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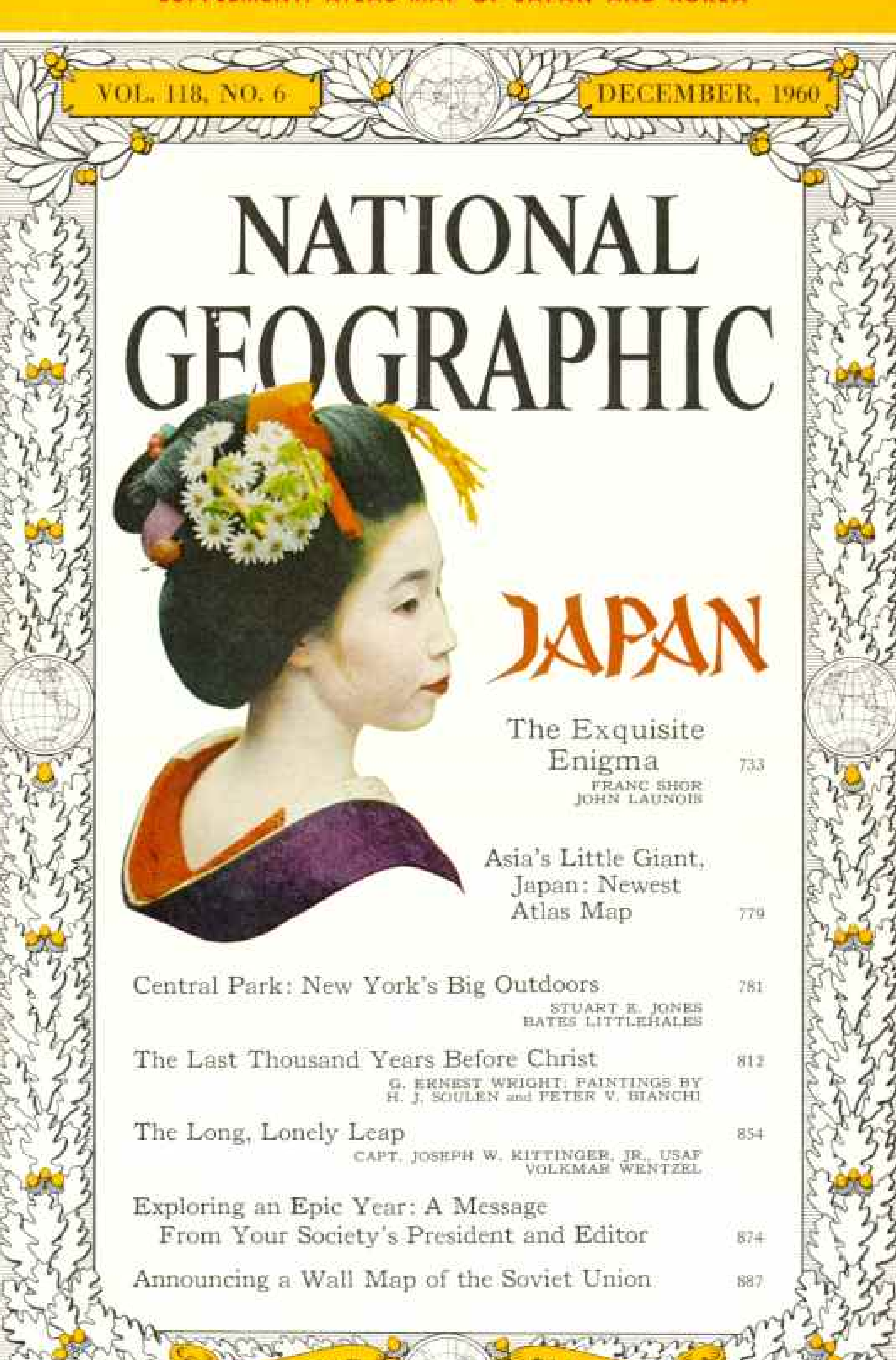

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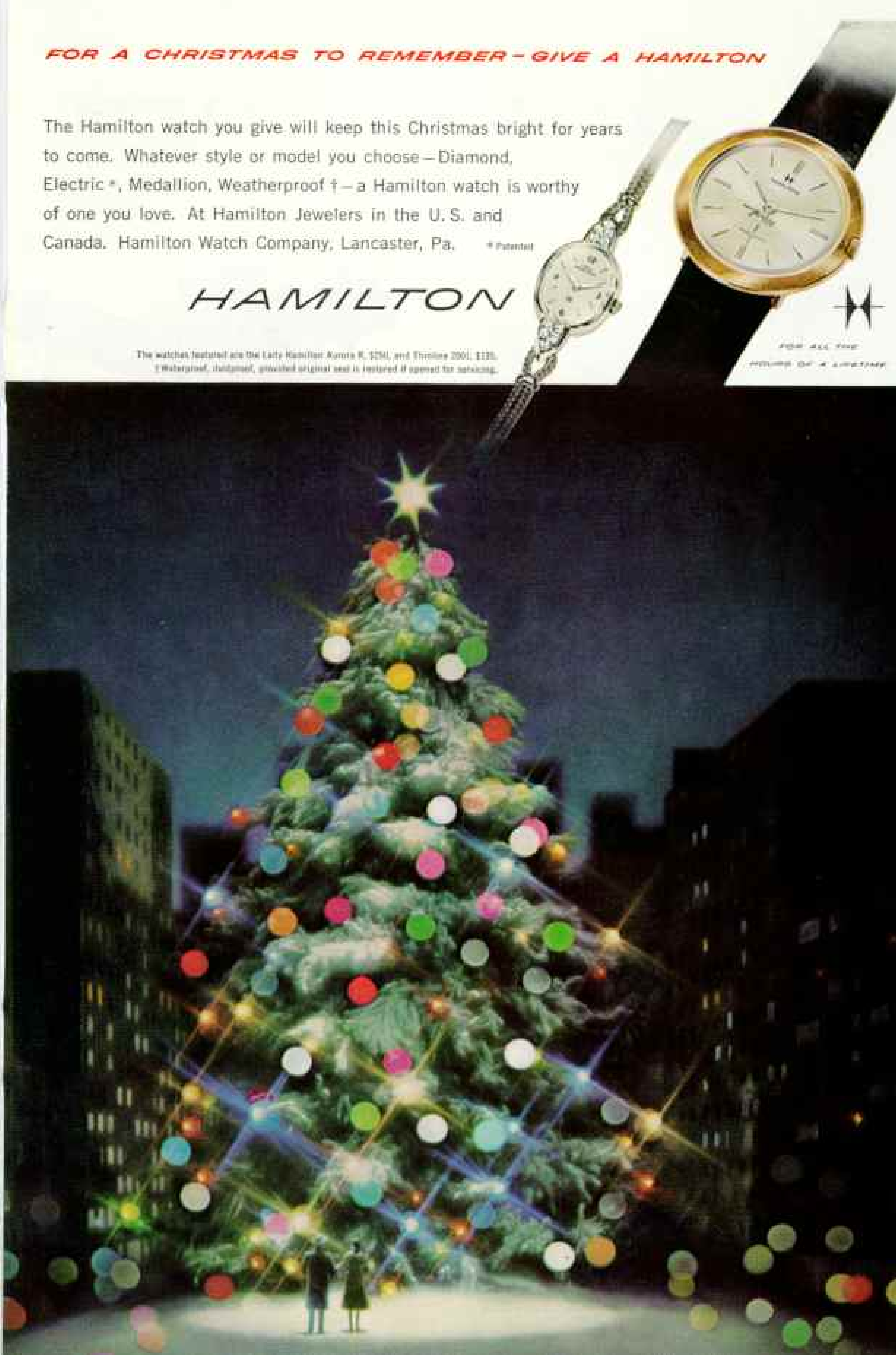
◀ COVER: *Flowers and a head of rice adorn a maiko's hair for the Japanese New Year* (*page 760*).



