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VOL. 122, NO. 6 DECEMBER, 1962

Puerto Rico's Seven-league Bootstraps

"Operation Bootstrap" has changed this island commonwealth from a land of desperate need to a booming showcase of democracy

By BART McDOWELL
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OUR PLANE BANKED and a Puerto Rican panorama tilted into view: gray old Spanish forts, new concrete-and-glass hotels, miles of glossy palms and shining beach, streaks of factory smoke stretching seaward on the trade winds.

This air view of San Juan has lately become familiar to thousands, for jet planes make Puerto Rico only three-and-a-half hours from Washington or New York, a little more than two hours from Miami. (See the National Geographic Society's new Atlas Map, **West Indies,** a supplement to this issue). Tourists and musicians come to see and hear the island's beauty; investors to estimate opportunity; diplomats to study a small-country success story.

New Wealth for the Commonwealth

The International Airport terminal at San Juan told a lot about the island. Sun-toasted tourists in floppy grass hats were dragging baskets of souvenirs to the luggage scales. Businessmen hurried by with briefcases. A delegation of Japanese observers stood in line to catch a plane home.

Clusters of well-scrubbed Puerto Rican families waited near the arrival gates to greet relatives returning from the United States mainland. And all over the airport, by the armful and the benchful, were Puerto Rican babies—toddling, napping, crying, cooing, playing.

The story of Puerto Rico is the story of people: 2,500,000 of them. They are crowded 727 to the square mile on their beautiful green 110-mile-long island, one of the world's most thickly settled spots. The United States would be as crowded if all the world's population—minus only the people of India—decided to move in.

Politically, Puerto Ricans are United States citizens, though they have no national vote and pay no Federal taxes. Ten

years ago the U. S. Congress made the island a self-governing commonwealth, or "associated free state." Soon Puerto Ricans may vote on their future status, choosing commonwealth, statehood, or independence.

Whatever their future, Puerto Ricans have made much history in their recent past. In 1942 they conceived an economic development plan that has since become famous, "Operation Bootstrap." The program aimed at transforming the overpopulated island from a land of desperate need to one of increasing plenty; it involved every commonwealth agency and every aspect of civic life.

New industry became a prime goal, and U. S. firms that expand to Puerto Rico enjoy a 10- to 13-year exemption from taxes. They receive help in finding sites, erecting buildings. They are given data on labor supply, power sources, housing, recreation.

The result of such economic wooing techniques: 110,000 new jobs in the past 14 years. Suddenly Puerto Ricans are relatively rich. Since 1950 their per capita income has

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Atlantic Breakers Lather the Beaches of San Juan, Puerto Rico's Capital

From the Government-owned Caribe Hilton Hotel in left foreground to old Spanish forts and buildings at the far end of the island, this picture spans 4½ centuries. San Juan began as a settlement covering four blocks. Today its cobbled streets are swallowed up in a 30-square-mile city of 432,000. Capitol building appears midway down the coast at right. Bridge across the San Antonio Channel (left) links Old San Juan with newer and larger Santurce (pages 760-61).

more than doubled, from less than $300 to $700.

The Puerto Rican death rate is now lower than that of the United States. Booming schools have taught 88 percent of the population to read and write.

To some who view the island's amazing progress, Puerto Rico is a "showcase of democracy." To others, a "bridge to the underdeveloped nations." Whatever the viewpoint, the future looks good for those armfuls of Puerto Rican babies.

Waiting for my bags, I looked for some of the island's famous migrants, those crowds that once spilled Puerto Rican misery into New York's Harlem. Near a gate marked "Thrift Flight" I saw a line of people.

"Yeah, I already live in New York—Brooklyn," said Carlos Riva, a slim, mustachioed Puerto Rican wearing a porkpie hat. "I work in a garment factory, and I came here to visit my parents. Now I go home to Brooklyn."

He was simply another tourist. Today it is hard to find a migrant of the *West Side Story* sort.

"The migrant tide has turned," the Puerto Rican Labor Department people told me. "Last year about 1,800 more people moved *into* the island than left it."

Old Convent Becomes New Hotel

On the traffic-humming four-lane highway from the airport to Old San Juan, we spanned several centuries in a few minutes. Past bright beachfront and pastel cottages we sped, then past Santurce's shining-white hotels, and on to the island where the city was born. More gleaming hotels; then the streets squeezed narrow in the shadow of the thick walls and arches of the old city.

For an eloquent example of how Puerto Rico blends the old and the new, I needed to look no farther than my own hotel.

It was a new hostelry in a building more than three centuries old. Through its carved mahogany doors I stepped into the golden age of Spain. Antique tapestries, iron lace, and elegant paintings—these are

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Spanish flavor pervades Old San Juan, whose beginnings date from 1521. Balconied buildings, weathered by centuries of sun and salt spray, flank the narrow sidewalks. Beneath them runs a complex system of tunnels, part of the early city's drainage system.

KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHERS THOMAS NEBBIA (ABOVE) AND B. ANTHONY STEWART © N.G.S.

Luscious fruits—oranges, *chironjas*, bananas, apples, and grapes—tempt shoppers in San Juan. In 1956 Puerto Rico's mountain wilds yielded the chironja, an apparent natural cross between orange and grapefruit.

Curbside bootblack sets up shop on paving stones of slag from iron furnaces. The bluish bricks came as ships' ballast from the Spanish Netherlands in early colonial days.

the trappings of El Convento, "the convent," which this building once was.

I read its history while seated in a patio where Carmelite nuns had once walked barefoot. Time moved back to the middle 1600's when a well-born widow, Doña Ana de Lanzós, wrote a letter to the Spanish Court:

"...I beg therefore, that the King grant permission to found a Convent where... women can enter a religious life. For the site ...I give an old house that I own... built of limestone, wood, brick, and mortar."

Philip IV gave permission: "...providing that it will be no expense whatsoever from

Santurce Lights the Tropical Night With 20th-century Sparkle

Founded a century before the *Mayflower* reached Plymouth Rock, San Juan overflowed its small island some sixty years ago and spilled into San-

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

turce. Today stucco and concrete buildings, many of them luxury apartments, spread across acres once sprinkled with country mansions and coconut groves. Traffic and architecture suggest Florida or southern California. This view from La Concha Hotel looks south across Dr. Ashford Avenue.

my Royal Treasury," and nuns came to worship and ponder eternity.

But gradually their temporal quarters decayed. By 1903 the Bishop felt that repairs would be too costly; the Carmelites moved out, and the old convent and neighborhood began a swift decline.

In 1959 young dime-store heir Robert F. Woolworth entered the picture. The old place was in a sorry state, but he saw only its historic past and potential future. Working with the Puerto Rican Institute of Culture, Mr. Woolworth invested where King Philip had refused, and restored Doña Ana's old house of "limestone, wood, brick, and mortar." The result—El Convento Hotel, which opened last January.

"I enjoy new things, and old things, and challenges," Fred Woolworth said in explanation of his investment. Sitting in El Convento's courtyard, he told me of his three-year project, how workmen had tunneled through four-foot walls to put in air-conditioning ducts, how he had matched old tiles with clay from the Dominican Republic.

Half a dozen sightseers walked past us, speaking animated Spanish.

"We have had as many as 8,000 visitors on a single Sunday, especially local people," Mr. Woolworth said.

Some old Puerto Rican families have shown even greater interest; they have given family heirlooms for display in the galleries.

Puerto Ricans Preserve Their Past

Such restoration projects are not limited to private enterprise. There is La Fortaleza, whose stone walls were raised by defense-minded Spaniards early in the 16th century. After a fire in 1625 necessitated reconstruction, it became the residence of the Governor, and remains so to this day. But in 1940, the massive structure sadly needed repair, and there was talk of abandonment. Instead, the

Government decided on restoration—half a million dollars' worth for the building and its tropical gardens.

More restoration is coming to the narrow, swarming streets of Old San Juan.

"Three-quarters of the buildings here belong to the 18th and 19th centuries," said Dr. Ricardo Alegría, head of the Institute of Culture. "We're restoring 230 acres—as the Rockefellers did Williamsburg, Virginia. But we are not working for the tourists. Our program is an answer to the critics of the United States . . . it proves that she has not destroyed Puerto Rican culture."

A few hilly blocks away from La Fortaleza, another structure bridges the four centuries of European settlement. The Casa Blanca, or White House, the oldest continuously inhabited European home in the Western Hemisphere, was begun in 1521. It sits

Gentle Waters Off Icacos Island Reflect Silver From the Winter Sun

Rocking to the rhythm of the Atlantic, pleasure boats moor by the beach of an idyllic isle off Puerto Rico's northeast tip. Mist shrouds mountains on the mainland.

Hawaii in the Caribbean: Thousands of graceful coconut palms fringe Luquillo Beach, thronged in summer but almost deserted in winter. Its parking lot can accommodate two thousand cars.

ODACHROMES BY NATIONAL GEOGRAPHIC CHIEF PHOTOGRAPHER B. ANTHONY STEWART © N.G.S.

proudly above San Juan Bay, surveying the passage of ships and time.

Treasure ships laden with gold anchored beneath the Casa Blanca. Sir Francis Drake's spry fleet darted into this harbor and dueled with the cannon of glowering El Morro (cover and page 792). Drake withdrew without victory but with all his ships afloat.

The Dutch invaded the port and put the torch to it—even burned a part of the Casa Blanca itself—before they were forced to retreat. The house survived five major sieges, as well as earthquake and hurricane.

In May, 1898, shells fired by United States naval vessels crashed into the house, then the residence of Spanish military engineers. When the Spanish-American War ended and Puerto Rico was ceded to the United States, Casa Blanca became the residence of the senior U. S. military commander on duty here. It is yet.

Ferns Rival Trees on El Yunque

One morning I drove 30 miles east to Luquillo, one of the world's most beautiful public beaches. The feathered shadows of coconut palms played on warm sand—but the great crescent of beach was almost deserted. I asked why.

"This is winter," said a vendor, who was finding little demand for his orange juice and *bacalaitos*, codfish fritters. "Puerto Ricans do not swim in the winter."

Even though U. S. continentals may fly a

KODACHROME BY B. ANTHONY STEWART © N.G.S.

Umbrella proves a must for visitors to 3,494-foot El Yunque, whose crest lacks only 30 feet of matching the highest of the Luquillo peaks, El Toro. Each year some 1,600 showers—each averaging only 20 minutes duration—douse the jungle-covered slopes.

Luxuriant Rain Forest Crowns Peaks of Sierra de Luquillo

Nurtured by an average annual rainfall of 180 inches, tree ferns grow 30 feet high and orchids bloom in profusion. Squawking parrots dart through the dense foliage of more than 200 species of trees and roost on vines 100 feet long and strong enough to support a man. A part of the Caribbean National Forest, the preserve ranks high among Puerto Rico's tourist attractions.

KODACHROME BY [illegible] HALL (LIFE SIZE)

Singing tree frog, *el coqui*, warbles his name in a sweet, clear voice. Only the male flutes the melodious mating call. The little amphibian lives in every section of the 110-mile-long island.

Visitors Fill New Hotels, So Puerto Rico Builds More

Cooling winds help moderate the island's temperatures, which average 76° F., with only a 6° variation between winter and summer. The sun shines 360 days a year. This superb climate annually attracts 400,000 visitors, who leave behind some 66 million dollars.

Breakfast on the terrace delights a guest at the new Dorado Beach Hotel, 15 miles west of San Juan. Rustling palms and crashing surf beyond play a majestic symphony.

El Ponce Intercontinental, Pan American Airways' handsome new hotel, overlooks the city of Ponce and the blue-green Caribbean. Opened in February, 1960, the hotel can accommodate 340 guests.

Dorado's builder, Laurance S. Rockefeller, and his wife play golf on the hotel's palm-studded oceanside course designed by links architect Robert Trent Jones. Many experts consider it the finest in the Caribbean.

KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHERS GEORGE MOBLEY (ABOVE) AND B. ANTHONY STEWART © N.G.S.

thousand miles to bask on this tropical isle, winter is winter to the Puerto Rican.

Half an hour later, it felt a bit like winter when my car climbed a 3,494-foot mountain peak. This was El Yunque, "the anvil," in the Caribbean National Forest, wettest spot on the island. Dampness weighted the air as the road coiled up past coffee plantations into the foggy mass that usually blurs El Yunque. The tap of light rain and windshield wipers pulsed a sleepy rhythm.

Roadside ferns seemed bigger with each ascending mile; soon they were tree-size. This was a true rain forest with an annual precipitation of 180 inches (pages 764-5).

Like the 1,600 other showers that fall here each year, this one lasted only about 20 minutes. I stopped to stroll and look.

The guidebook promised more than 200 species of trees here. The book also described a perfect orchid that grows no larger than a pinhead. El Yunque, larger than a haystack, hid the orchid well, but it proudly wore a less exotic flower, delicately petalled in many hues and provocatively called *Miramelinda*, "Look at me, pretty one" (page 778).

Planting Transmission Poles by Helicopter Speeds the Pace of Progress

Sugar cane thrashes violently in the backwash of rotor blades as a Sikorsky S-58 lowers a 50-foot, 2,200-pound timber unerringly into its hole. Linemen will "dress" the poles with wire. To take light and power to remote farms, copters have set in place nearly 8,000 poles throughout the island.

On a balcony overlook, a lone tourist in plaid shorts seemed to be talking to himself: "Hello, Sid. Do you read me, Sid?" He had beamed a walkie-talkie toward Luquillo Beach, which stretched out far below us.

"It's only six miles as the crow flies," he explained sheepishly. "Sid must have fallen asleep in the sun."

He tried a different antenna adjustment and was still calling Sid when I left.

Golfers Saved From Falling Coconuts

One day I drove west from San Juan to see the most luxurious place on the island, Dorado Beach Hotel (page 766). Here beach houses and cabanas thread deep palm groves.

Workers in white pack medicinal capsules in Parke, Davis and Company's factory at Carolina, five miles east of San Juan. Some 800 industrial plants have been established in Puerto Rico in the past 14 years as part of Operation Bootstrap, the island's do-it-yourself fight against poverty.

HS EKTACHROME (ABOVE) AND KODACHROME BY B. ANTHONY STEWART © N.G.S.

Dorado Beach was built by Laurance S. Rockefeller in a former grapefruit plantation.

On the Dorado Beach golf course, two young Puerto Ricans strolled near a lushly manicured green. I assumed they were caddies until one scooted up a palm; in an instant, two coconuts thudded to earth.

"We take no chance," said the young man on the ground. "We remove coconuts so no golfer will be surprised at his play."

Perhaps the greatest chance to be taken here is to drive a car in island traffic. Vehicles have increased six-fold since 1940, and they ricochet along the roads in the hands of daring drivers. One visitor, just back from the mountains, shakily gave me his impressions: "It's bad enough to see the flattened pigs and chickens. Then you pass those white crosses marking fatal accidents. And after *that*, you even see crosses knocked down by other cars."

Business Tugs at Bootstraps

But Puerto Rico must move at a fast pace. "We have some 800 factories here now," said a staff member of Fomento (the Economic Development Administration), which helps implement Operation Bootstrap. "And two new plants open every week."

Investors report extraordinary results: The year 1960 saw an average 29 percent return on money invested in the island's future.

When Puerto Rico was still called the "poorhouse of the Caribbean," the brilliant political leader Luis Muñoz Marín insisted that short-range relief was not enough. "We need more vitamins," he said, "and less aspirin." Now, literally, Puerto Rico has both; pharmaceutical plants are booming here (previous page). So are firms producing cigars, petrochemicals, and electronic equipment.

To power the new factories—and the families' new washing machines and TV sets—Puerto Ricans are festooning their steep hills with electric transmission lines. They do this job inventively, using helicopters.

I flew out in a Water Resources helicopter one morning, skimming steep fields and reservoirs and thin, rainbow-trimmed waterfalls. We touched down in the center of the island near Orocovis.

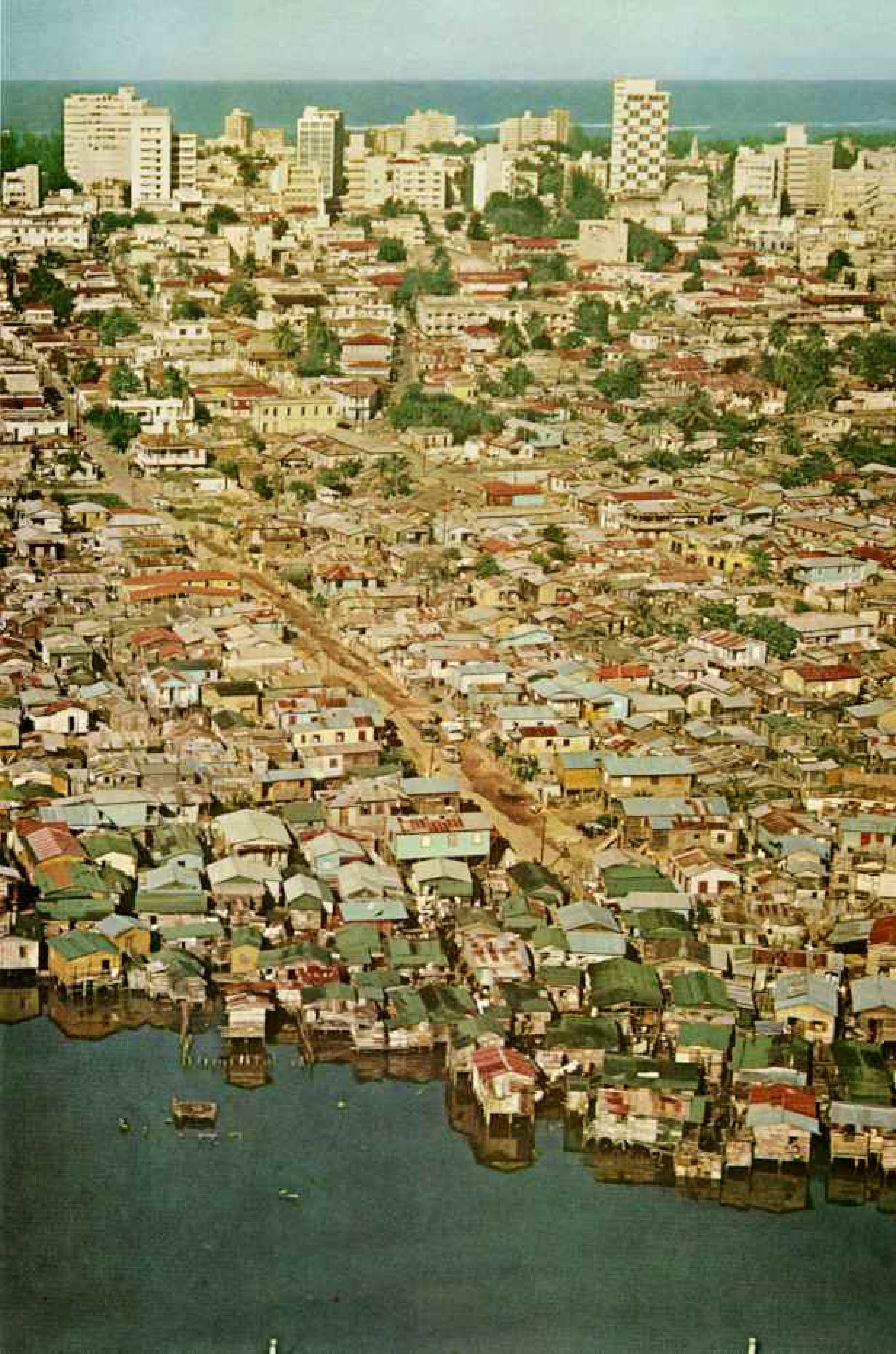
"See—the people are happy," said pilot Francisco de León. Fourteen *jíbaros*—country people—stood by their little homes, viewing a show that would bring electric lights.

A big Sikorsky S-58 helicopter thrashed toward the hillside, hovered over a stack of

KODACHROME BY B. ANTHONY STEWART (ABOVE) AND EKTACHROME BY THOMAS S. NEBBIA (OPPOSITE) © N.G.S.

Community TV, a gift of native sons who migrated to the U. S. mainland, entertains strollers in the plaza of San Lorenzo, 15 miles southeast of San Juan. Sunday evening viewing in predominantly Roman Catholic Puerto Rico includes a talk by a priest.

Sea of shanties along Martín Peña Channel contrasts with gleaming new Santurce buildings that overlook the ocean. Communities of wooden-box houses bear odd names: *El Fanguito* (the Mud Hole), and *La Perla* (the Pearl). Some dwellings sit on stilts above tidewater; a few show television antennas. But slums are disappearing as housing projects mushroom throughout the capital.



Precast houses supplant slums

Cascade of concrete gushes into a casting bed at the Villa del Rey housing project on the outskirts of Caguas. IBEC, a Rockefeller corporation, has erected more than 8,500 single-family homes on the island in eight years.

Wall panel eases into place in the Caguas development. Workmen raise five low-cost homes a day.

80 huge poles and hooked cables onto two of them. The chopper resembled a great bird building a giant nest. It swept up and out over the little green valley, the poles dangling straight down. Then, guided by a windblown signalman on the ground, the helicopter settled toward well-marked holes.

A whirlwind churned the earth; banana plants blew prostrate, clean clothes flailed wildly on the line, a startled horse dashed fearfully down the hill, and women buried their faces in aprons against the grit. Then, with a precise plunk, each pole fell upright into its slot (page 768).

"We have laid 8,000 poles, all over the island," the pilot told me. "No accidents in three years. We do in a month what used to take a year. Now," he added with pride, "we teach our techniques to U.S. continentals."

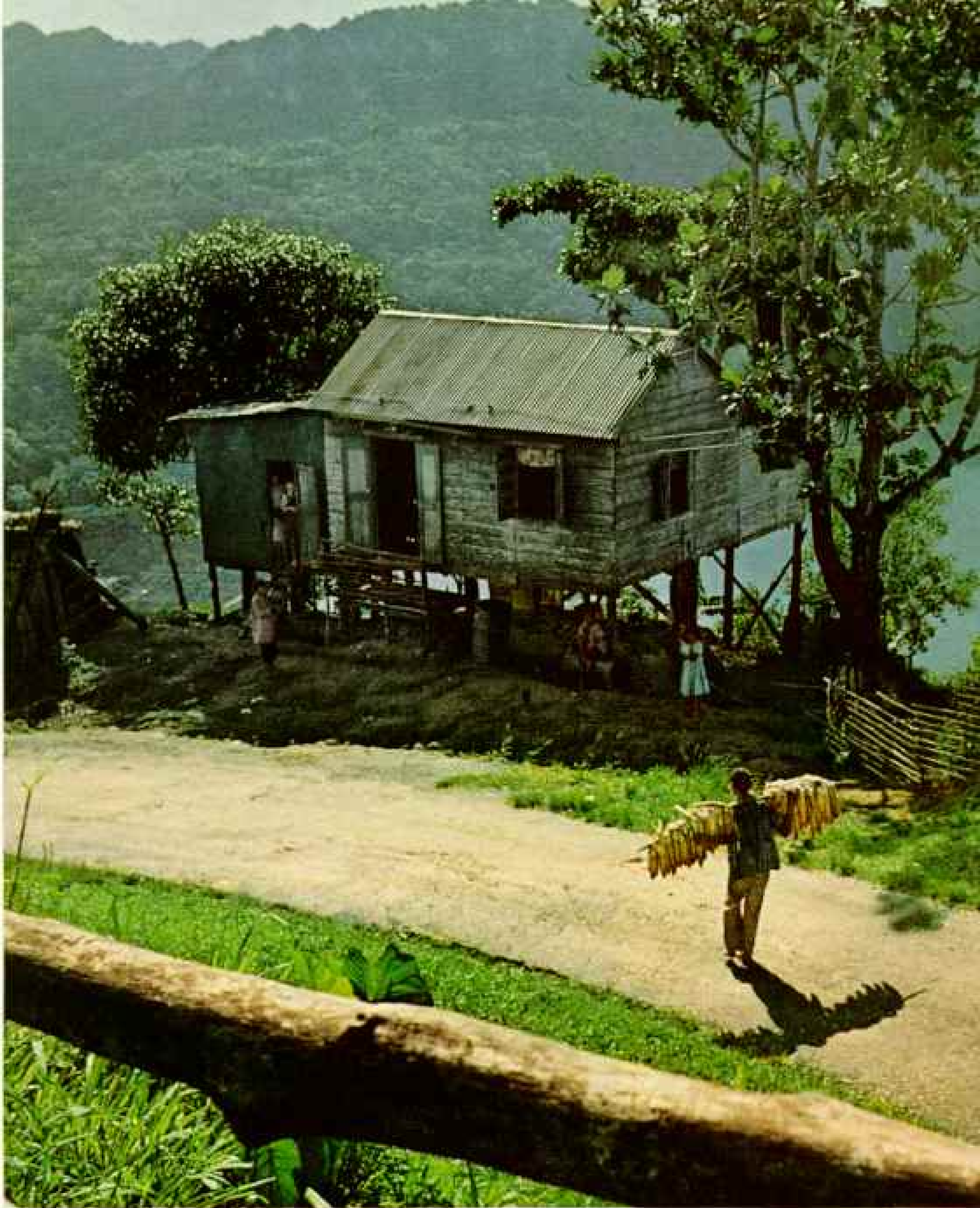
With the same flair, Puerto Ricans open supermarkets, clear slums, build freeways, and raise skyscraper apartments. I watched workmen mass-produce small homes for the housing division of IBEC—International Basic Economy Corporation—a private Rockefeller company (above and opposite). Giant vac-

KODACHROMES BY NATIONAL GEOGRAPHIC CHIEF PHOTOGRAPHER B. ANTHONY STEWART © N.G.S.

One-piece roof—28 tons of reinforced concrete—swings into position to fit the walls of a home in Villa del Rey.

In a demonstration at Humacao, south of the Luquillo Range, IBEC workmen assembled a precast concrete house in an hour—one of a hundred homes built for survivors of a hurricane in 1960.

Proud new homeowners in Villa del Rey move into a three-bedroom dwelling completely insulated and cross-ventilated. Such a house sells for $11,900, including land; a two-bedroom model for $9,500. Because rooms may be added easily as the family grows, the concrete houses prove enormously popular with middle-income Puerto Ricans.



uum-lift cranes move 28-ton reinforced roofs onto the shells of concrete houses, a novel technique that IBEC may export all over the hemisphere. Peru and Chile already have IBEC homes. Jamaica and other Caribbean lands provide promising markets.

New homes and new jobs mean greater local opportunity—and fewer migrants seeking jobs in New York and Chicago.

"Some used to fly north in the dead of winter—and take no coat," said Matilde Fernández of the Labor Department. "They would say, 'I don't need a coat. I have lived in the mountains, and do not feel the cold.'

"But unless they have traveled, Puerto Ricans have never known freezing weather. So I show them. I take their hand and put it into the freezer of the refrigerator—and I hold it there and say, 'That is the way the weather feels in a New York winter.'"

Miss Fernández helps any Puerto Rican who is considering migration to the mainland.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Farmer's Boxlike House Perches on Stilts Above a Man-made Lake

Tin-roofed dwelling of a *jíbaro*, or countryman, overlooks Lago Dos Bocas, a reservoir at the confluence of the Grande de Arecibo and Caonillas Rivers. Here dam and hydroelectric plant supply power for industry. Balanced load of corn riding the grower's shoulders casts an eaglelike shadow.

"We don't encourage or discourage their going," she says. "But we orient them on what to expect."

I followed Miss Fernández as she drove on her rounds of villages east of the capital.

"See that settlement—the new one?" she said. "Those people were moved here when we built the new airport. Many families were unhappy, so they started migrating to New York. Five families in one week! Well, we held some meetings and listened to their reasons—lack of good water, muddy streets, things of that sort. We found solutions. Now migrations from there have stopped."

At a little community of 500 people we visited villagers door to door. Later, I did the same thing in the villages of the mountains and the island's grassy western valleys. I must have entered more than a hundred homes. From them I can draw a composite picture of a "typical" visit.

A plot of packed and sprinkled earth marks the walkway. Red *amapola* flowers grow by the door, and a tiny vegetable plot rises high with lanky stalks of corn. On a porch just big enough for two rocking chairs, chubby children are at play. One is named Juan (after the Apostle), one Nelson (after New York Governor Rockefeller), and one is Junior (after the fashion for English names).

Cups Scarce, but Kindness Isn't

The lady of the house stops ironing to greet us. Would we care for refreshments? She dithers into a small kitchen.

Living room furnishings are spare. On the wall hang pictures of Christ, Governor Luis Muñoz Marín, and a self-conscious bride and groom. On the sill of an open window, small birds called *reinitas*, "little queens," nervously peck at a dish of sugar.

Our hostess returns with a tray of coffee, warm milk, and soda crackers. She has too few cups to go around, so she takes her coffee from a glass. We talk about the weather and the sugar cane crop.

A neighbor enters the room and sits down informally, explaining that she is waiting for the *público*, the public auto, that will soon come by. We talk about the community and how villagers help each other build their houses. The público arrives, honks, and the neighbor leaves in a fluster.

We finish nibbling at our crackers, thank our hostess, shake hands, and go.

Homes vary, of course. Some lack electricity and running water. Complexions range

Fingers stitch a signature on an embroidered handkerchief. Needlework, once a cottage industry in Puerto Rico, is waning.

With a pistol-like needle, rugmaker shoots tufts of wool into a canvas at the V'Soskes' Vega Baja plant, 20 miles west of San Juan. Man at left vacuums a finished carpet.

a wide spectrum (an estimated 20 percent of the population is Negro). But in every home —rich or poor—I found hospitality.

Just a generation ago, almost every humble house had a woman busy with low-paid needlework. I found few in 1962. With rising local wages, needlework industries have moved to the Philippines or Hong Kong.

Rugmakers Weave Rare Artistry

But if the embroidery needle has largely vanished, the carpet needle is sewing up a fine profit. At Vega Baja on the north coast, I visited with Thad V'Soske at one of six plants where the V'Soske brothers produce some of the world's most beautiful rugs.

"We've seen changes, all right," said Thad, a quick, kinetic man. "When we opened our first plant 25 years ago, the only other big industries were sugar and needlework. People here had no real incentive to work. Look at this." He darted to the window and gestured toward his parking lot. "Our first employees came here on burros and bikes. Now see the cars! The whole spirit has changed."

The V'Soskes brought quite a spirit with them when they moved here from Michigan.

"We started by showing three men—all of them farm workers—how to tuft rugs," Thad recalled. "One of them was nearly starved. Today he's one of our best-paid executives. The point is *he learned*. All of them did.

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

"Why did we decide to locate here? Puerto Ricans know how to make fine things. Their manual dexterity is something fantastic!"

We strolled into a towering tufting room where room-sized rugs hung from the high ceiling. Wielding pistol-like needles loaded with bright yarn, men shot the canvases with tufts of wool (above). Before our eyes, designs took shape—bold planes of color in the impressionistic style of Matisse, quiet florals that recalled the elegant geometry of different tastes and periods.

Thad credits Stanley V'Soske, oldest of the four brothers, with creating the exquisite designs. "Back in 1924, when we went into carpetmaking in Grand Rapids, we decided to try for an elegance that seemed to be missing from American carpets," Thad explained. "Stanley had studied painting, and he gave us artistic design and color."

Theirs is quite an American success story, for the family is only a generation removed from Poland. Today they employ 500 people in an industry that is truly international, with one of their plants near Galway, Ireland, and operations in Grand Rapids where two of the brothers remain. It's still very much a family business; Thad's wife Vesta and their three sons are in the firm.

Precise matching of colors is a specialty. I saw how it was done in a kind of chemist's shop that smelled of wet wool.

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Flamboyant trees brighten roads across the frostless island. Farmer carries plantains.

***Miramelinda* flower** *(Impatiens sultani)* carries a lilting message in its Spanish name: it means "Look at me, pretty one."

"Too much blue in this one," Thad V'Soske advised an employee.

The workman saw the difference that I did not, nodded, and tried again. In this way—in a plant that is part factory and part studio—the V'Soskes change the wiry carpet wools of Iceland and Iraq into Puerto Rican objects of art. New York museums display the rugs; so do palaces and exclusive clubs.

Air Visitors Bring a Bonanza

Back in San Juan, I dined with Pierre Greber in his Swiss Chalet restaurant and talked about a growing industry—tourism. Pierre played midwife to the infant industry. When the Government-owned Caribe Hilton opened in 1949, he was the harried personnel manager, literally searching the streets

HS EKTACHROME (ABOVE) AND KODACHROME BY NATIONAL GEOGRAPHIC STAFF PHOTOGRAPHER B. ANTHONY STEWART © N.G.S.

Last Call for Bets: a Cockfight Begins

Sports-minded Puerto Ricans have a taste for gambling. Thousands buy tickets weekly in the island's legal lotteries. Thoroughbred horses race the year around at San Juan's El Comandante.

A winter baseball season attracts vociferous crowds. The island has supplied a host of players to major-league teams on the mainland.

Most towns schedule Sunday cockfights during a 10-month season. Men make up the majority of spectators.

Cocks rarely meet death in the ring. An owner prefers to stop a fight rather than risk serious injury to his bird.

Pampered creatures with iridescent feathers, the birds sell for as much as $300, based on fighting ability. Skilled handlers control their sunning, exercise, and feeding.

Wading Atlantic shallows, fishermen head toward surf-washed Arecibo, on the north coast.

and stopping cars in quest of kitchen help.

During its first years, the Caribe Hilton had empty rooms. Then, with better plane schedules, Puerto Rico in the mid-1950's became fashionable among sun-seekers. Today it attracts many who once went to Cuba.

Banking on the future of tourism, Pierre Greber opened a tiny restaurant. Today he and his partners feed the public in three large restaurants and lodge hundreds in the Hotel Pierre, one of nearly a dozen hotels recently opened or still a-building. Almost overnight, tourism in Puerto Rico has become a $65,900,000 business.

Along with the visitors' purchased pleasures, we shared the pastimes of resident islanders: playing dominoes, writing poetry, feasting on *lechón asado* (roast pig), or attending cockfights. For the history-minded, there are the ruins of Caparra (map, page 757), whose stones include foundations believed to have supported the original house of Ponce de León, the first Governor. He founded the capital there in 1508, but the site was abandoned in 1521 for healthier seaside San Juan.

For some visitors, the sight of the island's aristocratic horses is reward enough for the trip. Puerto Ricans call the animals *paso fino* —literally "fine gait"—and they are the smoothest horses I've ever seen in motion. The paso fino is a blue blood descended from fine Andalusian-Arabians and disciplined by the island's geography. The gliding pace came naturally from work in the sugar-cane plan-

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Catch and shoes dangle from shoulder yokes

tations. An overseer spent his whole day in the saddle, and he chose his mount for comfort and held him to the easiest of strides.

I met the paso fino in Guaynabo at the country place of Don Ramón Ruiz Cestero. I arrived when the tropical sun was sinking through the orchid-laden branches of trees.

"The colts are already stabled," said Don Ramón. "But I insist you see them."

The two mounts were an electric pair—titian-hued Adagio and smoky-black Allegretto. Their necks arched proudly, their muscular bodies were all motion and satin. While I marveled, Don Ramón and his son Héctor, 18, engaged in friendly debate about which horse would win an upcoming show.

The show settled no quarrels about the colts. Adagio won the island-wide grand championship for conformation; Allegretto, ridden by his trainer, Don Ramón's 16-year-old son José, was grand champion for gait.

I saw another horse show at Ramey Air Force Base on the island's dry, grassy northwest tip. Here U. S. Air Force people have fallen under a prairie spell; their Lazy R Riding Club grazes 168 horses beside runways—and 100 of them are the paso fino.

An Air Force colonel even forecast a future for the breed in Texas.

"My wife and daughter bought paso fino mares," he said. "Now we're transferring to Texas. Well, we're taking the mares with us. These little horses are cutting quite a figure at horse shows back home. We're even talking about a paso fino association in the States."

Thus another Puerto Rican quality export.

Peace Corps Serves Blue Luncheon

From Ramey Air Force Base, photographer Tony Stewart and I doubled back into the hilly center of the island to a Peace Corps training spot, Camp Crozier, a few mountainous miles from Utuado. Our two-day visit was rugged, for here we tried to keep up with 49 young Peace Corps volunteers. The Brazil-bound trainees were spending four weeks in a teakwood forest, studying Portuguese, learning survival techniques, and practicing community service among villagers in nearby towns.

Of the 49, eight were Puerto Rican. What was the appeal? Pretty Gloria Pinto, of Manati, had a good answer: "Since 1958 I have been working with Puerto Rican 4-H groups. In the Peace Corps, I change the place—but I'll be working for my country still."

