging the streets with festive energy. Sixteen distinct Indian dialects spice the air; Spanish is a second language if spoken at all. The beautiful woven garments the women wear are encoded with art and meanings going back thousands of years. A queen is chosen—not the most conventionally beautiful but the one who most artfully represents her village and its traditional dress and speech. It's a soul-stirring experience to hear these women speak with pride and force of their origins, their traditions, the value they place on their customs and arts, and to see them parade through the streets in their stunning costumes.

At the women's weaving cooperative Sna Jolobtl, in the southern Mexican town of San Cristóbal de las Casas, a Mayan woman, dressed in skirt and blouse typical of her village of San Andrés Larrainzar, runs a credit card through a machine. Addressing the customer in Spanish, she folds the beautiful black wool jacket, woven in another nearby village, and hands it to the buyer. The transaction complete, the woman resumes speaking in her native Mayan tongue to her colleague, a woman weaving on a backstrap loom in the manner used for centuries.

At a gala opening at Oaxaca's Museo de Arte Contemporaneo, upper-class Mexican women, dressed proudly in exquisite *rebozos* (shawls) and *huipiles* (tunics) woven by indigenous women, sip *mezcal* and chat with students, curators, and

OPPOSITE Stacks of colorful textiles showcase the rich textures and vibrant patterns characteristic of Mexican fabrics.



artists from Mexico City, New York, and Berlin. In the city's thronged markets and surrounding communities and villages, traditional artisans, wearing the very same clothes as the women at the museum, bring ancient weaving traditions forward into the new century, braving the onslaught of machine-made goods.

In Los Angeles, artists adorn their mid-century modern home with Mexican shawls from their collection, lending warmth to a cool, contemporary ambience. Across the country in a New York City boutique, a customer examines a handwoven Mexican cloth dyed a subtle red from the cochineal insect that feeds on the nopal cacti, imagining it as a table runner on her dining room table or perhaps as a hanging on her bedroom wall.

Handicrafts have not died out in our postindustrial age. Indeed they not only survive but flourish. Artifacts made by local artisans worldwide fill contemporary emporia alongside the latest synthetics and industrial products. Handmade furniture, baskets, pottery, and textiles decorate modern homes and offices. Travelers scour local markets in remote lands for the inspiration that only an object made by hand can provide.

The more technology invades our lives with impersonal, colorless, and "branded" objects, the more value we find in a beautiful handwoven textile. In ways we can't always describe, we mourn the loss of beauty and sensuousness in a merely functional world. Finding a lovely woven cloth in a Mexican market or in a shop in one's own

land, selecting and purchasing it, blending it into one's environment as function or as decoration, bring aesthetics back into our lives—color, pattern, texture. Time slows down, if only for a moment, releasing us from our harried, hurried days; for it takes a long time to weave, and the result is something that only time can deliver. Woven objects also connect us to our own vanished histories; after all, who among us can't trace our origins back to ancestors who wove?

For many historical and cultural reasons, Mexico is one of the few remaining countries that still produces a wide variety of handmade textiles. The role of woven cloth in Mexico, strong since long before the arrival of the Spaniards, evolved in rich combination with European techniques for four centuries. Today, weaving survives in old and new forms, using both traditional natural dyes from indigo, sea snails, mosses, and tree bark, and modern synthetic threads and techniques.

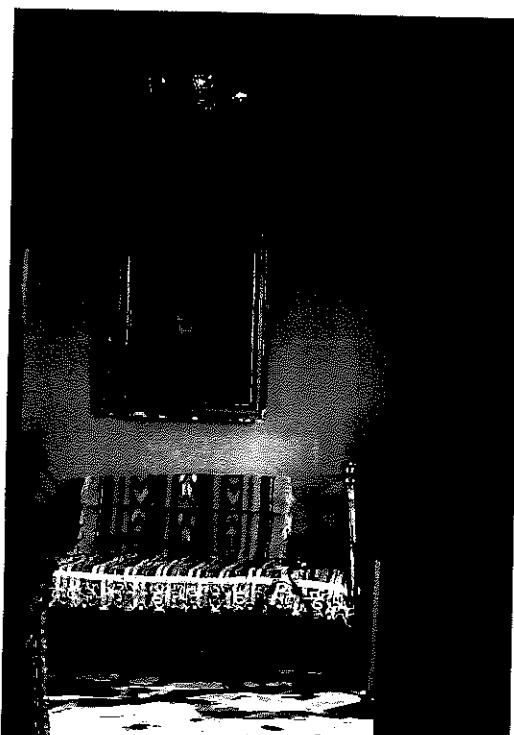
Until the last century, Mexican women wove garments for themselves and their families. Nowadays, they make textiles to sell on the open market. While the contemporary world is coming to regard handmade objects as a way to connect with deeper values, Mexico's textile artisans on their end are adapting to the tastes and needs of their new customers. The women of Guelaguetza are proud of their weaving arts and would like to maintain them. For both maker and buyer, the purchase of a woven *rebozo* or *sarape* sustains and advances a living culture.

Mexican Textiles—fascinating, informed, and wise—celebrates, in photos and text, a rich and enduring tradition. It also brings Mexican textiles into the arena of contemporary life, offering us a way to participate in a culture in which beauty and function still coexist.

OPPOSITE, LEFT Working on a backstrap loom, this weaver wears a blue and black striped *rebozo* shawl characteristic of *rebozos* woven in the state of Michoacán.

OPPOSITE, RIGHT Lightweight blankets, woven in graded stripes of color reflect the style perfected in vintage Sátillo *sarapes*.

BETWEEN Woven into the cushion cover are geometric designs inspired by ancient Zapotec patterns. A Guatemalan textile covers the bed.



Empire, Espionage,
and the Quest
for the Color
of Desire

A Perfect Red

AMY BUTLER
GREENFIELD

"Delightful, rollicking history. . . .
A fun read, well supported
by extensive research."

—Los Angeles Times



THREE

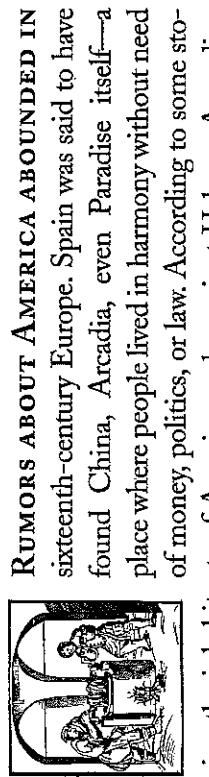
An Ancient Art

Although the destruction they cause is enormous, most scale insects are quite small, and cochineal—genus *Dactylopius*—is no exception. A wild cochineal insect is one-third the size of a ladybug and ranges in color from silver-gray to red-black. Six of them could fit quite comfortably along the length of a paperclip, provided they didn't fall through the middle first.

While some scales will eat almost anything, cochineal has very decided tastes. It feeds off the round, spiny branches of cacti belonging to the *Opuntia* genera. Native to the Americas, these cacti are commonly known to many English speakers as nopal or prickly pears. When a cochineal nymph hatches, it gets straight to work, slipping its beaklike proboscis into the nopal and sucking out the juices.

For female cochineal insects, life doesn't hold much more than this. Wingless, they spend their lives attached to one spot, secreting a waxy white nest in which they feed, lay their eggs, and die. To anyone passing by, they look like so many bits of cotton fluff caught against the spiny cactus. Male insects, which are less common than females, live a more adventurous life, developing wings which allow them to fly as they search for mates. Their free-spirited existence, however, has its own drawbacks: as they age, their mouthparts atrophy, and they live only half as long as females do.

All cochineal insects are parasites, but it is the females who do the most damage, since they spend virtually their whole lives eating. Left to themselves, they will suck their hosts dry. Fortunately for the cacti, the insects have many predators. Numerous grubs, worms, ants, and other invertebrates are major enemies of *Dactylopius*, and birds, lizards, mice, and armadillos have also been known to eat or attack the insects. For these mobile predators, the motionless female cochineal is easy pickings. The female, however, has a secret weapon at her disposal: she produces carminic acid, a compound belonging to a class of chemicals called anthraquinones, which ants and a few other ani-



RUMORS ABOUT AMERICA ABOUNDED IN sixteenth-century Europe. Spain was said to have found China, Arcadia, even Paradise itself—a place where people lived in harmony without need of money, politics, or law. According to some stories, the inhabitants of America spoke ancient Hebrew. According to other stories, they were the descendants of Visigoth kings. Other tales spoke of precious metals glittering on beaches, fountains of eternal youth, and seven golden cities with riches beyond compare. Europeans lured to the New World by such tales were doomed to disappointment. Yet not all the rumors about America were false. Indeed some were absolutely true, including the story about the spectacular red dye. Derived from the cochineal insect, it was central to the life and culture of the peoples of ancient Mexico.

A close cousin to oak-kermes, St. John's blood, and Armenian red, cochineal belongs, as they do, to the scale family. Infamous among gardeners for their voracious appetites, scales have been known to devastate greenhouses and gardens in a matter of days.

mals find disastrous. Armed with carminic acid, a female cochineal bug can hold her own against some would-be stalkers. Recent research suggests that the chemical may also protect her from internal parasites that plague other insects.

Carminic acid has another outstanding property that humans have appreciated for thousands of years: it is a powerful red dye. Pinch a female cochineal insect, and blood-red dye pours out. Apply the dye to mordanted cloth, and the fabric will remain red for centuries.

No one knows when humans began using cochineal to dye fabric, but archaeologists have found cochineal-saturated textiles that date back two thousand years. The oldest samples come from a great necropolis in Peru, leading some scholars to speculate that the Peruvians discovered cochineal dyeing and introduced it to Central America. Others argue that the peoples of ancient Mexico discovered the art first, or at any rate independently.

Wherever cochineal dyeing began, the evidence suggests that the cultivation of cochineal reached its apex in Mexico. As biologists have pointed out, animals that prey on domesticated cochineal are abundant in Mexico but relatively rare in Peru, indicating that Mexican cochineal and its predators have been coevolving for a much longer time than their Peruvian equivalents.

Tradition credits the people of the southern Mexican highlands—specifically the people of the overlapping regions of the Mixteca and Oaxaca—with the leading role in cochineal's development; neighboring groups may also have made a major contribution. In ancient times, the highland region boasted splendid cities and temples, but the vast majority of people there made their living as farmers, growing maize, beans, and squash, important crops in which they had exceptional expertise.* In addition, some highland

*Archaeologists have discovered evidence of squash and maize domestication in Oaxaca that dates back to 4000 to 8000 B.C., the earliest such evidence yet found in the Americas.

farmers cultivated cochineal, with striking results. Rather than collecting wild cochineal from the hills, they tended the insects carefully on their own farms, guarding them from predators. They also appear to have been the first to breed them for size and color.

Animal domestication was not a common phenomenon in ancient Mexico—primarily, it seems, because there were not many species in America suited to that kind of development. Mexicans did, however, show great skill in cultivating insects, including not only cochineal but another form of scale known as *Llaveia*, which produced a wax used in cosmetics, medicines, and the creation of pre-Columbian lacquer. They also seem to have worked closely with an American honeybee, with butterflies, and with various edible insects.