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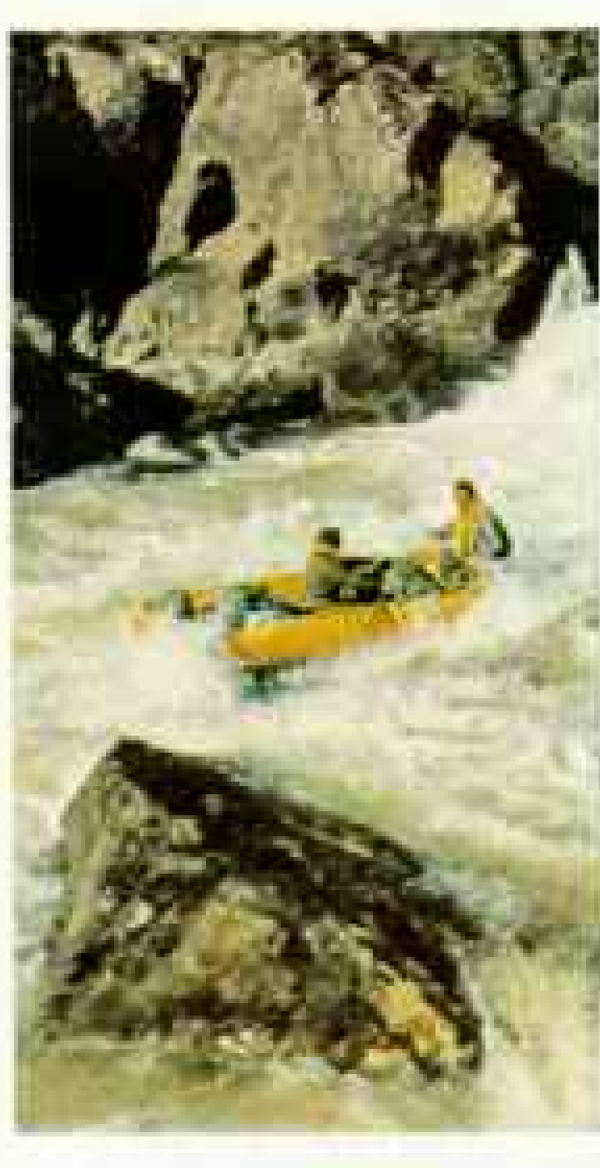

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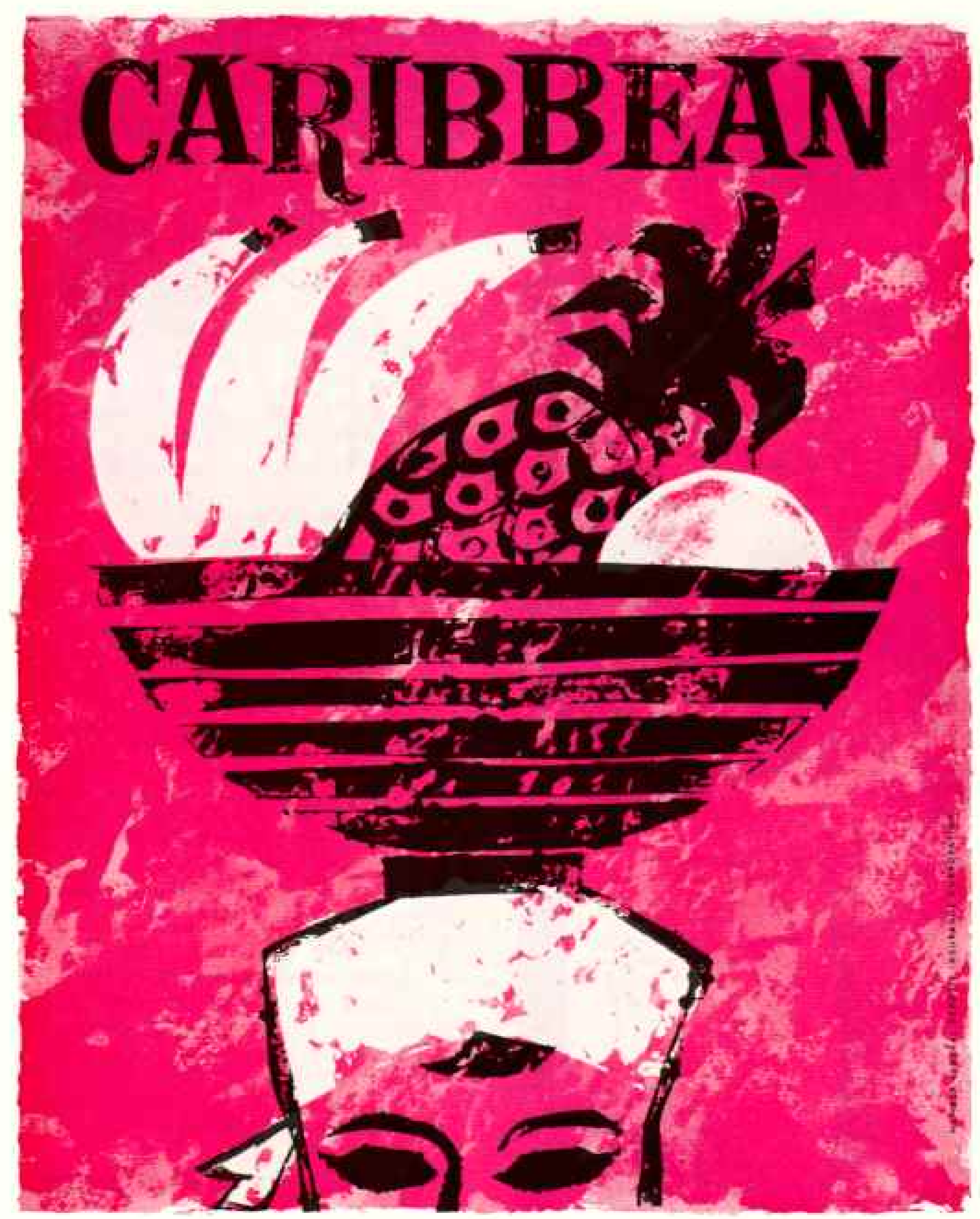

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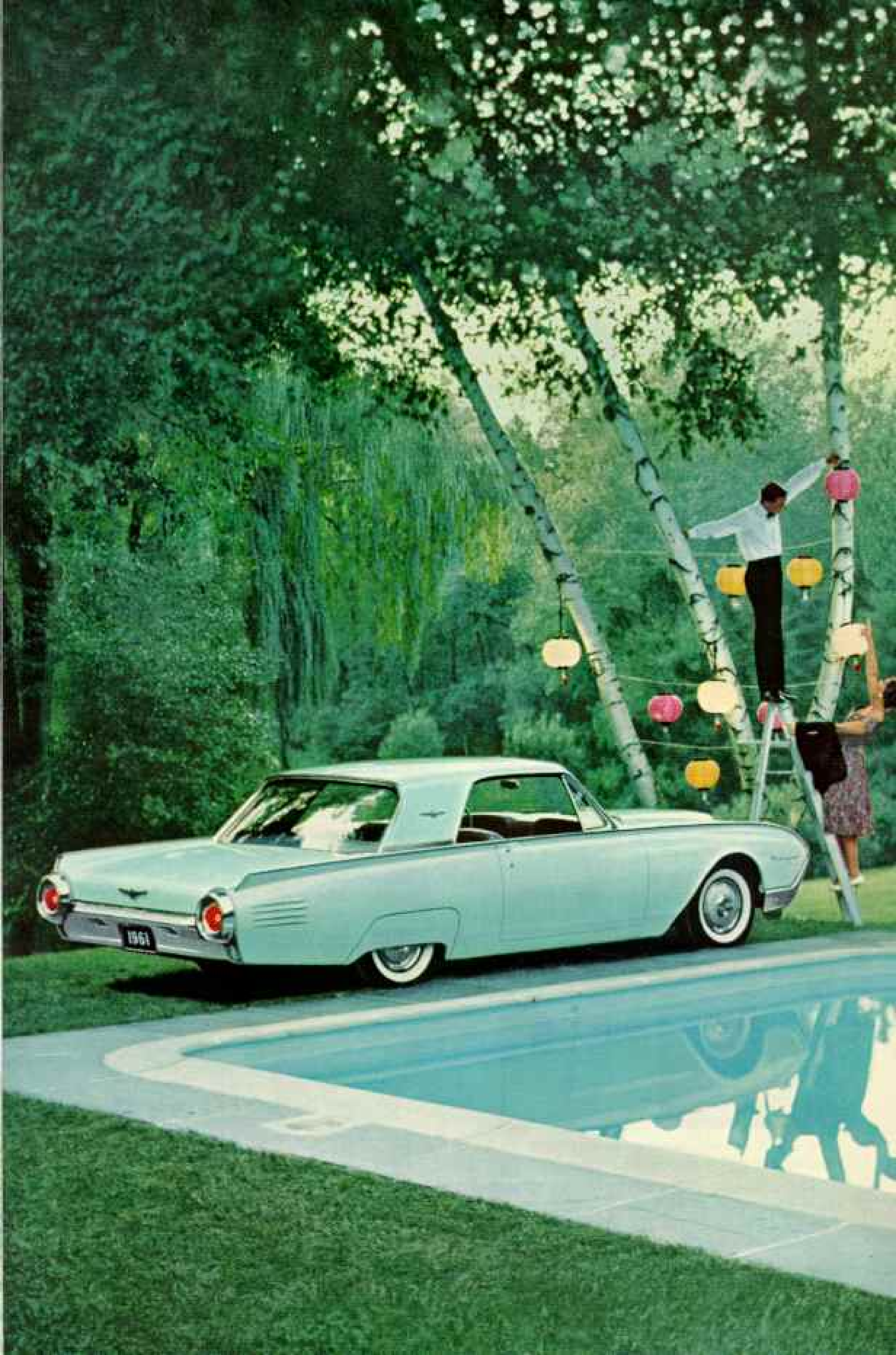
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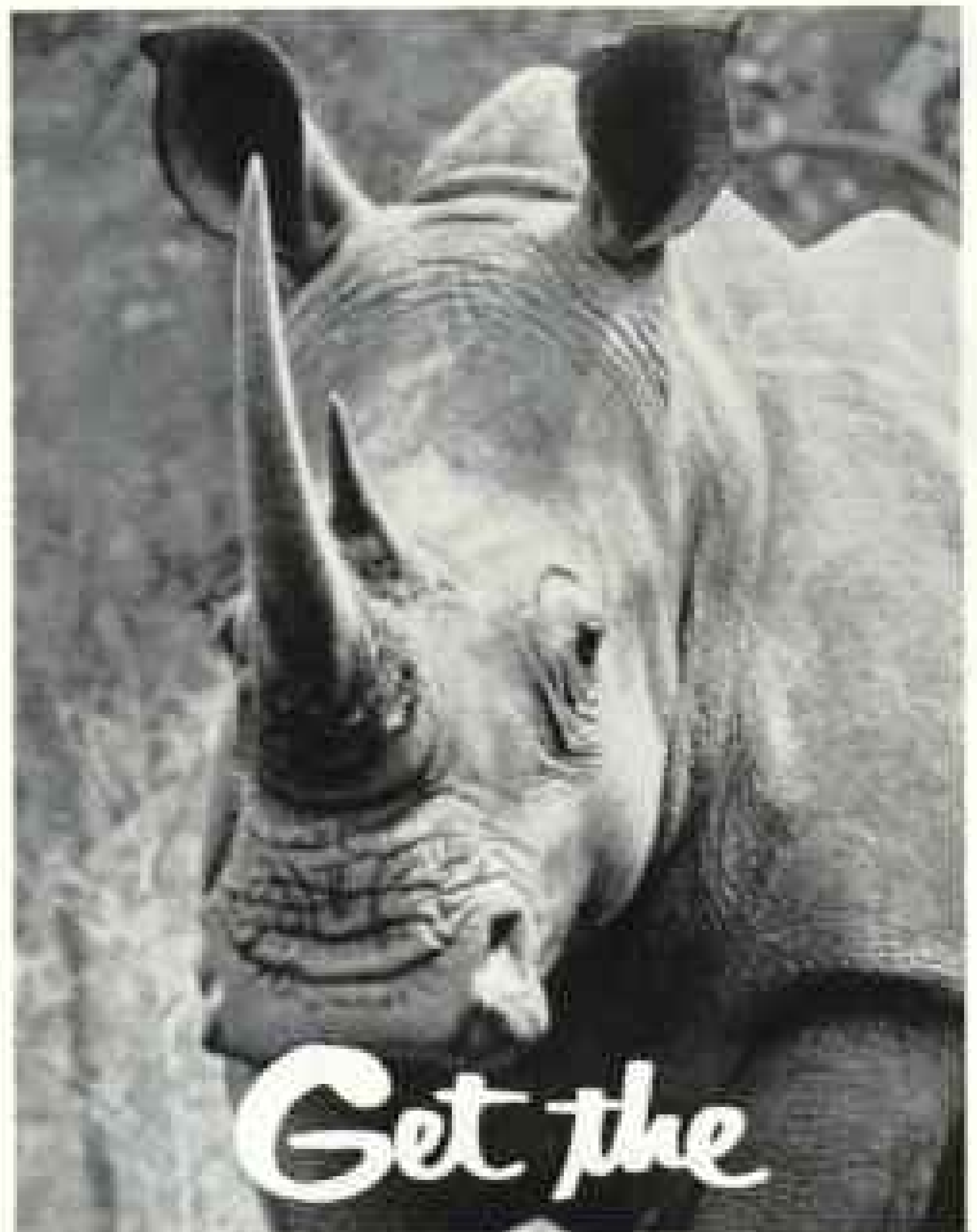