That night we slept in venerable Army tents. The *coqui* sang us to sleep, chirping his name with a flute's purity. Though as melodic as many a bird, the coqui is unfeathered—a tiny green tree frog that serenades the whole island (page 765).

Reveille was less melodic—the cadence of calisthenics and the groan of the obstacle course. Corpsmen scaled 85-foot cliffs. By lunchtime we and they were starving.

"Join us for a survival lunch," our hosts said. They explained about edible plants as we entered a moist, mossy wilderness. Someone had built a fire; others were bringing muddy roots called *yautia* and *malanga*.

"We clean away the mud," explained Ester Diaz. She amputated the gray exterior and tossed the roots into a pot with *bacalao*, dried codfish. The amalgam boiled a while,

Haystack hills of limestone pocking northern Puerto Rico west of San Juan remain from collapsed underground caverns. "From the air, the mounds reminded me of dyed eggs sitting on end in an Easter basket," says photographer Stewart. Pineapple fields stripe the valleys.

"Survival stew" of roots and dried codfish bubbles over the fire as Peace Corps trainees lunch in a teakwood forest near Utuado. Volunteers who have completed stateside training spend four weeks at Camp Crozier before embarking on Latin American assignments. They sleep in tents and begin each 15-hour day with a two-mile run.

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then corpsmen poured it onto banana leaves to cool. The whole stew was blue: fish, roots, and all. Perhaps iodine in the fish colored it; perhaps herbs. My curiosity died with my appetite. We ate the blue morsels with sharp sticks. Everything tasted like an excellent home remedy for a bad disease.

After a decent interval, we thanked our hosts and prepared to go.

"Your survival meal was a big success," I said.

It was; we survived.

Flaming Fields Illuminate the Night Sky

Our road led south, lacing back and forth across bright streams through fern-fringed forests and steep green valleys. We made poor time; again and again the car lodged behind toiling trucks piled high with sugar cane. Then, quite suddenly, the road opened to a view of the Caribbean coast and Ponce, the island's second city in population.

"Ponce is to San Juan what Boston is to New York," someone had told me. But there was more to the story. Old, proud Ponce—named for Ponce de León—is also a kind of Detroit. Its 114,286 people have made it a bustling industrial center.

Our first night there, we sat on the terrace of the hilltop Ponce Intercontinental Hotel (page 767) to watch the canefield fires. On the night before a harvest, firemen ignite the field. Leaves and underbrush burn away, but the juicy sugar cane withstands the blaze, and next day the cutting goes faster.

We watched the pyrotechnics during dinner. Fields lighted

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Farmer with a future: Ernesto Torres tills 30 acres in the arid southwest. Four years ago he grossed $4,000 a year from his parched land. Today his income averages $56,000. Irrigation spelled the difference. Señor Torres raises poultry so profitably that other farmers copy him.

Goat with a thirst licks a hydrant in Parguera, a village in the dry belt. All water used by residents must be pumped in from outlying hills.

up quietly, then flashed into towering yellow forests of flame; gradually they subsided into a dull rectangular glow (page 786). At one time I saw twelve fields ablaze, a luminous checkerboard of red on black. Beside our coffee cups wisps of charred leaf settled gently.

"They call this ash Puerto Rican snow," said Mrs. Leo J. Riordan, wife of the hotel manager. "It's a housekeeping problem."

Next morning cultivation superintendent Richard Giles took me to see the fields being prepared for harvest. He works for the Mercedita, a 12,000-acre cane plantation and sugar-refining complex on the eastern outskirts of Ponce. Near a team of bulldozer operators, we met a solitary cowboy on a skinny paso fino. He was Teodoro Torres, chief of the cane-burning operation.

"Yes, we burn this field tonight. The bulldozer tamps down the cane along the edge of the field to isolate the fire," said Mr. Torres. "We plan for a southeast breeze—the trade winds." And if the wind should change? "Then we will have much to do quickly. But there is no danger." He pointed to a stack of fire extinguishers.

In the same fields I had seen burning the night before, cane cutters were now at work, an army of carbon-smudged men assailing the scorched stalks. Some wore masks against the gritty ash. Machetes flashed in the hot sun like swords of Saracen warriors, as the cutters lopped off the topmost leaves, then dropped the stalks in neat rows (page 787).

Crawler tractors and mechanical cane loaders followed the men like giant insects. Each did the work of 60 laborers, lifting blackened bundles of cane for transport to the mill. Behind the machines came the comic rear guard: a regiment of cattle egrets walking stiffly, gobbling roasted bugs, and dragging their white plumage in the soot.

"We went through two years of torture to get this mechanical system started," said Mr. Giles. "Now we employ fewer men—and pay them better."

I wondered how wildlife fared in the burning fields. "There's one good result," said Mr. Giles. "Rats are a pest around cane. Burning kills the rat—and also the mongoose. You know, the mongoose was brought to Puerto Rico from Jamaica to control the rat. But he turned into a pest himself, eating chickens and eggs."

We drove past Mercedita's experimental fields and young mahogany groves planted as a private conservation program. A sky-scraping sugar silo and large buildings loomed

—the Mercedita Central, refinery for Snow White sugar and distillery for Don Q rum.

A chemical engineer, Luis R. Quiñones, showed me the mill—huge conveyer belts, sirupy boiler rooms as muggy as Turkish baths, white-dusted warehouses where the sugar was sacked. I asked how much cane the mill would chew up in a day, and found the answer staggering—5,500 tons!

Tuna Brought From Distant Waters

The waterfront of nearby Ponce is awash with paradox: A tuna-fish cannery scents up the port. "Yet not one of those fish was caught closer than 1,000 miles from here," an executive of the National Packing Company explained. "Our tuna comes from new fishing waters off Africa or Peru."

This unlikely industry revives the sailing routes of the historic triangular trade of the 1700's—the old exchange of New England rum for African slaves, which in turn were traded for West Indies molasses used in making New England rum. Now refrigerated ships bring African tuna for canning in Puerto Rico—and shipment to the U. S. east coast. Thanks to strategic location between product and market, tuna-scarce

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Fresh pineapples head toward market in Manatí. Island canneries process much of the fruit.

Tobacco grown in upland valleys makes excellent cigar filler. Exports to the United States have spurted in recent years, partly because of the U. S. embargo on goods from Communist Cuba.

Puerto Rico may soon become the world's largest tuna-canning center.

West of Ponce, we embarked at the little resort port of Parguera—where mangroves thrive beside dry, bald hills—on an evening tour of Phosphorescent Bay. You can agitate the black water and see micro-organisms work their luminous magic. The tour boat's propeller churns a chilly bonfire in your wake; darting fish resemble tracer bullets. Dip your hand into a bucket of the glinting water and you wear a glowing glove.*

By daylight we drove to Mayagüez, a sunny, flowering west coast port and the commonwealth's third largest city. Then we circled inland to old San Germán, a hilly little antique that swarms with students from the Inter-American University of Puerto Rico, a privately endowed liberal arts school. Here, in 1606, missionaries built the church of Porta Coeli, "gate of heaven." It stands clean and proud over a little plaza.

The San Germán area has bustle as well as charm. One reason is water, as proved by Ernesto Torres, a friendly round-faced farmer (page 784). Though his 30 acres lie only about 90 miles southwest of the dripping rain forest of El Yunque, his land was parching dry until four years ago. Ernesto could barely scratch a $4,000 yearly gross from his dusty soil. This year's total: about $56,000.

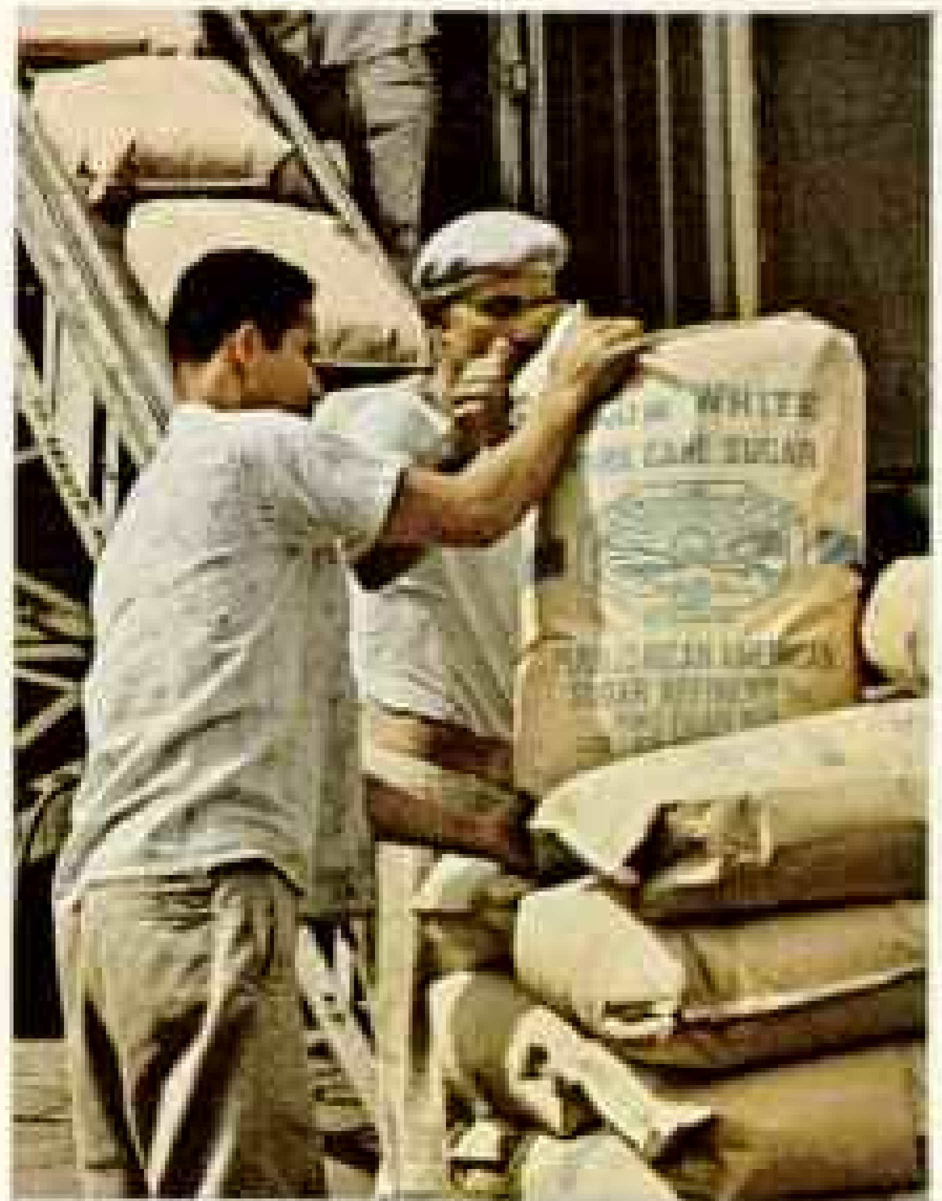
The difference came with the Lajas Valley public irrigation project. The local director, A. González Chapel, explained: "We don't expropriate land. We bring water to private farms. And we bring much more than water."

They do indeed. Lajas experts bring long-range planning to agriculture and help develop scientific farming.

Multiply the Ernesto Torres story hundreds of times, and you see the future of southwestern Puerto Rico, where another 25,000 thirsty acres await water and skills.

A mile or so from San Germán, the villag-

*See "Puerto Rico's Bay of Fire," by Paul A. Zahl, NATIONAL GEOGRAPHIC, July, 1960.



Refined sugar rolls off a conveyer belt at Mercedita Central near Ponce.

Blazing fields of cane silhouette a mechanical loader. Leaves and underbrush burn away without damaging the stalks, enabling cutters to work faster the next day.

Machetes slash cane and lop off the feathered tops. Loader's steel claws lift stalks. Mills will crush out their juice. Puerto Rico's most important crop, cane produces more than a million tons of raw sugar a year.

ODACHROMES BY NATIONAL GEOGRAPHIC CHIEF PHOTOGRAPHER B. ANTHONY STEWART © N.G.S.

ers of Ancones decided to wait no longer for water. Wiry, gray-haired Rafael Santiago told me why.

"We had to carry all our water from the stream. I would dip my bucket—like *this* —and in it I often found snakes! How ugly!" He made an ugly face.

And so Rafael and other citizens of Ancones laid the pipe for their own water system. They also built a school lunchroom. Now volunteers, including the 65-year-old Rafael, were manning borrowed government bulldozers to build a new community road.

"The villagers did it themselves—they got the idea, they planned, they did the job. We offered only orientation."

That was the way Fred Wale explained the part played by his Division of Community Education. One of Wale's field workers had come to Ancones as a kind of county farm agent; but instead of teaching how to farm, he cultivated the arts of self-reliance.

This program began in 1949 when a number of Puerto Rican leaders, particularly

Snowy prayer veils cap the heads of worshipers at morning Mass in Ponce's new and strikingly designed Church of Santa Maria Reina. Girls are students at Catholic University, one of the island's five institutions of higher learning.

Sunlight filters through modern stained-glass windows, dappling the habits of teacher-nuns entering the university chapel.

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the newly elected Governor, Luis Muñoz Marín, concluded that "sometimes governments do things *for* the people when they ought to do things *with* the people." To head the project the Government hired Mr. Wale, formerly with the U. S. Farm Security Administration. He and two others selected 40 field workers with "faith in the people." They picked a varied group: a peddler, a preacher, farmers, a policeman, a fisherman.

"How can you make a teacher out of a fisherman?" asked a skeptical politician.

"I gave what seemed a clever answer," Mr. Wale recalls. "I told him, 'You've forgotten the Apostles.' But then that politician turned and said, 'Who do you think *you* are?' He had me—but I got my fisherman anyway, and he became one of our best men."

Water systems, roads, schools, even little libraries testify to the program's success.

With such dramatic progress, what kind of future awaits one of those dark-eyed Puerto Rican babies born in 1962? I took this question to several commonwealth

Expressive hands emphasize the words of Luis Muñoz Marín, Puerto Rico's dynamic Governor, as he discusses the island's future at La Fortaleza, his official residence.

Nursemaid to two generations, Caya Ocasio Ortiz reads to the Governor's grandchildren on the terrace of La Fortaleza, the Governor's Palace since 1639. She also cared for Señor Muñoz's two daughters.

KODACHROME (ABOVE) AND EKTACHROME © N.G.S.

PUERTO RICO: facts and figures

COLUMBUS discovered Puerto Rico in 1493, and Ponce de León was first Governor. The island's name, meaning "rich port," reflects vain Spanish hopes of finding much gold. Ceded to the United States by Spain in 1898, Puerto Rico first became a U. S. territory, then a commonwealth. Its economic development is a model for Latin America.

Official name: Commonwealth of Puerto Rico. **Government:** Self-governing commonwealth voluntarily associated with the United States. **Area:** 3,437 square miles. **Population:** 2,500,000. **Language:** Spanish, but English is also widely spoken. **Religion:** Predominantly Roman Catholic.

Economy: 31 percent of working population in agriculture (sugar cane, livestock, dairying, poultry, tobacco, coffee, pineapples); 22 percent in industry (textiles and apparel, machinery and metals, electronics, and sugar processing). Few mineral resources, but abundant electric power.

Major cities: San Juan, the capital and largest city (pop. 432,377); Ponce, trade and industrial center (pop. 114,286); Mayagüez, shipping, food processing, and trading center (pop. 50,147).

Climate: Mild, tropical, with little seasonal change, tempered by easterly trade winds. Rainfall, scarce on southern and western slopes, averages about 60 inches yearly in north. Occasional hurricanes in August and September.

leaders. The first was Luis Ferré, Puerto Rico's outstanding industrialist and head of the statehood party. Don Luis, the son of a poor Cuban immigrant, was first to prove that Puerto Rico could support high-profit industry. He made his point in cement, glassware, paper products, and other lines to the tune of several million dollars, which enable him to support numerous philanthropies.

"The future of a baby born in 1962?" he mused. "Well, by the time that child is 21, he will live in the State of Puerto Rico. He will take an active interest in national politics. Thanks to statehood, our natural resources will be fully developed. This child will enjoy a cultural renaissance—painting, music, literature."

Perhaps a third of Puerto Rico agrees with Luis Ferré about statehood. A smaller minority wants independence. The rest either prefer commonwealth status or are undecided. Landowner Don Héctor Cestero of San Juan brushed his luxuriant white mustaches when I asked about a baby's future.

"I hope the Puerto Rican baby born in 1962 will not have to suffer the political status we have known during the last 64 years, but will live in the independent nation of Puerto Rico, in friendly relations with the United States."

To sample a woman's intuition, I called on San Juan's busy long-time mayor, Doña

Day-old islander, the eight-pound son of a cane cutter, is one of 2,000 born each year at Ponce's Gándara District Hospital. Student nurse cradles the healthy infant. Puerto Rico has a higher birth rate, 31 per 1,000 persons, and a lower death rate, 6.7 per 1,000, than the U. S.—23.4 and 9.3, respectively.

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Felisa Rincón de Gautier. In a turban and lace dress, she met me at her office a few feminine minutes late.

"Ah, such a beautiful future!" she said. "When our small children are grown, all our people will be middle class. Everyone will be free of envy."

Finally I went to La Fortaleza to see the Puerto Rican oracle of oracles, Luis Muñoz Marín, the long-dominant political leader and the first elected Governor. My visit began in the pale-blue grandeur of the Governor's office, where he sat behind an ornate desk with six telephones. But soon we moved to an informal balcony. The Governor pondered my question.

Even seated, Luis Muñoz Marín seemed to be pacing the floor. His great gray head sits necklessly on square shoulders; without other movement, he can gesture broadly with flashing brown eyes (opposite, left).

"Well. My prophecy represents my hope," he said, pursing his gray mustache.

"Today's child, when he is grown up, will have a home of his own—a nice one. Every device inside that home will be there for the comfort and enjoyment of the family. No furnishing will make the owners feel more important than a neighbor." The Governor jabbed an expressive forefinger toward my chest: "No status symbols!

"The child of 1962 will have a college education. His own children, if they have the aptitude, will also have a university education.

"The family will live in a commonwealth—but one greatly expanded—a new form of political organization within the Federal system. All this current debate of statehood or independence—when he reads the history books—will seem *strange, strange.*"

Would he clarify this political prophecy a bit? The brown eyes laughed and the leonine head tilted evasively; oracles thrive on ambiguity. He turned instead to a NATIONAL GEOGRAPHIC magazine that pictured the Governor and his family eleven years ago.*

"Come look," the Governor called to a pretty brunette standing in the archway; it was Doña Inés, the first lady.

Doña Inés looked at the photographs. "The children were roller skating on the terrace," she said. "Those children are grown now and have children of their own."

Food for Man's Spirit, Too

"And the nursemaid there—isn't that Caya?" asked the Governor. "She takes care of our grandchildren now" (opposite page).

"Caya is like one of the family," said Doña Inés. "She is even the godmother of our youngest granddaughter."

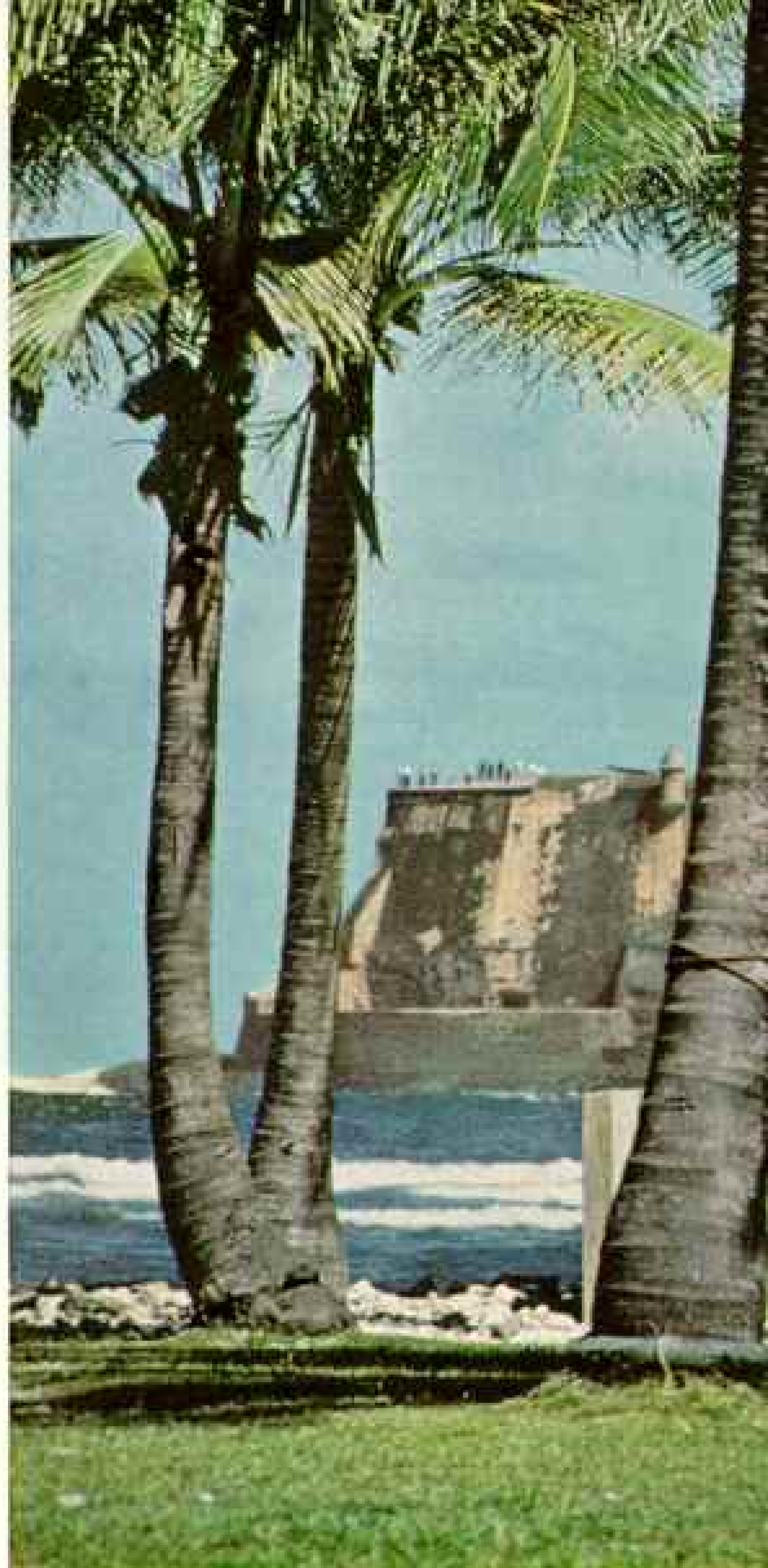
"Caya now goes to school at night," the Governor added. "She is a good example of Operation Serenity."

Operation Serenity is a sequel to Bootstrap. "Material progress is not enough," the Governor insists. His Operation Serenity is not a formal government project but, as one Puerto Rican defined it for me, "It's a loud rallying cry for quiet life." Art museums,

*See "Growing Pains Beset Puerto Rico," by William H. Nicholas, NATIONAL GEOGRAPHIC, April, 1951.

Spain's Gibraltar of the Caribbean in colonial days, massive El Morro rises 140 feet above the sea at the entrance to San Juan Bay (see cover). Its guns fought off many attacks by pirates. Telephoto lens frames the bastion from a palm-shaded greensward across the breeze-swept bay.

Long-silent cannons peer from gunports in El Morro's scarred walls. Visitors skirt the moat.



lectures, concerts—all have their place in Operation Serenity to deepen spiritual and cultural life. It begins with education, from the many new elementary schools to the two sprawling campuses of the University of Puerto Rico, at San Juan and Mayagüez. Many of the university's 21,500 students attend on scholarships, which are offered to young people of other countries as well.

Busy Life at 86 for Pablo Casals

Late one afternoon, Tony Stewart and I visited a man whose name is a cultural rock in any land. Pablo Casals, the world's most celebrated cellist and the founder of the Puerto Rican Casals Festival, lives on Santurce's beach; the ocean is his metronome.

The short, stocky maestro settled contemplatively and put a match to his pipe. Then he took up his cello, and the room filled with a Haydn sonata.

Afterward the maestro moved to a couch. His eyes were a startling blue and his face almost unlined. But when a jet roared over, he began to recall the early days of aviation—and I remembered that Pablo Casals was almost 86 years old.

At age 80, after a brilliant career spent mainly in Europe, the Spanish-born musician kept a promise he had made his Puerto Rican mother to return to her native island.

"When I came here, I told Governor Muñoz Marín that I could not become just an old man who is retiring," Mr. Casals recalled.

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"I told him, 'Here or anywhere, I need music.' So I proposed that we start the music festival.

"The Governor asked, 'How much will it cost?' I said, 'I don't know.' So we started the festival. Then I said, 'We must have a wonderful orchestra from the States.' The Governor asked, 'How much will it cost?' And I said, 'I don't know.' We got the orchestra.

"Then I told the Governor that we must have a fine conservatory. Musicians would come from all of South America. And he said, 'How much will it cost?' Again I said, 'I don't know.' So now we are getting it."

"How much did it finally cost?" I asked.

Don Pablo shook with laughter. "I *still* don't know!"

Whatever the cost, musicians do come from all over the hemisphere. So do students. But the greatest number of observers—16,632 from more than 100 countries so far—come to learn the secrets of the island's success.

San Juan's mayor, the charming Doña Felisa, put it all into tidy perspective. I was in her office when a group of Congolese municipal authorities arrived. She gave them a winning smile, then a pointed lecture.

"We Americans," she said, "are learning things about local government. Before we demand new powers, we should learn to use the powers we have."

Her statement went beyond government—straight to the bootstraps of her countrymen. Puerto Ricans are making their mark by using the powers they have. THE END

Cuba-troubled Caribbean

WITH THE COMMUNIST beachhead in Cuba bringing Russians within 90 miles of Florida, the spotlight of world attention—and tension—has swung to the Caribbean.

To give members up-to-date geographic background on this history-haunted and potentially explosive area, the National Geographic Society this month presents the timely new Atlas Series Map **West Indies.***

"If at any time the Communist build-up in Cuba were to endanger or interfere with our security in any way," President Kennedy has said, "the United States would act."

The President mentioned particularly the country's vital interest in preventing any threat to the Panama Canal or to the United States Naval Base on Guantánamo Bay, in southeastern Cuba.† Both appear, of course, on the new map, which reaches more than 3,080,000 members with this issue.

Map users will note, just west of Guantá-

Shown on New Atlas Map

namo, a place name that rings with the sound of bugles—San Juan Hill. Near here Teddy Roosevelt led his Rough Riders in the war that won Cuban independence from Spain.

From the mountain fastnesses of the Sierra Maestra, only a little farther west, the bearded young Fidel Castro launched the rebellion that made him master of Cuba—only to betray his countrymen by refusing them the right to vote and delivering them into the hands of Communism.

Elsewhere, the map records numerous changes in the sunny but sometimes troubled world that borders the Caribbean Sea. The capital of the Dominican Republic, on Hispaniola, once more appears as Santo Domingo. For 25 years it was Ciudad Trujillo, named for Rafael Leonidas Trujillo, whose strongman rule was ended May 30, 1961, by assassins' bullets.

Change has come, too, to San Salvador, also known as Watling Island, where Columbus first stepped ashore in the New World. According to his son Ferdinand, natives stood "astounded and marveling at the sight of the ships, which they took for animals."

Today San Salvador boasts another marvel: Tracking Station No. 5 in the Atlantic Missile Range, which helps plot and guide the courses of satellites along man's latest frontier. On the map, red triangles denote the San Salvador station and eight similar installations on other islands.

Scaled at 78 miles to the inch, the new map ranges from the tip of Florida to the Panama Canal, and from Honduras, Nicaragua, and Costa Rica to Barbados, easternmost of the West Indies. Twenty-six insets focus on in-

*West Indies is the 35th uniform-sized map issued by the Society in the past five years; it becomes Plate 23 in the Atlas Series. A convenient Folio is available to bind the maps; it may be ordered from the National Geographic Society, Dept. 58, Washington 6, D. C., at $4.85. Single maps of the series are 50 cents each; a packet of the 35 maps issued from 1958 through 1962, $10.50; a combination of the 35 maps and Folio, $14.00.

†See "Guantánamo: Keystone in the Caribbean," by Jules B. Billard, NATIONAL GEOGRAPHIC, March, 1961.

This Was a New Map of the West Indies 362 Years Ago

Enlarged and adapted from a section of the famed Molineaux-Wright map of the world drawn in England in 1600, it contains many place names still in use today. Some, such as Antigua, Guadeloupe, and Gracias a Dios—"Thanks Be to God"—were bestowed by Christopher Columbus.

To this fascinating old map the National Geographic Society's cartographers have added the routes of Columbus's four voyages. The third, in green, ends abruptly on Hispaniola (Baihi on the Molineaux-Wright map), where his political foes arrested him and sent him back to Spain in irons. Rhumb lines for navigators crisscross the map.

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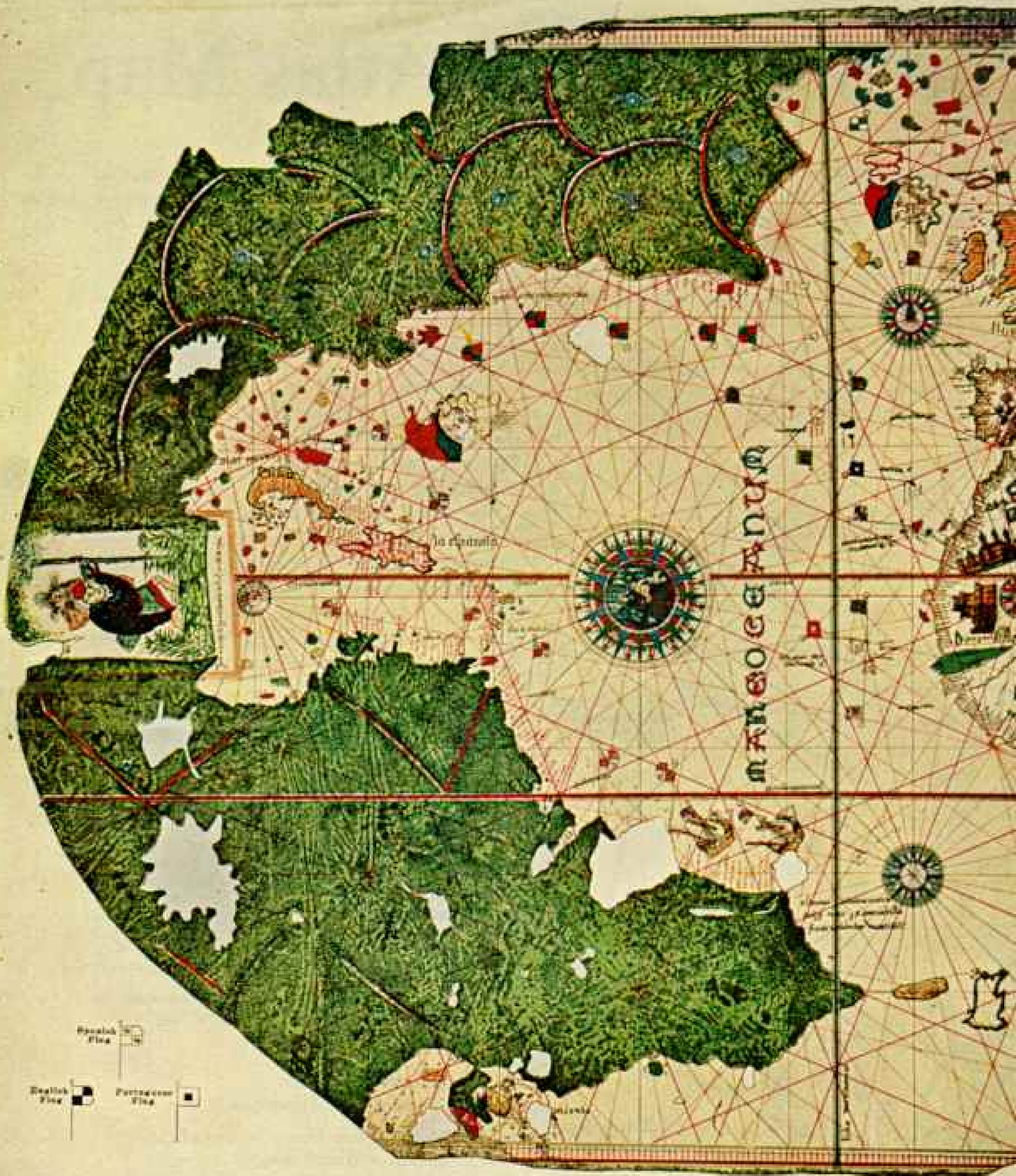

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How the New World Looked to a Sailor in the Time of Columbus

A world map from which this detail is taken was drawn in 1500 by Juan de la Cosa, a Basque mariner who sailed with Columbus in 1493 and made one other voyage to the West Indies. The tiny flags identifying territorial claimants were added much later. Rectangle at left encloses a portrait of St. Christopher. This time-worn copy of La Cosa's map turned up in 1832 in a Paris antique shop. It now reposes in the Naval Museum in Madrid. Irregular splotches are not lakes or islands but holes.

dividual islands and groups, showing them, as if through a magnifying glass, at scales up to five miles to the inch.

For some 300 years after Columbus, the Caribbean remained the door to the riches of America. After the Spanish came English, French, and Dutch pirates and men-of-war to seize galleons bound for Spain. Attracting adventurous, violent men, the West Indies became a melting pot of human strains.

The gold and silver stopped floating by, and new wealth sprang from West Indian sugar, coffee, and tobacco. Since the early 1500's Negro slaves had been imported to the West Indies, the Spaniards having found them more hardy and productive than the native Indians. Now planters stepped up the import of slaves to work the ever-expanding plantations, and soon the land itself became a rich prize. Between British and French, St. Lucia forcibly changed hands 14 times. When the battles ended, the greatest number of islands were under British influence.

In 1958 ten of these island colonies banded together into the West Indies Federation. But subsequently Jamaica and then Trinidad-Tobago, the two most powerful members politically and economically, voted to go their own ways as independent nations (the map shows them in yellow instead of British pink). The remaining eight plan to form a new Federation of the West Indies. These are Antigua, Barbados, Dominica, Grenada, Montserrat, St. Christopher-Nevis-Anguilla, St. Lucia, and St. Vincent.

The Caribs, for whom the Caribbean was named, find a last refuge on Dominica. These formerly fierce Indians also gave us the word "cannibal," via the Spanish *caribal*. Now they sell souvenirs on their reservation that centers around Salibia on the east coast.

Nature Trail Threads Watery Wonderland

Three of the inset maps magnify islands which are tinted in green to show their connection with the United States.

One depicts progressive Puerto Rico, the Spanish colony that became a free commonwealth associated with the United States (pages 755-93).

Two others show the Virgin Islands, purchased from Denmark for $25,000,000 in 1917. Old sugar plantations on St. John, given to the United States by National Geographic Trustee Laurance S. Rockefeller, grew into the Virgin Islands National Park. The park covers three-fourths of the island and continues offshore as a submerged nature trail. Undersea markers describe corals and plants for the benefit of snorkel-equipped swimmers and scuba divers.

Violet-bordered insets enlarge Martinique and butterfly-shaped Guadeloupe, each an overseas department of France.

Dutch possessions, keyed in orange, include the oil-refining centers of Aruba and Curaçao. Their cosmopolitan past is reflected in the local speech, called Papiamento, a musical combination of Spanish and Dutch flavored with French, English, Portuguese, and African words.

Oil Rigs Rise From Venezuelan Lake

Whence comes the oil for the refineries? From Venezuela's Lake Maracaibo, which is in fact an inland extension of the Gulf of Venezuela. Black derrick symbols mark the major oil fields, on land and in the lake. Pipelines, shown as black lines tufted with dots, carry crude oil 150 miles to tankers at Punta Cardón on the Paraguaná Peninsula.

The red line across the neck of Lake Maracaibo represents a new engineering triumph: a 5½-mile bridge, Latin America's longest, suspended from 135 concrete towers.

Red arrows on the map mark warm currents in the sea. Tracing them, we can envision the area as a gigantic heating pan. The trade winds drive warm currents into the Caribbean, where the tropical sun heats them further while they push around western Cuba through the Gulf of Mexico. The currents emerge through the Straits of Florida to pass northward along the U. S. coast and then to Europe as the Gulf Stream, dispensing warmth all the way to England and Norway.