Of all these ventures, the cochineal regimen produced the most dramatic and far-reaching results. Over the centuries, the ancient Mexicans' efforts paid off: under their care, a new species of cochineal flourished, a species now known to scientists as *Dactylopius coccus*. The new insect was twice the size of the wild varieties and produced considerably more dye; it may also have yielded a slightly more vibrant red. There was, however, a trade-off. Unlike wild cochineal, whose cottonlike nest allowed it to survive freezing temperatures and altitudes over 8,000 feet, the domesticated insect had only a thin coat of powdery wax on its back, leaving it extremely vulnerable to the elements. When exposed to frost or to a sustained heatwave, *Dactylopius coccus* often died. Nor could it tolerate constant rain and high humidity. Indeed, it was so delicate that an ill-timed shower could do it in. What *Dactylopius coccus* liked best was the climate where it had been bred: the warm, dry climate of the southern Mexican highlands, where temperatures generally hovered between fifty and eighty-five degrees Fahrenheit. Yet even the inhabitants of those highlands found it difficult to meet the insect's exacting requirements. Frosts, though rare in the highland valleys, were deadly, wiping out whole plantations of cochineal in a single

night, and the summer rains were similarly destructive. Farmers learned to time their harvests carefully, gathering and processing the cochineal before the rains fell. While they waited out the stormy season, they kept a clutch of pregnant females, known as cochineal *madres*, safe and dry in a corner of their homes, thereby assuring themselves of next year's crop. Some farmers carried the *madres*—protected in baskets lined with palm leaves—twenty or thirty miles up into the mountains, where they passed the summer in drier conditions.

Even when the weather was ideal, cochineal insects required work and care. Farmers had to "seed" or place nests of cochineal eggs onto cactus joints and protect the young nymphs from predators. They also had to weed out any wild cochineal that appeared, in order to prevent them from overwhelming their less hardy cousins.

The cacti required attention, too. The preferred host was *Opuntia ficus-indica*, but other opuntias were sometimes used, and all were susceptible to frost and rot. If they were not kept very clean, they succumbed to one of the many pests and diseases that preyed on them. Because cochineal insects did best on young leaves, farmers had to frequently prune the cacti to promote new growth. They also had to propagate new cacti, which involved cutting off a cactus leaf cleanly at the joint, allowing the scar to heal, and then planting the leaf in the ground. Eighteen months to three years later, the new cactus could safely be seeded with cochineal.

After seeding, domesticated cochineal took three to four months to mature. Farmers could count on two or occasionally three harvests a year, substantially more than could be expected from oak-kermes, St. John's blood, and Armenian red. Nor was cochineal as onerous to collect as these Old World kermes reds. Still, harvesting cochineal was at best a tedious business, one that could last for days or weeks, depending on the size of the nopal. Before it began, a white turkey was sacrificed to appease

Coqueela, the god in charge of cochineal. Then laborers took up sticks, quills, and brooms and flicked the female insects into a widemouthed bowl made of wood or clay. Perhaps because of concerns about rot and other infections, it was considered bad form to touch either the cochineal or the cactus directly with one's hand.

After harvesting, the insects were spread onto mats and dried in the sun for four or five days. To hurry the process along, farmers could place the insects in ovens or heat them in steam baths called *temazcalli*. In each case, the cochineal shriveled up and died, losing a third of its weight in the process. It took as many as 70,000 dried insects—and sometimes more—to make one pound of dye.

Raising cochineal was hard work, but the ancient Mexicans considered it well worth the effort. Long before the Conquest, farmers were able to sell their cochineal in many marketplaces, exchanging it for fish, maize, chile peppers, and salt. As commerce developed, certain merchants from the southern highlands became specialists in the rare dyestuff. The powerful merchants of the town of Nochixtlán, for instance, developed an extensive cochineal trade that reached as far south as present-day Nicaragua. Complex and sophisticated, these ancient trade networks flourished for centuries, reaching what may have been a high point under the rule of the Aztecs, a warrior society that controlled much of ancient Mexico in the fifteenth and early sixteenth centuries.

The Aztecs practiced human sacrifice, a fact that has rendered them infamous ever since. What is less well known is that their capital, Tenochtitlán, was one of the world's largest, cleanest, and most imposing cities in the early 1500s. Gifted poets and musicians, the Aztecs were also master craftsmen, especially when it came to textiles and dyes. Most remarkable was their skill in dyeing feathers, which they used in the thousands to cre-

ate elaborate cloaks, shields, and headdresses in a multitude of colorful designs. Much of this work was done by women, whose families prayed to the gods—according to Aztec accounts—that their daughters would be skillful in learning to “dye feathers in varied colors: azure, yellow, rose red, light blue, black.”

Like other ancient Mexicans, the Aztecs prized bright colors, and for them red held special allure. Indeed, one of their words for red (*tlapalli*) was also the word for color in general. In common with some European cultures, the Aztecs believed that red was the color of the sun, and they further identified the color with rituals of blood, death, and sacrifice. Although they had several red dyestuffs at their disposal—including weak forms of madder and another plant called *achiote*, or annatto—cochineal produced the most vibrant colors and was valued above all others.

The Aztecs called cochineal *nacaztli*, or “blood of the nopal”—a significant name, for the nopal cactus was central to Aztec identity and culture. They collected staggering amounts of the dyestuff as tribute from the chief centers of production. By the time of the Conquest, some records indicate that they were demanding over one hundred bags of cochineal a year from villages in Oaxaca and the Mixteca region; modern estimates suggest this may have amounted to over nine tons of cochineal, or more than a billion insects. Another district paid part of its tribute in cochineal-dyed cloth, 1,800 lengths every year.

The Aztecs used their cochineal tribute in a variety of ways. Doctors mixed the ground dyestuff with vinegar and applied it to wounds; they also prescribed it to cure a multitude of head, heart, and stomach problems. Cooks used cochineal to color tamales and other foods. Women used it to color their necks, cheeks, hands, and breasts. Some prostitutes even stained their teeth with it.

Aztec dyers used cochineal in their textiles, usually with alum as a mordant to make the color stick. Like the other insect reds, cochineal combined best with the proteins found in animal

fibers, rather than with cellulosic plant fibers. Feathers and rabbit fur came out of the dye bath glowing red. But Aztec dyers also obtained admirable, though paler, reds on cotton, too.

Aztec scribes illustrated their colorful histories and genealogies with cochineal, among other pigments, and craftsmen throughout ancient Mexico used cochineal to decorate their work. Pots, statues, baskets, jars, dancing poles, and even houses—all bore the stamp of the brilliant red dye.

Indeed, cochineal was everywhere in ancient Mexico. No wonder, then, that when the conquistadors arrived in 1519 the dyestuff provoked both their admiration and their envy. Many of these conquistadors were poor men themselves, for whom bright colors were a luxury. Even their leader, Hernán Cortés, had no great claim to wealth. Born to a family with noble pretensions but little money, Cortés had arrived in the New World in 1506, a scapergrace young man with little more than his sword and his clever tongue to recommend him.

In those early days Spain's American empire was limited to a few islands in the Caribbean. When Spain decided it was time to add Cuba to that list, Cortés joined the 1511 expedition and won the favor of Diego Velázquez, who became the island's governor. But Cortés's chance for lasting fame—and infamy—did not arrive until 1518, when his patron Velázquez put him in charge of an expedition to the mainland.

Although Spaniards had gone to the mainland before, no one had succeeded in establishing a settlement there—and a settlement was precisely what Velázquez wanted, for in European eyes it would give him a permanent legal claim to the territory. But Velázquez had no wish to endanger his life in an enemy land. Instead he preferred to remain safely in Cuba while Cortés served as his agent, under a commission that made it clear that Cortés could not act on his own but remained subject to Velázquez's authority.

Dreaming of glory, Cortés chafed at these restrictions, and soon after he arrived in Mexico he found a way to enlarge his remit. In a remarkably devious yet entirely legal maneuver, he established the army's beach encampment as an official Spanish municipality and christened it Villa Rica de la Vera Cruz (Rich Town of the True Cross), or Veracruz for short. He then persuaded the army to "elect" a town council of his own choosing—a council that promptly relieved him of Velázquez's commission and elected him captain of the army and chief justice of Veracruz. Under Spanish law, this election made Cortés his own man: he no longer had to bow to the wishes of Velázquez but instead derived his authority directly from Spain. And since Spain was three thousand miles away, Cortés was, for the time being, virtually a law unto himself.

Not everyone supported Cortés's bold move, but the new chief justice found it easy enough to silence his critics: any conquistador who opposed him was chained in irons. Velázquez, however, proved a far more powerful and implacable enemy. As Cortés began his ambitious campaign against the Aztecs, the Cuban governor sent an army after the renegade officer—an army which Cortés promptly defeated. But Velázquez refused to give up. Through his agents in Spain, he petitioned the king to condemn Cortés as a traitor. Cortés, meanwhile, composed his own letter to the king, in which he explained that far from being a traitor, he was conquering one of the world's great empires in the king's own name. Mexico, he wrote to his sovereign, was as rich as the land "from which Solomon is said to have taken the gold for the temple."

Cortés's description owed more to wishful thinking than to fact, for at the time he and his men had done little more than engage in a few skirmishes in humble villages along the Mexican coastline. But if the coastline villages did not live up to his billing, Tenochtitlán came far nearer the mark. Entering the city as guests of the Aztec ruler Montezuma, Cortés and his men learned that Tenochtitlán was the repository of a seemingly end-

less stream of tribute from the surrounding region. Left to their own devices as palace guests one day, Cortés and his men quietly pried open a door that led to Montezuma's secret coffers. "Cortés and some of his captains went in first," the conquistador Bernal Díaz del Castillo reported years later, "and they saw such a number of golden jewels and plates and disks . . . and other very great riches, that they were quite transported and did not know what to say about such wealth." As for himself, Díaz wrote, "I took it for certain that there could not be another such store of treasure in the whole world."

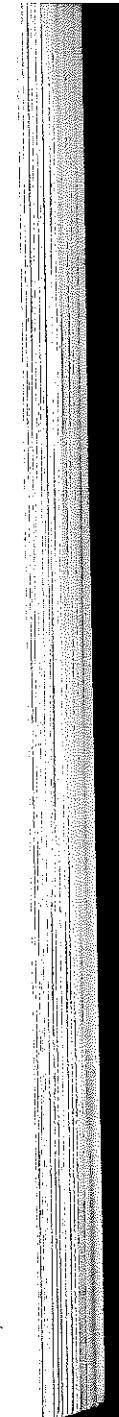
If Montezuma's secret vaults were full of treasure, so too were the marketplaces of Tenochtitlán, where merchants sold everything from furs and feathered cloaks to pottery, honey, salt, and slaves. To the conquistadors, it seemed the very stalls glittered with gold and silver, while dyes and pigments made the marketplace a kaleidoscope of color. "There are many sorts of spun cotton, in banks of every color, and it seems like the silk market at Granada, except here is a much greater quantity," Cortés reported to the king. "They sell as many colors for painters as may be found in Spain, and all of excellent hues." Desperate for royal attention and favor, Cortés had every reason to exaggerate the splendors of the world he meant to conquer, but Bernal Díaz del Castillo's more disinterested account of events confirms that the conquistadors were amazed by the wealth of dyes available in Aztec Mexico. More than thirty years after the Conquest, Díaz del Castillo remembered how he had marveled at the immense amounts of cochineal for sale in the great market of Tlatelolco, a suburb of Tenochtitlán. Like the other conquistadors, he called the commodity *grana*, the Spanish word for the most precious red dyestuffs.