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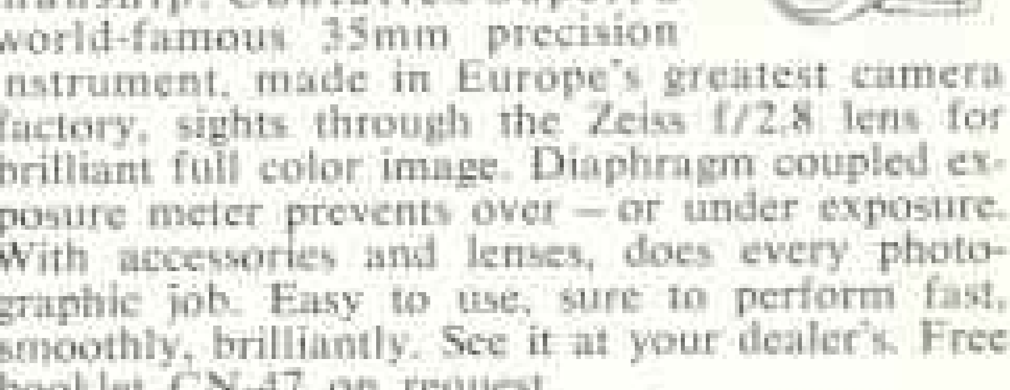

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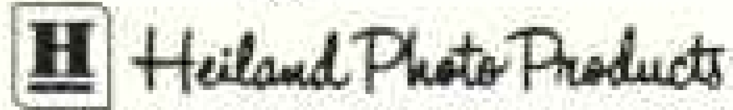

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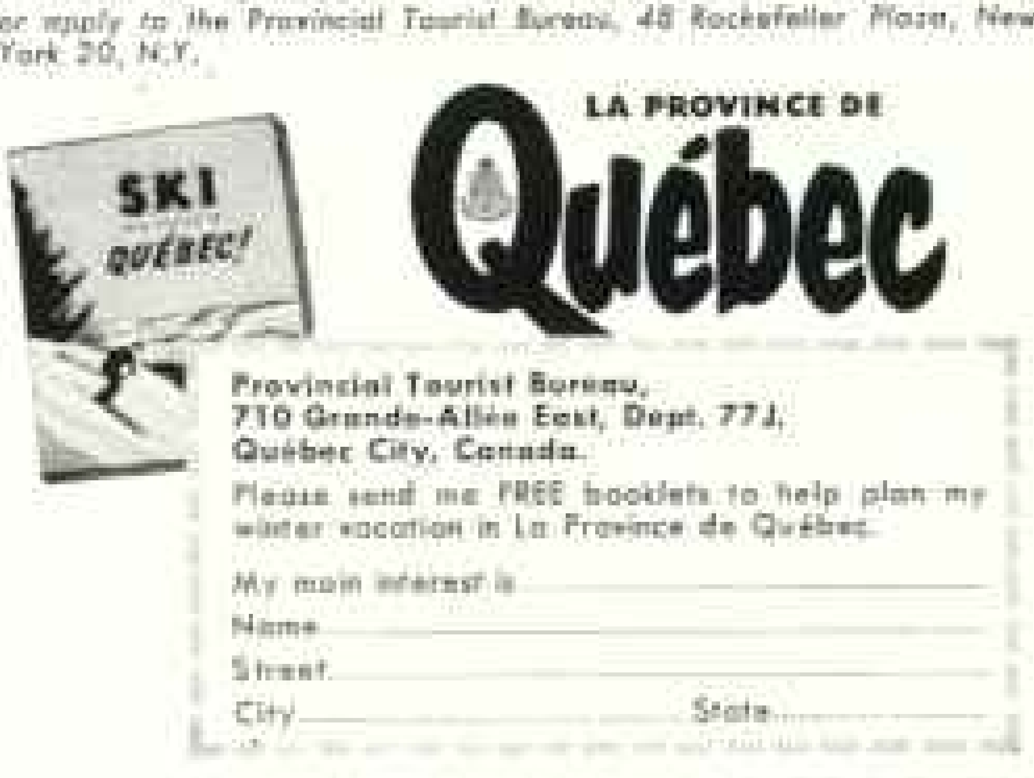