Island-hoppers used to rely mainly on schooners. Now these graceful fore-and-afters become fewer and the big cruise ships multiply. All the major islands have airports, marked by red stars, offering ever-faster service to the ever-more-numerous vacationers from less gentle climes. Pleasure yachts are also increasing, for sailing the Caribbean at leisure has become one of the world's great adventures.

But repression and bloodshed still stain the Caribbean, as symbolized by the Isle of Pines near Cuba's southwestern tip. Once a serene retreat for vacationers, it is now a prison for hundreds of anti-Communist Cubans.

THE END

A NEW LOOK AT

Medieval Europe

By KENNETH M. SETTON, Ph.D., Litt.D.

TWENTY PAINTINGS BRING TO LIFE A PERIOD VITAL TO OUR WESTERN HERITAGE, FROM ROME'S DECLINE TO THE NORMAN CONQUEST

In this 62-page presentation, the National Geographic Society carries forward the great panorama of history begun with its memorable articles on ancient Mesopotamia, Egypt, Greece, and Rome, all now combined in the Society's book, *Everyday Life in Ancient Times*.

Here we enter that welter of centuries into which Europe plunged after the Roman Empire fell apart—the Early Middle Ages—a time when barbarian tides infused new vigor into Europe's peoples. Walled cities replaced open towns, moated castles supplanted country villas, robber barons plundered wayfarers in a continent fragmented by feudalism. Classical learning retreated to the narrow confines of the monastery. But a great era lay just ahead, an age of birth for institutions and concepts that shape our lives even today.

To put the Early Middle Ages into fresh perspective, the Society asked an outstanding historian, Dr. Kenneth M. Setton, Professor and Director of Libraries at the University of Pennsylvania, to write an article and to guide artists Andre Durenceau and Birney Lettick in creating a series of dramatic canvases. Using latest research and with painstaking attention to detail, the scholar-artist team worked for more than four years. The Society proudly presents the result, an impressive portrayal of civilization moving from antiquity into a new age.—THE EDITOR

HISTORY is the memory of the human race. We study it because we cannot do otherwise. Curiosity impels us. When a teen-age girl reads her grandmother's love letters in the attic, she in her way does historical research. The paintings in this series also represent historical research, embodying as they do recent findings about the medieval world.

You will find writers who make sweeping references to the whole medieval period as the "Dark Ages." The term is inappropriate; most of the darkness lies with the writers themselves. Many imagined shadows disappear under the spotlight of research. We now see that we owe to this period some of our most valuable "modern" institutions—representative government as we know it today, our universities, even the shape of our cities.

In the United States alone, 400 scholars now specialize in the Middle Ages, which, taken broadly, extend from the founding of Constantinople (A.D. 324) to Columbus's first voyage to America. These scholars are seeking new knowledge. How can they uncover previously unknown facts of medieval history? They can excavate sites like the imperial palace at İstanbul, or they can read some of

Colossal head and hand of Constantine (page 810), first Emperor to embrace the Christian faith, dominate the courtyard of Rome's Palazzo dei Conservatori. These fragments survive from a fourth-century statue that stood near the Roman Forum (page 824).

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON © N.G.S.

AQUACHROME BY ULF SCHULKE © NATIONAL GEOGRAPHIC SOCIETY

the tens of thousands of unpublished texts and documents that line the libraries and archives of Europe. The Vatican archives alone house 20 miles of shelves containing largely unpublished documents; much of this material relates to the period before 1500.

Just as our own civilization has emerged from the Middle Ages, the Middle Ages in their turn emerged from antiquity. We are often told that the "fall of Rome" spelled the end of antiquity. But Rome did not fall; it declined gradually. Scholars dispute the basic causes of this decline, but we can see its symptoms well before A.D. 300.

The Roman Government had long felt the pressure of the Germanic peoples on the northern frontiers. While Rome was strong, these barbarians were repelled. The Germanic invasions did not cause the decline of Rome. The invasions were successful because Rome had already declined.

In the third century the Roman legions were withdrawn from Dacia (what is now Romania), and they never returned (page 802). And though Roman Britain, on the other side of Europe, was free of many of the troubles of the third century, London was soon to share the fate of most Roman cities as the weight of surrounding barbarians crumpled the decaying shell of empire.

In A.D. 410, the Visigoths sacked Rome (page 820), and a thrill of horror went through the civilized world. It was the first time in eight centuries that an enemy force had entered the city, and the myth of power that had persisted through a long decline lay shattered at last. Now the barbarians were bursting into the Empire all along the northern frontiers (map, page 818). Six or seven important Germanic kingdoms were established on Roman soil. A world died; with it went a way of life.

Between Constantine and Charlemagne, names crowd history's pages, but that of Clovis looms largest. A barbarian, he was also a statesman. His conversion to Christianity became the dominant fact of the era, as the Church became the dominant institution (page 826). At his death in 511 he ruled the Rhineland and much of today's France.

it helped supply such law and order as existed.

After the year 1000, population again increased. From the later 11th century new towns arose, often where no town had ever been. Trade and commerce began to flourish.

In the paintings that follow, we are concerned with the earlier Middle Ages. If there are shadows in the picture, keep in mind the achievements that lie ahead—the sunlight that will stream through the rose windows of Chartres and Notre Dame.

New political systems and institutions were to evolve. To the later Middle Ages we owe our trial by jury; the rise of representative government in the English Parliament, the Spanish Cortes, the French Estates General, and the German Reichstag; organization of the Roman Catholic Church; Romanesque and Gothic architecture; and such modern languages as Italian, Spanish, English, French,

Majesty of Imperial Rome haunts the Colosseum, a tiered crown on the Via dei Fori Imperiali. For four centuries, the metallic clang of gladiators' weapons and the roar of mobs eager to see death echoed within these walls, which later were damaged by earthquake and quarried for stone.

The Emperor Vespasian started work on the amphitheater in A.D. 72. Titus, his successor, completed the project eight years later.

Roman traffic of today swirls around a policeman with all the abandon of the ancient city's charioteers.

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER DEAN CONGER © N.G.S.

The cities and towns of Western Europe had declined with Rome. Some survived as centers of ecclesiastical and royal administration, but few of them as centers of economic productivity. Population decreased.

Both great and lowly lived on the land. Peasants like Randoin (page 846) tilled the soil on medieval manors without hope of surcease. Manorialism, despite its defects as an *economic* system, fed Europe.

As peasants toiled, their landlords protected them. Such landlords were subject to still greater lords; they became military "vassals of their lieges." This was feudalism, and whatever its deficiencies as a *political* system,

German. In the cities a new class was born, the bourgeoisie. The name comes from *burgensis*, inhabitant of a walled town.

No city in antiquity ever harbored a university as we understand the term today. Bologna, Paris, Oxford, which grew up in the 12th century, became the first such seats of learning. Our universities, therefore, are a medieval contribution.

The Western scenes in our paintings may seem darkling when contrasted with the gold-and-azure brilliance of Byzantium and the surging vigor of Islam. In the West the glory and splendor of the later Middle Ages are still to come.

* * *

Rome's legions abandon Dacia, modern Romania, to the Goths

THE ROMAN EAGLE, pride and glory of generations of legionaries, still spreads its wings from the shaft of a standard at center. But it surveys an ominous exodus, the final withdrawal of troops about A.D. 274 from Rome's eastern province of Dacia.

Victorious soldiers of Trajan had marched under the eagle more than a century and a half earlier, when they conquered the country. Trajan's Column in Rome preserves the record of their exploits.

The Empire sent colonists; many worked gold and salt mines under the protection of the occupying legions. Retired soldiers married Dacian women and settled down as small landed proprietors.

Towns grew up around Roman camps and ports. Apulum, the modern Alba Iulia just south of Cluj, marks the encampment of the XIII Legion. Roman merchants ventured beyond Dacia's boundaries, carrying not only wares but the Latin language.

Despite such peaceful pursuits, Dacia finally stood like a no man's land between the Danube and the ceaselessly probing Goths from north and east. To protect the province, the government enlisted mercenaries from conquered tribes.

"The introduction of barbar-

Roman soldiers, possibly members of the Praetorian Guard that made and unmade emperors, wear tunics, trouserlike *bracae* that reach the knee, and crested helmets worn in the mid-second century. Historians believe the frieze, now in the Louvre in Paris, may have ornamented a Roman arch.

PAINTING BY ANDRE DURENCEAU © NATIONAL GEOGRAPHIC SOCIETY

ians into the Roman armies," wrote Edward Gibbon in his *Decline and Fall of the Roman Empire*, "became every day more universal, more necessary, and more fatal." Rome was captive before she was taken, as the poet Rutilius Namatianus commented early in the fifth century.

By the mid-third century, Imperial Rome was foundering. Dacia was far away and indefensible. The Emperor Aurelian pulled his forces back to the Danube.

Here the army files past the eyes of mounted commanders on the distant hill. The legion's standard, an eagle, is carried by the *aquilifer*, who wears the skin of a wild beast. The *bucinator*, or trumpeter, summons stragglers.

For the next nine centuries Dacia all but disappeared from history. Migrating Goths, Huns, Slavs, Avars, Bulgars, and Germans plundered the land, but Rome's cultural heritage remained strong; the Romanian language, an offspring of Latin, still survives.

LONDINIVM
IN THE THIRD CENTVRY

STAFF ARTIST ROBERT W. NICHOLSON
© NATIONAL GEOGRAPHIC SOCIETY

Three-mile wall protects the London of Roman days

THE FIRST BOMB dropped on London in World War II initiated a new era in the archeology of Roman Londinium. Pits dug by explosives and the bulldozers of postwar rebuilders uncovered coins, lamps, statues, and mosaic floors buried twenty feet beneath a city so congested that archeologists seldom had found an opportunity to excavate it.

Most exciting discovery was the Temple of Mithras, an Asian deity, patron and protector of soldiers. Excavation in the Cripplegate area revealed walls of a fort, or *castra*, enclosing some eleven acres.

Invaded by Julius Caesar (54 B.C.), southern Britain was annexed in A.D. 43 by the Emperor Claudius, and Londinium was founded soon after. But in the year 60 a tribal uprising led by Queen Boudicca (Boadicea) left the town in ashes and its inhabitants dead. By the early third century, the Romans had built a wall enclosing an earlier fort. Towered gates spanned roads to other towns.

The Romans apparently saw no need of a river wall; none has yet been discovered. Wharves extended directly from warehouses to ships moored in the Thames. Merchant vessels took on cargoes of British slaves, cattle, hunting dogs, silver, iron, and lead. A wooden drawbridge carried traffic into what is now Southwark, on the south bank.

Thatched houses flanked mansions. Buildings, baths, and temples created an imposing skyline. The Basilica, with its forum, occupied two blocks (upper right). Merchants, soldiers, and slaves thronged paved streets.

On the western hill (left), now the site of St. Paul's, smoke drifted from kilns and workshops. Fleet River (left) and the Walbrook (left, center) flowed above ground where they now run in sewers.

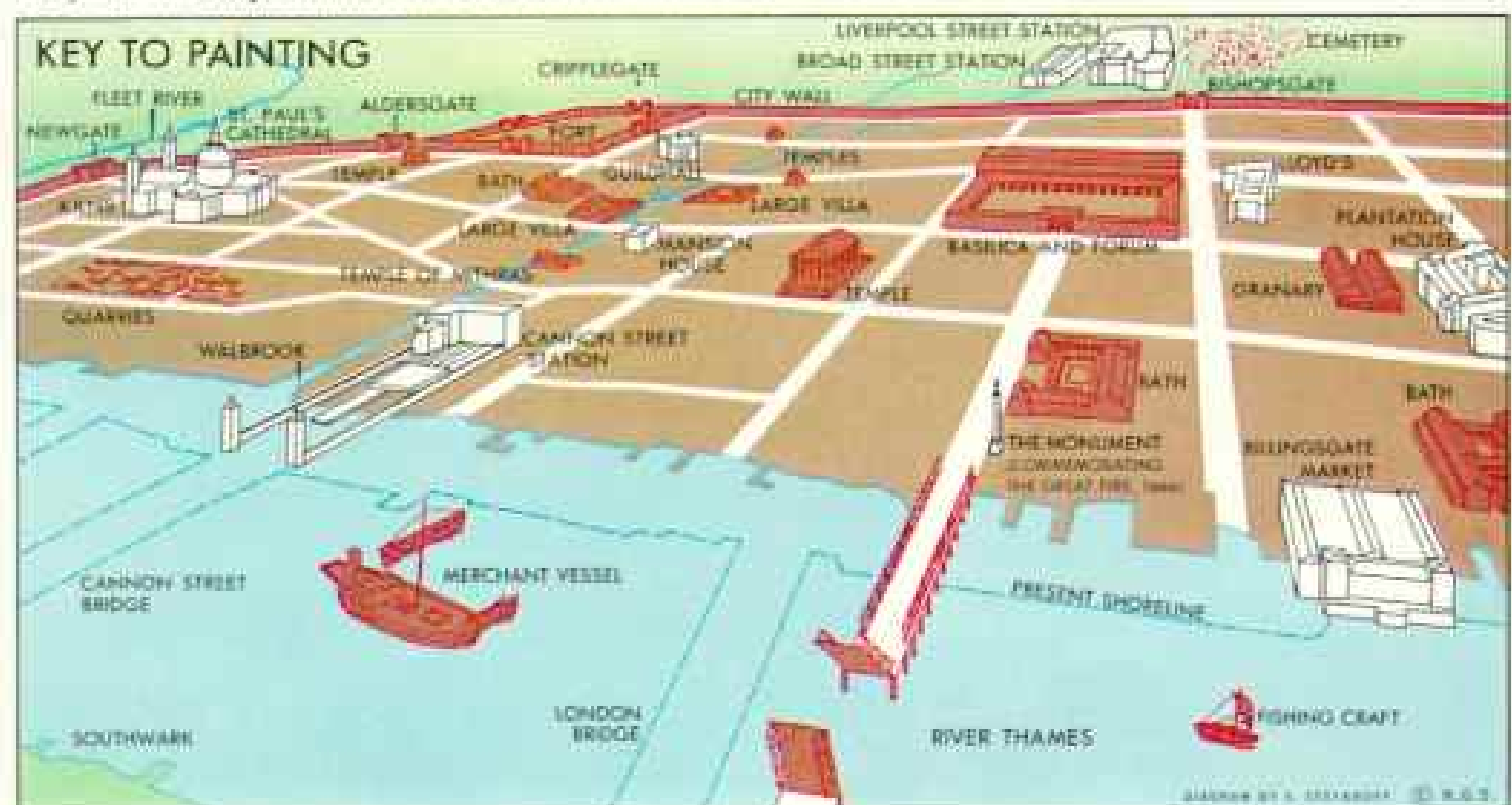
As Roman power crumbled in the western provinces, the emperors withdrew troops. Londinium sank into obscurity.

New Data From Noted Authorities

To create this map, the National Geographic Society sent staff artist Robert W. Nicholson to London to visit museums, take photographs, and consult archeologists and historians. He found sites of wall, fort, Basilica, and Temple of Mithras firmly established. Road alignments and Roman coins taken from the Thames located the drawbridge. In the case of other features, notably the imposing temple dominating the center of the city, exact sites are unknown, and their locations on the map reflect the informed assumptions of leading authorities.

The Society could not have prepared the map without the guidance of Prof. W. F. Grimes, Director of the Institute of Archaeology at London University and Honorary Director of Excavations for the Roman and Mediaeval London Excavation Council; Norman Cook, Keeper of the Guildhall Museum; and Ralph Merrifield, an assistant keeper at the Museum. From their great knowledge, these men gave the Society material never before correlated and published.

Key shows important features of Londinium in red and orients them with landmarks of today's city.



◀ THIS PAGE FOLDS OUT

Chained, a runaway tenant pleads with his Roman lord

KNEELING in the columned courtyard of his master's villa, a wretched tenant farmer pours out his anguish: Life was too hard... he could not meet the burdens imposed upon him... despair seized him... he had tried to escape.... Forgive, forgive.

The wealthy landlord and his son (right) show only hardhearted disdain. Though legally free, this man was bound by law to work their estate. The Emperor Constantine's law, dated October, 332, was emphatic: "Tenant farmers who meditate flight are to be put in chains and reduced to ... servitude."

The tragedy of this scene was generations in the making. During Rome's early days the small freeholder, cultivating his own acres and fighting when necessary, had been the backbone of the Republic. But as Rome embarked on a career of conquest, soldiering became a profession, and many farmers abandoned the plow to seek their fortunes in war.

Foreign grain flooded the Italian market; small farmers could not compete. Slaves replaced free labor, and gold flowed only into the pockets of rich landowners. Debt drove thousands into the cities. In Rome they joined the mob that rulers placated with bread and circuses. Wealthy men built up vast estates, worked by *coloni*, or tenants.

By the third century the Pax Romana—the Roman Peace—had vanished; improved leadership barely restored it in the fourth. War and famine threatened on every side. Cities decayed, commerce stagnated, and population declined. Landed aristocrats raised what they needed on their own estates. Much land passed out of cultivation. There was no security for the poor.

Emperor Valentinian III thus describes the grim winter of 450-451:

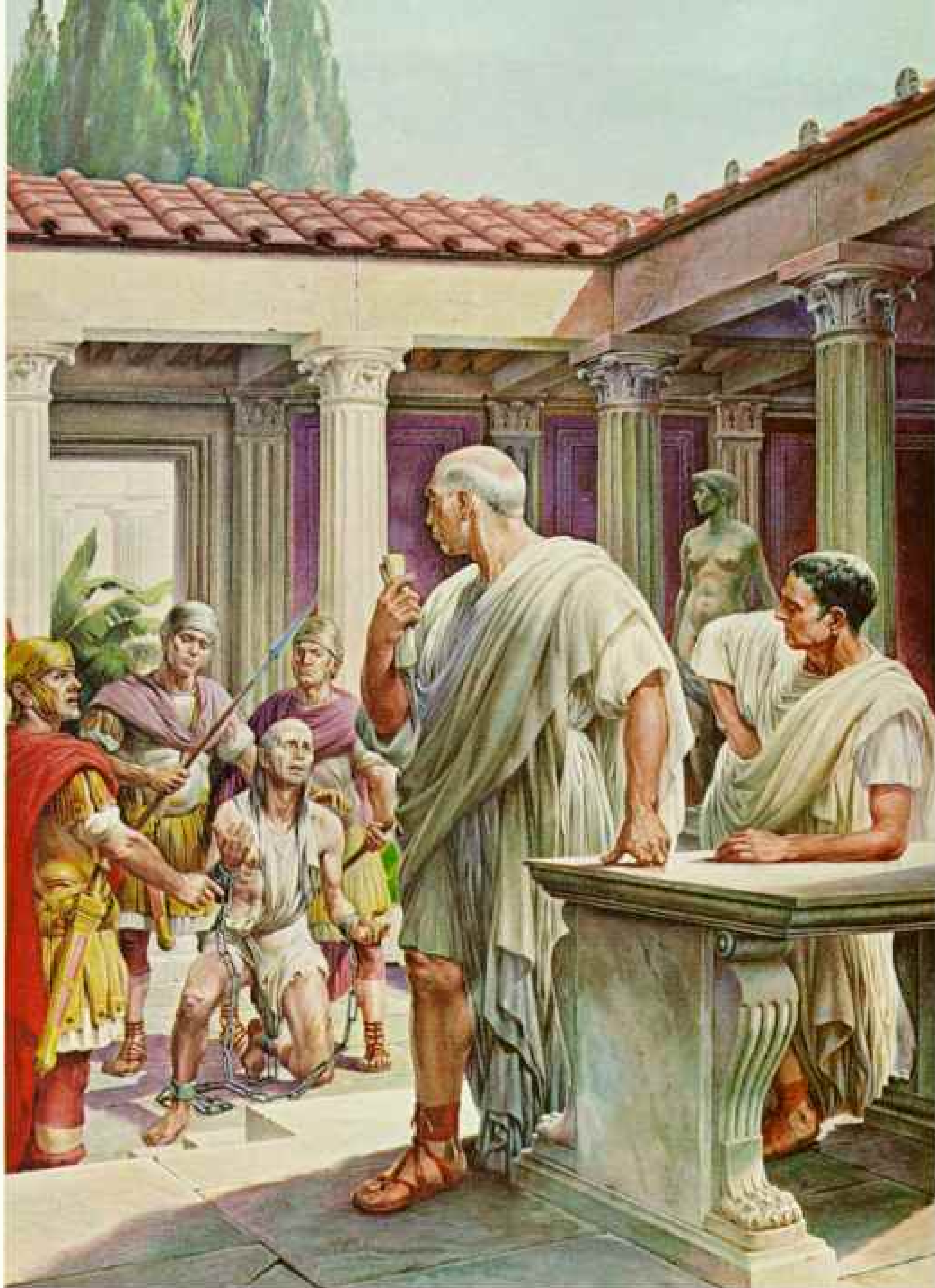
"It is well known that very recently the most ter-

Restored Villa Echoes the Delights of Pompeii

Luxury-loving Romans built handsome homes in the mountain-flanked city. Good times abruptly turned into tragedy in the year 79, when Mount Vesuvius erupted.

The death-dealing blanket of ash and cinders preserved a remarkable record of life in ancient times. Archeologists have unearthed villas complete even to statues and paintings. (See NATIONAL GEOGRAPHIC, November, 1961.)

As restored, House of the Vettii has fountains, a garden, and murals that glow with color applied almost 2,000 years ago. Villa opposite resembles this Pompeii mansion.



PAINTING BY ANDRE DURENCEAU © NATIONAL GEOGRAPHIC SOCIETY

rible famine has raged through all Italy, and that men have been forced to sell their children to escape the danger of impending death. . . .

"For there is nothing to which despair of his own life does not drive a man. A hungry person considers nothing shameful, nothing forbidden. His only concern is to live in any way he can.

"But I think that it is wrong that freedom should perish, because life does not perish. . . . To whom is it not preferable to die a free man rather than to bear the yoke of slavery?"

In an attempt to strengthen and stabilize society, the Imperial Government had already resorted to an overly simple solution. It decreed that all workers be fixed in their jobs for the remainder of their lives. When death at last relieved them of drudgery, their sons had to take over their tasks.

Constantine paces off the limits of his city

SPEAR IN HAND, a majestic figure leads his retinue up a hillside on the European shore of the Bosporus. No one notices the chill in the air on this memorable day in early November, 324.

Uneasiness rises among the attendants watching the striding figure. The white marble temples of Byzantium and the wall built more than a century before by the Emperor Septimius Severus recede farther and farther

PAINTING BY ANDRE DURENCEAU © NATIONAL GEOGRAPHIC SOCIETY

into the distance. Will Constantine never stop? He is going too far, almost two miles.

"How far will you go, Sire?" asks one.

"I must follow till He who leads me stops," he answers.

Thus tradition records the divine guidance given Constantine the Great as he marked out the west boundary of the new city he proposed to build, Constantinople, which was to become one of the most fabled in history.

The site was a strategic one, of immense importance, at the juncture of Europe and Asia (inset map, page 819). Yet Byzantium, which had commanded traffic between the

Mediterranean and Black Seas for a thousand years, had failed to become a great city.

Constantinople, however, marked a break with the pagan past. Constantine, the first Christian ruler, established it as the distinctly Christian capital of the Empire. By the end of the fourth century, almost everyone had become his own theologian. As St. Gregory of Nyssa wrote in amusement and despair:

"Every place in the city is full of theologians—the back alleys and public squares, the streets, the highways—clothes dealers, money changers, and grocers are all theologians.

"If you inquire about the value of your money, some philosopher explains wherein the Son differs from the Father. If you ask the price of bread, your answer is the Father is greater than the Son.

"If you should want to know whether the bath is ready, you get the pronouncement that the Son was created out of nothing!"

Latin Gives Way to Greek

But the greatness of Byzantine life does not lie in the controversies of theologians or in the ceremonial appearances of stiff-gowned court officials gliding down marble stairs. Life was hard, and Byzantine society was tough. Over the centuries the people endured half a dozen great sieges. The government always knew when to fight and when to make peace. The dust of battle settled on many a fine mosaic.

Although Constantine and those he brought from the West spoke Latin, official language of the army and the law courts, most people in the East continued to speak Greek. Latin gradually declined and, by the mid-seventh century, was entirely abandoned.

City Falls to Turks in 1453

The Byzantine Greeks built beautiful churches, but loved classical literature as well as the liturgy. If they tended sometimes toward asceticism and mysticism, they also prized social dignity.

In 1203-4 they lost their capital city to soldiers of the Fourth Crusade, but recovered it in 1261. Their defense of Constantinople against the seven weeks' siege of the Ottoman Turks in 1453 is one of the most glorious episodes in the long history of resistance to invaders. But again they lost their city and their freedom.

A millennium of history came to an end, and many a Byzantine had reason to recall the words of the psalmist:

"For a thousand years in thy sight are but as yesterday when it is past. . . ."

KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JAMES BLAIR © N.G.S.

Ancient Greeks named the city Byzantium; refounded as Constantinople, it was also called New Rome; to the Turks it is İstanbul.

Hagia Sophia (Holy Wisdom), center of Christian worship for centuries, stands above the Golden Horn near the acropolis of ancient Byzantium. Church became mosque and acquired minarets after the Turkish conquest five centuries ago, and mosque it remained until 1934, when the Turkish Republic made it a museum. Six minarets and dozens of domes embellish the Mosque of Sultan Ahmet I (left), Hagia Sophia's rival in size and splendor. Blue Mosque, its familiar name, derives from the rich color of the interior tiling.

Masses of fifth-century fortifications fringe İstanbul from the Sea of Marmara to the Golden Horn. Fearing attack by land, Theodosius II screened the western perimeter of his sprawling capital with a moated double wall four miles long that resisted attack through turbulent centuries.

In 1453 Ottoman Turks under Mohammed II assailed the ramparts for seven weeks. Finally they poured into the city through a breach in the cannon-battered walls and a postern the besieged defenders left inadequately guarded. Crumbling remnants of the barricade endure to tell the power of the Constantinople that was.

St. John Chrysostom damns woman's vanity

"JEZEBEL CREATES a tumult and Elijah flees!" cries the Patriarch of Constantinople. Thus in Biblical terms he describes the machinations of the beautiful Empress Eudoxia, who plots his exile for attacking the early fifth-century court of her husband, Arcadius.

Pointing a bony, accusing finger toward the ladies in the gallery of Hagia Sophia, the preacher thunders: "Last night she called me the thirteenth apostle, and today her name for me is Judas! Yesterday she sat willingly by my side, and today like a wild beast she has attacked me!"

An eloquent preacher, John became known to posterity as Chrysostom, meaning "golden mouth." He received his training at Antioch in the school of the pagan orator Libanius. When Libanius lay on his death bed, he was asked who should succeed him as director of the school.

"John would have been my choice," he is recorded as answering, "had not the Christians stolen him from us."

John's dedication soon brought him into conflict with social injustice. He railed against landowners who "reap the wealth that springs from the earth" and show no mercy toward "their wretched, toil-worn laborers."

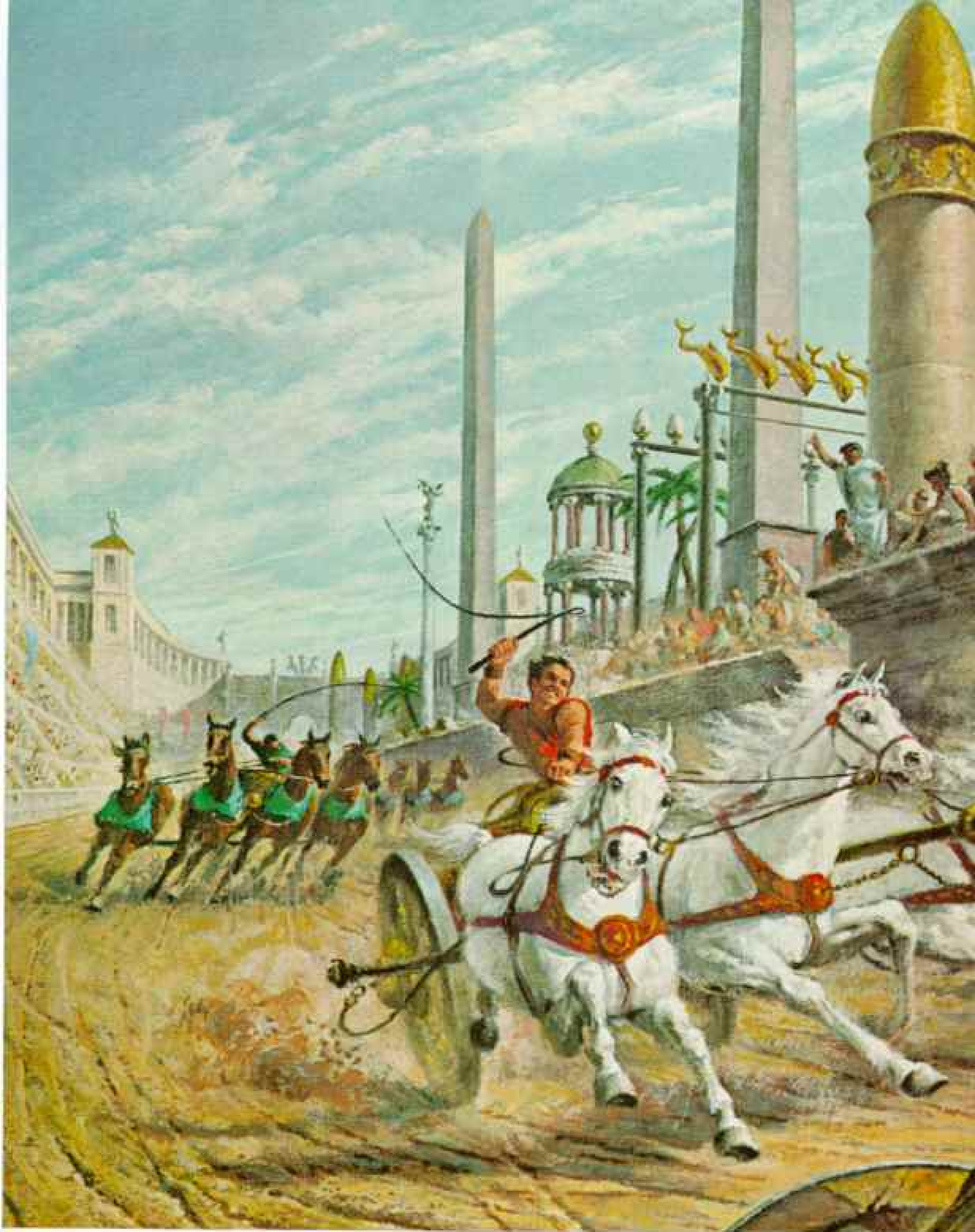
Called to head the Church at Constantinople, John used his eloquence against the luxury of the aristocracy. "What can be said of these women," he roared, "who have chamberpots made of silver? . . . Pagans mock us and consider our religion a fable."

Offended, the Empress Eudoxia had John banished, but the court later recalled him. Soon another crisis arose: The city prefect set up a silver statue of the Empress near Hagia Sophia and dedicated it with rowdy rites. When John preached against the outrage, he paid for his courage with a second exile, during which he died.

Miniature mosaic shows Chrysostom's hand raised in blessing. Dumbarton Oaks, center of Byzantine studies in Washington, D.C., preserves the 14th-century icon.

Seventh-century women's gallery of Rome's Sant' Agnese fuori le Mura served the artist as a model for the old Basilica of Hagia Sophia, which burned on the day St. John left Constantinople for the last time.

PAINTING BY ANDRÉ DURENCEAU
EKTACHROME BY NATIONAL GEOGRAPHIC
PHOTOGRAPHER ROBERT F. SISSON © N.G.S.



Circus charioteers gamble their lives for fortunes

A QUARTER OF A MILLION howling Romans jam the Circus Maximus to capacity. Colors of the four racing clubs, or factions—Greens and Reds, Blues and Whites—deck the charioteers as they frantically jockey their four-horse teams into position for a perilous

PAINTING BY BIRNEY LETTICK © NATIONAL GEOGRAPHIC SOCIETY

turn. After colliding with a smashed chariot of the Greens, a Blue driver goes into a disastrous skid that hurls him to the ground.

To accommodate the tremendous throngs drawn by the races, Julius Caesar expanded the Circus. Augustus added an imperial box connecting directly with his palace on the Palatine. He also erected upon the *spina*, the long backbone running through the center of the arena, the obelisk of Rameses II from Heliopolis in Egypt. This obelisk, as well as another contributed by Constantius, A.D. 357,

The Roman Empire
AND EARLY MEDIEVAL EUROPE

pierces a sky of scudding clouds in the artist's reconstruction of a day at the Roman races.

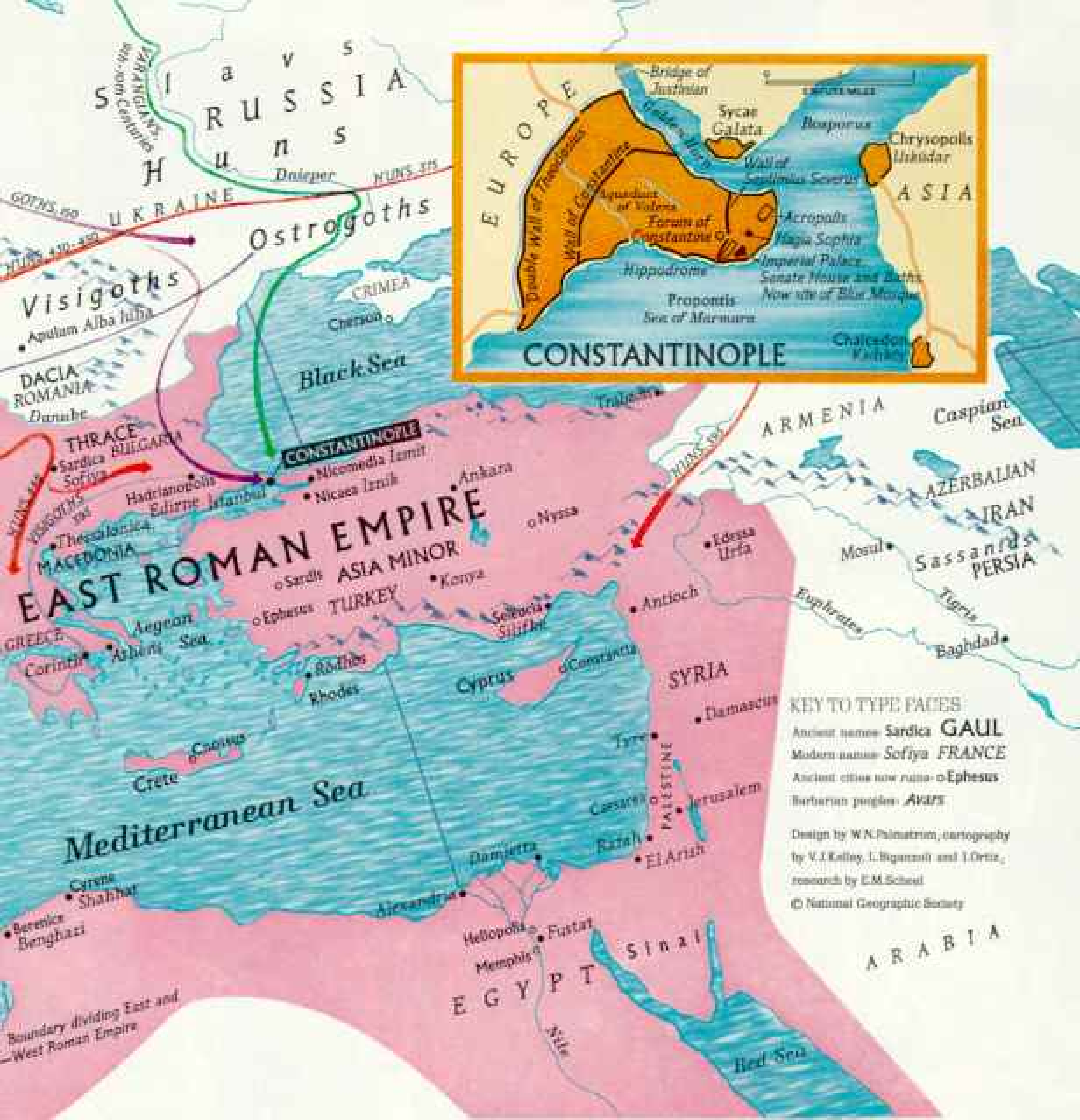
Bronze dolphins and marble eggs on the spina are turned over one at a time to tick off each of the race's seven laps. Shrines and statues punctuate the entire length of the spina. At either end three massive cones of gilt bronze form the *metae*, or goal posts. A palace towers in haughty eminence on the Aventine Hill beyond the Circus.