As proof of his good faith, Cortés sent several shipments of Mexican plunder to his sovereign. In late October 1519, the first ship reached Spain. On board were five Totonac Indians—three men and two women—whom the conquistadors had saved from

For the Aztecs, red had become the color of defeat. For the
conquistadors, it was a promise of riches to come.

The houses are roofless now, and their walls
are red with blood.
Worms are swarming in the streets and plazas,
and the walls are splattered with gore.
The water has turned red, as if it were dyed,
and when we drink it,
it has the taste of brine.

In Mexico, meanwhile, Cortés and his men were struggling
with the rare, exquisite reds of cochineal.
Accompanying the Tonacates were hundreds of treasures: gold
sacrifice, only to send them half a world away from home.
In 1521, they finally brought the Aztecs to their knees, with the
help of an outbreak of smallpox and an alliance with Tlaxcala, a
cochineal-producing province that was home to the Aztecs' fiercest enemies. Victorious, the conquistadors and their
Tlaxcalan allies burned the moated city of Tenochtitlán to the
ground and slaughtered most of its inhabitants. Grieving Aztec
poets composed their laments:



SIX

Cochineal on Trial



FAMOUS FOR ITS FLOWERING ORANGE trees and filthy streets, Seville had been Spain's official transatlantic port since 1503. By decree, all New World voyages started and ended at the city, and all American commodities—including cochineal—were unloaded and registered there.

That the Spanish Crown desired an official port was not surprising, for centralization made it easier for royal officials to regulate and tax the American trade. Seville, however, was an unlikely center of oceangoing commerce. Twenty leagues inland from the Mediterranean, it was centered on the muddy, shallow Guadalquivir, a river notorious for its sandbars. Yet Seville, for all its navigational failings, offered a number of significant advantages not found in other ports with deeper harbors and better access to the Atlantic. Not only was it well protected from pirates, but its location in the grain-rich region of Andalusia made it ideal for provisioning ships, and it boasted some of the most sophisticated markets in all Spain.

Sophistication, indeed, was a keynote of Sevillian life. "Quien no ha visto *Sevilla, no ha visto marrilla*," Spaniards said. "He who has not seen Seville, has not seen a wonder." Captured from the Moors in 1248, the city was undoubtedly both Spanish and Catholic, yet everywhere it was marked by the complex imprint of five hundred years of Arab rule. Moorish tiles glorified the walls of the royal palace, Moorish fountains cooled the city's walled courtyards, and Moorish rhythms echoed in the region's anguished music. Even Seville's cathedral, seat of the Spanish Inquisition, owed much to Moorish influence, for its bell tower, the famous Giralda, had once been the minaret of Muslim Seville's great mosque.

After Seville was named Spain's official New World port, its cosmopolitan atmosphere became even more pronounced. Foreigners and Spaniards alike poured into the city, hoping to become involved in the greatest economic venture of their time. Dubbed the "new Babylon," Seville became the decadent capital of a new golden age. In its streets and alongside its docks, tradesmen, sailors, and soldiers of fortune mingled with vagabonds, prostitutes, and assassins. Beggars roamed the city in inordinate numbers, feigning disease or madness to earn their bread. The city also played host to a wide and varied brotherhood of thieves—including the *cortabolas*, who stole purses; the *capadeoras*, who stole cloaks; and the *devotos*, who (oddly enough) went after religious images. But it was not only thieves who gave Seville its reputation for corruption. Its womenfolk, too, were a cause for concern, for as Sevillian men emigrated to the New World in droves, their wives, mothers, and sisters were left to manage affairs in their absence. Many of these women took advantage of their new freedom to make investments, buy property, and run businesses. By 1525, Seville was said to be a city "in the hands of women"—which the conventional considered a sure sign of moral decline. Yet the offenses of Seville's women paled beside those of its merchants. To the archbishop's indignation, they insisted on doing business in the

shadow of the city's cathedral; on rainy days they met in the nave of the cathedral itself. In 1598, they would move to a new building, built specifically for their trading, but until then the moneychangers remained in the temple, to the great consternation of the pious.

Even the pious, however, were drawn into the rhythms of Seville's commercial life—rhythms that were in large part controlled by the ebb and flow of traffic along the Guadalquivir. During the first half of the sixteenth century, there was no regular schedule of fleets, but each time a convoy of ships prepared for a voyage to the New World, the city hummed with activity. Shipwrights made repairs, captains searched for crew members, and merchants sent their agents scurrying to find provisions and cargoes for the journey. Salt cod, ship's biscuit, wine, oil, rope, gunpowder, ironware, paper, shoes, wax, cheese, bolts of cloth—stevedores loaded all these and more aboard the departing ships. Once the vessels had departed, the city's pulse returned to normal, only to quicken again when the ships returned from the New World, laden with exotic cargo.

Yet if Sevilians dreamed of New World treasure, the actual returns were disappointing during the early decades of empire. Although the conquistadors welcomed Spanish vessels and the goods they brought, they were not often inclined to restock the ships with marketable American commodities and send them back across the Atlantic. Even worse, from the merchants' point of view, was the conquistadors' habit of cannibalizing their ships. Because ship timber, iron fittings, and cannon were much in demand in the New World, many a Spanish vessel reached America only to be sold for scrap after it had arrived. Desperate for replacements, Sevillian merchants pressed clapped-out galleons into service. Overloaded and undermanned, they foundered at sea, producing staggering losses for all concerned. It was only in the 1540s that this shipping crisis eased, allowing the riches of America to freely pour into Seville.

Silver from newly discovered mines—especially the immense

and legendary mine at Potosí—made up the lion's share of the American riches that landed in Seville. But the Spanish colonies produced other exports, too, including sugar, pearls, indigo, hides, tallow, tobacco, and cochineal.

Tobacco, of course, was a somewhat puzzling commodity. New to Europe, it had no merchants who were expert in its qualities, nor did it have established routes of commerce; consequently it took time to achieve wide popularity. Cochineal, by contrast, seems to have been rapidly accepted by Seville's merchants, for their city had long been a center for the trade of kermes and other red dyestuffs. No doubt relying on the connections they had already developed in the business, they quickly put cochineal into the hands of Europe's dyers.

The first European dyers to work with cochineal were almost certainly Spanish, but if Spain's dyers had hoped to keep the new dyestuff to themselves, those hopes were soon dashed. Although cities like Segovia, Toledo, and Granada produced some fine fabrics, the Spanish textile industry was continually hampered by a lack of skilled workers. Trying to make the best of a bad situation, the Crown commandeered beggars and vagrants as wool shop workers, but the problem of skilled labor persisted, and prices for Spanish textiles remained high—a situation that would only worsen as inflation sent Spanish prices skyrocketing after 1550. Hamstrung by the labor shortage and by a national economy in crisis, Spanish cloth workers could make only limited use of cochineal. Instead, the merchants of Seville took to selling cochineal abroad, especially to Italians, who were always on the lookout for a new and promising red dyestuff.

To be sure, some dyers balked at buying an untried commodity. In 1543, for instance, the dyers' guild of Genoa scorned the new "mixture or composition that is called Indian kermes," ruling that it could not be used to dye silk. Yet many other dyers were eager to experiment with cochineal. Like the merchants of New

Spain, they understood the value of innovation; indeed, their cutthroat profession demanded it. In skillful hands, cochineal might yield profitable secrets, and no dyer wanted his rivals to steal a march on him. Across Italy, dyers quietly began to subject the "kermes and powder of Spain" to rigorous trials.

One of the earliest dyers to test cochineal's properties was a Tuscan by the name of Lapo da Diacceto, who applied cochineal dyes to silk in the early 1540s, with vivid and striking results. Similar experiments in Mexico in 1537 had failed to elicit much response from the conquistadors, but in Italy, where luxury textile production was considered a matter of the utmost state importance, the reaction was immediate and powerful. The most formidable man in Tuscany, Cosimo the Great—duke of Florence and head of the Medici family—became the dyer's sponsor. Da Diacceto continued with his experiments in secret, protected by the Medici name.

Outside the Medici domains, other Italian dyers were hot on his heels, including the Venetians. Since Venetian merchants dominated the trade in kermes reds, and since Venetian dyers were famous for the scarlet cloth made with those reds, the city had every reason to look askance at any dyestuff that might threaten the status quo. But Venetian merchants and dyers had not achieved their renown by ignoring new technologies. Having heard rumors of cochineal's great affinity for silk, they wished to see for themselves whether the American dyestuff could yield a color equal to their own Venetian scarlet.

In February 1543, an enterprising silk merchant and a distinguished citizen presented three samples of cochineal to the Venetian silk guild. Each sample had a different name—*achimilia*, *cochinea*, and *panuco*—possibly indicating slight variations in the place of origin. It was also true, however, that in 1543 cochineal was too new a commodity in Europe to have a settled name. Only later in the century would the term for the dyestuff

be firmly established as *grana cochinchilla*, or cochineal.* Despite the bewildering profusion of names, the two men attested that all three kinds of *grana* had been "grown in the Indies of the Emperor's Caesarian Majesty," Charles V. They wished the guild to test them, "to see their good quality, if they are really kermes or not."

Their request was straightforward enough, since it was standard practice for Venetian textile guilds—like top guilds elsewhere—to examine and regulate new dyestuffs, new suppliers, and new dyeing techniques. In the case of cochineal, however, the silk guild acted with uncommon speed, perhaps because the Mexican dyestuff was already regarded as a commodity of unusual importance. That same day guild officials gave a master dyer three skeins of silk, to be prepared for dyeing by the following Monday, when the trial would officially commence. In the meantime, they left the cochineal to soak and soften in three basins of water, which were placed under lock and key in a cabinet in the guildhall.

Three days later, on Monday, February 12, the trial began. Six master dyers—including the dyer who had prepared the three skeins of silk—came to the guildhall, where they applied a different sample of cochineal to each skein. Once the skeins dried, the dyers compared them to a reel of the highest-quality crimson silk, dyed in the traditional way. Cutting threads from each of the samples, they placed them "over the fire," in order to more fully assess their characteristics. When all this was done, the master dyers attested under oath that the three cochineal samples had produced a dye as good as the best traditional kermes reds.