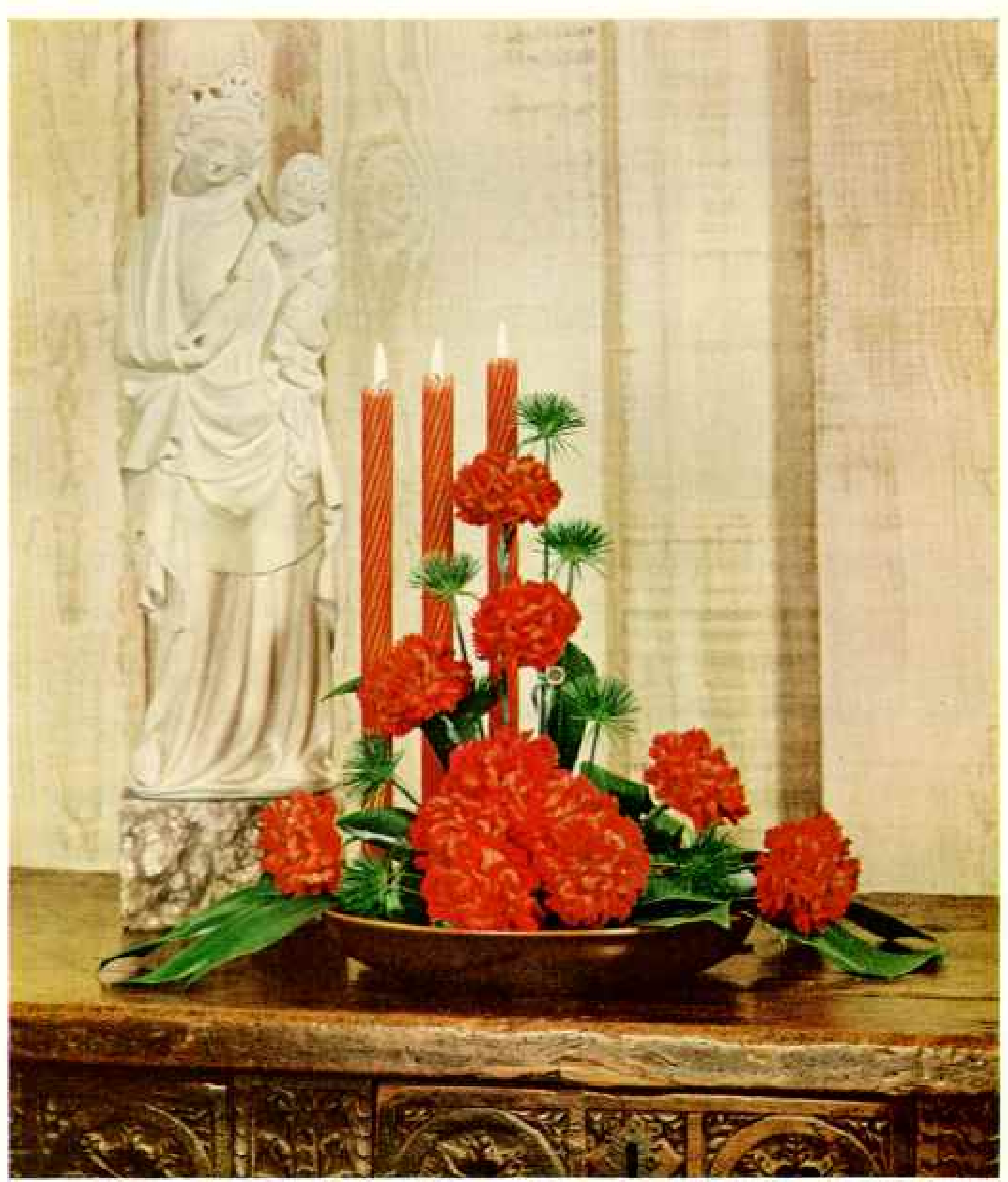

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Those who are hard of hearing are in great need of patience and understanding. Without it they are likely to feel the loneliness of the Antarctic explorer. Speaking slowly and distinctly is a great help. Fingers should be kept away from the lips since many deafened people unconsciously depend on some lip reading.

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VOL. 118, NO. 6 DECEMBER, 1960

Once branded as imitators, Nipponese now seek the lead in inventions and techniques, but beauty and grace survive amid the roar of industry

JAPAN THE EXQUISITE ENIGMA

By FRANC SHOR, Senior Assistant Editor

THE JAPANESE are a very polite people, and the young representative of the Japan Tourist Association who met me at Tokyo International Airport was obviously most embarrassed. We were through customs and on our way to a taxi before he could bring himself to broach the subject that was bothering him.

"Japan just now is very popular with tourists," he said. "Many visitors come from all over the world."

"I'm sure they'll like it," I replied. "I've been here many times, and I enjoy it more on each visit."

"Also," he continued, "Tokyo just now has many business people coming for trade fairs to see new Japanese products."

"I've heard what a wonderful economic recovery you've made," I told him. "I see Japanese products everywhere these days."

"Also," he went on, "have many conventions. Many important people from every country."

"That will be interesting," I said, climbing into the taxi. "Will you tell the driver what hotel I'm going to?"

There was a long pause and a sibilant escape of breath. "Is just the trouble," he whispered. "We cannot get you hotel room."

There was, he said, a nice Western-style hotel in Yokohama. But that was, I knew, an hour and a half from Tokyo, through some of the worst traffic in the world. We sat while the taximeter clicked busily.

"In Tokyo can find very nice Japanese-style inn," he offered. "If you can stay there one night, tomorrow can get you proper room in big hotel."

And that is how I came to the Tsukiji-en. I stayed there not one night but every night I was in Tokyo. It became a second home, and in my travels throughout Japan I stayed

Photographs by JOHN LAUNOIS, Black Star

KYOTO

in its country counterparts whenever I had the opportunity. Like most things Japanese, they combined beauty and utility and added a personal charm to warm a traveler's heart.

I had to bow my head to enter my room in the Tsukiji-en, but it was worth it. The chamber was beautifully proportioned and the furnishings were pure Japanese: a low table set on the *tatami*, the straw mats that covered the floor; four cushions around the table; a two-foot-high dressing table and mirror in one corner; and a lovely flower arrangement beneath the single scroll hung upon the rice-paper wall.

Well, *almost* pure Japanese. There were also a shining new television set, an air-conditioning unit, and a telephone.

Luxurious Bassu Becomes a Habit

But the room had more than beauty and utility; it had Kimi. Kimi was the maid, a square-faced country girl who adopted me the day I arrived and made my comfort her business. She knelt beside the table to serve my meals, arranged for my laundry, brought me damp towels called *oshibori* to wipe my face and hands, and arranged my bath. Ah, how she arranged my bath!

In Japan, you must understand, a "bassu" is much more than a way to get clean: it is ritual, recreation, and restorative. A Japanese businessman home from a hard day at the office seeks a hot bath as an American might yearn for a cold drink. And Kimi was determined to indoctrinate me in Japanese ways.

As it happens, I like to bathe in the morning, and I prefer a shower. Kimi was undaunted. Five minutes after my arrival in the evening, she would bring oshibori, tea, and a sweetmeat. Five minutes later she would appear bearing a great fluffy towel.

"Bassu ready, Shor-san."

"Not now, thank you, Kimi. I'm going out in a few minutes."

"But ready now, Shor-san. You try. *So* nice."

"No thanks, Kimi. I must go out right now."

Changing folkways of Japan stand forth when new meets old in Kyōto. Crash-helmeted motorcyclist and his friend shatter the quiet of the Gion-machi, an entertainment district. A strolling geisha and two apprentices in wooden clogs, silk kimonos, chalky make-up, and glossy black wigs suggest porcelain figurines.

Caught up in postwar transition, young Japan prefers Western dress and embraces modern customs. Boys no longer feel embarrassed to be seen in public with girls. To describe the noisy motorcyclists, Japanese coined a new word: *kaminariyoku*—thunder breed.

EKTACHROME BY JOHN LAUNOIS © NATIONAL GEOGRAPHIC SOCIETY

Lights Blaze Along the Ginza, Tokyo's Great White Way

Rivaling the glitter of Broadway or Piccadilly, the Ginza throbs to a cacophony of motor horns, blaring dance bands, twanging samisens, and the wail of the noodle vendor's pipe. Flashing bulbs

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and glowing neons advertise department stores, shops, restaurants, tearooms, and the thousands of bars that line the avenue and its cross streets. Curbside fortunetellers predict the future for a few cents. The Ginza's name derives from the word *gin* (silver) after a foundry that produced coins here three centuries ago.

Nichigeki Theater rises at left.

"So sorry, Shor-san. Have send shoes for boy shine. Come back maybe half hour. You have prenty time bassu."

So I had a bassu. And I came to like it, and look forward to it. I finally persuaded Kimi that I was quite capable of washing my own back, but she and all the other maids in the Tsukiji-en thought it odd of me.

Fish, Fish, and More Fish for Dinner

We understood each other better about meals. I wanted to eat Japanese style, and Kimi was happy. She served dinner in my room, kneeling beside me, telling me the Japanese name of each dish. My first meal involved raw fish, smoked fish, steamed fish, and fish soup, with preserved turnips and radishes. Breakfast was different: smoked fish, rice wrapped in thin sheets of seaweed, mushroom soup, pickled cucumbers, pickled cabbage, and pickled turnips. And always green tea.

There were, too, the more familiar sukiyaki and tempura. The tempura—prawns, fish, or seaweed cooked to a crisp golden brown in batter—came hot from the kitchen, but the sukiyaki Kimi cooked on the spot.

First she put an electric hot plate in the middle of my table; soon a heavy iron skillet smoked on top. Then came the ingredients arranged on a colorful china platter in a fashion that would have won a prize in an art exhibit: thin slices of well-marbled beef, translucent circles of raw onion, neat squares of bean curd, mysterious mounds of greens, and a coil of transparent noodles.

One by one they went into the frying pan, while Kimi stirred and added soya sauce and sugar. They simmered, the fragrance filled the room, and Kimi stirred and added.

Then, just as my appetite was about to overcome my patience, Kimi would break a raw egg into a bowl beside my rice, give the dish a final swirl, and start chopsticking delicacies from the pan into the egg. As rapidly, I transferred them into me, and dinner usually ended in a dead heat.

At night the table was whisked into a corner and Kimi spread my bed upon the floor: two thick quiltlike pads and a feather puff to cover me. At my head she placed a low reading lamp, then vanished like a genie.