Roman races, contests, and dramatic festivals were religious in origin, designed to appease the wrath or win the favor of the gods. Despite the howls of vast mobs urging on a winner, custom demanded decorum at the games. Eating and drinking were prohibited in the Circus Maximus.

On one occasion, Augustus reprimanded a Roman of some social standing for drinking wine. "If I want refreshment," the Emperor observed pointedly, "I go home."

To this the gentleman replied, "Ah, Caesar, but if you go home, you're sure to find your seat when you return!"

Darlings of Rome, the charioteers were pursued by women, wined and dined by mil-



Map spans several centuries of history. Red area shows the Roman Empire about A.D. 400, before repeated barbarian invasions overran the western half. The Eastern Empire, based on Constantinople, endured to the close of the Middle Ages.

lionaires. They demanded and received immense salaries. Inscriptions preserve some of their records: Scorpus registered 2,048 victories; Diocles raced 4,257 times, scored 1,462 wins, and retired with a fortune of 35,000,000 sesterces. A sesterce equals our nickel.

But charioteers frequently died young. Fuscus was killed at 24 after having won 57 victories. Aurelius Mollicius met death at 20, and Crescens lost his life at 22.

Chariot racing continued throughout the long life of Imperial Rome, but decadence immunized the citizenry to its thrills. Mobs of idle men demanded bloodier entertainment; emperors and politicians satisfied them with gladiatorial combats in the Colosseum.

The chief magistrates—consuls and praetors—bore the major expenses of the games, but time and again the emperors paid the bills to spare their officeholders from ruin. The poet Martial laughs at the irony of a citizen who lost his wife when he reached the distinction of praetor. Realizing that her husband would have to bear a calamitous cost, she divorced him lest poverty compel her to wear an old dress at the games.

Alaric's Visigoths pillage Rome in 410. Unprotected women and children in the Roman Forum

PAINTING BY ANDRE DURENCEAU © NATIONAL GEOGRAPHIC SOCIETY

cower amid the monuments of bygone grandeur. Flames burst from the Capitoline Hill

Dressed as Ostrogoths, the Magi Balthazar, Melchior, and Gaspar decorate the nave of Sant' Apollinare Nuovo in Ravenna. This exquisite mosaic survives as a reminder of Theodoric, Ostrogothic king of Italy (493-526), who made his capital at Ravenna. The three kings wear Germanic trousers.

◀ Visigoths loot a city too weak to defend itself

ALL-CONQUERING ROME fell to the barbarians without a struggle in August, 410, when Alaric the Visigoth occupied the city and treated his army to three days of plunder.

Italy was in a state of dire confusion. The imperial commander in Africa had halted grain shipments to Rome. The hungry people were too dispirited to fight.

City Felled by Famine and Sword

"The city that took the whole world," mourned St. Jerome, "is itself taken; nay, it fell by famine before it fell by the sword, and there were but a few found to be made prisoners. The rage of hunger had recourse to impious food; men tore one another's limbs, and the mother did not spare the baby at her breast. . . ."

Alaric, who had served as an imperial commander, soon withdrew his forces and moved southward. His goal was Africa, where he probably intended to settle the Visigoths, but death unexpectedly cut short his journey.

According to the sixth-century historian Jordanes, the Visigoths compelled the inhabitants of Consentia (opposite) to divert the course of the Busento River and carve a tomb for their ruler in the bedrock. They buried him there with part of the spoils taken from Rome. Then the Visigoths restored the Busento and slaughtered the laborers, lest they betray the secret of Alaric's grave.

In Andre Durenceau's painting (preceding pages), the dark façade of the Basilica Julia bounds the southern (left) edge of the Roman Forum. The majestic Temple of Jupiter Capitolinus (upper left) looks down on the Temple of Saturn and the Triumphal Arch of Tiberius with its bronze horses. Other bronze horses surmount the Arch of Septimius Severus (right). In the background flames engulf the Tabularium, or Public Record Office. Many of the ancient buildings survived the sack.

Invaders depicted in the painting were descended from Goths who drifted southward

from the Baltic area during the second and third centuries. The Goths occupied parts of present-day Romania and the Ukraine and more than once ravaged territory of the Eastern Roman Empire.

The East Goths, or Ostrogoths, settled in the lower Dnieper region, north of the Crimean Peninsula. The West Goths, or Visigoths, settled between the Dniester and Danube.

In 375 the Huns thundered out of Asia. They pushed the Ostrogoths toward the Dniester and the Visigoths south of the Danube. In exchange for haven, the Visigoths served as Roman "confederates."

Constantine's Sons Divide Roman World

The "fall of Rome" was long in coming. The city itself ceased to be the true capital of the Empire from the time of Diocletian, A.D. 284. In the West, Milan became the capital, then Ravenna. The sons of Constantine divided the Roman world "like an inheritance from their father." Theodosius later reunited the Empire, but his two sons in turn divided it into eastern and western parts.

In theory there remained one Empire, but the scale of history was tipping against the West. As the fifth century opened, Germanic nations settled within the frontiers.

Intrigue, murder, and treachery racked the ruling class. Stilicho, an able general who smashed Alaric's first two incursions into Italy, was executed by the distrustful Emperor Honorius, who made no effort to forestall Alaric's capture of Rome. The city recovered from the Visigothic raid, but the dissolution of the West continued.

Vandals' Legacy: an English Word

In 455 Vandals crossed the Mediterranean from their North African kingdom, seized Rome, and pillaged it for two weeks. Memory of their wanton destruction lingers on in the word "vandalism."

Long before this, power had passed into the hands of barbarian generals in the Roman armies. In 476 one of these deposed the boy Emperor Romulus Augustulus, who retired to a villa at Naples.

When another claimant to the throne disappeared, the West had seen the last of its Roman Emperors.

Busento River, site of Alaric's grave, flows through Cosenza, the ancient Consentia

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Forum's battered stones tell of Roman grandeur

ONETIME VILLAGE MARKET, the Roman Forum emerged during the Republic as the hub of the world.

In the Forum, as Julius Caesar sat in a golden chair on the Rostra, Marc Antony repeatedly offered him a royal diadem. Repeatedly Caesar refused, but the dictatorship he had established ended the Republic.

Through the Forum ran the city's oldest street, the Sacra Via, where jewelers and dealers in luxuries had their shops.

Barbarian raid, fire, and earthquake left the Forum in ruins. In the Middle Ages it be-

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came little more than a cow pasture. The last ancient monument erected in the Forum, the column of the Byzantine Emperor Phocas (left), rose in 608. Just beyond it, the Temple of Antoninus and Faustina, built in 141, endures as the Church of San Lorenzo in Miranda. Colosseum and the campanile of the Church of Santa Francesca Romana jut into the sky. In the background, the Arch of Titus commemorates the capture of Jerusalem.

A fragment of the Temple of Vesta (midground) owes its restoration to Mussolini. Corinthian columns at right survive the Temple of Castor, rebuilt by Tiberius.

Ruins of Basilica Julia (right), where law courts met, date from A.D. 12, when Augustus reconstructed a building erected by his great-uncle, Julius Caesar.

Pagan King Clovis accepts baptism by the Church

STANDING in the richly carved baptismal basin of the baptistery in Reims, Clovis hears the admonition of Bishop Remigius (right): "Meekly bow thy proud head.... Adore what thou hast burned, burn what thou hast adored!"

Thus Latin Christianity won its first barbarian king in the West, the stalwart chief of Frankish tribes in Gaul. For his act, Christians acclaimed Clovis a second Constantine.

Gregory, Bishop of Tours, left a vivid account of this Christmas Day, 496:

"The streets were shaded with tapestried hangings.... The smoke of incense spread in clouds, candles of fragrant odor burned brightly, and the whole shrine of the baptistery was filled with a divine fragrance...."

The King's baptism under the eyes of his wife Clotilda (behind the boy) served as an example to his warriors; three thousand followed him into the faith. His conversion signaled a turn on the road of history.

Pagan Takes a Christian Bride

When the pagan Clovis came to rule in 481, he was little more than a tribal chieftain. Ambitious, he began collecting territories through war. He married the Burgundian Princess Clotilda, who professed Christianity and persistently sought his conversion.

Legend recounts that in the midst of a battle against the Alemanni (whence the French word *Allemagne* for Germany), Clovis appealed to the God of his wife: "I entreat the glory of Thy help. If Thou grant me victory over these enemies... I will believe on Thee and be baptized in Thy name."

The Alemanni retreated immediately, and Clovis gained one of his greatest victories.

Almost four centuries later a story arose that, in baptizing Clovis, Bishop Remigius used an ampulla of holy oil, the *Sainte Ampoule*, brought from heaven by a white dove. The story became part of the mystique of royal power in France, where for centuries the king was almost a priest: He was the Most Christian King, *Roy Très Chrestien*.

Clovis and Clotilda, moving their capital to Paris, built the Church of the Holy Apostles. Some years after the King's death in 511, the Queen retired to a cloister. In 545 she was buried by her husband's side in the Holy Apostles, which later

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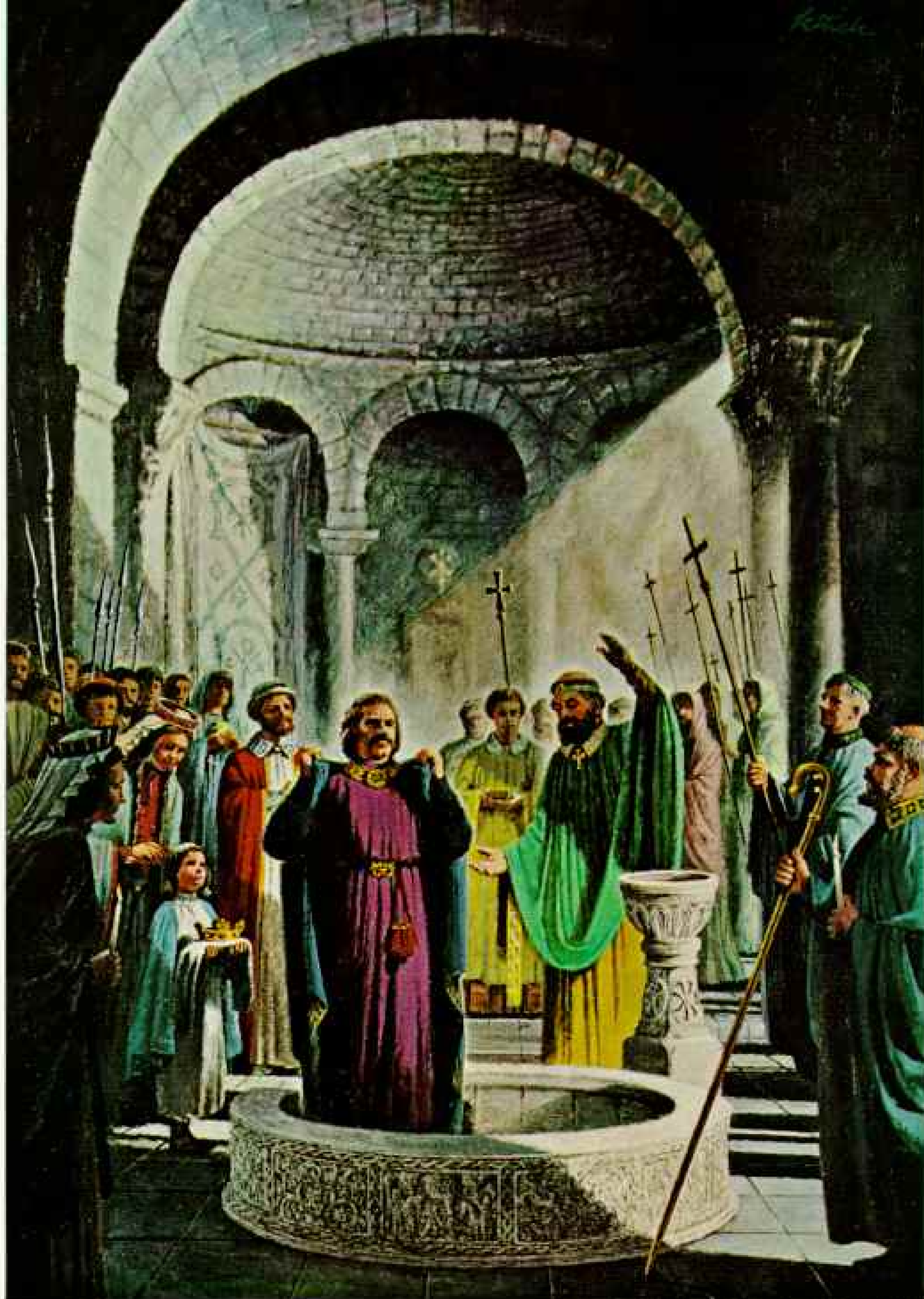
Historic baptistery at Fréjus, France, dates from the time of King Clovis. Its builders followed the style of small Roman temples, and most of the white marble capitals apparently came from an earlier pagan structure.

The Fréjus baptistery may be compared with the setting envisaged by the painter for Clovis's baptism.



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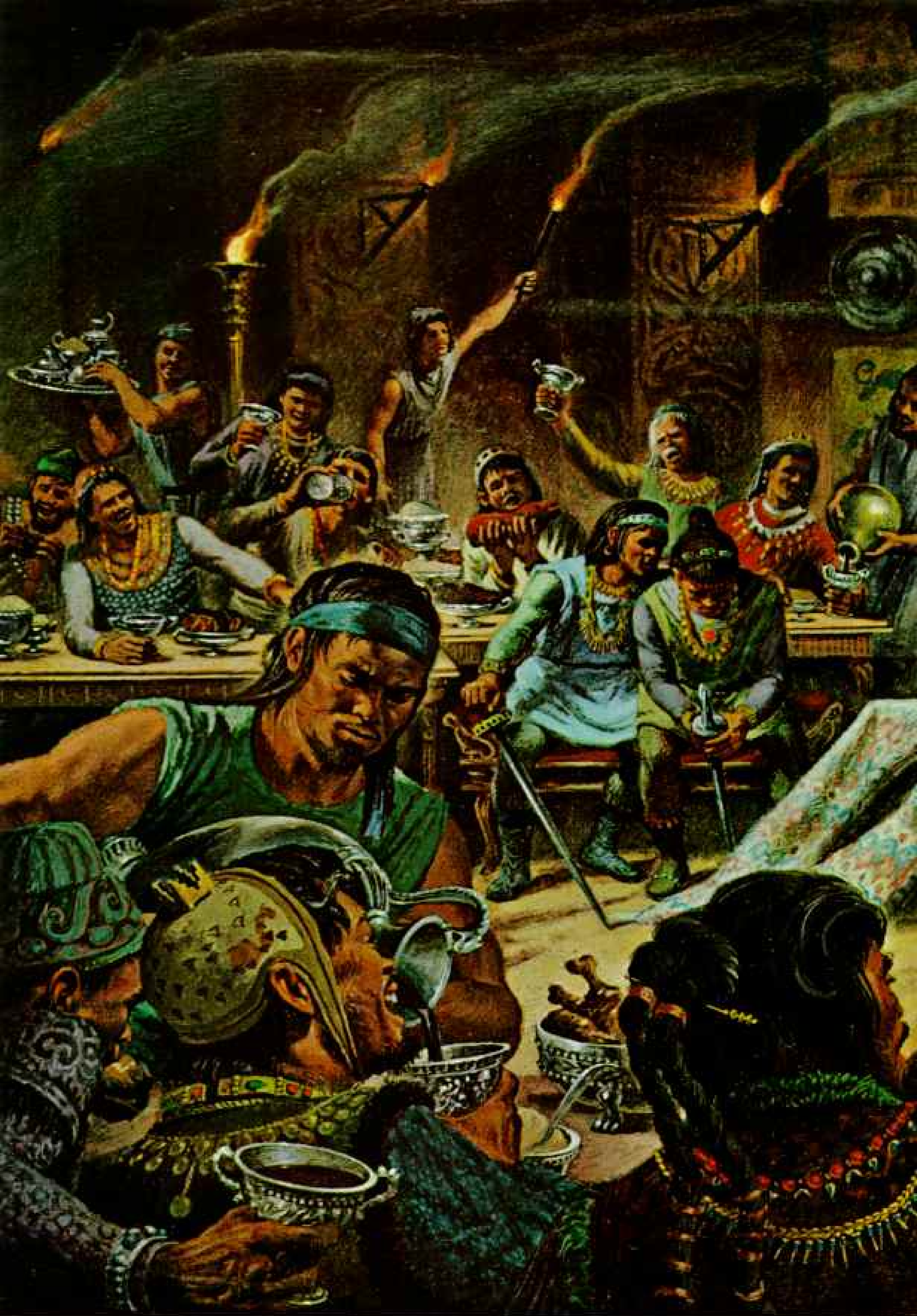
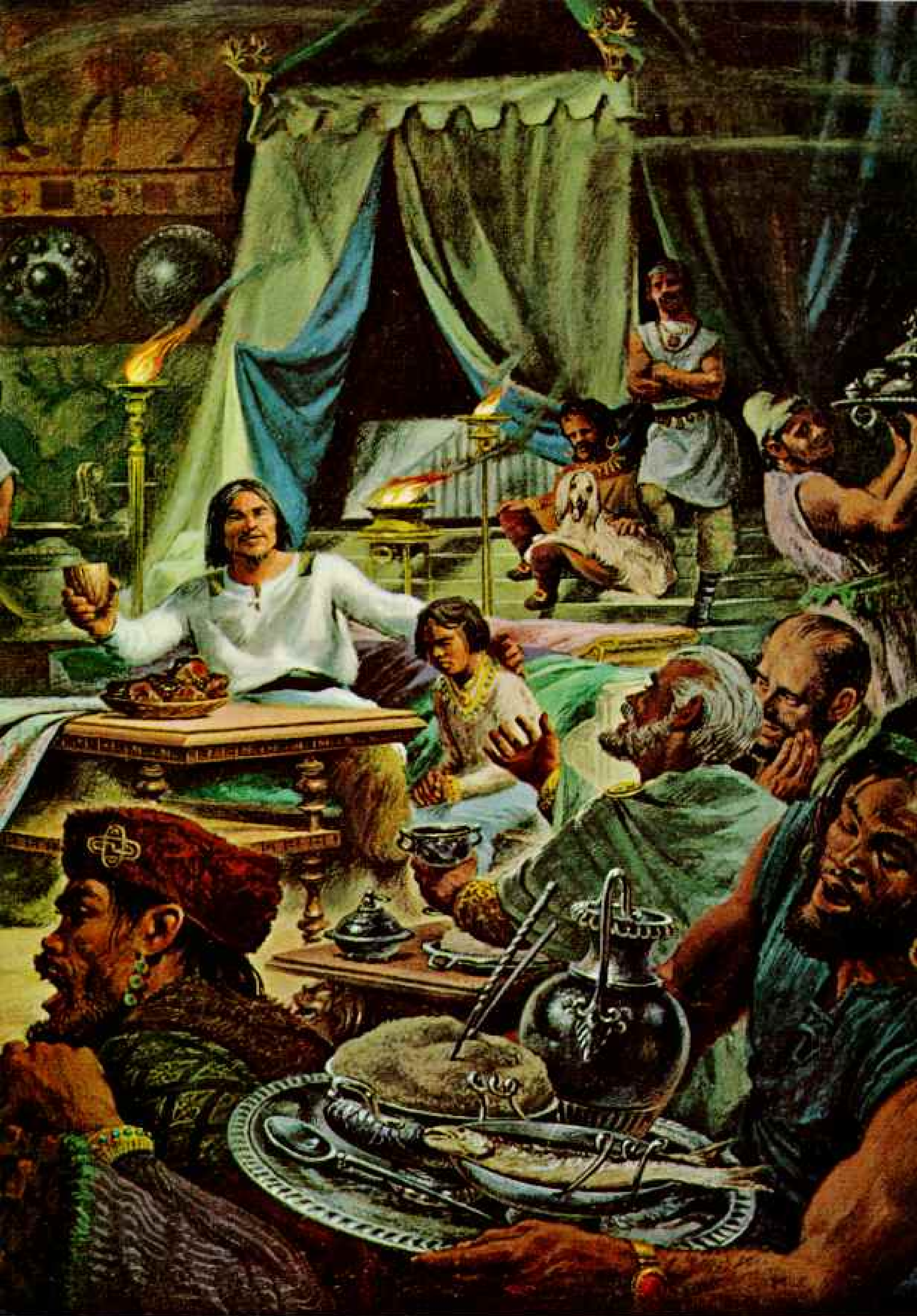
was to become the Church of Ste-Geneviève.

Germanic peoples established half a dozen important kingdoms in western Europe during the fifth century. Four of these peoples entered Roman territory as Arian heretics (Arianism, named for the early fourth-century priest Arius, was a heresy which subordinated the Son to the Father). The Franks and Anglo-Saxons, the other two, entered as pagans and were converted to Latin Catholicism. Enlisting the aid of the Church, they founded enduring states. Here we find the origins of France and England.

While Clovis set the stage for a new day in French history, the light was long in coming. Culture was "perishing," Gregory wrote. Warriors could not read, and even bishops could not spell. But dawn would come.



Attila's Huns feast a Byzantine envoy on the silver plate once used by Roman grandees.



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In a white tunic, the "Scourge of God" quietly presides, resting a hand on his youngest son

◀ Attila the Hun entertains at a barbarian banquet

IN THE LATE FOURTH CENTURY an Asian people poured into Europe from the lonely steppes beyond the Caspian. Nomadic herdsmen clad in skins and leggings and small round hats, they all but lived on their fleet, wiry horses. They formed a swift, hard-riding cavalry that scattered other barbarians like chaff. Within a generation they controlled a vast area from the Ukraine to the Danube.

Even Hun Babies Inspired Terror

They were known as Huns, a name that still conjures images of savagery and dread. Contemporary records describe the newcomers, with their shaggy garb and cruel visage, as terrifying in appearance. "Truly the very faces of their infants have a gruesomeness all their own," one observer said.

The Huns possessed no written language and, according to Roman chroniclers, knew nothing of their own past. But in the year 395 they made history by launching a two-pronged foray into the Eastern Empire. One army galloped across the frozen Danube; the other stormed through the passes of the Caucasus into Asia Minor.

Slaying, pillaging, and burning, the marauders swept across the land virtually unopposed. "They filled the whole earth with slaughter and panic . . ." wrote St. Jerome, who himself prepared to flee before them. "May Jesus avert such beasts from the Roman world in the future! They were at hand everywhere before they were expected: by their speed they outstripped rumor, and they took pity neither upon religion nor rank nor age nor wailing childhood."

Melting back into the north, before a hastily assembled imperial army, the Huns continued to raid the Roman frontiers and occasionally even served the emperors as mercenaries. Their principal energies they devoted to the conquest of other barbarian peoples. Hunnic horsemen, loosing deadly flurries of arrows from their short bows, ranged from the Caspian almost to the Rhine, from the Alps north to the Baltic.

Their short-lived empire reached its zenith in the first half of the fifth century under the generalship of Attila, whose merciless campaigns won him the title "Scourge of God." In 443 Attila's armies defeated the Eastern Empire and exacted an annual tribute of 2,100 pounds of gold.

Visitor Recorded Hunnic Life

Greedy for more plunder, Attila and his Hunnic horde again invaded the East four years later. "More than a hundred cities were captured," a witness tells us, "and Constantinople almost came into danger and most men fled from it. . . . And there were so many murders and blood-lettings that the dead could not be numbered."

Knowledge of Hunnic life and the appearance of the royal camp rests chiefly upon the account of Priscus Panites, who accompanied his friend Maximin on a Byzantine embassy to the victorious Attila in 449. Doubtless they

Key to painting, pages 828-9:

1 Attila, King of the Huns.
2 Ernas, Attila's favorite son.
3, 4 Older sons, apparently in little favor with Attila.
5 Onegesius, Attila's friend and second in command.
6 Berichus, a Hunnic or Scythian noble.
7 Priscus, the Byzantine historian.
8 Maximin, the Byzantine envoy.
9 Zerkon, a Moorish dwarf.
10 A Scythian jester.

found Attila, as the near-contemporary historian Jordanes described him, with a short, squat body, a large face with small, deep-set eyes, a flat nose, and a few straggling hairs instead of a beard.

Attila Eats From Wooden Dishes

Attila's camp, a semi-permanent village of timber and stone, was located on a plain somewhere in central Hungary. Here the Hunnic horsemen could move freely, and easily forestall surprise attack. Inside the settlement, Priscus found two wooden stockades, "built not for protection but for appearance." Attila's crude palace stood on an elevation within one of the compounds.

Following Priscus' detailed description, Birney Lettick's painting depicts a banquet attended by the envoys from Constantinople.

The light of blazing torches glitters on silver and gold. While guests and followers dine luxuriously, Attila, as is his wont, eats nothing but meat from a wooden trencher and drinks wine from a wooden cup. A canopy shelters the King's bed, which occupies a dais at the rear of the room.

After the banquet, Priscus recounts, "two barbarians coming forward in front of Attila sang songs they had composed, celebrating his victories and deeds of valor in war. And of the guests, as they looked at the singers, some were pleased with the verses, others reminded of wars were excited in their souls, while yet others, whose bodies were feeble with age and their spirits compelled to rest, shed tears."

Two years after Priscus' visit, Attila turned toward the Western Empire and slashed into Gaul. Having been checked by the Roman General Aetius near Châlons in 451, he diverted his attack the next year toward Italy and devastated the country as far as the Po River. Aetius' threatening army, an outbreak of plague among the Hunnic troops, and the appeals of an embassy headed by Pope Leo I caused Attila to spare Rome and withdraw beyond the Alps.

Not long afterward, while preparing still another foray, the King of the Huns took time to add a beautiful bride named Ildico to his other wives. Following the wedding, he drank heavily before retiring.

When Attila did not appear the following morning, servants broke into his chamber. There they found Ildico weeping beside the body of the Scourge of God, dead of a hemorrhage and suffocation.

Attila's horsemen cut off their hair and slashed their faces with swords, thus mourning "the greatest of all warriors... with no feminine lamentations and with no tears, but with the blood of men."

Heirs Quarrel as Huns Decline

The cruel ruler's empire did not long survive him. His sons divided his realm, quarreled among themselves, and, piecemeal, the Hunnic tribes drifted back into the obscurity from which they had come.

Hun is a generic term; we know of 20 different peoples who were called Huns. One of these, the Onogurs (Ten Arrows), are thought to have given their name to Ungaria, the modern Hungary.

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Gold and silver buckles and brooches adorned Hunnic garments. Fibula, or clasp, with horsehead bow (above), together with ornaments at right, forms part of a collection at the Walters Art Gallery, Baltimore, Maryland.

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Theodora begs Justinian to fight instead of flee

THE GLOOMY EMPEROR of the vast Byzantine Empire sits on his shaky throne in Constantinople and contemplates flight from a rebellious mob of his own people. Justinian, in 532, faces a revolt of the powerful circus factions. As some of his councilors give way to fear, the Empress Theodora here stands beside the throne and delivers an impassioned plea. The historian Procopius, her contemporary, records her words:

"It is impossible for a man, once born, not to die. But for a man who has reigned as Emperor, exile is intolerable. . . . If you wish to save yourself, Sire, it can easily be done. We have plenty of money. There is the sea; here are the ships.

"But think whether, once you have escaped to a place of safety, you would not prefer death. For my own part, I hold to the old saying that the imperial purple makes the best burial sheet!"

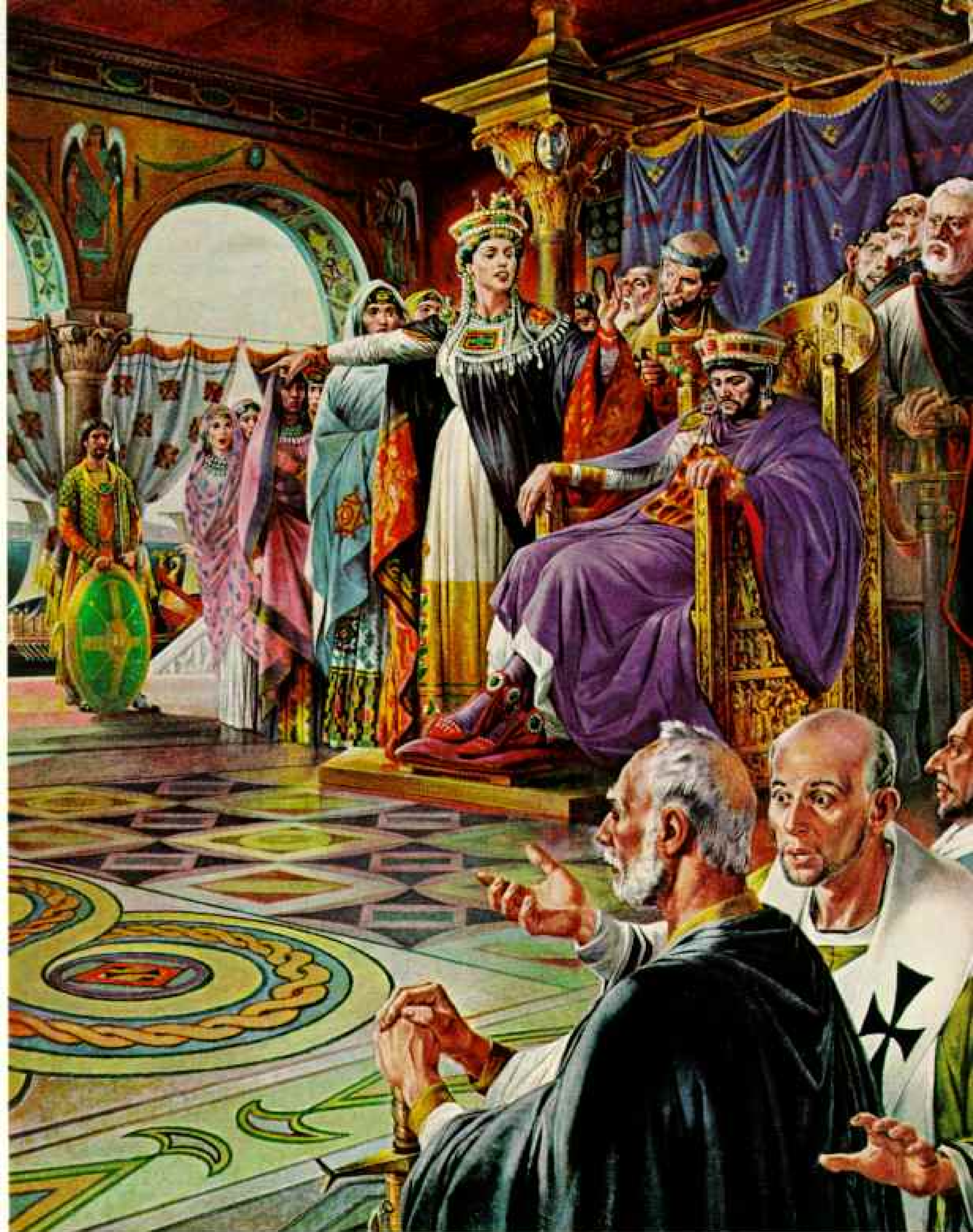
Justinian, taking heart, ordered his generals to attack; his soldiers killed 30,000 rioters, many in the Hippodrome.

Constantinople's people had been divided in their support of the Blues and the Greens, racing fraternities that also served as political parties. Sometimes 50,000 spectators watched the chariot races and shouted political opinions and grievances at their ruler in the imperial box.

Spectators in the Hippodrome formed a

Crowned and spangled, the Empress Theodora in mosaic adorns the Church of San Vitale in Ravenna, Italy, erected about 547. This contemporary portrait of the onetime actress suggests the beauty that won Justinian: luminous black eyes set in a delicate, oval face. A woman of spirit and steel, Theodora grew up in poverty on the streets of Constantinople. Before Justinian ascended the throne, he elevated her to the patrician class so that they might be married. She remained a powerful influence until her death by cancer in 548.

Crux Vaticana, one of the oldest relics in the treasure of St. Peter's, came as a gift from Justinian's nephew and heir, Justin II, to the Pope. A tradition tells of Justin's Empress, Sophia, relinquishing her own jewels—emeralds, hyacinths, aquamarines, and jasper—to enrich the cross.



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sort of popular assembly, as had their predecessors in the Athenian Agora and the Roman Forum. There developed a two-party system in which the Blues might be likened to conservatives, the Greens to liberals.

Although there were four circus factions in Constantinople, the Whites depended largely on the Blues, and the Reds on the Greens. Similar cliques had existed in Imperial Rome, but with less political effect.

The Blues, who represented religious orthodoxy and conservatism, had the blessing of the upper classes. The Greens, more radical, enlisted the mob's support.

Greens and Blues generally dwelt in separate districts. They maintained watch over certain sections of the city walls and formed a standing municipal militia. More than once they helped to repel barbarians. Arrogant, unruly, sometimes a law unto themselves, the factions found supporters in the impoverished who, dispossessed by Justinian's tax collectors, poured into Constantinople.

The Nika Revolt, named for the rallying cry, *nika!* (conquer!), began when the Blues and Greens joined in protest against the cruelly bungled execution of two ruffians, one from each faction. Riots grew to a storm, and the mob set fire to the city.

After a week, only blackened ruins stood in place of palaces and hospices, public buildings and churches, including Hagia Sophia—reconstructed since Chrysostom's time.

By quelling the riot, Justinian preserved his full autocratic power. He executed opposition leaders and discontinued for a time the games in the Hippodrome.

Greater City Rises From the Ruins

Surrounded by devastation at the conclusion of the riots, Justinian immediately set about rebuilding Constantinople to a state of magnificence that dazzled visitors for centuries. He restored the Senate House and baths and renovated his palace.

In five years the Emperor created a new Hagia Sophia, making it the largest church in Christendom and a vision of splendor. Its

Imperial pageantry lives on in a mosaic at Ravenna's Church of San Vitale. Emperor Justinian (with sacramental bowl) and Archbishop Maximian (with cross) lead a procession. Courtiers, bodyguards, and clerics complete the entourage. Brilliance of the panel is enhanced by the technique of setting tesserae at irregular angles so that they reflect light from all directions.

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Time-pocked monuments of bygone civilizations rise from a park where Constantinople's Hippodrome stood. Chariots raced around the towering shafts as spectators shouted encouragement to their favorites. Constantine VII sheathed the obelisk in foreground with gilded bronze and set at its base the inscription: "The Colossos was the pride of Rhodes; this bronze is the pride of our city." Obelisk beyond came from a temple at Karnak, Egypt. Blue Mosque soars at right, Hagia Sophia in the distant center.

dome seemed to "float in the air," Procopius wrote; its windows made it appear that "sunlight grew in it." Byzantine art and architecture awed travelers.

Turning abroad, Justinian sent his armies into North Africa, where they defeated the Vandals; into Italy, where they destroyed the Ostrogothic kingdom; and into Spain, where they wrested coastal territory from the Visigoths. Thus, Roman dominions returned to imperial rule.

Appointing patriarchs as he chose, the Emperor ruled as an eastern pontiff. In Rome, the Pope not only reigned spiritually but increased his temporal domains. Conflicts between Rome and Constantinople set in motion forces that in time split the Christian church into two main bodies, Roman Catholic in the West and Orthodox in the East.

Justinian tried to reorganize provincial administration, fixed salaries of officials, devised new tax collecting methods, and started a silk industry as a state monopoly. Most important, he codified all imperial laws back to Hadrian's reign and his Code and Digest survive as an important basis for modern law.

West Revives Roman Law

Code and Digest, in Latin, soon ceased to be useful in Byzantium, but five centuries later came the extraordinary revival of Roman law in the West. The first professors of law in Bologna, who were soon to form a university, rediscovered manuscripts of the Code and Digest. Later, Emperor Frederick Barbarossa, delighted with a law that lifted imperial power above all competing authority, used Justinian's work to his own advantage. The revival of Roman law helped give a secular spirit to European society.

Cassiodorus shows guests through his monastery

SCRATCH OF PEN on parchment, shuffle of sandals on stone floors, murmur of voices: This is an island of peace where scholarship survives in a sea of storm.

The aged scholar Cassiodorus welcomes a bishop to his monastery at Scyllacium (the modern Squillace, on the sole of the Italian boot). Here, he explains, we copy books, Christian and pagan; here we preserve treasures from the past.