Their statements, filed in guild archives along with the dyed silk and cochineal samples; were based solely on what Venetian artisans and guild officials could see with the naked eye. Yet in the twentieth century, when it finally became possible to analyze the structure of the kermes and cochineal dyes at the molecular level, scientists would reach similar conclusions. To this day the exact composition of these highly complex dyes is disputed, but chemists agree that their primary dyeing agents are closely related. The color of oak-kermes, for example, is produced by kermesic and flavo-kermesic acids, both of which have a chemical structure similar to that of cochineal's chief ingredient, carminic acid; trace amounts of kermesic acid are found in cochineal dye, too. St. John's blood, which contains a mixture of kermesic and carminic acids, is an even closer match for cochineal. The closest match of all is Armenian red, whose chemical composition is almost identical with that of cochineal dye.

The fact that cochineal most closely resembles St. John's blood and Armenian red is important, for Renaissance dyers seem to have set special store by these reds. Their high carminic acid content seems to have produced deeper and more lustrous reds than those produced by kermesic acid, especially on silk, the most luxurious of all fibers.

But cochineal had three advantages that St. John's blood and Armenian red lacked. First, cochineal insects produced their carminic acid with far fewer lipids than did the plump little Armenian insects, whose fat melted in the dyepot and sometimes coated the threads of silk, preventing the fibers from fully absorbing the dye.* Second, cochineal could be more efficiently

*The exact origins of the term *cochinilla* remain a mystery. One sixteenth-century Spaniard suggested that it was derived from the Latin word *coccus*, meaning "scarlet dye"; other scholars have speculated that it comes from the Latin *cocineus*, meaning "scarlet-colored." In Spanish, *cochinilla* literally means "little pig," and the term is applied not only to cochineal itself but to a crustacean that cochineal resembles, the woodlouse.

*According to the German dye specialist Harald Böhmer, Armenian red insects contain up to 50 percent lipids, an unusually high figure that has produced some startling results in the laboratory. Having located and harvested some of the Armenian insects in 1990, he processed them by cooking them in a lab oven. "This brutal treatment," he wrote, "produced a pleasant odor of fresh roast throughout the department and down the hall."

produced than either St. John's blood or the Armenian dyestuff, and it could be harvested several times a year. Third—and most important—cochineal yielded a far more powerful dye than any of the Old World reds. Though roughly similar in cost, ounce for ounce it was ten times more potent than oak-kermes and St. John's blood. It produced up to thirty times as much dye per ounce as Armenian red—a fact which must surely have caused dyers to marvel.

Cochineal, in other words, was the closest thing Europe had ever seen to a perfect red. Besides producing striking scarlets and crimson, it could be made to yield soft pinks and roses, which appeared very fragile but which were in fact very fast. Within a few years, top artisans in Venice, Milan, Florence, Lucca, and Antwerp were said to be using it daily, incorporating the dyestuff into new secret formulas which they applied to rich velvet, sleek satin, and crisp taffeta. Soon even the dyers of Genoa lost their distaste for the "Indian kermes." Worried that they were losing the business of customers who wanted cochineal, they legalized its use in 1550.

Not everyone, however, could be persuaded to join the cochineal camp. Some Frenchmen called on their compatriots to reject the dyestuff, arguing that it was a wasteful foreign luxury that depleted the country's store of bullion; they also worried it would destroy the market for French madder. In Venice, too, many merchants resisted the new commodity, fearing the damage it would do to the city's long-established trade in Old World kermes reds. Largely due to their opposition, the Venetian government forbade the use of cochineal on wool in the 1550s and 1560s. But such rules had little effect. To dyers, results meant far more than government rulings, and the results produced by cochineal were second to none.

By the 1570s, even the dyestuff's enemies were forced to admit that the cochineal business had become one of the most dynamic enterprises in Europe. Large stocks of cochineal could be found not only in Seville but in Rouen and Antwerp as well,

and lively markets also existed in dozens of other European cities, including Genoa, Florence, Marseilles, Nantes, and Lyon. Before the century was out, even Venice had capitulated to cochineal, and Venetian galleys laden with the dyestuff could be seen on the Adriatic. The amount of cochineal arriving in Seville each year—the key determinant of cochineal's price—became a matter for international speculation among merchants, bankers, and high-ranking diplomats.

Further proof of cochineal's importance in European markets was the appearance of cartels devoted to cornering the market in the dyestuff. This was worrisome enough on a regional level, but in 1585 two merchant families—the Capponis of Florence and the Maluendas of Burgos—together succeeded in creating a cochineal cartel that spanned most of Europe. Like most maneuvers in the dye trade, their cartel began as a covert operation. Having surreptitiously learned that the annual fleet had left New Spain with an unusually low amount of cochineal, the two firms sent out express couriers ordering their agents in Seville, Italy, France, and Flanders to quietly snap up every ounce of the dyestuff they could find. After these agents had secured most of Europe's existing stock of cochineal, as well as a large proportion of the incoming shipment, the Capponis and Maluendas substantially raised the asking price for the dyestuff. At first artisans and lesser merchants balked at the cost, but those who depended on cochineal for their livelihood—and who had enough money to meet the price—eventually gave in. Until the next harvest of cochineal arrived in 1586, European cloth makers remained at the mercy of the Capponis and Maluendas, who profited greatly from their monopoly.

What made the Capponi-Maluenda cartel so successful was the fact that cochineal had become indispensable to the production of high-quality fabric. As early as 1550, many fashionable Europeans were insisting that their red cloth be made with cochineal. Demand grew rapidly over the next few decades, mak-

ing the dyestuff's conquest unusually swift and complete: by 1580, cochineal had driven the traditional kermes reds to the fringes of the European textile market. The priest's red velvet chasuble, the dandy's red satin sleeves, the nobleman's red silken draperies, and the countess's red brocade skirts—all were now colored with cochineal.

THE INTENSITY OF EUROPE'S RESPONSE TO COCHINEAL
is all the more remarkable given the rise of black as a fashionable color in the sixteenth century—a somber trend that owed a great deal to the emperor who claimed the land in which cochineal was produced. On his father's side, Charles V was a Burgundian, and it was in Burgundy that black had first made its appearance as chic court garb. In the fifteenth century, the duke of Burgundy had taken to wearing black in order to set himself apart from his colorful courtiers; to ensure that there was no confusion about his status, he had worn only the finest and most expensive cloth. Inspired by this example, Charles also dressed for most of his reign in fine black garments, which he paired with a stiff white neck ruff. He may also have felt that this costume reflected his grave religious responsibilities as defender of the Catholic faith.

As Europe's greatest monarch, Charles was the man of the hour. Whatever he said or did was worth noting, and once noted, worth imitating. Soon black suits and white ruffs—the “Spanish fashion”—had been adopted not only by Spanish grandes but by trendsetting aristocrats across the Continent. Other neutrals and muted colors also became fashionable, a change that can clearly be traced in the wardrobe accounts of England's Elizabeth I. Daughter of the peacock-bright Henry VIII, she wore red and crimson in her youth, but after she ascended the throne in 1558, she dressed primarily in white, black, and gold, as well as subdued colors such as peach, ash, and tawny.

Yet despite these changes in fashion, the European market for high-quality red dyestuffs remained substantial. This was not only because they were sometimes used, with other dyes, to make the finest grades of black cloth, but because red itself remained extremely popular among the highest echelons of European society. For all its cachet, black and other neutrals were apt to be confused, at least at a distance, with the clothing of the poor and penitential. To avoid such embarrassment, some aristocrats, particularly women, continued to clad their entire persons in scarlet and crimson. Other elites conveyed a sense of majesty by combining their black-and-white garb with a splash of these valuable reds.

Among the many people who enhanced their black with red was Charles V, as a famous 1548 portrait by Titian, the greatest colorist of his age, demonstrates (see fig. 5). In the painting, which commemorated the emperor's victory over the Protestants at Mühlberg, red and black are everywhere evident. Charles's black-and-gold armor is set off by a magnificent red plume, red scarf, and red sash; his dark warhorse is bedecked with a red plume and a red-and-gold saddle cloth; Charles holds the horse in check with red reins. Even today, the medley of red and gold and black conveys the impression of great power and wealth, all the more since the portrait is life-size. Charles liked the painting so much that he paid Titian the princely sum of a thousand gold crowns for his work.

Other monarchs also found red a perfect foil for their black-and-white ensembles. Elizabeth I, for example, sometimes went so far as to dress all her ladies-in-waiting in red, the better to set off her own black-and-white gowns. For similar reasons, she dressed her servants in woollen scarlet livery—a fashion that influenced rulers and would-be rulers for centuries afterward.* Even in the

* Among those who wore scarlet livery was William Shakespeare, who like other royal actors was given “scarlet red cloth, 4 and half yards” to make his official costume for the coronation of Elizabeth's successor, James I.

democratic United States of America, George Washington and other prominent leaders favored scarlet livery for their servants. In Elizabethan England, courtiers who vied for the queen's attention took to wearing red satin and velvet; gentlemen who truly wished to be au courant dyed their beards to match.

Red backgrounds, too, were favored by the great. When Charles's chief rival, Francis I of France, posed for an early royal portrait in a costume of black, white, and gold, an intricately brocaded crimson backdrop enhanced his kingly air. Taking a page from the same book, black-clad noblemen often had themselves painted against scarlet draperies—a code for wealth that can be seen to especially fine advantage in the paintings of Anthony Van Dyck, whose billowing scarlet backdrops sometimes threatened to overwhelm his human subjects. Often the extravagant draperies were an illusion; only the wealthiest gentlemen could afford to be so lavish with such expensive fabrics. But to the relief of men of more straitened means, Van Dyck, like many other painters, kept stock draperies in his studio, which allowed sitters to appear richer than they in fact were.

Aristocrats who could afford luxury in real life surrounded themselves with scarlet and crimson tapestries, curtains, and cushions, which meant that the residences of Renaissance men-in-black were often a riot of color. Sir William Cecil, Queen Elizabeth's secretary of state, for example, may have followed the sober Spanish fashion in his dress, but at home he slept in a Jacobean bed flamboyantly hung with crimson velvet.

Even when traveling, aristocrats often enveloped themselves in red. The prince of Eboli, an influential confidant of Charles's son Philip, rode in a carriage upholstered in glowing cochineal-dyed satin, behind horses said to be the finest in Spain. When the countess of Carlisle, wife of England's ambassador to Russia, entered Moscow in 1663, she did so in a carriage upholstered in crimson velvet, accompanied by trumpeters, drummers, and two hundred sleighs.

If aristocrats liked to wrap themselves in rich red trappings, so too did less exalted individuals, including merchants and lawyers. Among those who succumbed to red's lure was the wily-eyed Venetian art merchant Jacopo Strada (fig. 6). In a portrait painted by Titian in 1568, Strada wears a black doublet with shining rose-colored silk sleeves, a sartorial advertisement of financial success and consequent social advancement. Although cochineal imports had helped make it possible for Strada and other prosperous men of the mercantile class to afford more red cloth than ever before, high-quality red textiles were still far from common, and they conferred prestige on those who wore them.