There was a charm, too, about the street. It was narrow and muddy and constantly torn up for repairs, but it was a microcosm of the city. Mrs. Nagano ran the flower shop at one end, and her two-year-old son Mino greeted me with an ankle-high tackle when I took my morning walk. Mrs. Yoshida, who kept the general store across the street, always had a pot of tea in the back of the shop, and that passed a pleasant ten minutes.

The Shimizuya Dye Shop and the Nipponoyo Print Shop were good for a smile and a pleasant "*Ohayo*," which sounds to me like Ohio but means, of course, good morning. I did pretty well in Japanese until noon, when Ohayo ran out, but I never could remember the word for good afternoon.

My favorite stop was at the far end of the street, in the Sushi Cooks Association club and hiring hall.

Sushi is thin-sliced raw fish and cold rice in a small package, a standard lunch for working people and travelers. Tokyo must have as many sushi shops and stands as New York has hamburger and hot dog counters. It should, of course, for it has nearly as many people: better than nine million at last report, and growing at the rate of a quarter million a year.

The sushi cooks were a happy lot. They spent the days playing *Go*, a game not unlike dominoes, and drinking tea while they discussed politics, *beisu-booru*, and the cost of living. Beisu-booru was the big topic, since the Japanese World Series was approaching; and when my interpreter announced that I

Three Kinds of Tokyo Night Life: Cabaret, Chorus, and Kabuki

Teen-agers pack the Tennessee (upper), a night club that offers American jazz and hillbilly tunes. While sipping coffee, they enjoy the rhythms of the Wagon Stars and the Seven Suns. Many vocalists memorize American songs by listening to records, with no understanding of the words.

The Atomic Girls, arms locked, legs a blur, prance before the footlights at the Kokusai Theater. They emulate the Rockettes of Radio City Music Hall in New York.

Combining drama, song, and dance, Kabuki preserves the theatrical traditions of feudal Japan. Men take all roles, though the law banning actresses was repealed long ago. Kanemon Nakamura (lower left) plays a part in a medieval drama at one of Tokyo's several Kabuki theaters.

KODACHROME (LOWER LEFT) AND [illegible] EKTACHROMES
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knew Lefty O'Doul, the former New York Giant who popularized baseball in Japan, I became a celebrity.

From time to time the telephone would ring, the manager of the club would announce that such and such a sushi kitchen needed a cook, and the high man on the list would leave. He always seemed a little reluctant to go, and I could understand.

Tokyo's Fragrance: Fresh Concrete

Downtown Tokyo, of course, has quite a different atmosphere. Nearly 400 million dollars' worth of new construction went up in 1959, and multistoried buildings continue to sprout at an astonishing rate (page 744). The smell of freshly poured concrete is the distinctive aroma of Tokyo today.

Traffic is unbelievable. There are more than a million and a half motor vehicles registered in Japan, and it sometimes seems as if all of them are on Tokyo's streets at once. Tokyo drivers have a disregard for life and limb that is frightening. Last year automobiles killed 776 people on the streets of Tokyo (New York City had 730 victims in the same year), and there was at least one more they almost scared to death.

Tokyo's boom has brought with it more problems than simply traffic jams, however, and the city is trying to bring order out of chaos by long-range planning.

Mr. Ryotaro Azuma, Governor of Tokyo, received me in the conference room of Tokyo's city hall. His face was thoughtful as he discussed his plans for the city.

"We must face the fact," he said, "that all these new arrivals bring with them their own housing problem. And they are usually people unable to share the tax burden that municipal housing creates.

"New factories bring in new people; so we are restricting their establishment. But temporary measures aren't enough. We must plan for the future."

Governor Azuma envisions satellite cities ringing the metropolitan area.

"Right now," he said, "we are laying out an over-all plan for an area within a 60-mile radius of Tokyo Station. Our population problem is so great that anything smaller would be only a stopgap."

Despite its housing and population problems, Tokyo's economic situation is constantly improving.

"I'm particularly proud," he smiled, "of the fact that Tokyo's budget is in the black. In fact, 1959 showed a very nice surplus."

Tokyo's boom, of course, is only a reflection of what is taking place in all Japan. With a population of 94 million, in an area a little smaller than California, per capita income has increased more than 40 percent in the past five years, and exports nearly 80 percent. Astonishingly, however, a concerted national campaign to keep population under control has reduced the birth rate from 28.1 per thousand in 1950 to 18.0 in 1958, and in 1960 population was almost in balance.

June Riots Shatter Calm

With this remarkable increase in the standard of living and the easing of population pressure, it is easy for the visitor to leap to the conclusion that political stability must follow economic success. American occupation forces, in the postwar years, gave the Nipponese careful tutelage in the ways of democracy, and on the surface things seemed peaceful during the three months I spent last winter in the Land of the Rising Sun.*

Only a few months later came the June riots that resulted in the resignation of Prime Minister Kishi and cancellation of President Eisenhower's visit. I flew back to Japan to bring my story up to date and to see if I could find a reason for what had happened.

There is, I concluded, no single key to an understanding of Japan. It is a combination lock.

Once again I stayed at the Tsukiji-en. I invited friends for tea and we sat cross-legged on the tatami-covered floor. A Japanese ac-

* For the story of Nippon's immediate postwar years, see "Japan Tries Freedom's Road," by Frederick G. Vosburgh, NATIONAL GEOGRAPHIC, May, 1950.

Tokyo Leftists, Defying the Government, Snake-dance in the Streets

Demonstrators last June shouted slogans against Prime Minister Nobusuke Kishi and Japan's new security pact with the United States. Mobs invaded the building which houses the Japanese parliament, burned police trucks, and surrounded a car carrying President Eisenhower's press secretary. The riots failed to block the treaty, but led to Mr. Kishi's resignation and forced the cancellation of Mr. Eisenhower's visit to Japan. Flags identify rioters as members of Sohyo, a council of 52 labor unions.

EKTACHROME © NATIONAL GEOGRAPHIC SOCIETY

quaintance began an embarrassed apology for the seemingly anti-American riots.

"I don't think it was anti-U. S.," an American friend who has lived in Tokyo for years interjected. "And I should know; I was caught in one of the worst of the demonstrations. I had to go to the Diet building, and I arrived just as a mob of young men was trying to overturn two police cars. I was knocked down in the crush.

"Half a dozen of the rioters helped me to my feet, brushed me off, and apologized. They formed a wedge and made a path for me to the edge of the mob. I thanked them; they bowed, and went back to turning over the cars."

The story brought a chuckle, but a Japanese university professor hastened to put it into proper focus.

"Don't make the mistake of thinking those demonstrators weren't deadly serious," he cautioned. "They were. It is true that a lot of the riots were led by professional Communists, and probably many members of the mob were paid to be there. But thousands of those young men were determined to show their opposition to what they believed was a militarist move.

"I'm sure most Japanese young people aren't anti-American. But they are bitterly antimilitarist. They know what war can mean, and they are afraid of it."

Japanese Still Unused to Majority Rule

I think the professor was right. Talks with dozens of Japanese left me firmly convinced that the democracy bequeathed by the American occupation is still strange to many of its beneficiaries.

For centuries the Japanese lived under a stern authoritarian government. The great mass of people had little voice in their own

affairs. Their concept of democracy was Utopian; once it was granted, they felt, each man should be free to do exactly as he pleased. It takes time to learn that true democracy involves acceptance of heavy responsibilities, and more important, it requires submission to majority rule.

Few of the Japanese students and intellectuals with whom I talked disputed the fact that the majority of their fellow countrymen actually supported the party and the policies against which their riots were directed. If new elections had been held last summer, they admitted, the ruling party would probably have been returned to power.

"But it isn't fair for a majority to force its will upon a minority," they complained. And a new expression was common among them last summer; they spoke of "the tyranny of the majority."

Growing Pains of an Asian Democracy

What they perhaps did not know was that their complaint was common to all youthful democracies. We experienced it in the United States a hundred years ago. John C. Calhoun, of South Carolina, expounded it in a series of speeches in the U. S. Senate. "The doctrine of the concurrent minority," it was called then, and it took four tragic years of civil war to establish the fact that, within constitutional limits, majority rule is absolute. This inexperience in the democratic process, plus an understandable desire to stay clear of war, created a fertile soil for agitation in Japan.

Add to this the fact that Japan has a tradition of violence in political affairs—assassination was a not uncommon form of protest in prewar days—and the riots become more understandable.

Kimono buyers examine costly silks at a store in Kyōto. Kneeling on mats, the shopkeeper (right) and his customers discuss fabric, style, and price. A kimono may cost $5 to $500.

Japanese Santa in spectacles parades with a placard proclaiming Christmas bargains. An imported holiday, Christmas carries little religious significance in Tokyo. But Japanese enthusiastically observe it with festivities and gift giving.

Children peer curiously at an incense burner, once believed to possess magical curative powers in its sacred smoke.