Among the first to introduce the cultivation of learning into the common life of a monastery, Cassiodorus in the sixth century provided the model that became a tradition. After his time thousands of monks copied tens of thousands of manuscripts in hundreds of monasteries throughout Europe. Without their labor, the world might have lost many precious works of antiquity.

Living beyond the age of 90, Cassiodorus himself served as a link between antiquity and the Middle Ages.

Almost a century of turmoil ended in the Italian Peninsula when in 493 Theodoric the Great, the Ostrogothic king, occupied the capital city of Ravenna after a three-year siege and became master of Italy.

About the year 507 Theodoric appointed as quaestor, or royal secretary, young Flavius Magnus Aurelius Cassiodorus, member of a distinguished Roman family.

For more than 30 years Cassiodorus held official positions of responsibility. Eventually (in 533) he became praetorian prefect, thus attaining the highest civil office in the kingdom, a post his father had held.

After Theodoric died, Cassiodorus served unworthy successors, but about 540, while Justinian's armies were fighting to gain Italy, he retreated to his family estate at Scyllacium. There he founded a monastery and a hermitage. The monastery he called Vivarium, from the fishpools, gardens, and game preserves all around it.

For some three decades Cassiodorus guided his monks, fighting "against the devil's illicit tempta-

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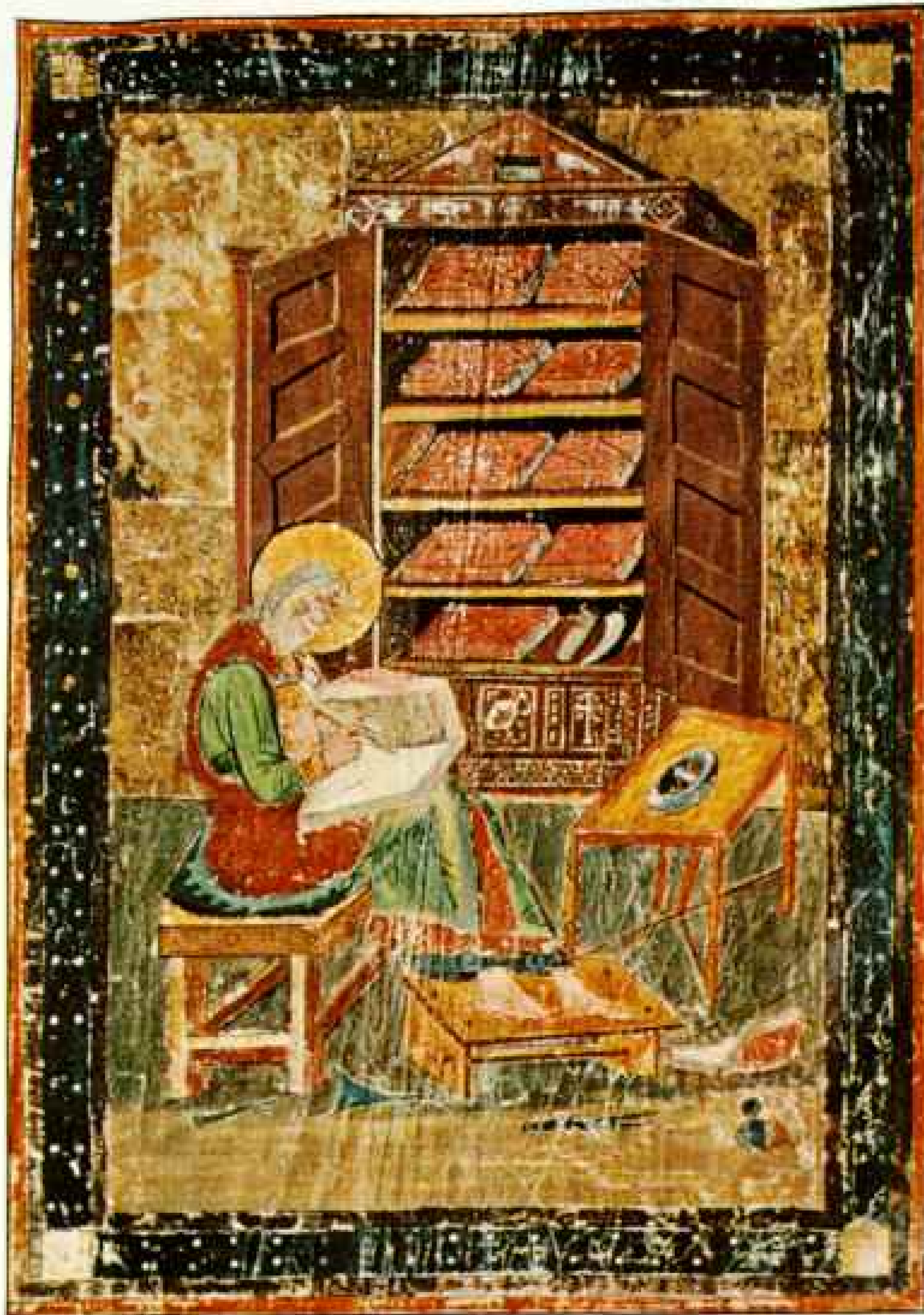
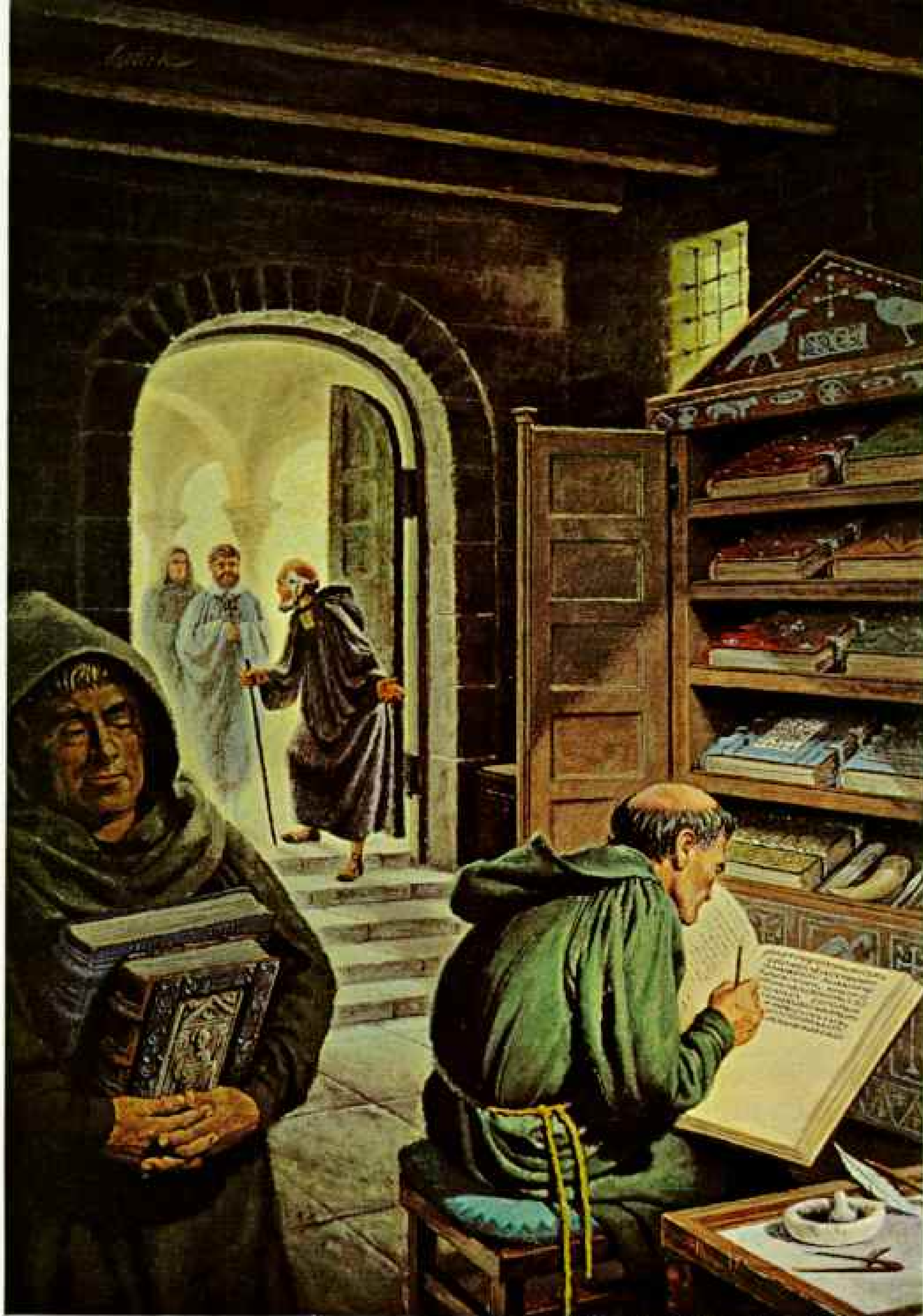


Ezra the scribe. Biblical priest, appears in ecclesiastical garb in an illumination from the *Codex Amiatinus*. This work, by an English copyist of the early eighth century, rests in the Biblioteca Laurenziana at Florence, Italy. Some scholars believe the painting reproduces one done about 150 years earlier by the monks of Cassiodorus for his *Codex Grandior*, which has disappeared. Bookcase served as a model for the one in the painting.



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tions with pen and ink," as he wrote. "Of all the works that can be accomplished by manual labor, none pleases me so much as the work of the copyists—if only they will copy correctly."

Cassiodorus was always the advocate of learning. As an official of the Ostrogothic court, he had heard that Rome's school teachers were poorly paid, and insisted: "If we pay actors on the stage for entertaining us, surely we should reward... those responsible for our morals and our education."

The monastery at Squillace became a refuge for lovers of peace and study. Cassiodorus directed that "all guests who come shall be received as though they were Christ."

Amr invades Egypt without opening Caliph Omar's letter of recall

TWO YEARS after the death of the Prophet Mohammed (632), the Arabs burst from the furnace of Arabia, bent upon conquest. They were to win an empire that would stretch from the Pyrenees to the Indus.

The Byzantine and Persian Empires had exhausted each other in a long war. In the mid-630's the Arabs invaded both Persia and the Byzantine provinces of Syria and Palestine. They swept all before them. In 638 Jerusalem opened its gates to the Caliph Omar.

Now the general Amr ibn el-Asi expressed the burning desire to add the rich Byzantine province of Egypt to the growing domain of Islam. To this idea, Omar gave a dubious and reluctant consent.

With only 4,000 horsemen, Amr raced toward the Egyptian frontier in early December, 639. But when he had reached Rafah, messengers from the Caliph overtook him with a letter.

Amr suspected its contents. He declined to open it until he had reached El-Arish, just inside Egypt's frontier. The letter bade him return if he was still in Palestine, but to proceed if he had crossed over into Egypt.

Amr read the letter to his lieutenants, and gave the command to advance. They shouted their approval.

Alexandria Falls to Arabs

When the Arabs had taken three or four important places in Egypt, Alexandria capitulated on easy terms in the fall of 641. The white-marble beauty of the city overwhelmed the simple sons of the desert; Amr wrote the Caliph with obvious exaggeration:

"I have taken a city of which I can only say that it contains 4,000 palaces, 4,000 baths, 400 theaters, 12,000 greengrocers, and 40,000 Jews!"

Four years later the Byzantine fleet recaptured Alexandria, but Amr recovered it, this time by force.

With the Arabs' coming, a thousand years of Greek culture in Egypt vanished like snow under a hot sun.

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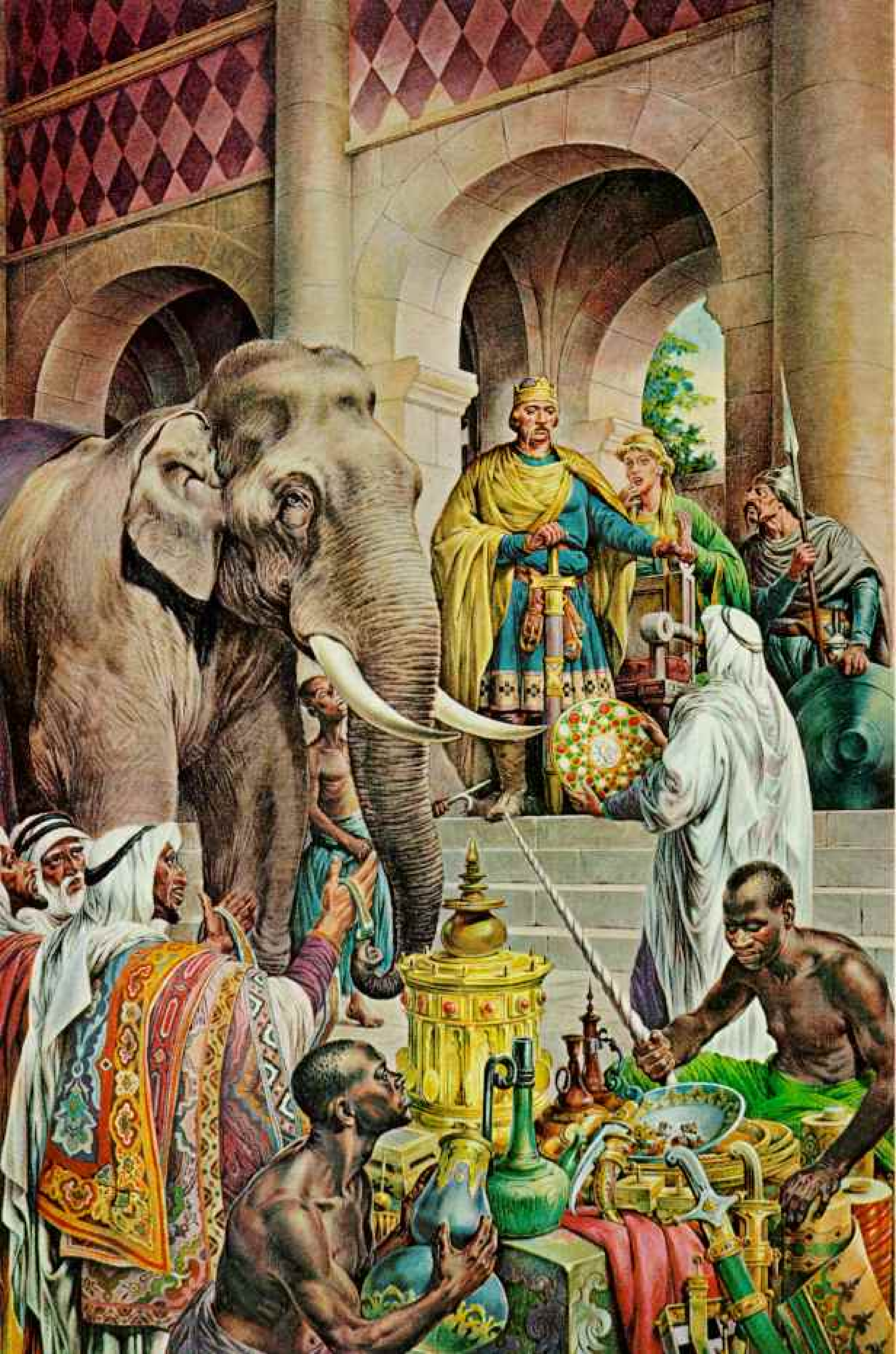

Charlemagne receives a Caliph's gift elephant

WONDERS from the workshops of Araby dazzle the monarch of the Frankish Empire, but the elephant called Abu al-Abbas wins his heart. The day: July 20, 802.

Envoys from Harun al-Rashid, the Caliph of *Arabian Nights* fame, display their master's presents at Charlemagne's palace at Aachen, in present-day Germany. From Baghdad come gold platters, bolts of silk, rugs, porcelain vases, swords and daggers of Damascene steel, and a chessboard. A marvelous bronze waterclock (center) that struck the hours arrived with a later embassy.

Charlemagne adopted the elephant as a member of the family. For eight years, Abu al-Abbas lumbered beside his master on travels across an empire that stretched from the Pyrenees to the Elbe. The Indian beast astonished the Frankish people, even as circus animals delight small boys today.

When Charlemagne set out to fight the Danes in 810, Abu al-Abbas went with him to terrorize the enemy. Suddenly, to the Emperor's sorrow, the elephant died. And the monarch's luck went with him. A mysterious plague decimated cattle. Three members of Charlemagne's family died, and he soon followed them.

During his reign, Charlemagne, a deeply religious man, reformed and strengthened the Church. In Rome on Christmas Day, 800, Pope Leo III crowned him Emperor.

Charlemagne encouraged the founding of schools, but he himself was barely able to write the difficult scripts of his day. He used to keep "tablets and blanks in bed under his pillow," a member of his court reported, so that "at leisure hours he might accustom his hand to form letters; however, as he did not begin his efforts in due season, but late in life, they met with ill-success."

Islam Enjoys a Golden Age

Could Abu al-Abbas have talked, he might have told Charlemagne of a civilization superior to Europe's.

For five centuries 37 caliphs of the Abbasid dynasty reigned in magnificence from Baghdad. Moslem scholars translated learned works into Arabic from Greek, Persian, Syriac, and Sanskrit. Moslem physicians were famous. "Julep" is a Persian word; "sirup," Arabic; both were aromatic medicinal drinks.

Geographers, astronomers, and astrologers, alchemists, physicists, and mathematicians, the Moslems enriched European culture. Proof of their contributions is preserved in our technical vocabulary, which contains many words of Arabic origin. Among them are *alkali, alembic, alcohol, alchemy, algebra, amalgam, zenith, nadir, cipher.* Moslem mathematicians used the cipher, or zero, more than two centuries before it appeared in Europe.

Moslem scholars wrote about tides and the weather, agriculture and irrigation, plants and trees, camels and wild animals.

Europeans prized Damascene steel and Cordovan leather. Fustat gave us our word "fustian"; Mosul contributed "muslin," and Damascus, "damask." Spain copied the brown-and-yellow watered silks produced in Baghdad's Attabiyah quarter. Samuel Pepys's "false taby wastecoate" derives from Attabiyah, as does our term "tabby" cat.

Regal figure in bronze, thought to be Charlemagne, stands among the medieval treasures of the Louvre.

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Vikings loot and burn a French royal manor

DROPPING OARS and taking up weapons, Norsemen pour out of their longships, ram the main gate of a palace compound, and scale its walls. Sword and torch spare nothing in their path.

Swashbuckling seafarers led by minor nobles, the Vikings swept out of Scandinavia from the close of the eighth century. In an

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age when other mariners timidly hugged the coastline, they fearlessly steered their bobbing ships across the seas. Leaving death and ruin in their wake, Viking raiders harried France, Scotland, England, and Ireland. Pagans all, they sacked monasteries, where people often stored their valuables. During the summer raiding season, churches echoed to the prayer, "Deliver us, O Lord, from the fury of the Norsemen."

Europe's farthest reaches felt the sharp edge of the Vikings' sword and the sharper

edge of their greed. Pirate ships, sometimes in fleets of 300 to 400 vessels, coursed up the Rhine and the Meuse, the Humber and the Thames, the Seine and the Loire.

One band rowed up the Guadalquivir and attacked the Moorish rulers of Spain. Another laid siege to Paris, and only a desperate ten-month defense saved the city.

The Norsemen possessed a genius for exploration. They embarked on expeditions that ranged as far away as Greenland, trading and colonizing.

The Vikings also went east, establishing themselves in several places in Russia, and used the rivers as highways to trade with the Middle East. In an attempt to plunder Azerbaijan, a province of modern Iran, they sailed the Caspian Sea. They also attacked Constantinople and exacted tribute.

Settlements Followed Norse Conquest

Most dramatic and controversial of Norse expeditions was the westward voyage of Leif Ericson about the year 1000. Learning that another Norseman had sighted a tree-covered coast west of Greenland, Leif and his hardy followers set sail to explore it.

Norse sources say the party reached a land where grass grew throughout the year and grapes thrived. Leif called his discovery Vinland, for its wild grapevines. Some historians conjecture that he landed in New England.

Vikings settled in parts of eastern England. Others established themselves in Normandy, land of the Northmen. Their descendants conquered England (page 850).

Kiss on Foot Upends French King

In 911 the Frankish King Charles the Simple reluctantly acknowledged Rollo, the Norse leader, as Duke of Normandy. His terms of recognition required Rollo to become a Christian and Charles's vassal.

In pledging his loyalty, Rollo was expected to kiss the royal foot, but the proud Norseman refused to bend his knee to any man.

Since confirmation of his title required the deed, Rollo directed one of his warriors to act in his stead. The story goes that the Norseman seized the King's foot and raised it to his lips without bending over. Charles sprawled ingloriously, causing, in the words of a chronicler, "a roar of laughter and a great disturbance among the spectators."

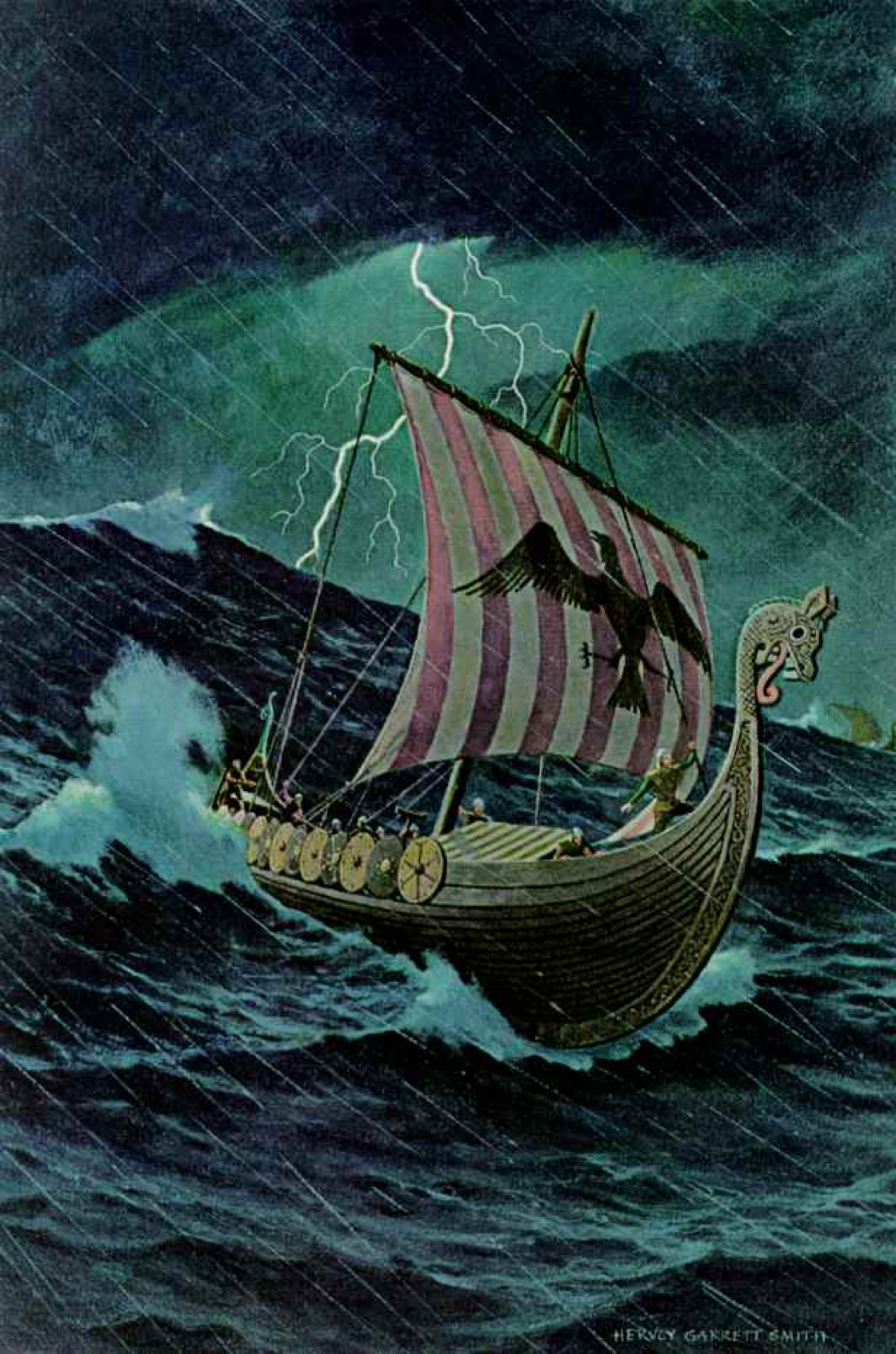
When stronger governments grew up in Europe, Viking raids subsided, and little is heard of them after the mid-11th century.

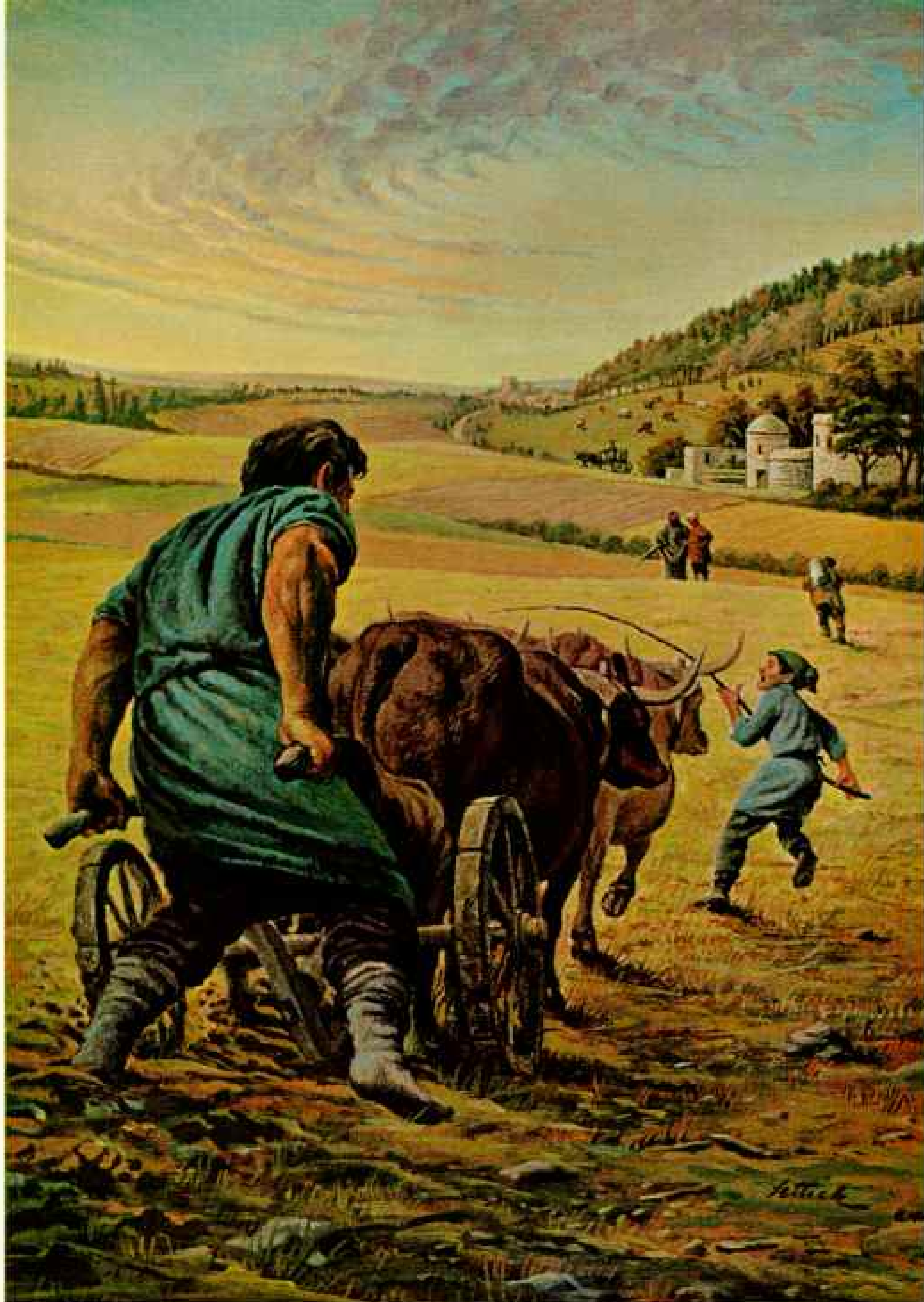
Modern Scandinavians, descended from the Norsemen, prize the magnificent sagas which glorify their exciting past.

KODACHROME BY [illegible] © NATIONAL GEOGRAPHIC SOCIETY

Oseberg longship, an exhibit in Oslo's Viking Ship Hall, sailed some 1,100 years ago. After a long life in the water, the 70-foot double-ended craft became a burial chamber for a queen and lay in Norway's blue clay until it was unearthed in 1904.

Dragon-headed Viking longships sweep shoreward on a mission of mayhem and plunder: a dramatic painting by Hervey Garrett Smith. Relieved of rowing by driving winds, the sea rovers wait behind their warship's ornamental shields. Rarely displayed thus at sea, the shields were usually stored until the ship reached a port.


HERVEY GARRETT SMITH



PAINTING BY BIRNEY LETTICK © NATIONAL GEOGRAPHIC SOCIETY

Randoin the peasant tills church lands in France

MUSCLES STRAINING, the farmer sets the point of his wooden plow into the earth. Swinging a goad, his son Girbold urges on a team of plodding oxen. A water carrier trudges toward a steward and monk, who survey fields belonging to the powerful Benedictine Abbey of St-Germain-des-Prés, near ninth-century Paris.

The widely scattered estates of the abbey were well managed, and even today we know much about them. Late in Charlemagne's reign, Irminon, the Abbot of St-Germain-des-Prés, prepared an extraordinary record of

all the abbey's holdings, together with its serfs and *coloni*, or tenants.

Irminon's survey became known as the Polyptychum, a book of "many leaves." His account details the obscure lives of the poor; it tells who held the land and what they owed for it. From the abbot's compilation, we can still witness the panorama of French farm life of a thousand years ago, as we hear the shouts of the villagers and mark the activity of mill and bakehouse.

Man's Work Is Never Done

Randoin lives on a manse in the village of Epinay-sur-Orge, 15 miles south of Paris. A free man bound to monastic estates, he cultivates as his own about 13 acres of farmland and half an acre of vineyard.

To pay for home and farm, Randoin gives service. On demand from the abbey's steward, he plows, plants, and harvests other lands belonging to St-Germain, which will own Epinay until the French Revolution. Randoin also does other chores.

By way of taxes, Randoin and his neighbors together pay a yearly average of 32 shillings, 10 pence in money; 6 sheep and 4 ewes; about 1,235 gallons of wine; 3,000 shingles; 134 chickens and 670 eggs for rights of pasturage and other privileges.

Thus for Randoin, wife Gisoilde, and their sons, Aldoin, Ragente, and Girbold, life rides a seesaw of toil. This day they work for their lord; that day for themselves.

Sundays and saints' days bring respite. The Emperor himself ordered: "No servile work shall be done on Sundays, neither shall men perform their rustic labors ... nor come to the law courts, nor follow the chase."

On Sundays Randoin and his family go to church, and afterward in the churchyard they linger with other peasants. Out of the pagan past come "ballads and dancings and evil and wanton songs and such-like lures of the devil," or so the clergy complain.

Other ancient superstitions remain to comfort Randoin. Before beginning his day of plowing, he tucks a little cake made of different kinds of meal into a furrow and sings: "Earth, Earth, Earth! O Earth, our mother! May the All-Wielder, Ever-Lord grant thee acres a-waxing. . . ."

When illness strikes, Randoin may turn for help to a witch or warlock, or beg the spirit of a twisted tree to give aid.

But Christianity, too, gives him solace. In times of drought, Randoin's neighbors at Villeneuve-St-Georges take the statue of their patron saint down from the altar and plunge it into the Seine.

Spices and Silks From Distant Lands

Besides Christmas, the year's big event is the fair at St-Denis, just outside Paris. Randoin and his family try to go to the fair, for this is their one glimpse of the world beyond the horizon of fields.

Shopping for salt or dye, peasants eye the rich buying silks, spices, or leather goods from faraway Venice or Syria. But when they return home, wonder fades, and on the morrow work claims them anew.

Eighth-century sketch on parchment shows English plowmen at their grueling task

Gold-and-blue mosaic blazes in Hagia Sophia

SITTING ON A SCAFFOLD, a 10th-century artist painstakingly inserts a bit of colored glass into wet plaster, and a mosaic masterpiece nears completion. Twenty-one feet above the floor of Hagia Sophia, he fills in the background, his working sketches beside him. His assistant mounts a ladder with plumb line and glass tesserae. Lashings and pegs, in place of expensive metal nails, hold the platform together, and wooden pins tighten the ladder rungs.

The mosaic, known as the Vestibule Madonna because it appears over the door of the south vestibule, depicts the enthroned Mother and Child receiving the offerings of Byzantium's two most celebrated Emperors.

Constantine (right) offers the city to the Virgin, Constantinople's patron. "Constantine, the great Emperor among the saints," proclaims the inscription. Justinian, "Emperor of great renown," proffers the domed Hagia Sophia, which he rebuilt at enormous cost. Comparing his work with the Temple at Jerusalem, the Emperor cried rapturously, "Solomon, I have vanquished you!"

Russian envoys, converted to Christianity, saw the splendor as the "abode of Almighty God Himself, where He manifested His glory direct to mortal eyes."

KODACHROME (ABOVE) AND HD EKTACHROME BY JAMES BLAIR © N.G.S.

Poor spelling by a restorer betrays itself in the last word of the vertical inscription that describes the Justinian of the mosaic. With faulty Greek, the repair reads "BACIAEIE" instead of "BACIAEYC" (*Basileus*, meaning emperor or king). Artist Durenceau's craftsmen in the painting spell the word correctly.

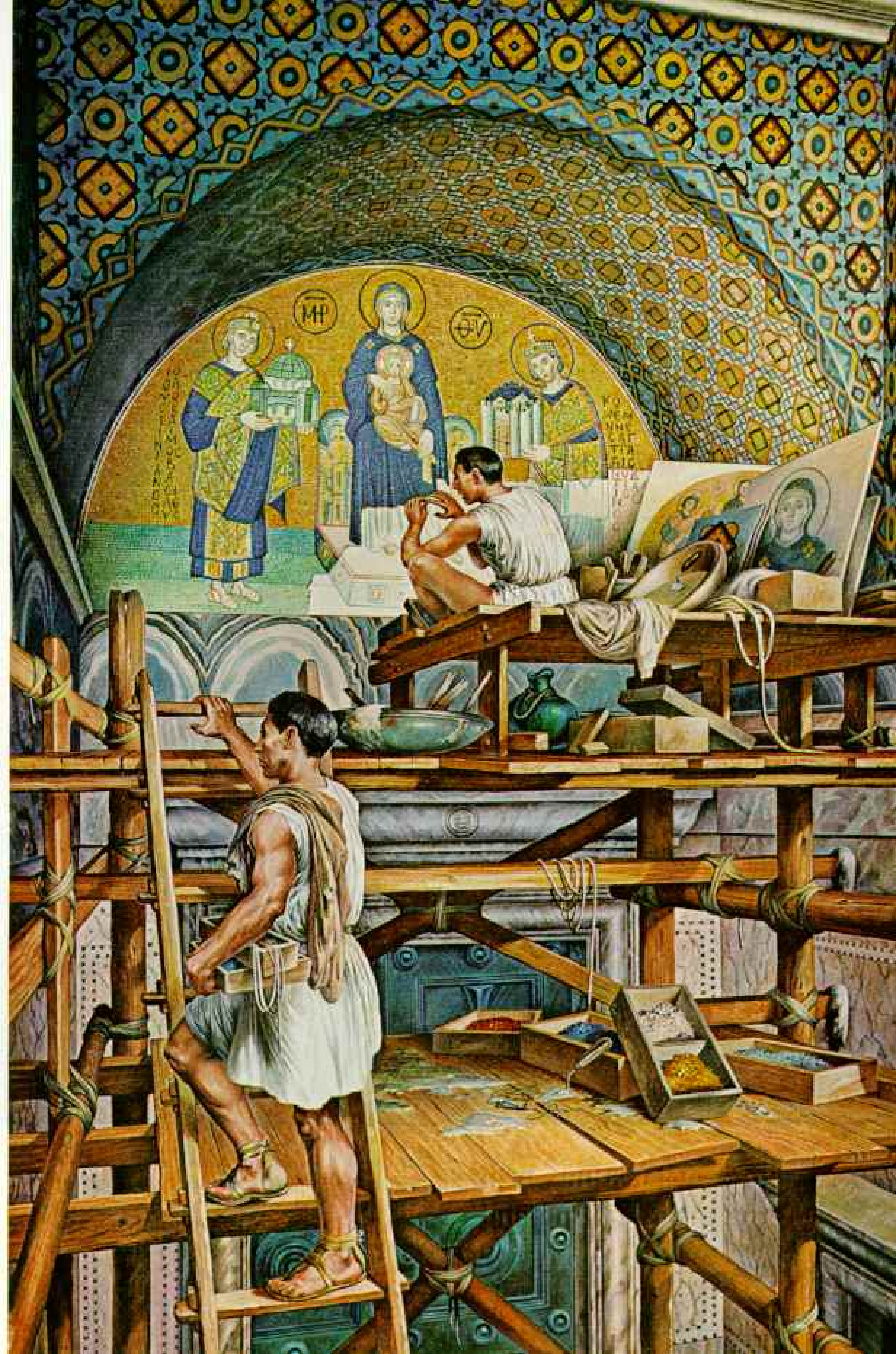
Today the work holds the admiring gaze of visitors (lower left) in Hagia Sophia Museum, the former church.