For some merchants, cochineal-dyed cloth was a means not only of displaying wealth but of acquiring it, too. Most of the trade in cochineal-dyed textiles took place within the boundaries of Europe, but European merchants also exported top-quality cochineal-dyed woolens, in limited quantities, to the Middle East, India, and the Americas. Cochineal-dyed cloth was probably carried to Africa as well, where red fabrics were a prized item of exchange in the slave trade, worth as much as a man's liberty or even his life.

THE BULK OF THE COCHINEAL THAT ARRIVED IN
Europe was used as a textile dye, but the dried insects came to be employed for other purposes as well. Like the ancient Mexicans, Europeans saw cosmetic applications for cochineal and made an art of applying it to their faces. In Elizabethan England, the startling contrast of vivid cochineal-stained lips and pallid white cheeks, coated with lead powder, was considered the height of beauty.

Another aesthetic practice that Europeans had in common with the ancient Mexicans was the use of cochineal as an artists' pigment. In Europe, cochineal was usually used as an ingredient

for crimson lake—*lake* being the general term for any pigment made by attaching colorless inorganic compounds to translucent dyes, enabling the dyes to be used in painting.

Red lakes were also made with madder, lac, and various types of kermes. Only recently have museum conservationists discovered reliable ways of distinguishing which dyestuff was used in a given work of art. Although many paintings have yet to be tested, and others have produced equivocal results, early analysis indicates that cochineal was much more slowly adopted by painters than by dyers.

Largely ignored for several decades, cochineal lakes finally came into their own in the late 1500s and 1600s, finding a place on the palettes of masters like Tintoretto, Vermeer, Rembrandt, Rubens, and Van Dyck. Velázquez and other Spanish artists are also thought to have used them. In later centuries, cochineal lakes would also appear in the works of, among others, Canaletto, La Tour, Gainsborough, Seurat, and J. M. W. Turner.

To make cochineal lakes, painters sometimes started with shearings from cochineal-dyed textiles, then boiled them in lye and added alum to extract the red coloring. A stronger and clearer red could be obtained by starting with the raw pigment itself. "Buy . . . some good Cochinele, about half an ounce will do," counseled one early art manual, which then advised painters to grind the insects into "fine Pouder, then put to them as many

Drops of the Tartar Lye as will just wet it, and make it give forth its Colour." After adding water, the painters were to "take a bit of Allum, and with a Knife scrape very finely a very little of it into the Tincture . . . [to] make it a delicate Crimson." The whole mixture was then strained into a clean pot and used quickly, "for this is a Colour that always looks most Noble when soon made use of, for it will decay if it stand long."

As this last warning suggests, cochineal paints were not nearly as durable as cochineal textile dyes. When made with a sufficient proportion of dye to fixative medium, cochineal lakes were fairly fast in oil paintings, but like all lakes they had a ten-

dency to fade with exposure to light. In high-quality paints, this process could take centuries; in poor-quality ones, the red coloring might fade in a matter of months. Used as a watercolor paint, cochineal was even more transient, with a loss of color evident in a few days or even a few hours. Aware of these limitations, some artists painstakingly sought out the very best lake pigments or more often manufactured them themselves, according to their own exacting standards. Their diligence frequently paid long-term dividends; the cochineal lake that Rembrandt used in *The Jewish Bride*, for example, has given added depth and beauty to the bride's red skirt for over three hundred years (see fig. 7). A less careful artist—Turner is the most famous example—could see his cochineal-streaked sunsets fade before his eyes.

Artists who made their own paints were often advised to procure cochineal from their local "Drugist" or pharmacy, advice that highlights the fact that Europeans also used cochineal as a medicine. This practice, too, was at least partly borrowed from ancient Mexico. Francisco Hernández, a sixteenth-century physician who had traveled to New Spain, recommended in *De materia medica*, his handbook of American medicines, that Europeans use the dyestuff in the Mexican manner: "Dissolved in vinegar and applied in the form of a poultice, it cures wounds, strengthens the heart, head and stomach, and cleans the teeth extraordinarily well."

If Hernández's readers were inclined to follow this Mexican prescription, it was probably because Europeans themselves had a long tradition of using dyes as medicines. In Latin—the indispenable language of Renaissance medical professionals—the word *pigmentum* signified both a pigment and a drug, and many substances were employed in both fashions, including various types of kermes reds. Cochineal thus slotted neatly into the European pharmacopoeia and remained there for centuries.

European medical indications for cochineal were many and varied—and like dyers, most apothecaries had their own secret formulas for its use. In addition to the applications extolled by

Hernández, cochineal was considered an antidepressant: Gerard's *Herball*, a widely consulted medical text, claimed in the seventeenth century that it was "good against melancholy diseases, vain imaginations, sighings, griefe, and sorrow with manifest cause, for that it purgeth away melancholy humors." Cochineal was also praised for producing sweat, preventing infection, and cooling fevers, which may explain why the dyestuff was given to England's Charles II—along with cinnamon, marshmallow leaves, violets, rock salt, and antimony—in an enema as he lay on his deathbed in 1680. Desperate remedies were in fashion; before the king expired, doctors also applied pitch and pigeon dung to his feet.

An eighteenth-century English manual, *The Country Housewife's Family Companion*, also prescribed cochineal for jaundice. The book directed sufferers to mix the dyestuff with cream of tartar and Venetian soap, "and take half a dram three times a day"—a foul-tasting potion, no doubt, but preferable to the alternative, which was to swallow "nine live lice every morning for a week, in a little ale." A more palatable cochineal remedy was described by Lorenzo Da Ponte, the librettist for Mozart's *Le nozze di Figaro*, *Don Giovanni*, and *Così fan tutte*. En route to Bologna, his carriage overturned, and the injured Da Ponte was carried half-dead to a nearby inn. Tucked into bed by the innkeeper's wife, he was brought a "drink of excellent Chianti" and "an exquisite cochineal liqueur of prodigious strength made only in Florence." So powerful was this liqueur, Da Ponte claimed, that in less than three hours he was ready to continue his journey.

Cochineal was used in other foods and drinks as well, though not always for medicinal purposes. In early-nineteenth-century England, the dyestuff was frequently used by bakers "to make the apple and the gooseberry outblush the cherry and the plum." Yet the idea that cochineal had medical properties endured, at least in some circles. During the same era, cochineal was added to the meals of mental patients in the United States, ostensibly to calm them.

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FOR ALL THAT COCHINEAL PROVED A USEFUL ADDITION to European dressing tables, paintboxes, and medicine cabinets, it was primarily the textile industry that fueled trade in the dyestuff. Eventually, that trade crisscrossed the world. Cochineal traveled to Constantinople in Venetian galleys; from there, merchants sent it on to Turkey and the Caspian region, where the dyestuff was greatly admired and used to make intricate textiles and carpets. Merchants from France, Spain, Holland, and Flanders also helped funnel cochineal to the East, and as a result of their efforts artisans in Persia and Cairo began using it. Cochineal became popular, too, among the people of the Philippines, who received their cochineal courtesy of the Spanish galleons that had opened up trade between Acapulco and Manila in the 1570s. From the Philippines, cochineal eventually found its way to China, where it became known as *yang hung*, "foreign red."

Year by year, cochineal was sweeping the world, an early instance of truly global trade. So popular was the dyestuff that in *Candide*, Voltaire satirically pointed to cochineal as proof that humans were living in the best of all possible worlds. When innocent Candide questions how syphilis could exist in a perfect world, Dr. Pangloss explains that the dreaded disease ultimately works toward the greater good. Syphilis, after all, comes from America, and without America, Pangloss triumphantly concludes, "we should not have chocolate and cochineal."

If few of Voltaire's readers were quite so optimistic as Pangloss, it was nevertheless true that to most Europeans cochineal seemed a gift of nature, a perfect commodity that God had intended them to possess and use to their own advantage. It never crossed their minds that the dyestuff might actually be a cultural legacy—the result of the ancient Mexicans' long and successful effort to cultivate a strain of cochineal that would produce a perfect red. Not until the early 1900s did biologists, informed

by evolutionary theory, began to suspect how great a role the ancient Mexicans had played in the creation of *Datura meteloides*. Renaissance Europeans, who neither knew nor cared about these cultural origins, merely concerned themselves with the fact that cochineal had no equal. Yet whether Europeans acknowledged it or not, cochineal's global triumph owed less to their efforts than to thousands of years of Mexican ingenuity. And as European merchants struggled to meet the world's burgeoning demand for the dyestuff, they soon found themselves relying once again on the initiative of Mexico's indigenous people.

SEVEN

Legacies



AMONG THE EUROPEANS WHO SAW cochineal as an object of desire was Philip II, Charles V's son and heir. Cochineal, for Philip, meant money in the bank—and money was something that Philip, like his father before him, desperately needed.

Quiet and conscientious, Philip had come to the throne in the shadow of his father's financial disgrace. Although Charles had managed to conceal the extent of his debts for decades, toward the end of his reign his income was mortgaged away a year in advance, and he was regularly confiscating private silver remittances from the New World in order to pay his debts. He ostensibly paid for the silver with government bonds, but his vast military expenditures, financed by bankers' loans that ran to millions of ducats every year, ultimately proved more than his empire could bear. In 1552, when Charles suffered a crushing defeat at the hands of the Protestant princes of Germany, his bankers began to call in their loans. Hard-pressed, Charles

turned to Sevillian merchants for cash, but his obligations were so immense that the city's banking system soon collapsed under the strain. In 1557, the Spanish Crown was forced to declare itself bankrupt.

By then, however, Charles was no longer king. Strung by financial and military failure, crippled by gout, and weary of the burdens of state, Charles had abdicated in favor of his son in 1556. For months afterward, the great monarch's retirement to the rural monastery of San Geronimo de Yuste was the talk of Europe. That the most powerful man in Europe should become a monk seemed incredible. Rumor had it that he had gone so far as to hold his own funeral, to mark the end of his life as king.

As is often the case, however, rumor had it wrong. It was true that Charles had retired to a monastery to contemplate the life to come, but he did not take vows, and he was in no way dead to the joys of the temporal world. On the contrary, his well-furnished house in the monastery grounds was filled with lavish tapestries and works of art, including paintings by Titian. Fifty people served him there, including brewers, barbers, musicians, watchmakers, and cooks. Special couriers provided him with exotic foods, and he feasted each day on oysters, olives, anchovies, iced beer, and eel pie. Although his doctor frowned upon the consumption of such rich delicacies, Charles continued to enjoy the pleasures of the table until he died of fever in September 1558, at the age of fifty-eight. Philip, meanwhile, was left to fight the good fight in his father's stead—and to pay off his father's debts.

Did Philip resent being pushed into this role? The evidence suggests not. Twenty-eight when his father abdicated, Philip had been groomed for imperial responsibilities from an early age—responsibilities that included stints as his father's regent in Spain and a short, unhappy, and ultimately fruitless marriage to England's Bloody Mary Tudor.