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Television Tower and Soaring Skyline Hide the Scars of Earthquake and Air Raid

Ravaged by fire after the 1923 quake and again in 1945 by the U. S. fire-bomb attacks, Tokyo arose from the ashes of each holocaust. Modern buildings mushroom in the business districts. A

KODACHROME BY JOHN LAUNOIS © NATIONAL GEOGRAPHIC SOCIETY

population exceeding nine million ranks greater Tokyo second only to New York City among the world's metropolitan areas. Suggesting the Eiffel Tower, the 1,092-foot Tokyo Tower climbs 108 feet higher than the Paris landmark. Built to withstand earth tremors and typhoons, the structure thrusts its needle tip from a knoll in Shiba Park.

Besides, thousands of Japanese soldiers who surrendered to the Russians in the closing days of World War II were kept for years in Soviet prison camps. Many were given intensive Communist training. When they came home in the late 1940's and early 1950's, they formed hard-core Communist cadres, skilled in the techniques of violence. Many of the riot leaders were from this group.

Political Future Beset by Hazards

Americans long resident in Japan are convinced that in the years to come Nippon will achieve a political stability to balance her present economic position. But education and experience come hard, and the road ahead is not an easy one. There are undercurrents in the political and social structure of the new Japan which can do more damage than the tidal waves and typhoons which have battered the islands for centuries.

Fortunately, however, these are considerations which do not intrude upon the ordinary traveler. Japan is a country of almost unbelievable scenic beauty, where hospitality and comfort are found in even the most out-of-the-way resort. There are attractions for almost every taste: skiing, beach resorts, mountain inns with miles of manicured trails, national parks, inland lakes, and temples and

shrines without number. And everywhere a smiling welcome on arrival, and a sincere *sayonara* for departure.

With John Launois I spent my winter visit traveling the length and breadth of Japan's three principal islands: Hokkaidō, Honshū, and Kyūshū. John, a young American photographer, makes his home in Tokyo, and his intimate knowledge of the country proved invaluable. It was at his suggestion that our first trip outside Tokyo took us to Japan's ancient capital of Kyōto (see the new Atlas map, Japan and Korea, a supplement to this issue).

Kyōto is less than seven hours by train from Tokyo, but it is a million light-years away in atmosphere. Although it is a city of 1¼ million people, it seems as peaceful as a country village. Capital of Japan for a thousand years before the government moved to Tokyo in 1868, it has a dignity and a serene charm equaled by few other cities in the world.

Here are the famous Yasaka Shrine, the Chion-In Temple with its enormous bell, the

Bristling antenna proclaims the present; hand threshing of rice recalls the past.

Television reaches the tiniest villages. Viewers enjoy American Westerns in which cowhands speak dubbed-in Japanese.

Since only 16 percent of mountainous Japan is arable, growers cultivate even the hillsides. Fields terrace the slope beyond this farmhouse near Tawarazaka.

Pampered cattle receive tenderizing rubdowns. These farmers in the Tarumi district of southwest Kōbe rub their animals with handfuls of straw. They say that massage promotes marbling of the lean meat.

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Silver and Gold Pavilions, and the Kiyomizu Temple, from which one can look down on the whole city. And here are gardens that give new dimension to landscape architecture.

There is no need to mention one in particular, for words cannot interpret a thought, a mood, or an emotion, and the gardens of Kyōto are all those things. Some are of flowers or moss, some of only rock and sand (page 762). Some are formal as an Emperor's wedding, some a bow to nature's native art. But each carries a message of beauty.

All Kyōto is, in a way, a garden. It seems to have invited nature to step inside the city limits, then led her gently into each individual home. The houses are of wood, and the wood seems as old as time itself. Even neon signs seem forced to blend their garish rays into the over-all effect.

Here, too, are some of Japan's most famous teahouses. The simple beauty of the 17th-century Koho-an and the moss-accented serenity of the Shokin-tei are perfect settings for the ancient ritual with which Nippon offers her favorite brew. Here again it is the mood which is the essence of the ceremony. Everything contributes to an atmosphere of contemplation.

But there is another drink that is becoming a symbol in Kyōto, and in all Japan. It is coffee. Coffeehouses, dimly lit and intimate, are the headquarters of the new genera-

Industrial Rebirth of Japan

BELCHING steel mills in Kōbe (below) symbolize the nation's industrial vigor. Though forced to import coking coal and most of her iron ore, Japan ranks as Asia's leading steel producer. Her recovery from defeat in World War II seems all the more impressive since she lost her greatest source of raw material and her chief market when China fell to the Communists.

Japanese excel at jobs calling for manual skills and expert craftsmanship. Girl at the Tokyo plant of Nippon Kogaku K.K. inspects Nikon cameras (opposite, upper left). Hands encased in rubber gloves, a Sony Corporation technician in Tokyo assembles tiny radio transistors in a sealed, humidity-free box.

Humming shipyards make Japan the foremost builder of seagoing vessels. *Naess Voyager*, a supertanker, takes shape on the ways of the Mitsubishi shipbuilding company in Nagasaki.

EKTACHROME (UPPER LEFT) BY NIKON; KODACHROMES BY JOHN LAUNOIS © N.G.S.

tion of intellectuals. Here one never hears the notes of samisen or flute—only recorded Western music, usually classical or advanced jazz. Young Japanese discuss art and philosophy to the strains of Beethoven's *Emperor Concerto*, and a twenty-cent cup of excellent coffee is made to last the evening.

Nearer to Tokyo in time—only a short two hours on a sparkling new train surprisingly advertised as the "Romance Car"—is Nikkō National Park, perhaps Japan's most famous beauty spot and certainly one of its most popular tourist attractions. Foreigners find Nikkō charming; Japanese themselves apparently find it irresistible. Rooms are at a premium in almost every season, and holiday weekends resemble July Fourth at Atlantic City.

Endless ribbons emerge from dryers in a textile mill. Swinging back and forth, plaiters drop the material in neat folds. Japan, which imports cotton, wool, and the ingredients of synthetic fibers, exports more textiles and textile products than any other country.

Freshly Dyed Strips of Kimono Silk Dry on the Bank of the Katsura River

For centuries Kyōto's silk-weaving quarter, Nishijin, has been famous for fine fabrics. The city's home craftsmen continue to rely on time-tested techniques for brocades, though they now use motor-driven looms for less expensive materials.

Hand dyeing of silks takes two weeks. An artist first contrives a design, which is transferred to stencils, one for each color. Dyers place the stencils above the material and rub in a pastelike pigment. After baking in a steam oven, the silk goes for washing to the Katsura or Kamo rivers, whose waters, Japanese believe, are unexcelled for the fixing of dye. These workmen wade in with long trains of cloth. Spread to dry along the pebbled banks, the brilliant bolts await the kimono maker's shears.

Since no more than 10 strips of expensive silks carry the imprint of a single set of stencils, the well-dressed Japanese woman has little fear of encountering a duplicate of her kimono.

It is not difficult to understand this enthusiasm once you have crossed the incredibly beautiful vermilion-lacquered Shinkyo Bridge or looked up at the Yomeimon Gate of the famous Toshogu Shrine. It should be garish, this explosive blend of gold and crimson. But somehow it settles into its background of pine branches as if it had been there forever, instead of a mere 300 years.

If man-made things of beauty are not what you seek, Nikkō still offers a multitude of attractions. Lake Chūzenji, more than 4,000 feet above sea level, stretches its serene expanse of blue water in a mountain setting for canoes, rowboats, and small yachts.

There are excellent golf links and tennis courts, and the mountain paths are gentle and perfectly tended. So clean are the walks that even a stray pine needle calls out to be picked up. One feels constrained to speak in hushed tones, so peaceful is the atmosphere.

Utsunomiya is the capital of Nikkō's Tochigi prefecture. In its suburbs is a towering 88-foot statue of Yoya Heiwa Kannon, the goddess of mercy and peace, and it seems fitting that she preside in such an atmosphere. So fitting, in fact, that I was shocked, standing at her feet, when my guide urged me back into our taxicab.

"We'll have to hurry," he said, "because you have an appointment in half an hour to see the Fuji Heavy Industries plant."

"What do they make?" I queried.

"Jet planes," my guide said proudly.

KODACHROME (BELOW) AND ANSCOCHROME © NATIONAL GEOGRAPHIC SOCIETY

I kept the appointment, with regret.

There were no jet planes in Uji-Yamada, in southern Mie prefecture, where I visited the Ise Grand Shrine, holy of holies for Japan's Shinto worshipers. Here in twin temples four miles apart are enshrined the goddesses Toyouke-Omikami, patroness of crops, and Amaterasu-Omikami, legendary first ancestor of Japan's Imperial Family, and the mirror that is one of the Three Sacred Treasures—mirror, sword, and jewels—which make up the Imperial Regalia of Japan. And here a language difficulty almost cost me a friend.

Tetsuo Suda, my driver, was a middle-aged man of great dignity. He spoke very little English, but we managed. He lunched with me when we traveled, and his knowledge of local customs was most helpful. But on the day we visited Uji he suddenly refused to enter a restaurant with me. All afternoon he was silent. At our inn that night I asked an English-speaking Japanese schoolteacher to find out what I had done.

"Suda-san says you have insulted the Emperor," he reported to me. "And,

Yokogawa Folk Enjoy a Dip in the Communal Bathtub

Japanese bathing customs stem from Shinto purification rites. Today, the average Japanese takes a bath not only for cleanliness but also for relaxation after a hard day in office, shop, or field.