In 1204 the Fourth Crusaders looted the church's treasures. Two and a half centuries later conquering Ottoman Turks chained and enslaved the throngs that crowded into Hagia Sophia for refuge. Sparing the church, they made it Islam's largest mosque.

Because of the Koranic injunction against graven images, Turks plastered over the Christian symbols on the walls.

Mosaics in Hagia Sophia reappeared briefly in 1847, when the sultan ordered the edifice repaired, but they quickly vanished again.

In 1934 Kemal Ataturk, founder of the Turkish Republic, converted the mosque into a museum and shared its mosaics with the world. Cleared of plaster, the mural's intense colors today shine above marble panels naturally grained in the shape of arches.



Victory at Hastings brings Norman rule to England

NORMAN HORSEMAN against Anglo-Saxon foot soldier; lance against spear, sword, bow, and club; armor against leather. The place is Hastings, a crossroads in Sussex; the time, October 14, 1066, a date every English-speaking schoolboy is compelled to memorize, whether or not he grasps its profound effect upon his manners, speech, and law.

Through the spring and summer of 1066,

PAINTING BY BIRNEY LETTICK © NATIONAL GEOGRAPHIC SOCIETY

William, Duke of Normandy and descendant of Norsemen, prepared for the conquest of England. Kinsmen, friends, and vassals contributed ships; knights rallied to William's cause from France and even the Norman states of Sicily and Southern Italy. Pope Alexander II sent a banner in token of support.

William claimed England by right of inheritance from his childless cousin Edward the Confessor. But the Witan, the English assembly of nobles and royal advisers, disregarded the Norman by presenting the crown to Harold Godwinson, Earl of Wessex.

As the summer ended, Harold Hardrada,

Ruins of Battle Abbey crown Senlac Hill, where Normans subdued Anglo-Saxons in the Battle of Hastings. Here, in fulfillment of a vow, William the Conqueror erected a monastery to commemorate his victory. Visiting students examine the remains of an 11th-century church believed erected on the spot where King Harold perished. Battle Abbey School for girls occupies the former Abbot's House at right.

Legend in linen, the Bayeux Tapestry documents the story of the Norman Conquest of England, ending with Harold's defeat and death at Hastings. Scenes portray Norman knights and English soldiers engaging in mortal combat; Saxons defending a hillock; and Bishop Odo (third from right) brandishing a mace to rally the Normans. Actually an embroidery, not a tapestry, this famous treasure is believed to date from the late 11th century. Travelers see it still intact at Bayeux, France.

King of Norway, thrust into Yorkshire and captured the city of York. The English Harold raced north from London to meet him.

On September 25 the English surprised the invaders at Stamford Bridge on the Derwent River. Anglo-Saxon soldiery routed the Norwegians, Hardrada fell dead with an arrow through the throat, and King Harold scored the final, stunning victory in the 300-year contest between Norsemen and English.

On September 28, Duke William landed unopposed at Pevensey on the Sussex coast. The news reached Harold three days later at York. Promptly he gathered his tired, battered army and marched south. In a week he covered the 200 miles to London.

Meanwhile William had advanced to Hastings, whence he could strike in several directions. To his knights the invasion had one overriding purpose: to dispossess the English and divide their holdings.

Harold, marching south from London, chose the site for the battle—the ridge of Senlac (Sandlake), some eight miles from Hastings. His sturdy soldiers occupied it on the evening of October 13. As the armies drew up in battle array, each side numbered some seven thousand men.

Next day William's troops, their heavy equipment clattering, charged uphill into the wall of shields presented by the English. The stout defense held them back.

Late in the afternoon the Norman knights twice feigned retreat to draw the embattled English down from the ridge. Each time they wheeled and cut down their pursuers.

Birney Lettick's painting captures one of these climactic moments. Atop Senlac, the Golden Dragon banner of Wessex and the Standard of the Fighting Man—Harold's pennants—snap defiantly. The core of his troops maintain the shield wall. On the right, Anglo-Saxon warriors who unwisely chased the enemy fight for their lives. The view looks northeast, with Telham Hill off to the right.

At length, King Harold fell wounded, and four Norman knights thundered in to administer the *coup de grâce*. One of the world's most famous battles had been decided and the course of English history had been forever altered.

Language Reflects Norman Heritage

William introduced Norman feudalism into England. His followers so influenced the English language that many of our modern words derive from Norman French.

Today when the cry "Oyez, oyez" sounds through a court of law in the United States, it echoes the Battle of Hastings. For *oyez* stems from the Norman word *oir*, to hear. A plaintiff instituting an action to recover goods must plead in trover—meaning "find" in old French—or in replevin, meaning "pledge." "Justice," "defendant," "jury," "sue," and "accuse" are all French derivatives.

A number of our terms dealing with government, such as "liberty," "parliament," and "authority," crossed the Channel with the Normans.

Western mercenaries join Constantinople's army

BANNERS FLYING, dispossessed Englishmen and disgruntled Norsemen offer their services to the Byzantine Empire. The time is the 1080's.

Beneath a canopy signifying authority, the emissary of Emperor Alexius I welcomes recruits for the imperial bodyguard, the Varangians, at a rendezvous on the Asian shore of the Bosporus. With sails up, ships stand ready to transport the company to Constantinople.

Englishmen driven into exile by William the Conqueror welcomed the chance to fight again. As the chronicler Ordericus Vitalis records, "The English were much distressed by their loss of liberty.... A number of them, with the fresh bloom of youth upon them, went to distant lands...."

At the time of our painting, the Varangian, or Northern, Guard was about a hundred years old. At first the Emperor recruited Varangians from the Scandinavian forces in Russia, later from French Normandy and the Norman states of Southern Italy and Sicily. After 1066 the Varangians came especially from England, refugee warriors from the Conqueror's victory.

Travelers could hear English spoken in the streets of Constantinople. In the 11th century thousands of Western pilgrims made

PAINTING BY ANDRÉ DURENCEAU © NATIONAL GEOGRAPHIC SOCIETY

Runic inscription on a marble lion in Venice attests the presence of Norsemen in Byzantine Athens. Scandinavian soldiers carved the runes on a Greek work that guarded Piraeus, the city's harbor. Centuries later, Venetians, at war with the Turks in Greece, took the lion home. In the same campaign (1687-88), they shelled the Parthenon, where the Turks had stored gunpowder, severely damaging that architectural gem of the ages.

Paint makes some of the runes more visible (lower picture). Scholars generally agree that the time-worn inscription defies a comprehensible reading.

KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON © N.G.S.

their way to the Holy Land. We know of some sixscore pilgrimages to the East; they form a prelude to the Crusades which began at the end of the century. Many wayfarers paused in Constantinople.

When a pilgrim from Canterbury visited the Byzantine capital about 1090 on his return from Jerusalem, he found "some Englishmen, friends of his, members of the imperial household."

Though declining, Constantinople still reflected glory. Villehardouin, a leader of the Fourth Crusade (1203-4), marveled at "so rich a city . . . high walls and strong towers . . . rich palaces and mighty churches . . . the height and length of that city which above all others was supreme."

Normans take a census for the Domesday Book

HOLDING A SCROLL, the sheriff stands in the square of an English town and testifies regarding the wealth of his shire. A monk, who uses a wagon as a desk, records the sheriff's statements.

Barons and clerks of the royal commission cluster in shade at the left and occasionally refresh themselves with the food and drink on the table. A mounted knight upholds the

PAINTING BY BIRNEY LETTICK © NATIONAL GEOGRAPHIC SOCIETY

King's peace. Market-bound, an oxcart rumbles past an old Saxon tower. Tin from Cornwall, well known to the ancients, roofs the church on the right. Behind the sheriff other witnesses wait to testify.

William the Conqueror is gathering material for the kingdom-wide survey of property that within a century will become known as the Domesday, or Doomsday, Book because it seemed as complete a record as would be kept for the Last Judgment.

After Hastings, English cities capitulated one by one. On Christmas Day, 1066, the victorious Duke of Normandy received the

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Domesday Book, King William's tax inventory, details England's economic resources at the time of the Norman Conquest. For material on early England, historians and others still consult the great book, now nearly 900 years old. Dr. Neville Williams, Assistant Keeper of Public Records, displays parchment pages of the original copy in the Public Record Office at London.

"**King William** holds Windsor in demesne," reads the Domesday Book in Latin (opposite, top of column 2). "King Edward held it." Thus the Norman proclaimed a fief in Berkshire as crown property. Its storied castle, which survives as England's oldest royal residence, inspired the name adopted in 1917 by the House of Windsor.

crown of England in Westminster Abbey.

True to his commitment to the adventurous knights who followed him across the Channel, William parceled out among them the offices and lands of the former Anglo-Saxon lords.

By 1072 the King had beaten down the last of his English enemies. Thenceforward a network of castles garrisoned by Norman fighting men kept the peace, while the Norman nobility and clergy reshaped English life.

Inquest Paves Way for Taxation

On a midwinter day in 1085, William wore his crown at Gloucester. It was a solemn occasion. After "deep speech with his wise men," he decided to hold an inquest of all England.

William's predecessors had levied a land tax called the Danegeld, named for the Danes who had settled in England from the middle of the ninth century.

As a basis for his own land tax, William sought an assessment of the extent and value of every estate in the kingdom. Jealous of his prerogatives, he wanted to know if any of his Norman nobles had occupied land reserved for the King.

In the following year barons, legates, and justices streamed across England to collect the information. Royal commissioners held inquests, or investigations, in the courts of the chief towns of the shires. Barons and others gave testimony as to the land and animals in their possession.

The commissioners summoned jurors from every hundred, or township, to give verdicts, or statements of truth, concerning the hundred. From every village came villeins to render their own verdicts on the estates that bordered or encompassed their villages.

"So minutely did [William] cause the survey to be made," according to one medieval chronicler, "that there was not one hide nor yard of land, nor even . . . was there an ox, cow, or swine that was not set down in the writ."

A witness has left us an account of a Domes-

day Inquest. Investigating the holdings of the Abbey of Ely in Cambridgeshire, the royal commissioners proceeded thus:

"The King's barons inquired by the oath of the sheriff of the shire and of all the barons and of their Frenchmen and of the whole hundred, the priest, reeve, and six villeins of every vill, how the manse is called, who held it in the time of King Edward [before 1066], who holds it now, how many hides [theoretically 120 acres of arable land], how many plough teams ... how many villeins, how many cottagers, how many serfs, how many freeholders ... how much wood, how much meadow, how much pasture, how many mills, how many fisheries. ..."

Scribes organized the assembled material, reduced it, and entered the data concerning each shire in a separate quire or section. Some years later, the separate quires were bound together in two bulky volumes, the Domesday Book. These volumes still exist, giving us an incomparable source and a marvelous picture of 11th-century England—one that is complete almost to the last animal.

William had only a year to live after the Inquest was finished. While riding through the burning ruins of Mantes, a French town he had attacked, he was thrown against the pommel of his saddle and injured internally. He died early in September, 1087.

King's Right to a Grave Challenged

William's entourage prepared to bury him in St. Stephen's, an abbey church that he himself had built at Caen. In the midst of the funeral ceremony, a certain Ascelin vociferously laid claim to the abbey's land—William had taken it from him by force—and challenged the clergy's right to bury the Conqueror on the property. When inquiry corroborated Ascelin's claim, the clergy promptly purchased the land and proceeded with William's funeral.

"All marvelled," wrote Master Wace the chronicler, "that this great king, who had conquered so much and won so many cities and so many fine castles, could not call so much land his own as his body might lie in after his death." THE END

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OUR CHANGING Atlantic Coastline

By NATHANIEL T. KENNEY
National Geographic Senior Staff

Illustrations by
B. ANTHONY STEWART
National Geographic Chief Photographer

IT WAS midafternoon on March 7, 1962. Flying home from Italy, I looked down from my jet at Long Island's shore.

A row of houses stood in breaking surf. To my horror, one suddenly disintegrated and became a tangle of jetsam cast high on the shore.

At Idlewild airport a customs man told me, "You've had a view of the Atlantic seaboard's worst winter storm in maybe half a century."

It was never even named, this storm. It was a freak.

It struck almost unheralded. It lasted four days. It caused havoc I doubt could be repaired for half a billion dollars. It killed 40 people.

HARVEY CEDARS was all but wiped out. It stood —and is now being rebuilt—on a strip of sand off the New Jersey coast called Long Beach Island.

You see it below in its agony. A shroud of salt water covers what was a pleasant summer resort. A few beach homes stand, saved by their foundations of long pilings.

Helicopters flew residents out, but seven could not be saved. Three of these, one a heroic chief of

police, set out to seek missing families. Waves like those on the beach below overwhelmed them.

The camera angle greatly foreshortens these breakers. Witnesses estimated that they towered *twenty* feet high.

THE GREAT SEAS battered harmlessly against New England's rocks. Spent when they reached Florida's sands, they did relatively little damage there. They vented their worst violence between Montauk Point, at the eastern tip of Long Island, and Ocracoke Island, on the Outer Banks of North Carolina. The changes they made in the shore in four days would have taken a century of ordinary storms.

The man who bought television star Dave Garroway's house at Westhampton Beach, Long Island, on March 6 set out to see his new property. He couldn't find the house. And he never did.

On Chincoteague Island, Virginia, my old friend Orville Quillen looked out the bedroom window of his house on Main Street. "Hand me the broom," he said to his wife. "I'll fend off these boats before they knock the wall down."

When the retaining wall in front of George Vakos's Virginia Beach motel collapsed, he sent out word he'd pay $25 for any old automobile delivered to the motel parking lot. A score of battered wrecks arrived. George bulldozed them into the breached wall; his quick thinking saved the motel.

Mayor Hugh Cropper, Jr., of Ocean City, Maryland, sloshed out to inspect the resort's three-mile-long boardwalk. The boardwalk was gone, every plank of it.

The colossal wooden elephant at Margate City, just south of Atlantic City, New Jersey, into which you may climb for a small fee, lost its concrete toenails.

At Cape Hatteras National Seashore Recreational Area, North Carolina, the ocean cut off the new comfort stations from the camp-

ground at Oregon Inlet, leaving them surrounded by deep water.

There was one consolation: If the storm had struck in holiday season, the death toll would have been far greater. But almost no one had insurance for property loss. Fire and wind coverage, yes—but this was wave damage, and the companies, if they write this at all, must charge almost prohibitive fees.

Harvey Cedars, New Jersey, Falls Apart in the Great Storm of March, 1962

Swirling, bitter-cold waters carried away more than half the 500-odd homes of the Long Beach Island resort. In the top photograph, taken at the tempest's height, oceanfront cottages float into Barnegat Bay (foreground). View below, from same vantage point, surveys the desolation days later. Only one house survives. (See also pages 860-61).

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Stripped of Its Walls, a House Sags to the Sands in Stricken Harvey Cedars

Battering storm forced more than a thousand islanders to flee from their homes. Many returned to find their dwellings had disappeared completely. "I watched houses crumple to their knees like men who had been dealt stunning blows," an eyewitness wrote. "Then they slowly disintegrated and yielded their contents to the waves' greedy fingers."

A FREAK STORM, I noted earlier. What made it so?

To start with, the United States Weather Bureau explains, a pair of weak storm centers joined forces to make a single big storm. North Atlantic storms normally move northeastward, but this whirling giant of last March didn't.

It paused, instead, off the Middle Atlantic coast, in just the right spot to vent its fury landward. Then it took an erratic jog to the southeast and lashed the shore south of the Mason-Dixon line as well.

The storm's position gave it a 1,000-mile "fetch," as weathermen describe the distance over which a wind can sweep unimpeded in a single direction. Winds that begin to build waves so far at sea can pile up a lot of water before reaching shore, and that water will invade a lot of places where no water should ever be found.

That is what happened last March.

The winds themselves did little direct damage—another freak aspect. Only a short distance inland, away from the reach of the bruising waves, the effects of the storm were almost negligible.

Finally, the storm struck at precisely that period in the 28-day lunar cycle when the gravitational forces of sun and moon are pulling together to produce the highest tides of the month.

So there it was—"the great Atlantic storm of 1962," persistent, thorough, relentless.

THE OCEANS never cease sculpturing the land. In a storm they work harder, but no matter what the weather, the labor goes on.

Where the medium is hard rock, change is infinitely slow. It can take centuries to smash a cliff, and centuries more to grind the pieces to sand. That is one reason why the granite coast of Maine has so few sandy beaches.

Where the land is soft, as from Long Island to the Florida Keys, the Atlantic can carve with dramatic speed. Overnight a storm can undermine and topple a cliff of clay, shift a sandspit, build a reef, carve a new inlet through a barrier island (page 876).

Man must know the shape of the shore on which he dwells. In the United States the Coast and Geodetic Survey records the vital statistics on maps and charts.*

Before-and-after pictures on the following pages show the magnitude of the task the Survey faced after the March storm. Every change you see in the air photographs had to be mapped with all possible speed, lest boats be wrecked on new reefs and counties levy real estate taxes on parcels of ocean.

Rear Adm. H. Arnold Karo, Director of the Survey, created a 300-man task force while the winds still raged. He ordered out every available survey ship. His staff of aerial

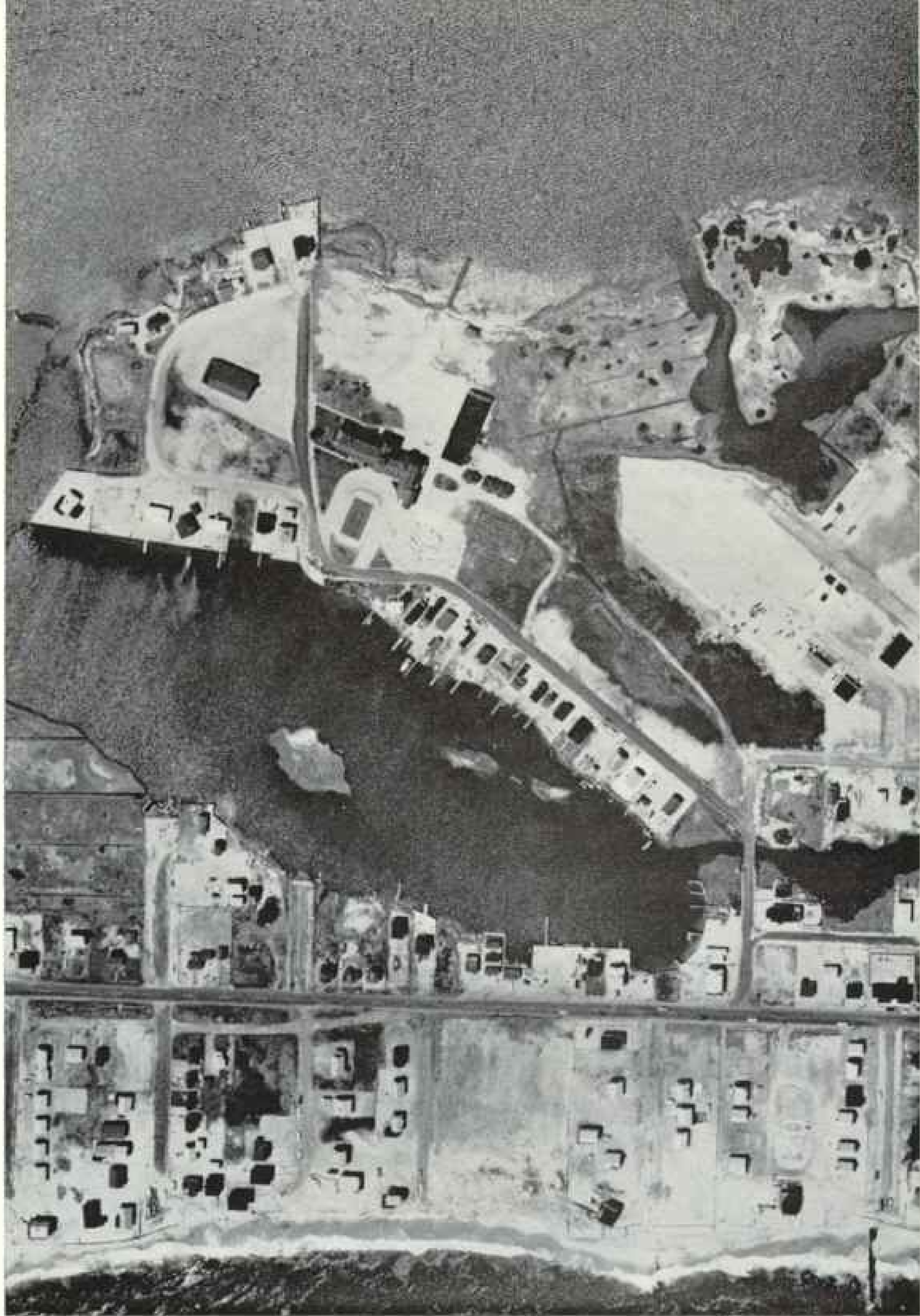
(Continued on page 873)

*See "Charting Our Sea and Air Lanes," by Stuart E. Jones, NATIONAL GEOGRAPHIC, February, 1957.

Visitors to Fire Island Improvise a House of Table, Chairs, Wall, and Clock

Fire Island forms a barrier beach that parallels and protects a long stretch of Long Island, New York. As wild and beautiful as the sea that steadily encroaches, the island has no roads; residents and their guests must come and go by boat. After the storm, furniture littered the sand. Cottagers consigned worthless debris to bonfires.

KODACHROMES BY NATIONAL GEOGRAPHIC CHIEF PHOTOGRAPHER B. ANTHONY STEWART © N.G.S.



AERO SERVICE CORPORATION

Aerial view shows Harvey Cedars before the storm. Generations of vacationers summered in the clustered cottages, fished and boated in placid Barnegat Bay (top), and bathed in the frothing Atlantic (below). Oceanside boulevard links Beach Haven Heights (13 miles to left) and Barnegat Light (up island to right).

NEXT PAGE FOLDS OUT

AERO SERVICE CORPORATION

No match for the raging gale, the community crumbles as ten-foot waves link ocean and bay, cutting wide, deep gashes in the sandspit. Survivors huddle in homes on high ground, living on bread and milk flown in by helicopters. Water and sand obscure Long Beach Boulevard.

KODACHROME BY NATIONAL GEOGRAPHIC CHIEF PHOTOGRAPHER B. ANTHONY STEWART © N.G.S.

Only 7 of 53 cottages still stand between sea and highway, graphic evidence of the staggering loss. Shaking off the shock, residents bulldozed away waist-deep sand, burned debris, and cleared the road. Here, three months later, the resort opens to summer visitors as usual. Arrow points to red house shown on pages 860-63.

Long Beach Island before the storm

Seventeen days after the disaster

High tide blots out shoals visible above at ebb.

Crashing seas had cut a new channel to the bay, but workmen filled it before this photograph was made.

Marshes lie under a blanket of storm-swept sand.

The gale's force beached U.S.S. *Monssen*, a moth-balled destroyer under tow.

Mobile homes from a trailer park form a jumble like boxcars after a train wreck.

The southernmost three miles of the 18-mile-long island show in this three-page foldout. Scale: One inch equals 1,000 feet.

U. S. DEPARTMENT OF COMMERCE, COAST AND GEODETIC SURVEY

More sand smothers marshes well back from the ocean front.

Sand chokes neatly squared corners of two marinas.

Breakers clawed ocean highway, and a segment collapsed.

Sea's furious assault ate away 25 to 50 feet of shore.

House for sail! Wind and tide pushed homes to sea and clams to shore. This Westhampton Beach cottage drifted forlornly into Moriches Bay on Long Island's Atlantic side. Boatman in foreground gathers a basketful of clams from the sea floor.

Clams cobble the shore of Brigantine, New Jersey, where wrecked homes and motels strew the beach. Rampaging seas from Cape Cod to Cape Hatteras cast clams ashore by the millions; shifting sand buried oyster beds.

MIKE BLIZZARD

photographers were flying as soon as the skies cleared, and his cartographers were waiting for the pictures.

By mid-April the Survey had published the last of 27 emergency chartlets covering the storm-swept coast. It is now correcting the standard maps and charts. In the spring of 1963 it will go back for another look.

"So soon?" I asked.

"The sea is a perfectionist," said Admiral Karo. "Work done in haste it often does over.

"Besides, didn't you just say the sea takes no holidays? The Survey is one agency that can never work itself out of a job."

FOR THE MOST PART, wild creatures that live where sea meets shore took the March storm in stride, as they take all storms.

At first it appeared that the famous wild ponies of Assateague and Chincoteague Islands would surely perish. Massive waves bombarded these offshore islands of Maryland and Virginia for four days. Yet somehow more than half the animals managed to scrabble to high, safe ground.

The channel bass and bluefish showed up as usual off the Outer Banks of North Carolina, when the time came for them to show up. Where the bottom had changed under the storm's fury, the fish moved to new feeding grounds. Fishermen had only to learn the new places (page 886).

The United States Fish and Wildlife Service's Pea Island National Wildlife Refuge on the Outer Banks is the nesting ground for seven species of herons and egrets. The birds flew north from the Gulf of Mexico as usual, and where they found their old rookery damaged, they simply built next door.

The March storm, in the final analysis, mattered greatly only to humans. If we had agreed, as the wild creatures do, to the sea's terms for coexistence, we would have suffered no more than they.

Misty Not Only Survives; She Presents a New Foal to Her Owners

On wind-swept Chincoteague and Assateague Islands off the Virginia and Maryland coasts, more than a hundred wild ponies died in the storm. When floodwaters rose, the Ralph Beebes of Chincoteague moved Misty from her stable into their kitchen. A few days later she gave birth to her third foal. Appropriately, the bay-and-white filly was named Stormy. Sixteen-year-old Misty is the heroine of a children's book and a movie.

Mystery shrouds the origin of the ponies. One legend contends the animals descend from Arabian horses that swam ashore from a wrecked Spanish galleon; another says they stem from a herd owned by pirates.

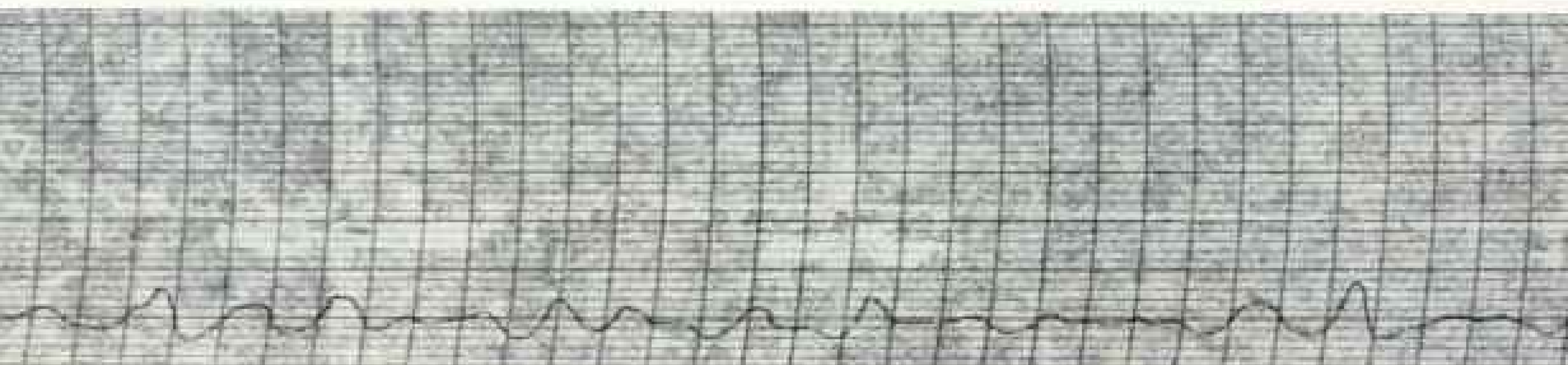
KODACHROME BY NATIONAL GEOGRAPHIC CHIEF PHOTOGRAPHER B. ANTHONY STEWART © N.G.S.

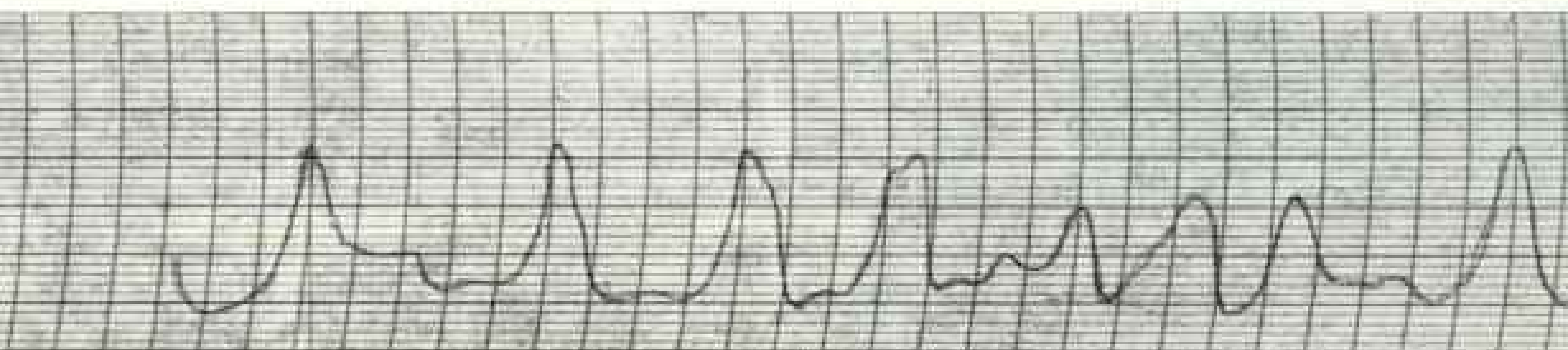
ATLANTIC CITY, New Jersey, on an island of sand, has learned to respect the sea that endlessly threatens it. For half a century it has studied the ways of the waves and how to placate them.

"Let these new resorts build right in the breakers and come apart when the first big storm hits," said City Engineer George Swinton. "We never move a bucket of sand until we're sure the sea won't take it as an insult and seek revenge. So, in the March storm, we had bad damage only to the north, on the Absecon Inlet end of the island."

Builders of Atlantic City's two great piers extending into the sea accepted the risk of trespassing on the waves. Million Dollar Pier got away with it in March. Steel Pier, which has a permanent General Motors automobile exhibition at the landward end and a trained horse that dives into a tank at the other, took

Steel Pier loses midsection and tip to the waves. Pier owners repaired the damage in 16 weeks. Aerial at right shows pier and Atlantic City before the storm.





KODACHROME (TOP) BY NATIONAL GEOGRAPHIC PHOTOGRAPHER DEAN CONGER © N.G.S.

Wave gauge registers swells (top) that normally lap the Steel Pier and (below) eight-foot breakers of the growing storm on March 6. As seas increased, the U. S. Army Corps of Engineers gauge washed away; no official record exists of the waves' maximum height.

a drubbing, but by midsummer it had been rebuilt larger than ever.

Atlantic City has spent some $1,300,000 for protection against the ocean over the past 12 years. State and Federal Governments matched the resort's own outlay.

It is reasonable overhead. Eight million visitors come each year to stroll the famous Boardwalk, which was built initially to keep them from tracking sand into the hotels, and each year they leave $700,000,000 behind. City officials claim they have played host to more conventions than any other city on earth. Most colorful event of the year is the contest to select a Miss America.

Not only at Atlantic City has man learned to live with the sea. Jones Beach, part of the

(Continued on page 879)

Storm-born Inlet Slices Hatteras Island; State Engineers Quickly Bridged the Cut

Atlantic breakers smashing across the sands into Pamlico Sound (right) created the breakthrough. The new bridge already carries traffic toward the distant lighthouse.

At left, beyond the bridge, sand begins to bury a now-useless segment of the storm-cut highway.

Angler in waders unhooks a bluefish plucked from the surf near the mouth of the new inlet.

Cape Hatteras Light, tallest in the Nation, flashes 193 feet above the sea and warns ships against treacherous Diamond Shoals, "Graveyard of the Atlantic." Dashed lines to the north mark the new channel.

KODACHROMES BY FRANC SHOR (BELOW) AND B. ANTHONY STEWART © N.G.S.

New York State Park system, on Long Island, is another resort that knows how to survive the worst the Atlantic can throw at it.

Robert Moses, fiery President of the Long Island State Park Commission, years ago piled sand 15 feet high from Jones Inlet to Captree State Park, put a hard road on top, and then planted beach grass and shrubs on the slopes to keep it in place.

"It cost a lot of money," he said. "Proper beach stabilization is complex, expensive, and controversial. But Jones Beach got mostly spray in March. A major ocean breakthrough there is almost impossible."

If you are not in a tearing hurry for protection, you can put up ordinary snow fence, and the winds will build dunes by piling sand at the fence line. When the fence is covered, more fence on top of the new dune will build the sand still higher.

Dunes built this way by the Civilian Conservation Corps in the thirties held back the sea on Hatteras Island. The rows nearest the Atlantic gave way before the storm, especially where people had thoughtlessly trampled the beach grass to death, but a second line of defense back from the shore saved the land behind it.

Snow Fences and Beach Grass Help Nature Build Protective Dunes

Without this maze of fencing, Long Beach Island would have suffered even more severely. In six Middle Atlantic states some $30,000,000 in Federal aid is being spent in the wake of the storm, about half of it for the shaping of dunes.

Bulldozers and scrapers raise a barrier to protect ocean highway at Dewey Beach, Delaware. As floodwaters subsided, this scene was repeated at countless points. Bulldozers worked around the clock to clear lots and level torn beaches.

KODACHROMES BY B. ANTHONY STEWART © N.G.S.

Buried to the eaves, this beachside house once sheltered a fisherman's family. Creeping inland, the sea of sand engulfed the village of Wash Woods, North Carolina.

Smothered by shifting sands but bared by the March storm, cypress stumps stud the beach at False Cape, Virginia. Encroaching Atlantic ages ago drowned a swamp where the big trees stood.

About 20,000 years ago, the great glaciers began to retreat from northern earth. Swelled by the ice melt, the seas rose all over the world, invading the land in what scientists call the Flandrian transgression.

Thus, for all practical purposes, our eastern seaboard is drowned coast, and the Atlantic, still rising as glaciers melt in Greenland and the Antarctic, continues to encroach on the land. It especially dislikes offshore islands and barrier sands and pushes them steadily into coastal lagoons, like Barnegat Bay and Pamlico Sound.

Not 100 years ago the people of Wash Woods lived quietly on the narrow land between Currituck Sound and the Atlantic, south of the Virginia-North Carolina border. Gradually they moved away. As they left, the sea and its allies, the sands and the winds, slowly buried their homes and filled in their soundside harbor. Now wild hogs live under their deserted church, and fox grapes strangle the lichened gravestones.

At Wash Woods I remembered the words of a distinguished U. S. Army Engineer: "If the sea really wants it, the sea will take it."

Modified tobacco planter furrows the shore of Bodie Island, North Carolina. Sprouts of beach grass fed into blowing sand will take root and encourage dune building.

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

KODACHROMES BY JAMES H. [illegible] (ABOVE) AND B. ANTHONY STEWART © N.G.S.

Artificial Beaches Help Engineers Guard Shores

To study wave action, the U.S. Army Corps of Engineers uses a series of tanks at its Beach Erosion Test Grounds, Washington, D.C.

Earthmovers first build a beach in a 635-foot, 1½-million-gallon tank (left). Then six-foot waves are sent crashing onto the sands (below). To create these breakers, the bulkhead at far end slaps the water every 6.5 seconds.

Jet-type vacuum cleaner in the hands of Sherry Myers, Jr., sucks up drifted sand that waves have borne from hopper at upper right to trough in foreground. By weighing the sand, technicians determine the amount moved by waves. Green dye and stopwatch enable Robert P. Stafford to measure speed of water movement. The men work in a tank resembling a giant wading pool.