Awed by his larger-than-life father, Philip feared he would never measure up to Charles's golden standard. His trepidation

must have increased when he failed to be elected Holy Roman Emperor in his father's stead; the title, along with the Habsburg lands in central Europe, went instead to Charles's brother Ferdinand. In the territory that remained—Spain, Portugal, the Netherlands, parts of Italy and North Africa, and Spanish America—Philip was determined to prove himself a worthy and illustrious son. Continuing his father's battle against Protestantism, he fought hard to preserve his legacy.

Like his father, Philip found war costly. To provide money for the fight, and to restore a royal treasury devastated by his father's previous campaigns, he taxed his European subjects heavily. As his father's experience had already proved, however, taxing Europeans was a tricky business. It was much easier to obtain money from America, especially after Philip replaced the inefficient transatlantic convoys with a well-organized annual system of treasure fleets in the 1560s. By then, the silver mines of Mexico and Peru, which had barely begun to produce returns in Charles's day, were pouring an average of over 600,000 pesos into the royal coffers every year—an amount that would rise to over two million pesos a year in the 1590s, toward the end of Philip's reign.

These staggering returns were a gift that other European rulers envied, but for Philip they were not enough. "Apart from nearly all my revenues being sold or mortgaged," he wrote in 1565, "I owe very large sums of money and have need of very much more for the maintenance of my realms." Soldiers were expensive, and a month of battles could sometimes cost as much as an entire year's silver remittance.

To increase his returns from America, Philip, like his father, was forced to look to that continent's other exports. Chief among them was cochineal, which by the late 1560s was well on its way to becoming New Spain's most valuable export after silver. As many as 175,000 pounds of dyestuff were harvested annually, most of which seems to have been shipped to Seville. The Sevillian authorities valued cochineal imports at approximately 250,000 pesos a year, and

the Crown, which taxed the dyestuff heavily both in Spain and in Mexico, profited accordingly. Royal taxes—including the *alcabala* (a sales tax), the *averría* (a tax that paid for Philip's fleet system), and the *almajarifazgo* (a duty on imports and exports)—amounted to as much as 25 percent of cochineal's import value, and the Crown collected additional sales taxes each time the dyestuff was resold in Spain.

None of these facts would have escaped Philip, a born bureaucrat who not only insisted on reading all state papers himself but also corrected his secretaries' mistakes in the margins. Impressed by the cochineal figures, and aware that European demand for the dyestuff was still rising, he began to look for ways to boost cochineal production in New Spain. In July 1568, he and his advisers ordered the newly appointed viceroy, Martín Enríquez de Almanza, to gather information on cochineal production and trade, with a view to increasing exports. In particular, they wanted to know "the quantity of cochineal collected in New Spain each year, and the people who collect it, and what price it is worth in that land."

To a man of Philip's regal position, boasting cochineal production may have seemed a simple matter of collecting information and passing decrees. But like his father, he was to discover that it was difficult to dictate to the people of New Spain. Heavily burdened with other responsibilities, Viceroy Enriquez did not deliver any reports on cochineal to Philip II until the 1570s. By then, however, the viceroy had accepted that Spanish colonists had little interest in cultivating the dyestuff.

Although Enriquez did not say so, this continuing lack of interest in cochineal was something of an anomaly. While early Spanish settlers had scorned indigenous crops like cochineal, later colonists usually proved more open to the opportunities that such commodities offered. Cocoa beans—which, like cochineal, were native to America—are a case in point. In the decades immediately after the Conquest, some Spanish settlers adopted the indigenous

custom of using cocoa beans as a medium of exchange, but few were willing to drink the Aztec chocolate made from those beans.* Gradually, however, they developed a taste for the drink, especially when the bitter, spicy brew was sweetened with sugar. They also began to appreciate the importance of cocoa and chocolate in American markets, and to show great interest in growing cocoa for themselves. By the late sixteenth century, Spanish settlers owned numerous cocoa plantations in Mexico and Guatemala, and over the next century they would expand their operations still farther.

If late-sixteenth-century Spaniards were willing to grow cocoa, a crop that was barely known in Europe at the time, why wouldn't they grow cochineal, which was worth far more per pound than chocolate, and which was much desired by merchants around the globe? The answer seems to lie in the fragile biology of the cochineal insect itself. Extremely sensitive to variations in climate and prone to attack by predators and disease, *Dactylopius coccus* was ill suited to the Spanish system of enterprise—a system that promoted the use of forced or low-wage labor on large-scale, capital-intensive projects.

Cocoa trees, though native to America, adapted fairly well to this Spanish system. Grown on huge plantations with cheap indigenous labor, or with the labor of imported African slaves, the trees produced decent profits. But when some settlers, lured by the hope of high profits, tried to raise cochineal the same way, they often met with failure. An unexpected storm or frost could ruin them, and fungal diseases and cochineal pests seemed to spread like wildfire in their large tracts of nopal. Even when they did manage to harvest a sizable crop, there was no telling what its market value might be, since cochineal prices varied wildly from year to year.

Far from showing economies of scale, cochineal seemed to *One early conquistador described chocolate as appearing like dirty water, or—when mixed with red dye—like a bowl of human blood.

do best when grown on family plots, perhaps because only small-scale growers had the patience and personal incentive to give it the painstaking attention it needed. But wealthy Spaniards were not interested in this kind of farming, and poor Spaniards lacked the detailed understanding of cochineal cultivation that made growing the insect profitable. Instead, it was Indian peasants, cultivating cochineal in thousands of small cactus patches, who produced most of the world's supply of the Mexican dyestuff—not only in the sixteenth century but through the entire period of Spanish rule (see fig. 8).

BASED ON PRECEDENT, THE PEOPLE OF OAXACA AND the Mixteca region ought to have been the first to take advantage of Europe's appetite for cochineal. Wild cochineal had most likely been domesticated in that part of the southern highlands, and farmers there had been leading producers of the dyestuff under the Aztecs.⁷ The initial Oaxacan and Mixtecan response to the European cochineal boom, however, was compromised by the Spaniards in their midst.

Many of these Spaniards were Dominican missionaries, who first arrived in the region in the late 1520s. According to two seventeenth-century Spanish accounts, the missionaries actually “taught” the Indians to plant nopal and grow cochineal—a story that no doubt pleased Spanish readers, but which bore no relation to the facts, since sixteenth-century Indians knew far more about cochineal than did the recently arrived friars. Indeed, while some Dominicans may have encouraged indigenous people to grow cochineal—and to contribute some of the profits to the work of evangelization—most friars were convinced that better opportunities were afforded by silkworms, which they introduced to the province in the 1530s. Urged on by the missionaries, thousands of indigenous people chose to devote themselves to silk in

the 1540s and 1550s. Other native Mexicans were forced into the work by Spanish *encomenderos*, who like the Dominicans saw more potential in silk than cochineal. Although Oaxacan and Mixtecan cochineal production did increase during this period, it was overshadowed by the silk boom. Indeed, silk manufacturers may well have absorbed much of the local supply of the dyestuff, as they strove to create outstanding colored fabrics for international markets. In any case, the amount of cochineal exported from this region fell far short of meeting European demand.

Where, then, did Spanish merchants find the bulk of their cochineal? Some, it seems, found suppliers in Michoacán, Jalisco, and Yucatán, but these areas of Mexico never produced large amounts of cochineal. Yucatán, in particular, with its droughts and extreme heat, produced very small yields. For far more impressive supplies of cochineal, knowledgeable merchants turned instead to Puebla, a city more than a hundred miles northwest of Oaxaca. Because Puebla was on the main colonial road that ran between Mexico City and New Spain's official port, Veracruz, merchants who bought cochineal there found it relatively easy to transport the dyestuff to market.

A great deal of the cochineal that passed through Puebla in the 1540s and 1550s was actually grown a bit farther north, in the region of Tlaxcala. A fiercely proud and patriotic people, the Tlaxcalans enjoyed more freedom than any other indigenous people in New Spain—a state of affairs that had its roots in the pre-Conquest era, when Tlaxcala had been the only city-state in central Mexico to remain undefeated by the Aztecs. Montezuma told the Spaniards that he believed he could crush the province, but that he preferred a protracted and inconclusive war instead, to train his soldiers and provide his priests with sacrificial victims, in the form of captured Tlaxcalan warriors. Not surprisingly, Tlaxcala became Spain's greatest ally during the Conquest, supplying thousands of warriors for the assault on the Aztec empire. Without Tlaxcalan aid, Cortés's expedition would almost

certainly have failed. Recognizing his debt, Cortés, acting in the king's name, granted the Tlaxcalans a degree of independence unique in New Spain: they were to be governed by the Crown, as Spaniards themselves were, and not by *encomenderos*. No *encomiendas* were ever granted in their province, and Spaniards were discouraged from settling there.

To be sure, Tlaxcalan independence was far from absolute. Even though Tlaxcalans did not have to provide tribute for *encomenderos*, they were still forced to pay other forms of tribute to the Spanish government, Church, and army. Moreover, Spanish officials ruled the province at the higher levels, and despite discouragement other Spaniards settled there and became ever more influential. But Tlaxcalans were freer than most Mexican peoples, and they made good use of their direct relationship with the Crown, going so far as to send envoys to Spain to obtain personal guarantees of their freedoms from Charles V himself. Accomplished diplomats and astute businessmen, the Tlaxcalan envoys may even have spoken with Spanish merchants about the possibilities presented by cochineal.

It was not the machinations of diplomats, however, that made Tlaxcala so central to the post-Conquest cochineal boom. What made Tlaxcala so important was the relative independence of the Tlaxcalan people themselves. Freed from the demands and directives of Spaniards who had little interest in cochineal cultivation, Tlaxcalans responded quickly and enthusiastically to the first indications of strong European demand for the dyestuff. Having produced cochineal on a small scale in the Aztec era, they expanded production dramatically from the mid-1540s, very soon after European dyers started seriously seeking out the dyestuff. By the early 1550s, the Tlaxcalans were producing large amounts of cochineal for the European market each year.

The rewards were tremendous. In 1554, Spanish merchants in Mexico estimated that the Tlaxcala-Puebla cochineal trade was worth over 100,000 pesos a year to New Spain—considerably less

than annual silver remittances but nevertheless a remarkable sum for an agricultural product. At the time, a laborer in Spain was unlikely to earn as much as a single peso a week. With this kind of wealth in the offing, cochineal merchants prospered at many levels, with Spanish merchants focusing on the transatlantic end of the business, and indigenous merchants continuing to play a major role in local and regional markets.

Cochineal's indigenous producers also found the business profitable—too profitable, in the opinion of the Tlaxcalan *cabildo*, the council of elite Indians that oversaw daily life in the province. Concerned that the very success of the trade was leading to social disorder, the council prohibited the cultivation of cochineal in 1552. Evidently the measure failed, for nine months later, in March 1553, the council devoted an entire meeting to the cochineal problem.