Before entering the steaming-hot tub, a miniature swimming pool, the bather lathers himself and rinses off the soap with hot water from a wooden bowl.

Still popular throughout rural Japan, communal bathing has declined in some cities. Even where the practice has ended, custom dictates the order in which a household uses the tub: guests first, followed by the father, wife and younger children, the older children, and the servants. Since each washes before soaking, they all use the same water.

Ninety families of Yokogawa, a farming village on Honshū, use the tub at left. All these bathers are members of the Nakanishi clan. Water comes from a thermal spring.

ANSCOCHROME © NATIONAL GEOGRAPHIC SOCIETY

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Barn and silo near Atsunai, a village on Hokkaidō, reflect the influence of American agricultural experts who advised the islanders in the 1870's. Cows, climate, and rolling countryside of this northern island suggest Ohio.

Kneeling on straw mats, the Araki family dines on rice and salmon. Their farm home on Hokkaidō looks American on the outside (above), but the interior (below) follows Japanese tradition. Father's prized motorcycle reposes in the house.

of all places, in the shrine of his ancestor."

"But that's impossible," I said. "I haven't even mentioned the Emperor."

"Suda-san says you spoke with a friend about destroying the Imperial Family."

Suddenly I realized what had happened. At the Geku, or outer shrine, I had met an American architect. He had pointed out some interesting architectural features of the structure, and our conversation had turned to Frank Lloyd Wright's famous Imperial Hotel in Tokyo. There had been a report that that structure was to be razed, and I had asked the architect if he thought the Imperial should be torn down. Suda-san had heard, understood only a few words, and leaped to a conclusion. I explained, Tetsuo Suda apologized, and our journey became once more a friendly affair.

On our way to Kyūshū, southernmost of Japan's major islands, we paused only briefly in Ōsaka. This city of more than two and a half million is strikingly modern, reminiscent in many ways of the U.S. Midwest.

Near-by Kōbe, another city with more than a million population, is one of Japan's principal ports (page 748). Nearly 40 percent of the nation's exports go through her harbor, and her own steel and rubber plants account for a considerable part of these. And within a few minutes from the heart of town are both mountain and beach resorts. Residents happily call their city "Japan in Miniature."

But John and I were looking for the part of Japan which has changed least, her farming areas. And in the mountains of Kyūshū, we knew, were terraced rice fields where man had conquered nature. So we flew to Fukuoka and there found, to my surprise, an air-conditioned American taxi in which we drove the mountain roads to Kamikaguchi village.

Japan lives on rice. Living standards have increased tremendously since the war, and industrialization has made fantastic strides; the nation of the Rising Sun has become famous for transistors and tankers and dynamos. But day in and day out the important thing to most of the country's 94 million people is the family rice bowl. If it is full, Japan is well nourished and content. If not, other things become insignificant.

Recent years have been bountiful ones; bumper harvest has followed bumper harvest. As the green fields began to ripen in early August of this year, a national harvest of 12 million metric tons was estimated. The 1936-40 average was a little less than 10 million metric tons. Improved seed, better fertilizer, and modern methods of cultivation were showing their effects.

John and I set off at dawn from our Kamikaguchi inn to visit one of Kyūshū's richest production areas, a mountain-rimmed bowl holding a cascade of terraces golden in the early sun (page 746). We bumped along winding roads, through fields lined with bam-

Too big for its shelter, a fishing boat pokes its prow through an opening. Preferring partial cover to none at all, fishermen at Atsunai cut a hole to accommodate the craft during winter's lull. Thatch protects the exposed section. The girl mends crab traps.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Crab boats crowd the harbor at Nemuro, a fishing port at the eastern end of Hokkaidō that counts a fleet of 250 vessels. Crewmen jeopardize their liberty to net the king crab, since its haunt lies near waters patrolled by Russian gunboats. After a successful sortie, a vessel may land a five-ton haul.

To prove that the king crab (*Paralithodes camtschatica*) deserves its name, the fisherwoman below exhibits an 8.8-pound specimen measuring 45 inches from toe to toe. Canned at dockside, the meat makes tasty cocktails, salads, and Newburgs.

Situated in one of the globe's richest fishing areas, Japan leads the world in the size of her catch. Seafood supplies protein vital to the Japanese diet. In a year the average islander eats 48 pounds of fish but only seven pounds of meat.

boo, some seeded in corn and others with the fresh, glowing green of tea plants.

Then, as we reached a plateau, we were in the midst of acre after acre of ripening rice, dotted with threshing floors. In the center of each stood a puffing gasoline-powered machine spewing forth a plume of chaff and a narrow stream of grain.

The Watanabe family were surprised when we stopped, polite when John asked if he could photograph their labor, amused that I was interested in their life. There were three generations in the family, they told us, twenty people in all, wringing a comfortable living from five acres of terraced hillside. Everyone worked. The women brought the sheaves. Father fed grain into the thresher. Children carried away beheaded stalks, and a sparsely bearded grandfather sacked grain in woven straw bags.

Sadakichi Watanabe, broad-shouldered and heavily muscled, shut down the thresher to let it cool. The machine was two years old, he told us, cost some $300, and should last another 10 years. It would pay for itself in two or three years, he said, because it produced a full bag of grain from every two bags of unthreshed rice, while hand-threshing methods produced at best two bags from five.

"A bag of hulled rice brings about 4,000 yen," he said, "and last year we sold twenty bags. That was most of our cash crop—about $225—but it was all we needed. We raised enough wheat for bread, I butchered a few

KODACHROME BY JOHN LAUNOIS © NATIONAL GEOGRAPHIC SOCIETY

Russian Raiders Left This Family Without a Provider

As World War II ended, the Soviet Union seized the Kuril Islands, an 800-mile-long archipelago that yielded much of Japan's salmon and crab catch. Red gunboats patrolling the islands drive off or capture Japanese fishermen who sail too close. In a recent 10-month period they impounded 62 vessels.

One of the victims was Koichi Murayama. Here his wife, mother, and three children huddle anxiously before a stove in Nemuro while awaiting word of his fate. Several days later they learned he had been sentenced to prison. Nowadays Hokkaidō fishermen take out "capture insurance" (page 773).

pigs, and we keep fifty chickens, so we had plenty of eggs."

The Watanabe house, solidly built and comfortably shaded by ancient evergreens, was topped by a many-fingered television antenna. Watanabe-san waved toward it with pride.

"We were the first to have television in Hirata village," he told us. "My son came back from his shipyard job in Nagasaki to tell us about it. At first I thought it was crazy. 'Farmers do not need such things,' I told him. But now I do not know how we would do without it; the youngsters couldn't live without the Lone Ranger."

Today there are more than five million television sets in Japan, and their manufacture has been one of the factors in the country's fantastic industrial resurgence. Nippon has long been a manufacturing nation, and its cottage industries were well developed long

Wading in a quiet bay, a woman gathers *nori*, an edible seaweed;

before Pearl Harbor. But now a change has taken place.

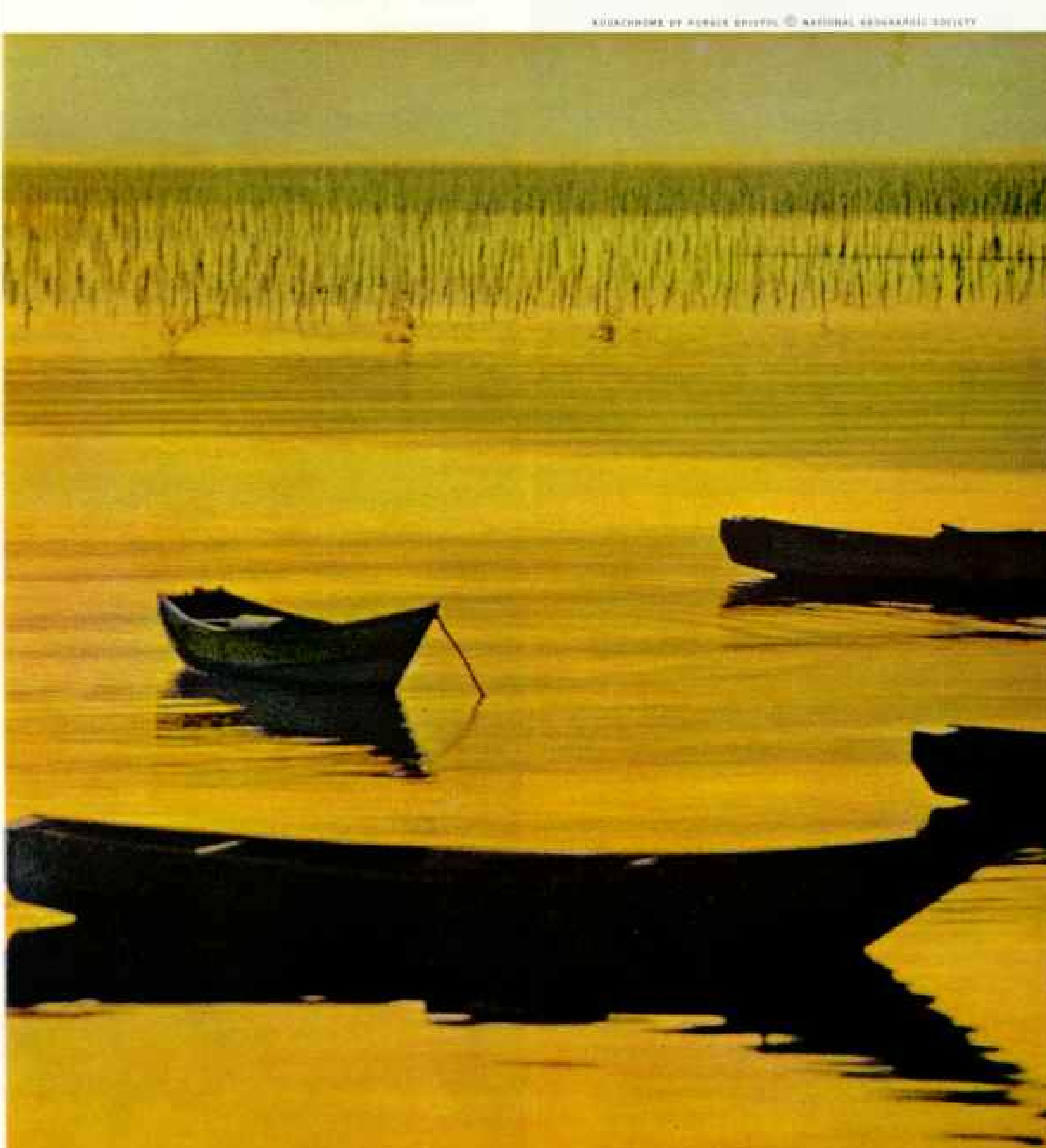
Before the war the Japanese were famous in international markets as excellent copyists of other people's inventions. There were stories of a Japanese town renamed "USA" so that products could be stamped "Made in USA." That may have been true in the thirties, but today Nipponese industrialists are leaders in both invention and techniques.