KODACHROME BY NATIONAL GEOGRAPHIC CHIEF PHOTOGRAPHER B. ANTHONY STEWART © N.G.S.

THE CORPS OF ENGINEERS of the United States Army has the never-ending job of guarding our coasts against the seas.

With stone, timber, and concrete it builds sea walls and jetties. With bulldozers and hydraulic dredges it makes beaches and dunes; then it grasses them against erosion.

Before it can build, it must know where and how to build. Its Beach Erosion Board has an extensive laboratory off MacArthur Boulevard in Washington, D. C.; the accompanying photographs show some of the lab's testing tanks.

Until I spent a day there, I did not understand how complex a thing the action of sea on shore could be.

The sea is one of earth's most powerful forces, matched only by winds and earthquakes and running inland waters. It is whimsical—building one day, destroying its own handiwork the next. It can be brutal, it can be exceedingly subtle, but it can never be still.

It will move fine sand a certain distance in a given time. Mix in clay or pebbles, and the rate and extent of movement change. A host of other variables add their effects—sea-bottom contours, which help determine the shapes of waves; the waves themselves, their speed, size, angle of attack upon the shore; the tides; coastal currents. Even the chemical content of sea water, which affects its ability to dissolve earth materials, makes a difference.

To build wisely, the Corps of Engineers must first identify every force at work on the scene, then know what it can do. Its specialists find few universal formulas.

They try many different ideas and materials. I saw a man placing strange concrete objects with protruding arms into a tank.

"Those arms cause the objects to lock together like children's playing jacks when waves tumble them," he explained. "They tend to stay put in a jetty or breakwater where stones of equal weight would be rolled away."

The Corps has also investigated many other unusual defense methods, such as lines of flexible rafts anchored offshore to calm waves; nature's own inshore rafts of matted weed and kelp; and even underwater pipes laid near vulnerable shores to release strong hydraulic jets or clouds of air bubbles when wind and storm threaten, thus breaking up severe wave action.

Battered boardwalk takes shape again at Rehoboth Beach, Delaware. Pilings and a few cross timbers weathered the storm, but planks washed away. Seaside cottages and motels were shattered.

Rebuilt Rehoboth shows scarcely a scar four months after its ordeal. Engineers trucked tons of sand from inland sources to level and widen the eroded beach, here bright with umbrellas.

PRESIDENT KENNEDY on March 9 proclaimed storm-mauled coastal points in New Jersey, Delaware, Maryland, and Virginia to be disaster areas. Later he added New York and North Carolina. The declaration made Federal funds for rebuilding storm damage available through the Office of Emergency Planning, the former Office of Civil and Defense Mobilization.

The President acted swiftly, but thousands of first-aid workers, of course, had been in the field for three days.

Coast Guard, Army, Navy, Marines, Air Force, Red Cross, National Guard, Civil Defense, local police, fire and health departments, public utility crews, even yachtsmen and skin divers worked together to succor storm victims. Helicopters plucked hundreds from the waters. Military amphibious vehicles found their noblest use.

The Engineers began rebuilding beaches and dunes. The job's immensity precluded finished work: The Corps could only build bulwarks that would protect against the worst storm the coast could expect in an average ten-year period. Communities and private owners would have to continue the work.

The Congress enacted a law allowing storm victims to deduct their losses from their 1961 income taxes. (Ordinarily they would have had to wait a year.) And the Federal Small Business Administration, which had already helped many merchants set up businesses in the beach areas, made emergency loans for the rehabilitation of their stores.

It was one of those small business loans, by the way, that cost my fishing partner Worth Britt of Nags Head, North Carolina, his bed. Seems you couldn't get a loan for a store in which everything wasn't for sale. Worth, who lives in his gift and furniture shop, dutifully put price tags on his own things. Somebody bought his bed.

Worth was still getting used to a new bed when Stewart Udall, Secretary of the Interior, suggested that now might be the time for governments on every level to take over for public recreational use those beaches that the March storm had proved to be too perilous for permanent occupation.

The response to Mr. Udall's idea was immediate. Local governments began checking land deeds to plot likely properties. Although little land went immediately under govern-

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Spin rigs slap the surf as anglers cast into a school of bluefish coursing through

mental wings, acquisition proceedings were begun in many places, and the chances were good that there would soon be more public beaches along a coast now largely in private ownership.

Dozens of communities passed beach protection laws. In such places it became illegal to improve the view by leveling a dune or killing the binding grass on its sides.

THE SEA, of course, can also be kind to humans. Fishermen know the good that lies at its edge. The lady in the army surplus camouflage coat above will never forget this moment. The fish on her line is the first she ever caught. Tony Stewart, who took the picture, asked her name.

"Stop asking silly questions and look at my beautiful, beautiful fish," she said.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

the new inlet on Hatteras Island. Mists of early May shroud the ever-restless Atlantic

IT IS SUMMER as I write this. The Atlantic Ocean surges peacefully upon the shore. On the sands of the Outer Banks, the voice of the sea, one of the oldest on earth, is a soporific whisper. Against New England's rocks the voice is deep, a bass without present menace.

March 5, 6, 7, and 8 seem long ago.

"After each storm," said Robert Moses, "people get religion and announce that they are ready for taxation and the long look ahead for their children's children.

"A few months later, the backsliding begins, and the ultimate solution yields to petty expedients on the same old shifting sands."

Maybe this time it is different. Maybe people will heed the March storm's warning. I hope so. It can't be much fun swimming out of your bedroom window. THE END

YOUR SOCIETY'S PRESIDENT REPORTS

A Year of Widening Horizons

From the sea floor to Everest, from book publishing to television, new projects enlarge the scope of National Geographic services

"**Here is *The White House*,**" says Dr. Melville Bell Grosvenor (left), the Society's President and Editor, as he presents first copies of a new guidebook to Presi-

A NATIONAL GEOGRAPHIC Society public service project may start in a laboratory, a jungle, or even under the sea. This year we embarked on one beneath a sparkling chandelier in the Oval Drawing Room of the White House.

The time was January, 1962. A few weeks earlier Mrs. John F. Kennedy had organized the White House Historical Association, a nonprofit organization "to enhance understanding, appreciation, and enjoyment of the Executive Mansion." One objective was to produce a guidebook to the White House. It would have to be accurate, well illustrated in color—and inexpensive.

The Executive Mansion had never had such a book in its 162-year history. But with more than a million people visiting the White House annually, one was obviously needed.

Mrs. Kennedy had enjoyed the White House article published in NATIONAL GEOGRAPHIC for January, 1961, the month her husband took office. Now the Historical Association had asked the National Geographic Society to lend its photographic and editorial skills to produce the White House book.

It was a challenge, and I was immediately enthusiastic. But the idea had to be considered in the light of the Society's other activities, for 1962 promised by all odds to be the busiest and most productive year in our history. We were working on scores of new major

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER THOMAS NEBBIA © N.G.S.

dent John F. Kennedy, Dr. David E. Finley, Chairman of the Board of Directors, White House Historical Association, and Mrs. Kennedy in the White House Conference Room. The book, illustrated and edited by the Society as a public service, is the first comprehensive guide to the President's House.

articles for your NATIONAL GEOGRAPHIC. Financial grants for scientific programs through the Committee for Research and Exploration doubled those of any preceding year. We were hard at work on an extraordinary new World Atlas to be published in the spring of 1963.

Moreover, the magazine itself was setting a record for number of pages with illustrations in color—a total of 1,644 this year, the most editorial color ever used by a magazine.

Plans also were afoot for publishing the weekly National Geographic *School Bulletin* in color. Designed to bring geographic news to pupils of the third to seventh grades,

the *Bulletin* had been a 12-page leaflet in black and white. Expanded to 16 pages, it is now lavishly illustrated by color photographs; its stories of people and places around the world are written in words children understand. The $2 yearly subscription falls far short of costs. Your Society makes up the difference with an educational subsidy of more than $100,000 a year.

And this was not all. We had half a dozen books of our own in preparation, including two volumes offered to members in 1962.

Could we, considering all this, take on another major publishing venture? I took the White House book plan to the Society's Board of Trustees, and they unanimously authorized participation as a public service.

And that is how a few of us from the magazine staff came to be sitting with Mrs. Kennedy and distinguished members of the Association in the White House that January day.

"We want the best guide possible," Mrs. Kennedy told us, "accurate, colorful, and informative." The 132-page publication, we agreed, should be profusely illustrated, chiefly with new color pictures taken by National Geographic Society photographers. When I showed Mrs. Kennedy some tentative layouts, she paused at one photograph.

"Perhaps we could flop it," said Mrs. Kennedy, using a newspaper term for reversing a picture. Her training as a reporter-photographer, combined with her intimate knowledge of the White House, made Jacqueline Kennedy a highly qualified editor-in-chief of the guidebook.

Photographers Bates Littlehales and George F. Mobley of our staff took hundreds of color pictures of White House grounds, rooms, paintings, art objects, and furniture. Illustrations Editors Robert L. Breeden and Donald Crump designed layouts; Dee J. Andella supervised the making of color engravings, the cost of which was assumed by the Society. The Editorial Research staff under Miss Margaret Bledsoe carefully checked accuracy of the text, which was written by Mrs. John N. Pearce of the White House staff. In over-all charge was Senior Assistant Editor Franc Shor.

[illegible] BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON © N.G.S.

Atop a fire ladder, National Geographic photographer George F. Mobley captures a rarely glimpsed view of the White House. His photograph (opposite) adorns the guide's cover. Beyond the roof, the picture takes in the Washington Monument, Jefferson Memorial, Tidal Basin, and distant Potomac.

THE White House

After almost six months of work, the book was ready, and on June 28 we assembled at the White House at the invitation of President Kennedy.

Dr. David E. Finley, Chairman of the Board of the White House Historical Association, joined me in presenting the first copies to Mrs. Kennedy and the President.

"The excellent photographs . . . as well as the format of the book itself," Dr. Finley said, "have been most generously contributed as a public service by the National Geographic Society. We are deeply grateful to them. . . .

"We hope that all who visit the White House and who read about it in this book will have a better understanding of the beauty and the contents of this great house and the part that it has played in the history of our country." *

In presenting copies to the First Family, I remarked that the book was "a tribute to you, Mrs. Kennedy. Every line, every picture, reflects your own personal attention. The happy results represent your desire to bring to the public the story of our great heritage, the President's House. . . .

"Here is *The White House*," I concluded, "a token of appreciation and thanks to you from the three million members of the National Geographic Society and from all Americans, for your work in this project."

President Kennedy's response was warm and gratifying: "I want to express our thanks to the National Geographic for the work that they have done, and to members of the staff.

"I am grateful to all of those who participated in a very important public service. . . . And I also want to express my warmest congratulations and appreciation to my wife."

*The guide may be ordered from the nonprofit White House Historical Association, 718 Jackson Place, N.W., Washington 6, D.C. Price: $1.25, including postage and handling. Income from sales will be used to publish other materials about the White House and to acquire historic furnishings for the Executive Mansion.

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER WINFIELD PARKS

"An extraordinary document," says the President as he and his wife leaf through their presentation copies. "A beautiful book."

EKTACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER THOMAS NEBBIA © N.G.S.

Often, when we talk about such public service projects and our various grants to scientists and explorers, members ask me, "Who gives these funds?"

My answer is always the same: "*You* do." The Society is self-endowed by the modest dues each member pays annually, plus the proceeds from the sale of National Geographic maps, globes, and books.

Speaking of books, the idea for our new *Men, Ships, and the Sea* was born in an unusual but appropriate way. It began one day

Pilgrims to the White House queue up on South Executive Avenue. In 1961 the stately mansion for the first time attracted more than a million people, opening its doors to 1,322,279. This year's millionth visitor arrived on July 26; by mid-September, last year's total had already been exceeded.

"**All Creation** going to the White House," Robert Cruikshank subtitled this print, which appears in the new guide. Throngs celebrating Andrew Jackson's 1829 inauguration converge on the South Portico.

Writer Alan Villiers Spins a Salty Tale of Adventure

The author of *Men, Ships, and the Sea* conns the ketch *Tectona* off Cornwall. In this latest Geographic book, Australian-born Captain Villiers reviews maritime history from the first rafts.

Loaded with tea, *Taeping* and *Ariel* sprint side by side. Leaving China together in 1866, the clippers arrived off England three months later only minutes apart. Montague Dawson's painting opens the chapter "The Quest for Speed," in *Men, Ships, and the Sea.*

KODACHROME BY MELVILLE BELL GROSVENOR © N.G.S.

To illustrate *Men, Ships, and the Sea*, Book Service editor Merle Severy (standing) and book designer Howard Paine examined a hundred thousand pictures and chose 440 of the finest. For material, they searched marine collections of more than 20 countries.

in mid-Atlantic some thirty years ago when a steamer overtook a square-rigged windjammer and passengers hurried to the rails to view the rare and stirring sight. One of the passengers was my father, Dr. Gilbert H. Grosvenor, who served for 55 years as Editor of the magazine and is now Chairman of the Board of Trustees. He took several pictures of the square-rigger and noted the vessel's name, *Grace Harwar*.

Later, through Lloyd's Register, my father located the windjammer and learned that a gifted young sailor had just completed an exciting 138-day voyage aboard her. The young seaman summed it up this way:

"... One of us was killed; a second went out of his mind; a third went overboard. We were short of food and the ship leaked. We tried to make for Cape Town in distress and could not. We saw black albatrosses and endured indescribable suffering off the Horn in the dead of winter."

Clearly, this Australian—Alan Villiers was his name—had the gusto and talent to share his salty adventures with readers. His first article, "Rounding the Horn in a Windjammer," appeared in the February, 1931, NATIONAL GEOGRAPHIC.

As a young member of the editorial staff, I was thrilled by this story—as I have been by the 16 Villiers tales that followed. From my father, I had inherited a love of the sea. I had spent every summer of my life on the water. As a midshipman at the U. S. Naval Academy, I had studied the influence of sea power on world history.

Alan Villiers often visited the Society's offices, and I came to regard him as friend as well as hero. I always wanted to sail with him, and two years ago the chance came. I

In *Men, Ships, and the Sea*, you will relive seagoing history, sail across new frontiers, fight great battles, see civilizations change. Order through National Geographic Society, Dept. 54, Washington 6, D. C. Enclose $9.85, or you may request later billing.

Pin-pointing flagged markers, glaciologist Alfred W. Stuart of Ohio State University peers through a theodolite to compute movements in Antarctica's vast Ross Ice Shelf. Scientific findings gathered around the world are incorporated into National Geographic maps.

King-sized corkscrew enables members of the Society-sponsored Michigan State University expedition, led by Dr. Maynard Miller, to probe an Alaskan glacier for ice samples (left). The Society also supported the Tarr-Martin expeditions to Alaska in 1909-11, a pioneering effort in the science of glaciology.

Squinting in the Himalayan sun, Barry C. Bishop of the National Geographic staff photographs and maps the Mingbo Valley in Nepal. Mr. Bishop and Dr. Miller will represent the Society in next year's assault on Everest by an American team of climbers and scientists.

joined him aboard the ketch *Tectona* for a cruise off the Cornish coast of England.

To the music of the sea we talked ships—about all the seven seas, about ship design, the voyages of explorers, and great naval battles. While studying the landfalls of the Cornish coast, we dreamed of a book—one that would embody the romance of geography as seen through the eyes of great sailors.

Two months ago that dream became a handsome 436-page reality. Alan Villiers is a chief contributor—both as an author and as a sailor who helped to plan its rich contents. So *Men, Ships, and the Sea* exists today because of a chance rendezvous in mid-Atlantic some thirty years ago.

The Society's Book Service began in 1954 with one editor and a part-time secretary. Since then, this service has acquired a substantial editorial staff; its volumes have sold more than 1,250,000 copies. But we employ not one salesman. Our publications are available only to members, subscribers, and friends who write or call at our headquarters. Yet each title has become a best seller.

In the nine months since publication, 125,000 members and friends have bought *America's Historylands*. This lavish volume represents a new concept in presenting history. All the great historical shrines of the United States are here, but instead of being rigidly grouped by location or date, they are placed in the epoch or movement of which they are symbols.

Harvard professor of history Dr. Frank Freidel wrote us: "I have never seen such a sumptuously illustrated, excitingly designed book in the field of American history."

Both for the books and for the magazine, our paper cost has been materially reduced by new equipment and methods employed by the Society's supplier, the Oxford Paper Company. At the same time, our printers, R. R. Donnelley & Sons Company of Chicago, have improved the performance of our huge new presses, sharply reducing paper wastage. Result: To serve a greatly increased membership, we printed nearly 3½ million more copies of your magazine in 1962 than in 1961, yet paid about the same for paper.

America's Historylands ($11.95) and America's Wonderlands ($8.95) offer a unique panorama of the Nation's historic and scenic heritage. Order separately or boxed together at $19.50 from National Geographic Society, Dept. 54, Washington 6, D. C. Send payment, or ask to be billed later.

EKTACHROME BY ROBERT S. OAKES © N.G.S.

Original Geographic globe (right) inspires two sister spheres: its illuminated 12-inch twin and a 16-inch model. Chief Cartographer James M. Darley and assistant Wellman Chamberlin (left) compare scales.

Globes may be ordered only from National Geographic Society, Dept. 54, Washington 6, D. C. Illuminated 12-inch globe, $23.50; new 16-inch globe, $36.95, or request brochure describing time-payment plans.

EKTACHROME (ABOVE) BY DEAN CONGER FOR NASA AND KODACHROME BY OTIS IMBODEN, NATIONAL GEOGRAPHIC STAFF © N.G.S.

EKTACHROME BY BILL TAUB, NASA

National Geographic Men Win Awards in Covering War and Space Flights

From the helicopter at left, Staff Photographer Dean Conger's camera recorded the recovery of Astronaut Alan B. Shepard, Jr., from the sea, May 5, 1961. At lower left, Conger—on loan to NASA—congratulates Shepard (left) on his feat. Conger's photographs won him the title of "Magazine Photographer of the Year."

Street scene in war-torn Vientiane, Laos, helped Assistant Illustrations Editor W. E. Garrett (opposite, lower) win prime honors for "magazine picture story, news."

Science writer Kenneth F. Weaver (below right) rides the truck that is starting John Glenn's historic capsule on its return trip from Grand Turk Island to Cape Canaveral. His "Countdown for Space" (May, 1961, GEOGRAPHIC) won the Aviation/Space Writers' top award for magazine articles.

EKTACHROME BY W. E. GARRETT, NATIONAL GEOGRAPHIC STAFF © N.G.S.

EKTACHROME BY [illegible]

Such savings have enabled the Society, for the fifth successive year, to avoid an increase in dues, despite generally rising prices. These efficiencies also created new opportunities to broaden our work. Thus our Committee for Research and Exploration was able to approve more grants to scientists and explorers—totaling hundreds of thousands of dollars—than ever before.

How do these grants advance knowledge? Off Turkey, archeologists dive to wrecked ships that have lain untouched since ancient times. In the Mediterranean, engineers test undersea chambers for enabling explorers and scientists to live and work on the ocean floor for days and even weeks.

Other current expeditions of the Society study meteorites in Australia, creatures of the coral reefs off Florida, insects in Southeast Asia, grizzly bears in Yellowstone National Park, chimpanzees in Tanganyika, and ospreys in Connecticut. They seek the story of early man in Africa, Wyoming, Colorado, and New Mexico; of primitive peoples in New Guinea and Brazil; of Biblical archeology in Jerusalem, and of a lost chapter of Egyptian history at Gebel Adda, in Nubia.

Members can take real pride in these and other current projects, all made possible by the modest dues they pay.

75th Anniversary Coming

Even larger plans lie ahead for 1963, your Society's Diamond Anniversary year. In next month's issue, Executive Vice President and Secretary Melvin M. Payne will tell the story of the Society's world-wide explorations and researches—two hundred expeditions since the Society was founded in 1888.

One important event of our anniversary year will be the publication of the *National Geographic Atlas of the World*, the ambitious project begun with issuance of the first Atlas Map in 1958.

Members have received seven of these maps a year, and thousands have built up their own "do-it-yourself" atlas in the popular Atlas Folio. But during this time the world itself has been changing enormously. Since 1958, some 25 countries in Africa, Asia, Oceania, and the West Indies have become independent. And scientists have learned so much about Antarctica that our cartographers have included 90 descriptive notes on the Society's Atlas Map of that continent to appear in February, 1963.

Next spring, when the World Atlas is complete, we will offer our members the most

accurate, detailed, and timely volume of its kind ever produced.

During 1963, too, we will be exploring the possibilities of another great new service. We are planning a series of television programs to tell stories of exploration, of distant places and people—in short, the personalized geography long familiar to our members through the magazine and books. In charge of this challenging project is an outstanding young television producer-director, Robert C. Doyle, who came to us after distinguished service with the American and National Broadcasting Companies.

The Society plans to start its television project as a public service, financing all production expenses to ensure complete editorial control. Later we hope selected sponsors

EKTACHROME BY ROBERT S. OAKES, NATIONAL GEOGRAPHIC STAFF © N.G.S.

The Society's Monumental New Headquarters in Washington, D. C., Attains Its Full Ten-story Stature

Designed by famed architect Edward Durell Stone, the building will consolidate many National Geographic services. The structure will house editorial and business offices, the latest in cartographic facilities and photographic laboratories, and an enlarged Explorers Hall, open to the public.

The distinctive roof forms a concrete canopy cantilevered out 11 feet on all sides, because, says Mr. Stone, "I like to have a hat on my buildings." Besides lending shade, the overhang will create shadow patterns by day and a glowing rim by night. Present headquarters (far left) will continue in use.

will defray some production costs, just as advertisers pay some expenses of magazine production and thus help keep members' dues low.

Speaking of that, I'd like to thank you for your generous support of our summer remittance program. More than half the membership paid 1963's dues last July, August, and September. This enables us to spread the work load throughout the year, substantially reducing clerical and accounting costs. This is a big factor in keeping the dues down.

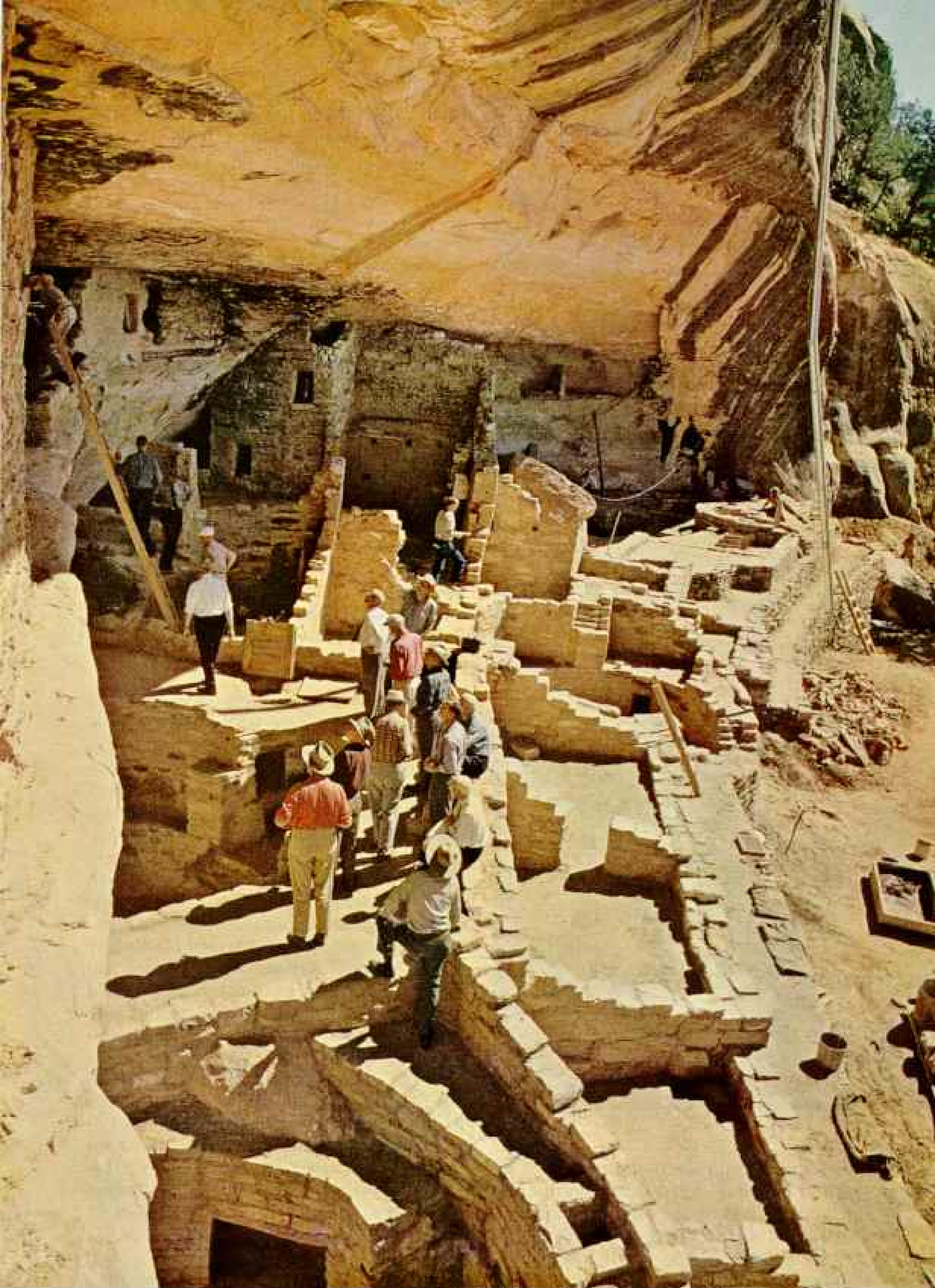
In the past year, many of our staff members have won new recognition. Kenneth F. Weaver of the magazine's Senior Editorial Staff received the 1962 magazine writing award of the Aviation/Space Writers Association for his article, "Countdown for Space," in the May, 1961, NATIONAL GEOGRAPHIC.

Staff Photographer Loaned to NASA

Another staff man and prize winner who has focused on the Nation's space program, Dean Conger, was named "Magazine Photographer of the Year" in the annual contest sponsored by the University of Missouri School of Journalism, the National Press Photographers Association, and the World Book Encyclopedia. Mr. Conger also won first prize in the general news category. You have seen his photographs of space recoveries not only in the GEOGRAPHIC but also in other publications, for your Society has loaned Mr. Conger to the National Aeronautics and Space Administration to assure a comprehensive record of its historic flights. His NASA pictures are available to any accredited publication—another public service by your Society.

In the same photographic contest, Assistant Illustrations Editor W. E. Garrett placed first in the category of "magazine picture story, news" for his coverage of troubled Laos in the August, 1961, magazine. Other GEOGRAPHIC photographers cited were Robert B. Goodman, Bates Littlehales, Robert F. Sisson, B. Anthony Stewart, John E. Fletcher, and Volkmar Wentzel.

This year we had an unusual request from the U. S. Department of Defense. To ensure a better-informed public, U. S. servicemen on duty with NATO forces needed expert train-



KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ALBERT MOLDVAY © N.G.S.

Stone-and-adobe cliff dwellings survive in Wetherill Mesa, Colorado, a site being studied and preserved as a National Geographic-United States National Park Service project. Members of the Society's Committee for Research and Exploration visit Mug House, built by Indians seven centuries ago.

Inquisitive chimpanzee from the Washington, D.C., Zoo makes friends with Dr. Leonard Carmichael, Chairman of the Society's Committee for Research and Exploration, and British scientist Jane Goodall. With support from the Society, Miss Goodall studies Tanganyika chimpanzees in the wild.

KODACHROME BY B. ANTHONY STEWART AND JOHN E. FLETCHER © N.G.S.

To show how earliest man used stone tools, Dr. L. S. B. Leakey (left) disjoints a carcass at Olduvai Gorge, Tanganyika, with a chopper he fashioned from stone.

Arrangement of stones excavated in a gravel bed suggests Olduvai men erected a shelter two million years ago. Mary Leakey shows the discovery to Dr. Thomas W. McKnew, Vice Chairman of the Society's Board of Trustees. For their 30 years of work in "revolutionizing knowledge of prehistory," the Leakeys were jointly awarded the Society's coveted Hubbard Medal.

KODACHROMES BY DAVID S. BOYER (BELOW) AND ROBERT F. SISSON, NATIONAL GEOGRAPHIC STAFF

6,000 members and guests applaud Hubbard Medal winner John H. Glenn, Jr.

A STANDING OVATION greets the first American to orbit the earth. Colonel Glenn appears on the rostrum of the Washington, D. C., National Guard Armory on April 9, 1962. There Vice President Lyndon B. Johnson presented him the 21st Hubbard Medal awarded by the National Geographic Society: "For extraordinary contributions to scientific knowledge of the world and beyond as a pioneer in exploring the ocean of space."

Colonel Glenn (opposite, below) also accepted a life membership in the Society.

Beaming with pride, Annie Glenn received a bronze replica of her husband's medal.

Fiery Atlas carries Colonel Glenn's Mercury capsule aloft from Cape Canaveral, Florida, on February 20, 1962. As the missile burned away its fuel load, the astronaut reported, the nose of the thin-skinned rocket oscillated, giving "the sensation of being out on the end of a springboard."

NATIONAL GEOGRAPHIC PHOTOGRAPHER ALBERT MOLDVAY © N.G.S.

ing in civilian press and television techniques. The Society shared the talents of its Director of Photography, James M. Godbold, who directed three photographic seminars and one "workshop" in London, Madrid, and two West German cities; some 200 servicemen attended.

Hubbard Medal Honors Exploits in Space and Prehistory

The Hubbard Medal, highest honor given by the Society for research and exploration, was first awarded in 1906 to dauntless Arctic explorer Robert E. Peary, who reached the North Pole three years later. The medal has been presented only 21 times; two of these awards were made during the year for achievements of far-reaching significance.

The first went to Dr. and Mrs. L. S. B. Leakey of Nairobi, Kenya, "for revolutionizing knowledge of prehistory by unearthing fossils of earliest man and giant animals in East Africa." Before the Leakeys' findings, the earliest known fossils of man were those of Peking and Java man, some 500,000 years old. In 1959 the Leakeys startled the world of science with their discovery of *Zinjanthropus*, or East African man, in strata considerably older. University of California geologists, using the new potassium-argon method of dating, later assigned these remains an age of 1,750,000 years.

Working under grants from the Society's Committee for Research and Exploration, Dr. and Mrs. Leakey have since found even older fossil remains of a child, and teeth of a hominoid, new to science, that lived 14 million years ago.

Chief Justice of the United States Earl Warren represented the Society's Board of Trustees in presenting the medal to this remarkable husband-wife team at Constitution Hall in Washington on March 23, 1962.

The second Hubbard Medal award of the year was made on the Society's behalf by Vice President Lyndon B. Johnson. Before an audience of 6,000 Society members and guests, at the National Guard Armory in Washington, on April 9, 1962, the

KODACHROME (ABOVE) BY B. ANTHONY STEWART AND EKTACHROME BY ROBERT S. OAKES, NATIONAL GEOGRAPHIC STAFF © N.G.S.

Vice President bestowed the award on Lt. Col. John H. Glenn, Jr., first United States astronaut to orbit the earth. The citation read: "For extraordinary contributions to scientific knowledge of the world and beyond as a pioneer in exploring the ocean of space."

Vice President Johnson himself was honored by the Society. On June 8, 1962, he received the Jane Smith Award and a life membership "in recognition of his contributions to geography through his far-ranging travels and untiring efforts to bring the peoples of the world closer together."

You share the achievements—and the adventures—of National Geographic Society award winners. You participate as a member of this Society, as a sponsor of its expeditions, and as a reader of its world-renowned journal. By renewing your own membership and by recommending friends, you, too, help to bring the peoples of the world closer together. During 1963, we shall continue our efforts to warrant and reward your loyal help.

Melville Bell Grosvenor

Vice President Johnson Accepts the Society's Jane Smith Award

Dr. Grosvenor (center) presented the Smith Award (below), especially struck for the Vice President in recognition of his contributions to geography. Conrad Wirth (left), National Park Service Director and a National Geographic Trustee, inscribes a copy of the Society's best-selling *America's Historylands* for the Vice President.

NATIONAL GEOGRAPHIC *Society*

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National Geographic Magazine

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The National Geographic Society is chartered in Washington, D. C., in accordance with the laws of the United States, as a nonprofit scientific and educational organization for increasing and diffusing geographic knowledge and promoting research and exploration.

The Society has conducted more than 200 expeditions and scientific projects. It disseminates knowledge to millions through its world-famous National Geographic, its 21 million color maps a year, its books, monographs, bulletins for schools, its information service for press, radio, and television.