To judge from the official minutes taken at the meeting, the council members regarded the dyestuff as the root of all evil in Tlaxcala. Like most elite Tlaxcalans, they were fervent Catholic converts, and they noted with dismay that cochineal growers "devote themselves to their cochineal on Sundays and holy days; no longer do they go to church to hear mass as the holy church commands us." Even worse, "they buy *pulque* and then get drunk."^{*} As far as the council was concerned, the cochineal dealers, too, behaved outrageously. Not only did they trade on Sunday, but they encouraged female cochineal sellers to drink to excess, the better to "commit sins" with them—though, for modesty's sake the council declined to detail the sins in question.

What bothered the council most, however, was that the Tlaxcalan cochineal growers no longer showed proper deference to their betters. In the best tradition of nouveaux riches everywhere, the cochineal farmers were growing uppity. "He who

* Made by Mexicans since ancient times, *pulque* is an alcoholic beverage derived from the sap of the maguey plant.

belonged to someone no longer respects whoever was his lord and master," the council lamented. Cochineal-growing commoners were dressing above their station, drinking too much, and buying goods that formerly only nobles could afford, including the best Aztec chocolate—"very thick, with plenty of cocoa in it." To demonstrate their new status, some commoners had even started to refuse perfectly good chocolate on the grounds that it was weak and watery. A few of them, the council indignantly noted, went so far as to "pour it on the ground . . . [and] they imagine themselves very grand because of it."

Faced with such rudeness, the council could only conclude that the entire social order of Tlaxcala was on the verge of collapse. Not one Tlaxcalan commoner seemed content with his lot. "Everyone does nothing but take care of cochineal cactus," the council noted in its records. "They no longer want to cultivate their fields, but idly neglect them." The consequences, the council believed, were dire: "Because of this, now many fields are going to grass, and famine truly impends."

The council members' fears were exaggerated—Tlaxcala was not on the brink of starvation, or anywhere near it—but their apocalyptic language reveals the degree to which the cochineal boom had disturbed the Tlaxcalan social order. Yet the council was aware, too, that cochineal had a powerful constituency, not only among commoners but among the many nobles who made money from the dyestuff. It was this constituency that had made the council's previous ban on cochineal cultivation a dead letter. Tacitly acknowledging the impossibility of enforcing another such ban, the council decided to steer a more moderate course: this time around, they merely forbade Tlaxcalans to plant more than ten nopal cacti each.

Nine months later, the council reported that "a very great quantity of cochineal cactus was destroyed" as a result of this rule. Yet market forces could not so easily be denied. In the face of burgeoning European demand for cochineal, the ten-nopal

limit soon proved no more effective than the 1552 prohibition. Proud of their relative independence from Spanish rule, Tlaxcalans were nevertheless eager to take advantage of all that Spanish merchants had to offer, even as their dealings with these merchants tied them ever closer to global markets over which they had no control.

A devil's bargain, perhaps, but Tlaxcalans profited from the deal. For decades to come, Tlaxcalan commoners would continue to wear fancy clothes, drink thick chocolate—and produce tons of cochineal for the European market.

DUE IN NO SMALL PART TO THE EFFORTS OF Tlaxcalans, the amount of cochineal reaching Seville rose spectacularly in the mid-sixteenth century, rising from less than 50,000 pounds of cochineal in 1557 to over 150,000 pounds in 1574. But Tlaxcala did not remain a world center for cochineal production forever. By the late sixteenth century, despite promises to the contrary, the region was being overrun by Spaniards, whose cattle and oxen devastated Tlaxcalan villages and nopalries. Tlaxcalan cochineal growers also faced ever-increasing competition from their Mixtecan and Oaxacan neighbors to the south, who after experiencing severe reversals in the silk industry in the 1570s had returned to producing their traditional dyestuff.

By the early seventeenth century, Oaxaca City, also known by the Spanish name of Antequera, had become the new center for cochineal production. Before the century was out, the province of Oaxaca—which under Spanish rule included not only the Valley of Oaxaca but much of the Mixteca region within its boundaries—enjoyed a virtual monopoly on cochineal production. This state of affairs continued for the rest of the Spanish colonial period.

Oaxaca's dominance in the industry brought tremendous

wealth to its capital city, allowing the construction of gracious homes and lush gardens near the bustling central plaza. The city's many churches were further evidence of its prosperity, especially the magnificent Dominican complex of Santo Domingo, whose soaring church nave glistened with so much gold leaf that crossing its threshold was like entering a vast gilded jewel box. Beside the church, a large Dominican monastery enclosed the clerical brotherhood within its peaceful walls. Friars who walked along the quiet corridors saw breathtaking views through the monastery's wide windows, which framed the high Oaxacan mountains in a manner worthy of a fine Renaissance painting.

Yet if there was ample evidence that Oaxaca City had benefited from having cornered the cochineal trade, there were those who argued—as the council of Tlaxcala had once argued—that cochineal was anything but a good influence on the region's indigenous inhabitants. In an uncanny echo of the Tlaxcalans, a Spanish cleric in Oaxaca wrote in the late 1500s that indigenous people were growing cochineal instead of food, that they were buying their staples from other towns, and that they were getting drunk on their cochineal proceeds. Later, some twentieth-century historians would argue that the cochineal boom had a destructive influence on indigenous life, putting Indians at the mercy of international markets in general and Spanish merchants in particular.

Was cochineal really such a terrible influence? Recent research suggests that, on the contrary, indigenous Oaxacans benefited tremendously from cultivating the dyestuff.

One indication that cochineal cultivation was actually a positive factor in indigenous life is the fact that most Indians appear to have cultivated the dyestuff voluntarily, selling it on their own account to other Indians or to merchants' agents. Although Spanish officials sometimes attempted to increase production through coercion, the efforts rarely enjoyed any sustained success. In the 1570s, for example, Viceroy Enríquez ordered that

Indians raise cochineal in all areas considered suitable to its cultivation, but his efforts met with mixed success at best. A similarly coercive decree was issued in 1597, when Philip II ordered his administrators in New Spain to "compel the Indians, by all rightful and legal means," to cultivate nopal and cochineal. Soon afterward, Gonzalo Gómez de Cervantes, a provincial governor, proposed that Indians in cochineal-producing areas be required to raise twenty-five nopal each. Nothing much, however, came of these strong-arm approaches. Perennially strapped for cash, the Crown could not afford to enforce even the lordly dictates of its king, let alone those of provincial authorities.

What instead proved most effective in boosting cochineal production were market incentives. Rather than threaten Indians with the stick of laws and quotas, Spanish merchants offered them the carrot of credit—an offer many Indians, long accustomed to participating in sophisticated markets, willingly accepted.

Exactly how and when this cochineal credit system got started is a mystery. Merchants in Mexico were offering advance payments for silk by the 1560s, but a credit system for cochineal appears to have developed even earlier, before 1550. At first it was much frowned upon by the Spanish authorities, who passed laws against it, but evidently the system persisted, becoming commonplace by the 1600s. The linchpins of the system were local officials, whom the bankrupt Spanish Crown could not afford to pay. Men of gente birth but limited income, these officials often accepted loans from Spanish merchants, with the understanding that they would use a substantial part of the money to extend credit to Indian cochineal producers for a period of six to eight months. Indians later repaid the loans with cochineal offered at a fixed rate. After the officials had collected the cochineal, they sold it to the Spanish merchants who had lent them money in the first place.

Officials who selected borrowers carefully and were forceful

in collecting payment at harvest time could usually repay their debts and make a substantial profit besides. In time, their lucrative posts became some of the most sought-after positions in the Spanish Empire. Merchants, spared from the onerous duty of administering thousands of Indian loans themselves, also profited from the arrangement.

Yet if Spanish officials and merchants enjoyed the greatest advantages from this system, Indians benefited, too. Cochineal loans were one of the few sources of credit available to them, and many used the money to buy high-cost items such as bulls and mules, which they could not have afforded any other way. The contracts' fixed rate for cochineal was usually below market price, but once cochineal growers had paid their debts, they were permitted to sell the remaining dyestuff to anyone they pleased, for as much as the market would bear. That Indians considered these terms reasonable—or at least acceptable—is evident from the alacrity with which they signed cochineal contracts. Although they occasionally protested to Spanish authorities about local officials who pressed too hard for repayment of cochineal loans, they almost never claimed that they had signed those loan contracts unwillingly. Complaints from Indians whose application for credit was denied, or who did not receive as large a loan as they wanted, were far more common.

Indigenous people who participated in the cochineal credit system usually raised cochineal on their own land or on land owned by the village as a whole, often as a sideline to the main business of subsistence agriculture. Produced in this way, cochineal cultivation was an attractive way of generating the small cash income that most indigenous households needed or desired. Unlike most forms of paid labor under the Spaniards, it did not require Indians to part from their villages and families or to suffer the degradation of working directly under the people who had conquered them. Instead, it allowed them to work at home, in the company of their children and extended family (see fig. 9).

By the middle of the sixteenth century, the devastating twin impact of Spanish rule and Old World diseases had fragmented many native communities. Entire cultures were disappearing. But in areas where cochineal was grown—areas where people were able to make a living while remaining close to their kin—communities demonstrated a remarkable ability to withstand such pressures. Many villages that grew cochineal were able to preserve their languages, traditions, and cultures for centuries, which helps explain why Oaxaca, the chief cochineal-producing region, remains today the most culturally and linguistically diverse state in Mexico.

If cochineal satisfied the desire for color in Europe, among Mexicans it met even deeper needs. More than a marvelous dyestuff, cochineal for them was a living legacy from their ancestors, a gift that connected past and present, and a critical source of strength in the battle for personal and cultural survival.

EIGHT

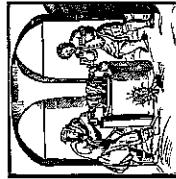
Trade Secrets

that their success depended on the support of the Crown's subjects, especially the powerful merchants of New Spain.

Of the thousands of people in New Spain trading in cochineal by the late sixteenth century, most were small dealers who auctioned off cochineal in weekly markets, or who roamed from town to town, looking for cochineal on the cheap. Primarily Indians, mestizos, mulattoes, and Africans, they were people of little influence, with whom the Crown could deal harshly without fearing retaliation. And deal harshly it did. In 1580, Viceroy Enríquez banned blacks and mulattoes from trading in cochineal; he allowed Indians to engage in the business only if they were the servants of Spaniards.

The merchants at the top of the network, however, were a different story. With enough capital and nerve to engage in the risky but spectacularly rewarding transatlantic arm of the cochineal trade, these Spanish businessmen had few qualms about going head to head with Spanish officials whenever they deemed that they were being treated unfairly. Apparently, however, Viceroy Enríquez's discriminatory 1580 decree was one ruling that met with their full approval, probably because it cut down on the competition their agents faced. It is possible, too, that some of them believed—mistakenly—that the new laws would cut down on fraud, the most pressing problem of the cochineal trade.