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COVER: *Cruise ship* Empress of Canada *steams past El Morro fortress in San Juan Bay, Puerto Rico (page 792).*

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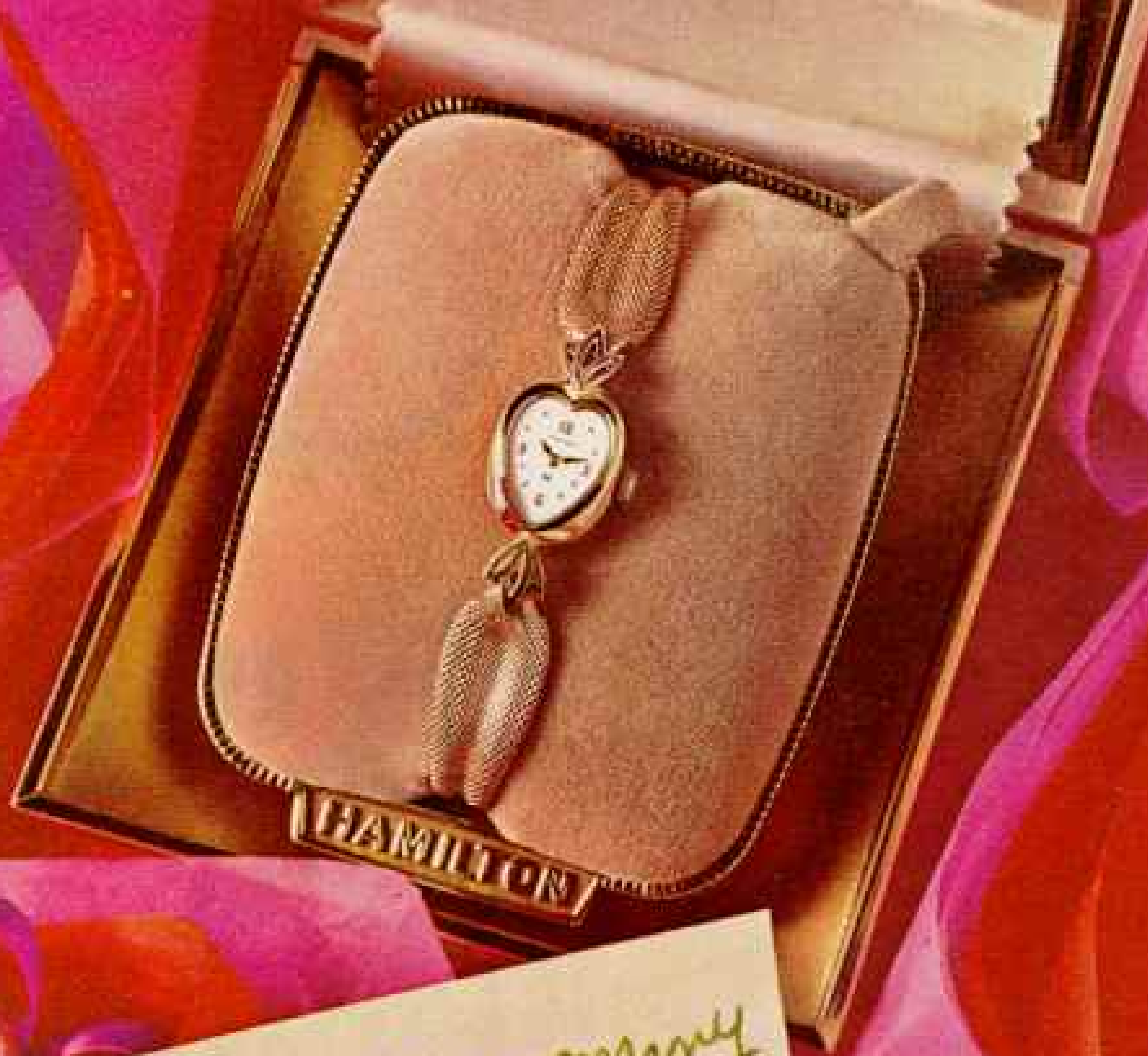

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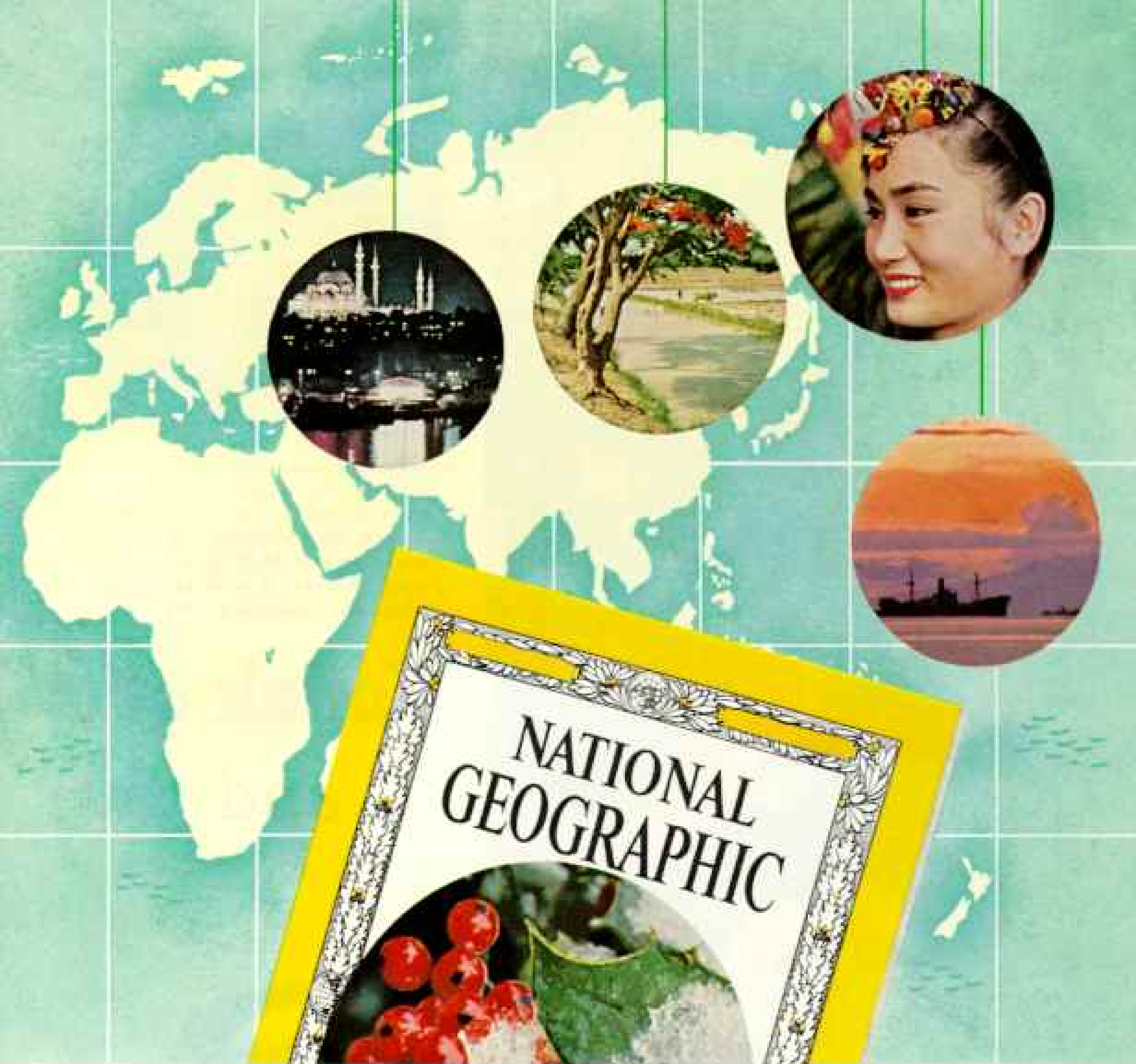

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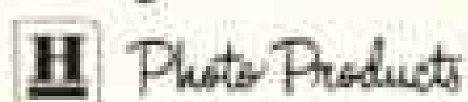

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What you *see* will be impressive, too. The presence of such firms as Parke-Davis, Union Carbide, International Paper, U.S. Rubber, and Shell Oil is solid proof that U.S. industry now considers this Commonwealth a long term, permanent manufacturing site. U. S. plants are opening in Puerto Rico at the rate of two a week.

If you are a manufacturer, you should have more information about Puerto Rico when you plan your trip. Write and tell us about your firm and your particular product. We'll send you information on the specific advantages Puerto Rico offers your industry.

If you would care to let us know when you are coming, we'll have one of our industrial representatives meet you at the airport and show you what Puerto Rico offers you as a manufacturer.

Write to the Commonwealth of Puerto Rico, Dept. NG, 666 Fifth Avenue, New York 19, N.Y.

Simple fact:

The water of the Bahamas is the clearest in the world.

This photograph was taken off Nassau. To do it the photographer had to build a special glass-windowed underwater box.

Take another look at the picture.

The transparency and colouring of this sea is something you will never forget.

Swim in it. Water ski on it. Loll on the beach and look at it.

Pop in a boat and explore. There are, altogether, seven hundred big and little islands down here.

The sand is like talcum powder. The palms are tremendous. Wildly coloured tropical flowers are everywhere.

The hotels are smart, in a leisurely way. The Bahamian people are gay and warmly hospitable.

Plot now. Figure on this winter. Count on your Travel Agent to make your escape look easy. Or write Dept. YX, Bahamas Development Board, 608 First National Bank Bldg., Miami 32.

Nassau AND THE Bahamas

BY SEA: Seven-day cruises (two days and a night in Nassau) from $170. The M.S. Italia sailing from New York every Saturday at 4:00 P.M. The S.S. Queen Frederica sailing from New York January 18, 25, February 1, 8 at 9:00 P.M. and from Boston February 16, 23 at 5:00 P.M. Home Lines, 42 Broadway, New York 4.

Three-day, all-expense cruises (two days and a night in Nassau) from $54. The S.S. Bahama Star sailing from Miami every Monday and Friday at 5:00 P.M. Eastern Steamship Corp., Miami 1.

BY AIR: Direct, daily flights from New York (2½ hours), Miami (50 minutes) and other principal Florida cities. Direct service from Toronto and Montreal.

UNRETOUCHED PHOTOGRAPH BY BURT GLINN

15 DAYS IN EUROPE NEXT SUMMER ONLY $649

INCLUDING AIRFARE!

Now BOAC offers you really magnificent European tour bargains for the Summer. You can choose an Independent Tour, an escorted Val-U-Tour, or a wonderful air-sea tour.

If you think these prices are low, you'll find BOAC off-season tour prices even lower. So if you plan to tour Europe before March 31st, enquire about our off-season tours. Read about these three typical BOAC tour bargains, then send in the coupon for full details.

Escorted Val-U-Tour: *the "Premier" 15-day tour for only $649.00* takes you to England, Belgium, West Germany, Austria, Switzerland and France. The new, low price of $649 includes everything—your round-trip fare, on a Rolls-Royce 707 jet, all transfers, cross-Channel steamship fares, travel by luxurious motor coach, hotel accommodations, all meals, sightseeing expenses and gratuities.

The Unescorted Gaelic tour: *17 days for only $766.00.* This tour takes you to London, Stratford for a Shakespeare performance, Chester, the mountains of North Wales, Dublin the West of Ireland, and Edinburgh. Your tour price covers your Economy Class Round-trip air fare, all other rail, coach, boat and air fares, all transfers, all sightseeing charges, hotel accommodations, all breakfasts except in London, all dinners and lunches on all-day trips.

The Wondertour: *29 days for only $924.00.* On this escorted tour, you'll spend 24 fascinating days in Europe, and five days aboard a luxurious Cunard "Queen." You travel one way by BOAC Rolls-Royce 707 Jetliner, the other way by "Queen." Your tour price covers your Round-trip sea/air fare, all hotel accommodations, transfers, sightseeing costs, breakfasts and selected lunches and dinners. This tour takes you to London, Amsterdam, Brussels, Cologne, Heidelberg, Innsbruck, Venice, Florence, Rome, along the Italian and French Rivieras—staying at La Spezi and Nice, Lyons and Paris.

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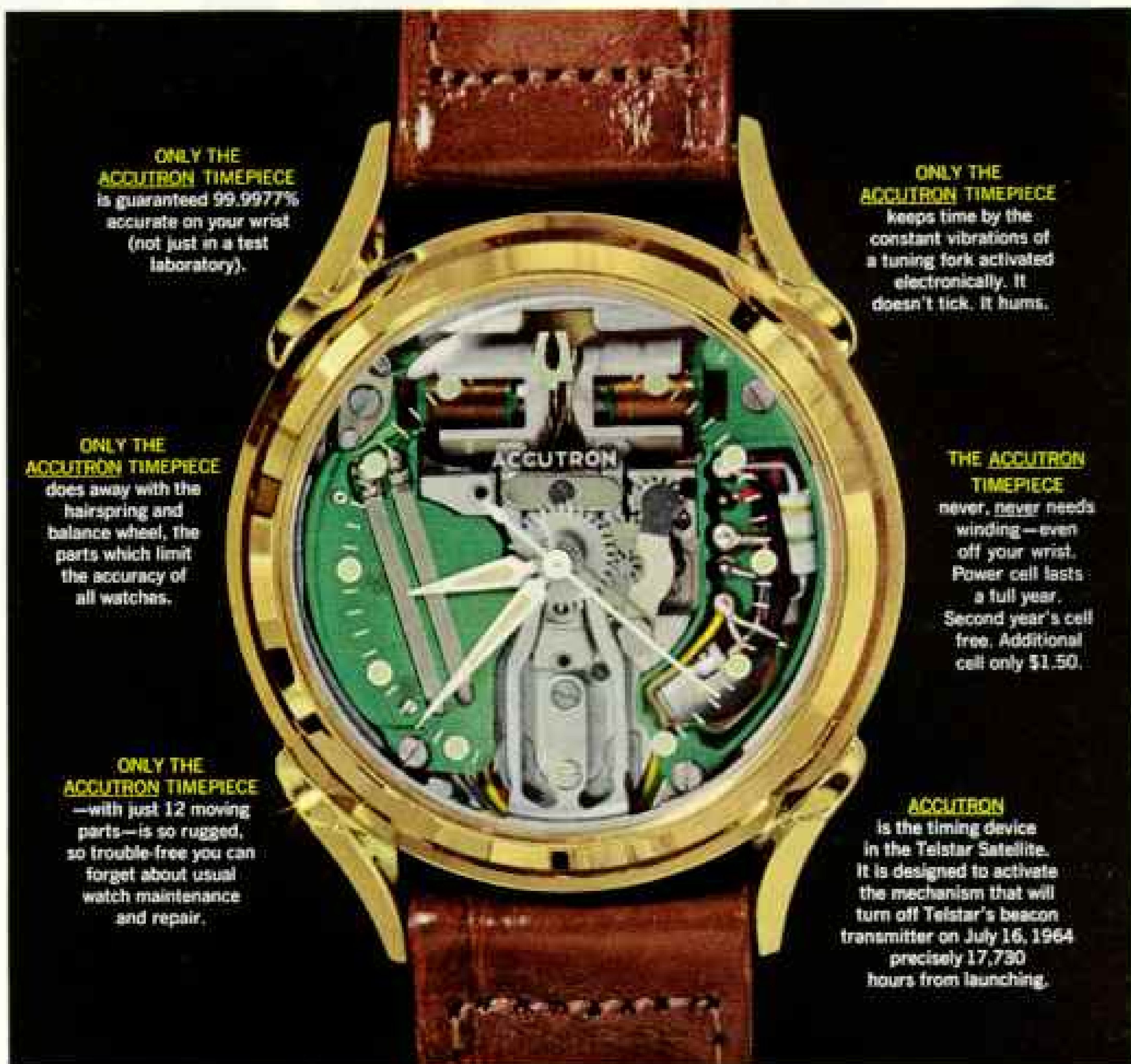
Why you should wear ACCUTRON† instead of a watch



Above: **ACCUTRON** "Spaceview" model. Unique transparent dial shows electronic tuning fork mechanism. 14-KT gold case. $250*

ACCUTRON† by BULOVA

The only timepiece guaranteed 99.9977% accurate on your wrist.

It makes the finest watches—even electric watches—obsolete.

Symbol of accuracy through electronics

ACCUTRON† is the registered trade mark of the Bulova Watch Co., Inc.

©1962 Bulova Watch Company, Inc., New York, Toronto, Bienne, Milan. *All prices plus tax—waterproof when case, crystal and crown are intact.

ACCUTRON "207" handsomely designed case, dial with raised, faceted characters. $150*

The ACCUTRON† timepiece is the first major advance in personal timekeeping in over 300 years

The ACCUTRON timepiece keeps time by a revolutionary new principle. A transistorized electronic circuit drives a miniature tuning fork that vibrates at a constant 360 times a second. Result? ACCUTRON is 99.9977% accurate on your wrist. It already has become the new world standard of accuracy. The ACCUTRON timepiece has been purchased by the U. S. Air Force for every pilot in the X-15 Project. It has been approved for use by major railroads. The ACCUTRON timepiece is available in many distinguished waterproof* and shock-resistant styles—all created by the world's leading designers. See ACCUTRON—most distinctive timepiece you can own, most unique gift you can give. From $125 to $2500.* For name of nearest ACCUTRON dealer and free booklet, write Bulova Watch Co., Inc., Dept. 1, 630 Fifth Ave., New York 20, N. Y. Don't you owe it to yourself to wear ACCUTRON instead of a watch?

THE ACCUTRON GUARANTEE OF ACCURACY!

Accutron is guaranteed by Bulova not to gain or lose more than one minute a month in actual daily use on your wrist. For one full year from date of purchase, the authorized jeweler from whom you purchased your Accutron timepiece will adjust it to this tolerance, if necessary, without charge.

ACCUTRON "221" uniquely styled case in brilliant, hand-lapped 14-KT gold. $275*

ARE YOU IN THE UPPER MIDDLE SOCIO-ECONOMIC LEVEL WITH 2.7 CHILDREN?

If you answer "Yes" to the above, you are in very good shape indeed. Discounting the fractional offspring (a defense mechanism of researchers), your family has been well blessed. By this time you have already earned a home, a car (or two), a power mower, and a life membership in the National Geographic Society. You have also earned a rest, specifically the new and exciting and joyous rest and relaxation which comes from playing a Conn Organ in your home.

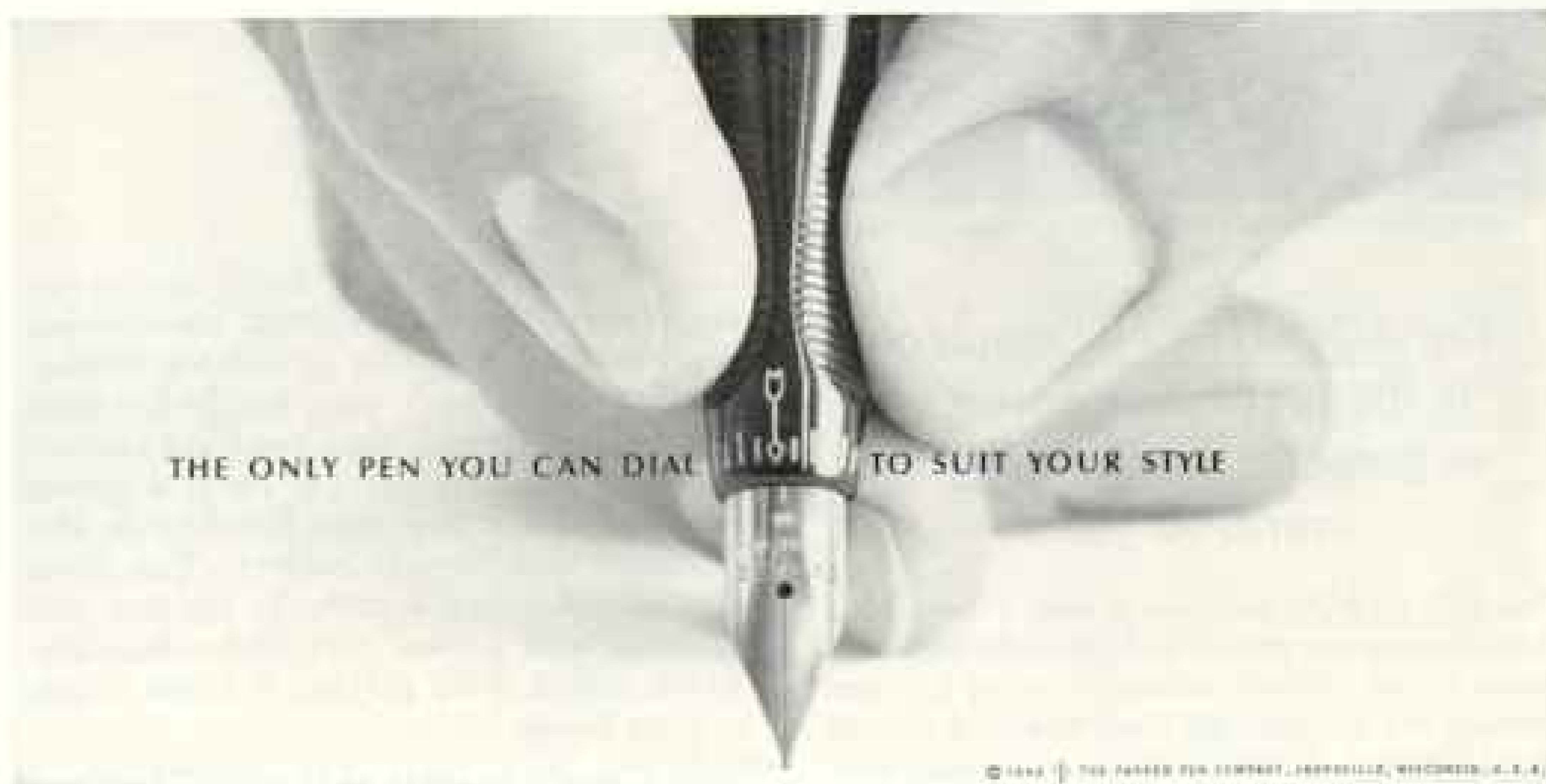
Conn's remarkable new "Instant Music" method of learning gets you off to a fast start and with the right techniques. No endless scales and exercises. If you know your alphabet from "A" to "G" you can play one of 39 popular songs in a matter of minutes. And you'll be playing with both keyboards, with exciting band effects, and with foot pedals, too.

You play *naturally*, with true human expression, the way a professional organist does. That's because the Conn is a professional-quality instrument. No lifeless push-buttons, no recorded gimmicks. The Conn is an instrument of vast musical versatility, created by C. G. Conn, Ltd., world's largest manufacturer of band instruments. No matter how skilled you become, you'll find it virtually impossible to exhaust the Conn's musical potentialities. You will never outgrow it, never tire of it.

There are seven beautifully-crafted models, with prices starting at $995. Your Conn dealer will be happy to arrange terms for anybody who is in the upper middle socio-economic level... with or without 2.7 children! *For helpful free booklet, "How to Choose an Organ," plus free "Caprice Capers" LP record, just write to Dept. NG-3, Conn Organ Corporation, Elkhart, Indiana.*

CONN ORGAN

ENTIRELY NEW IDEA IN FOUNTAIN PENS:



You can dial the point to fit your writing angle

Just in time for Christmas
An ideal gift for people who like to show off something really new to their friends . . . for people who are fussy about their penmanship . . . for southpaws who have to go into contortions to make an ordinary pen write smoothly for them.

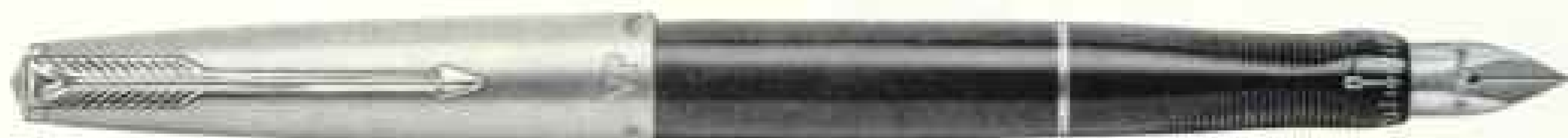
Here's how the new Parker VP works:
Pick it up and your fingertips automatically slip into a comfortable position, thanks to the gently contoured grip.

Dial the big, handsome, solid 14K gold point until the tip touches the paper at just the angle you want. Then you're all set to write with more ease and comfort than you ever thought possible. It's *that* simple.

The VP gives you a choice of 15 instantly replaceable points. They range from a *needle* point to an *extra-broad executive*.

To help take the guesswork out of picking the right point for yourself or a friend, your Parker franchised dealer has a little booklet entitled, appropriately enough, "How to pick the right point for a VP." Why not pick up your free copy tomorrow?

PARKER *Maker of the world's most wanted pens*



New Parker VP* – $10.00

*VERY PERSONAL

HOW TO MAKE THE FINEST CAR IN THE WORLD FINER

First, you must create the finest car in the world. We have: the timeless Continental. Then by constant refinement, we make the best car better each year.

For 1963, for instance, the Continental contains more leg room. And the luggage compartment offers even greater usable space. Major engine refinements, a new high turbulence piston design and new full range carburetion, provide superior acceleration for safer passing at freeway speeds.

This is the Lincoln Continental. Timeless in styling, thrilling in performance. And complete in luxury. It is the only American automobile considered one of the world's seven great cars.

It offered the first two-year or 24,000-mile total-car warranty of any automobile in America.*

LINCOLN CONTINENTAL

*Ford Motor Company warrants to its dealers, and its dealers, in turn, warrant to their Lincoln Continental owners as follows: That for 24 months or for 24,000 miles, whichever comes first, free replacement, including related labor, will be made by dealers, of any part with a defect in workmanship or materials. Tires are not covered by the warranty; appropriate adjustments will be made by tire companies. Owners will remain responsible for normal maintenance services and routine replacement of parts such as filters, spark plugs, ignition points, wiper blades, and brake and clutch linings, and normal deterioration of soft trim and appearance items.

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Blaauwberg Strand, Cape Town, with Table Mountain in background

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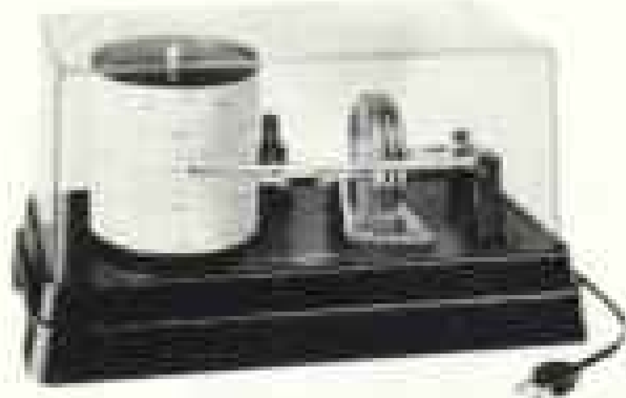

WEATHER-HAWK* STORMOSCOPE* Recording Barometer #6450, $60.00

Has new UNI/MAG Movement which gives 2½ times more pen travel for any change in pressure. Shows rate, trend, and magnitude of changes with great sensitivity on 7-day chart. Range: 29 to 31" of mercury. For 0 to 10,000 ft. altitude. Other recording barometers from $49.50 to $325.00. At gift, housewares departments and sporting goods stores. *TRADE MARK

BY *Taylor*

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Heart of the Scenic Southwest

Come—join the happy people! Relax in our warm golden sunshine. Live outdoors, play outdoors all winter long. You'll cherish every moment in friendly, relaxed Tucson.

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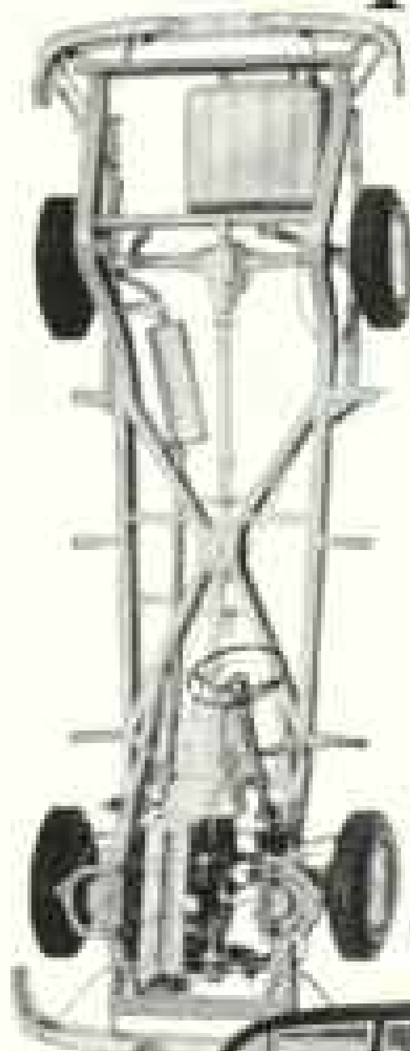
Western Gateway to Mexico

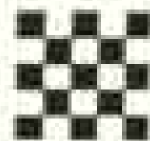
Too practical?



Certainly not! How can a car be too practical about safety? Or comfort? Or interior space? The CHECKER seats 8 adults ... 6 in easy-chair luxury, 2 on neat auxiliary seats. That's practical transportation.

The timeless CHECKER is economical to operate, sneers at maintenance bills and is built to last for years and years and years.

Sound interesting? It is. Write for brochure.



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CHECKER Marathon and Superba series ... 4 door sedans and 4 door station wagons. Power and automatic equipment available.

MIRANDA

... when critical focusing makes the Big Difference!

Get the accuracy of single-lens reflex photography plus rangefinder focusing speed ... get Miranda's exclusive, built-in 'Multi Split-Grid' Rangefinder.

Also—instant return mirror; interchangeable pentaprism; speeds to 1/500th; rapid advance and rewind levers; plus UNIQUE MOUNT THAT TAKES LENSES OF MOST OTHER 35mm SLR CAMERAS!

With 50mm Automatic f1.9 Lens, less than $170.*
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* Your dealer determines price in your area. [illegible]

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DECEMBER						
SUN	MON	TUE	WED	THUR	FRI	SAT
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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23/30	24/31	25	26	27	28	29

JANUARY						
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FEBRUARY						
SUN	MON	TUE	WED	THUR	FRI	SAT
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10	11	12	13	14	15	16
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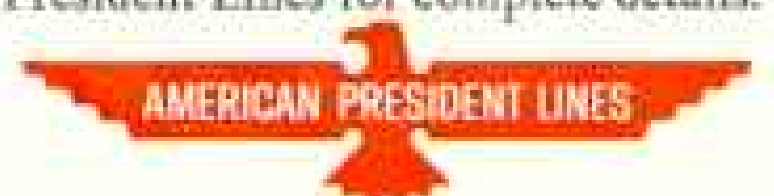
Put a 42-day Orient cruise on *your* calendar! With the new SS President Roosevelt joining other Presidents Hoover, Cleveland, and Wilson, there's a sailing every other week from San Francisco/Los Angeles to Hawaii, Japan, Hong Kong, and the Philippines. Presidential luxury includes everything from heated swimming pool to 24-hour room service. Special holiday season rates for December sailings: First Class fares reduced 25%, starting at just $912 for complete cruise. Economy Class available at 10% reduction on round trip. For choice accommodations book now. See your Travel Agent or American President Lines for complete details.



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STORMOSCOPE* Barometers with new UNI/MAG* Movement give 2½ times more pointer action. CYGNUS Model has simulated brass finish, leatherette front panel. Outstanding value. AQUILA Combination forecasts weather, tells humidity and room temperature. Solid mahogany case. Other barometers from $8.95 to $325.00 at gift, jewelry, hardware and department stores.
*TRADE MARK

BY *Taylor*

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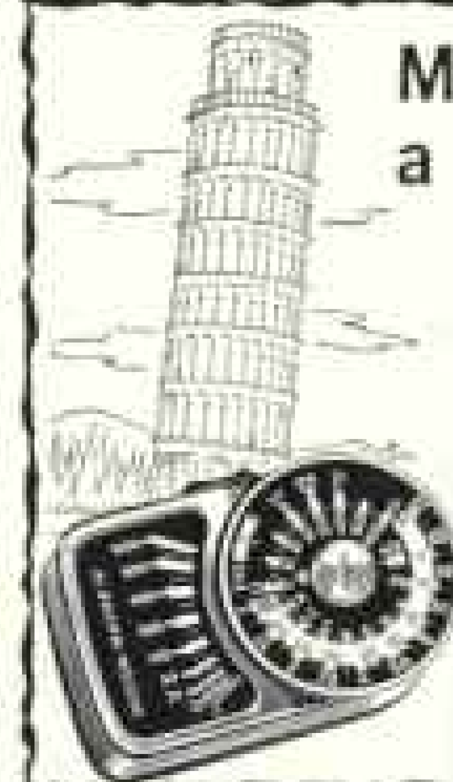

Make every photo a 'MASTER-piece'

When you're on a trip a fumbled photo is an opportunity lost forever. A Weston MASTER IV exposure meter helps you make every shot count . . . ends disappointments. It's the universal meter—for use with any camera, any film, anywhere. See it at your photo dealer's.

WESTON MASTER IV
exposure meter

What to tell your wife before the Thunderbird comes

You won't have to tell her how beautiful a Thunderbird is. She can see that no other car has Thunderbird's spirit and excitement. And you won't have to remind her that no other car *performs* like Thunderbird. Let her discover how it swings aside the steering wheel as she enters. And only Thunderbird seats her in such comfort—and steers and stops for her as easily as breathing. But a word of caution. This car looks like one million dollars, after taxes.

So remember to tell your wife that *no other luxury car costs so little*. And few of them hold their worth as well. Tell your wife this for now. She'll fall in love with Thunderbird all by herself, once it comes.

WINDSCOPE Wind Speed and Direction Indicator. Tells both wind speed and direction on one dial. Generates own power. Transmitting unit may be as far as 2000 ft. from indicating unit. Easy to install—trouble free. Also available as separate instruments at $59.95 each. At hardware, marine, sporting goods and department stores. *TRADE MARK

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THE BALSCOPE TEN

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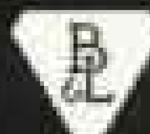
■ For the first time, due to a manufacturing break-through . . . a *quality* telescope for only $9.95! Ideal instrument for all kinds of nature study, for vacations, for all outdoors. No clumsy draw tube—focus with a single turn of the eyepiece. Only 10¼" long, and weighs just 9 ounces. Belt holster accessory at 98¢. See it at optical, photographic and sporting goods dealers. Made to American standards of quality by America's most respected optical craftsmen, Bausch & Lomb Incorporated, Rochester 2, N. Y.

BAUSCH & LOMB 

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helps you discover the ***fun*** *of*

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Before you set out on your Florida holiday, get this free guide to vacation fun in Fort Lauderdale. Spectacular color views show you its beauties and attractions. All the things to see and do are covered in its 16 pages. No obligation, of course, but we'll wager you'll be tempted to visit Fort Lauderdale — for the fun of it.

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WHY DOESN'T EVERYONE OWN AN ALPA?

Frankly—not everyone can afford the best. After all, not everyone drives a Rolls Royce, a Cadillac or a Jaguar.

Custom built to the most rigid European Quality Standards, the ALPA offers you a brilliant, compensated ground-glass for exact framing, with diagonal split-image range-finder that pinpoints focus instantly. Each ALPA lens—from 24 to 5000mm—is individually film tested and hand-picked for you. And only ALPA's fabulous Macro-Switar 50mm f/1.8 Auto-APOCHROMAT provides critical sharpness, precise color rendition AND focuses down to 7" close-ups.

That's why people who want the very finest camera, choose the ALPA, precision built in Switzerland for people who demand the very best.

Please write for ALPA Color-Catalog GA-12 to Karl Heitz, Inc., 480 Lexington Ave., New York, U.S.A. or the ALPA factory Pignons S.A., Ballaigues, Switzerland.

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In one respect (and one only), an Argus is like any other camera. It *can* be dropped. But the similarity ends right there. If you do drop an Argus camera or projector, and if there's any damage, Argus will repair it at no cost to you. This ironclad Argus guarantee covers *any* accidental damage, and it's good for a full year.

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BY *Taylor*

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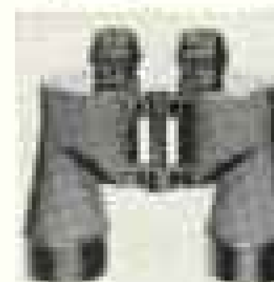

War Surplus! American-Made 7x50 Binoculars

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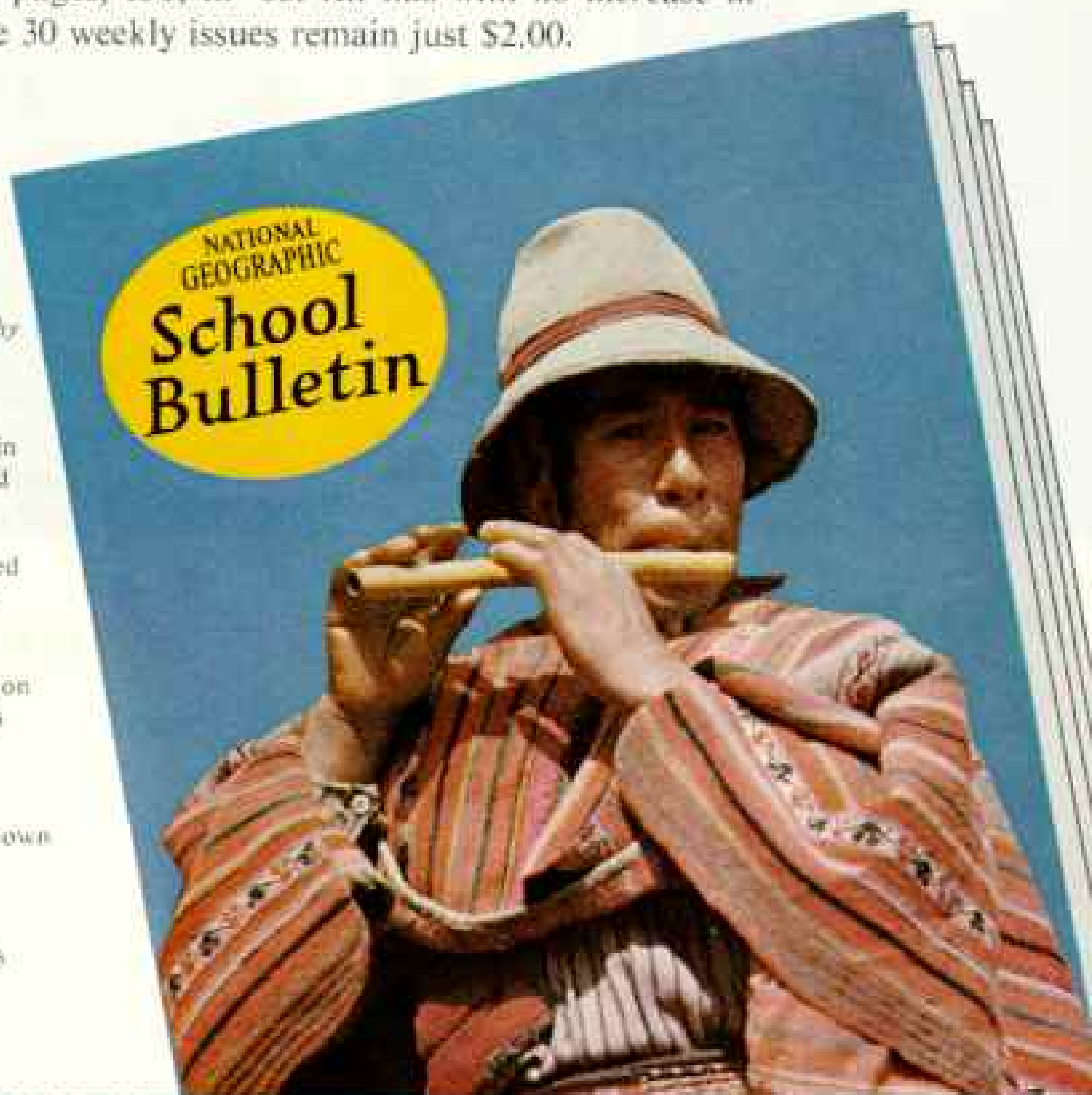

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