From the time of the Conquest, and probably under the Aztecs as well, tricksters and con artists had been attracted to cochineal because it was such a lucrative commodity. Since tiny quantities of the dyestuff could produce a considerable profit, even small-scale frauds could be worthwhile. Consequently, fraud was common at every level of the trade and at every point of interchange: Indian producers cheated Indian dealers, who cheated Spanish merchants, who cheated European buyers, who cheated European consumers.



THE ADMINISTRATION OF EMPIRE IS NO EASY TASK. So, at least, the Spanish Crown must have concluded as it attempted to exercise control over its possessions in America. To rule the continent, the Crown relied on an immense bureaucracy of officials, judges, and councils, a bureaucracy whose size and scope amazed many Europeans. Yet even with this mighty corps of officials behind it, the Crown could not always impose its will on Spanish America.

Cochineal was no exception to this rule. When it came to increasing cochineal production, the credit system's incentives had triumphed over the Crown's brute-force directives. In other respects, too, the cochineal trade proved difficult for the Crown to regulate. At the behest of Philip II and his son and successor, Philip III, the officials of New Spain attempted to formulate trade rules, combat market fraud, and establish a royal monopoly on the dyestuff—all in the name of producing more cash for the Spanish treasury. In every case, Crown officials soon discovered

The gambits employed were legion. Some sellers attempted to pass off low-grade cochineal as the top-drawer article, a scam that was particularly effective if the customer lacked experience with the dyestuff. Other dealers, taking advantage of the fact that cochineal payments were based on weight, doctored the balances. Counterfeitors went one step farther and doctored the cochineal itself. The simplest way to do this was to mix the grains of cochineal with sand, chalk, or tiny pebbles, but many people used more sophisticated techniques that enveloped the real grains of cochineal in thin coatings of red ochre, flour, lime, and ashes. Some sellers also attempted to add weight to the cochineal by killing the insects in hot water and packing them before they were fully dry; the resulting cochineal rotted before it reached Europe and was worthless to dyers.

These sharp practices led some Europeans to complain about the quality of the cochineal they received. In 1552, for example, a dyer reported to the Venetian senate that "the new Indian ker-mes" was often adulterated; as a result, he claimed, "the colors fade in a short time, and become bad and horrible to be seen." Whether cochineal was in fact any more likely to be adulterated than the traditional kermes reds is an open question. After all, guilds and governments frequently inspected many kinds of dyestuffs, and it is unlikely they did this without cause. Nevertheless, Indian traders, Spanish merchants, and Spanish officials were worried, for if cochineal came to be seen as an unreliable, low-quality dyestuff, their profits would decline.

Even before the Venetian complaint was filed, Tlaxcala's elite council had appointed special officials to oversee the cochineal trade and to ensure that standard measures were used. Soon afterward, in 1554, four Spanish merchants asked the Mexico City authorities to investigate the phenomenon of cochineal adulteration and to find ways to stop it. The following year, after hearing extensive testimony on the subject, the chief investigator recommended that all cochineal be inspected and sealed by

Crown officials, that adulterated cochineal be confiscated, and that both buyers and sellers of false cochineal be fined. If the buyers or sellers happened to be mestizo, black, or Indian, the investigator further recommended that they be punished with a public whipping of one hundred lashes.

The viceroy of Mexico apparently accepted these recommendations and enacted them into law, but enforcement was weak and piecemeal. At the time, cochineal was not a high priority for the Crown, and not enough officials were assigned to the job. Officials also found it difficult to detect many common frauds, in part because there was legitimate debate about the proper way to kill and dry the cochineal insects. Most people agreed that the best method was to expose them to continuous sunlight; the resulting dyestuff, known as *plateada* or *blanca* for its powdery silver surface, was widely considered the top grade of cochineal. But since sun-drying, done properly, could take up to two weeks, many producers experimented with cheaper techniques. *Jaspeada* (marbled) cochineal was baked; *negra* (black) was killed on a hot plate; *deneigrada* (lightened) was boiled in steaming cauldrons. Other types of cochineal were dispatched with vinegar, smoke, or sulfur fumes. The relative value of the cochineal these methods produced was anyone's guess.

As cochineal became increasingly important to royal finances, Crown officials became more aggressive. In September 1572, Viceroy Enríquez made all processing methods except sun-drying illegal. A month later, he created a new Crown position, the *juez de grana*, "the judge of cochineal." Charged with enforcing a new and more rigorous system of inspection, the judge was based in Puebla, which at the time was New Spain's most important cochineal entrepôt. Under the new regime, all cochineal had to be weighed in front of the judge in Puebla's public markets before it could be exported to Spain. The judge also examined the dyestuff for quality and purity. If a sack of cochineal made the grade, it was packed in a wooden box. When the box was full, it

was nailed shut, branded with an official mark, and stored in a public warehouse. At the official port at Veracruz, ship captains were forbidden to accept any cochineal that did not come in a crate marked with the judge's brand. Only certified boxes of cochineal were carried to Spain, along with a copy of all inspection records and receipts, which were checked by merchants and customs officials in Seville.

It was a marvelously thorough system, one that presented serious obstacles to swindlers. But most cochineal merchants opposed it—not necessarily because they were dishonest but because they felt it gave too much power to the Crown. They particularly objected to storing their cochineal in public warehouses after inspection. What they wanted instead was an amendment allowing the judge to inspect cochineal in merchants' homes, after which the merchants would be allowed to store the sealed cochineal in a locked room on their own property.

So powerful were these merchants, and so strong and united their demands, that a bare two months after passing the new regulations Viceroy Enríquez was forced to accede to their wishes. From December 1572, merchants were allowed to store sealed cochineal in their own storehouses for a maximum of four days, after which it had to be shipped to Veracruz. The change opened the door to all kinds of merchant fraud, and consequently Enríquez reinstated the original law in 1580, near the end of his term of office. By then, he had also appointed additional judges for other cochineal entrepôts, an act that did much to improve the quality of cochineal exports, even as it tried the tempers of Spanish merchants.

Long after Enríquez had left office, merchants and Crown officials continued to wrangle over cochineal regulations. To Crown officials, merchants appeared sly double-dealers, bent on cheating the king of his due. To merchants, Crown officials seemed meddling busybodies whose arbitrary rules increased the costs of trade.

What worried the merchants most were the Crown's repeated attempts to create a royal monopoly on cochineal—a monopoly that would cut the merchants out of the business altogether. In Spain, as in much of Europe, it was common for the Crown to claim monopoly rights over a trade, especially if it involved a scarce and highly valuable commodity like cochineal. Royal officials did not always run the monopolies themselves but often auctioned them off, exclusive rights to the Spanish slave trade, for example, were sold to a Portuguese contractor in 1595. Either way, monopolies were an easy way for a ruler to make money, which is why they proved so attractive to the bankrupt Spanish Crown.

From the 1560s to the early 1600s, Crown officials in Spain repeatedly came up with schemes for setting up a royal monopoly on cochineal—the only American agricultural product they ever deemed worthy of such treatment. Again and again, however, these plans were frustrated by logistical problems and merchant opposition. Only in 1618 did the Crown finally establish a partial monopoly on the dyestuff. Under the new law, the merchants of New Spain were required to auction off their cochineal to the king's agents. The profitable transatlantic arm of the trade thus became the province of the Crown, which apparently hoped to net about 100,000 pesos a year from the arrangement.

Rightly perceiving this semi-monopoly as a threat to their livelihood, merchants hid their cochineal, lied to Crown officials about the way the grading system worked, and generally drove auction prices sky high. Conceding, with some bitterness, that the "dealers in cochineal are crafty and far more knowledgeable than we are," Crown officials repealed the law in 1622. In subsequent years, the Spanish government occasionally tried to resurrect the notion of a royal cochineal monopoly, but Mexico's top officials always rejected the idea. In their view, the struggle of 1618–1622 had proved that it was a waste of time to establish a monopoly that the merchant community adamantly opposed. Yet although the Crown had no success in creating a royal

monopoly on the dyestuff, it did succeed in an even more vital task: maintaining the global monopoly on cochineal production that belonged to the Spanish Empire as a whole. By the early 1600s, Spanish cochineal imports were worth more than 500,000 pesos a year. To keep this lucrative trade in Spanish hands, the Crown had to prevent other Europeans from producing the dyestuff for themselves.

Taking a cue from the Venetians and other major players in the color trade, Spanish officials treated cochineal as if it were a state secret, making it clear that the curious and the indiscreet would be punished. In part, the Crown relied on existing Spanish laws that made it hard for foreigners to get close to the sources of cochineal production. Crown officials, for example, did not allow anyone to travel to America without a permit, which most foreigners found impossible to obtain. Although some people discovered ways to get around the system—chiefly through residence in Spain or a Spanish dominion, marriage to a Spaniard, employment by a Spanish firm, or forged paperwork—any foreigner in New Spain who showed too strong an interest in cochineal was carefully watched and, if necessary, deported.

In addition, Philip II enacted a law that specifically forbade foreigners to trade in the dyestuff—a ruling that deprived foreign merchants not only of a valuable item of commerce but of a reasonable excuse to visit the cochineal nopalries of New Spain. At first foreigners who violated the law were merely threatened with the loss of their goods, but from 1614, when Philip III passed a harsh law against all foreign trade, the punishment was death.

The Spanish Crown had a habit of passing draconian laws that it could not enforce, but when it came to preserving Spain's global monopoly on cochineal, Crown law, for once, proved effective, especially as far as the live insect was concerned. In part this was because Crown officials realized how high the stakes were, and were correspondingly zealous in their prosecution of the relevant statutes. But no doubt it helped that in this battle

the Crown had the full cooperation of Spanish merchants on both sides of the Atlantic. Indeed, no Spaniard wished Spain to lose its monopoly, for the country's possession of the superb dyestuff had become a point of patriotic pride.

Even so, it is somewhat surprising that Spain managed to keep such a firm grip on an animal as small as cochineal. There was, however, another factor working in Spain's favor: cochineal's inability to tolerate all but the most optimum environments. Vulnerable to heat, cold, rain, and other sudden changes, *Dactylopius coccus* was not a natural traveler. Moreover, techniques for collecting botanical and zoological specimens were still quite primitive (and would remain so until the nineteenth century). Most collectors simply sent back pressed plants and stuffed animals or did the best they could to keep living collections alive in trunks and packing cases—a makeshift approach that was ineffective with creatures as delicate as cochineal. Anyone who tried to cram live cochineal into a chest and smuggle it out of the country was likely to find the insects dead before he reached the border.

Yet if royal edicts, Spanish vigilance, and cochineal biology ✓ combined to make it almost impossible for foreigners to steal cochineal from Mexico, the fact remained that at some point the processed dyestuff had to be shipped across the Atlantic to Seville. Even the most experienced Spanish captains regarded this voyage with some trepidation, for they knew that their enemies might attack at any moment—"Pirats," as the poet-adventurer John Donne described them, "which doe know / That there come weak ships fraught with Cutchanell, / The men board them."

Bold and cunning, these pirates were determined to smash

the Spanish monopoly and seize the transatlantic cochineal trade

for themselves.