An old friend of mine, M. C. Sodano, is now manager of the International General Electric Company in Japan. Mike, a solidly built former U. S. Marine Corps lieutenant colonel, is a leader in Tokyo's American community and a former president of the American Chamber of Commerce there.

"These people are excellent engineers," he told me. "They are very meticulous in everything they do. They have some fine scien-

winter's dawn silhouettes boats at their moorings near Yokohama

KODACHROME BY HORACE BRISTOL © NATIONAL GEOGRAPHIC SOCIETY



Fire-walking Buddhist treads blazing logs at a festival in the Gango Temple, Nara. Flames fail to harm those who step lightly and quickly, but sometimes burn men who, lacking faith and calmness, move uncertainly.

tists, and a lot of original work is being done.

"In some areas, such as optics, radio and communications equipment, and camera manufacture, Japanese output compares very favorably with United States products."

Mike arranged an appointment with Mr. Akio Morita, Executive Vice President of the Sony Corporation, one of the country's largest manufacturers of electronics equipment. To my delight, Mr. Morita turned out to be a long-time member of the National Geographic Society.

"When we placed our first advertising for transistor radios in the United States," he beamed, "I insisted that part of it go in the GEOGRAPHIC.

Drawn by 40 Costumed Men, a 9-ton Float Totters Through the Streets of Kyōto

For more than a millennium Japanese have lined Kyōto's streets to watch parades of portable shrines during the Gion Festival, which a Shinto priest organized to invoke divine aid against a pestilence ravaging the city.

Called *hoko*, the floats carry priceless tapestries, paintings, and gold ornaments. Each wears as a spire a 120- to 130-foot mast that impressed the photographer as "seeming to reach for heaven." Musicians, who share rides with life-sized effigies of historic figures, play ancient airs on bamboo flutes.

Five-foot wooden wheels cannot be steered; this crew turns a corner by sliding the front wheels across a slick bamboo mat.

" 'We're trying to make the best transistor radios in the world,' I told our agency, 'and the readers of the GEOGRAPHIC are the kind of people who want the best.' I was right, too."

From this happy note, Mr. Morita proceeded to a figure-filled recital of Sony's amazing growth, one of the most remarkable success stories in postwar industry anywhere.

Sony was founded only a few months after Japan's surrender ended World War II. A group of young scientists and engineers working in government laboratories found themselves jobless and nearly penniless. Under the direction of Masaru Ibuka, still Sony's President, they organized a company with capital of less than $500.

"We didn't have any money to buy machinery," Mr. Morita reminisced. "All we had was enthusiasm and brains; so we had to work at 120-percent efficiency.

"Cooperation was the big factor in our success. In a big company, people specialize. But when we got a contract, every expert put his mind to work on it. We had physicists, chemists, metallurgists, and a variety of engineers. That cooperation was so successful that we still practice it.

"We had our first success in magnetic tape. Then we made the world's first pocket-sized transistor radio. The first model sold one hundred thousand. The newest version is already over half a million, and still selling."

KODACHROMES BY JOHN LAUNOIS (BELOW) AND P. D. O'NEILL © NATIONAL GEOGRAPHIC SOCIETY

Sony engineers are proud of an exhibit outside their board room. It contains more than 30 copies of the original TR-63 radio from a score of countries. These days it is the Japanese government that protests about patent-infringing imitation.

There were 30-odd associates in the Sony of 15 years ago; today the company employs more than 3,500; nearly 20 percent have university degrees. Tape recorders, transistors, and transistor radios are the most important products, but research never stops. Early this year Sony marketed the world's first all-transistor television set.

Sony today has capital of more than 2.5 million dollars, and last year produced more than $27,000,000 worth of goods.

"The important thing," said Mr. Morita, "is that we're competing in the world market, not on the basis of cheap labor, but on the foundations of inventive skill and superior manufacturing techniques."

Austere Beauty Absorbs a Kyôto Monk Meditating in the Ryoanji Garden

Attributed to Soami, a 15th-century master of the tea ceremony, the garden's stark simplicity reflects the impact of Zen Buddhist thought on Japanese art between the 12th and 14th centuries.

In earlier years Japanese landscaping tended to be sunny and cheerful. Zen introduced the concept of an abstract garden designed to aid devotees in their meditations.

Here rocks protrude above the raked sand like islands in a waveless sea. Only a few lichens, subdued in tone, vary the garden's design.

Zen Buddhists believe the tranquil expanse of sand and rock induces the peace required to gain *satori*, a flash of insight into philosophical truths.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

With Mr. Morita as a guide, I walked through the air-conditioned and well-lighted assembly rooms of Sony's factory. I tested tape recorders in a sound-proof booth, watched two-band radios rolling down an assembly line, and failed miserably in an attempt to assemble, under a microscope, the heart of a transistor—a task which involved bonding leads of gold wire only .0015 of an inch in diameter to a germanium bar. I could see the bar, but my untrained hands couldn't bring the points together. The fact that half a dozen attractive girls in the same room were doing the job with considerable dispatch didn't make me feel any better (page 749).

In a room where germanium crystals are grown in impressively complicated machines, I stopped for a chat with 36-year-old Sadamu Kurokami, a technician who operates one of the mechanical monsters. Mr. Kurokami, graduate of a Japanese technical high school, has been with Sony since its founding.

Like a painted doll, a Hiroshima girl prays at a Shinto shrine during the Autumn Festival. For this holiday parents dress daughters in their brightest kimonos.

Second graders of the Sugo Primary School on Kyūshū bow to teacher as morning class begins.

Starting to school marks the end of a life of indulgence. Small children rule the Japanese home as tyrants; doting parents satisfy their every whim.

Despite shortages of both teachers and schools, Japan has one of the world's lowest illiteracy rates—two percent.

Boys and girls study together in most public schools.

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

He offered to explain the operation of the machine, but I assured him it was a hopeless task. Besides, I was more interested in the man than the machine. I had heard a lot of talk about low Japanese wages. How low were they, I wanted to know, in terms of actual living standards?

Mr. Kurokami, remember, is no unskilled laborer. He is a technician with considerable seniority in one of his country's most successful corporations. As such, he is typical of the skilled men whose output has enabled Japanese wares to compete on equal terms with the best other nations have to offer.

"My base pay is roughly $110 a month," he told me. "I have a wife and three sons, so I get a family allowance of $8 a month. I average about $30 a month in overtime."

That brings Mr. Kurokami to nearly $150 a month. Last year he received a midsummer bonus of 4.7 months' pay and a Christmas gratuity of 4.5 months' salary. That came to a little more than $1,000. Total yearly income, about $2,800, or $235 a month.

"I live in Mitaka, about an hour away," Kurokami-san went on, after we had checked the figures a couple of times. "The company furnishes free transportation. I have a three-room apartment with kitchen and bath. Since it's in a municipal housing development, the rent is only $10 a month. But my utility bills run almost double that. Still, we have plenty for food and clothing and entertainment, and we're able to save a bit."

The Kurokami family has a television set at home—Mr. Kurokami made it himself. They have two radios, one homemade. The father is a camera fan and owns two 35mm. cameras plus an 8mm. movie camera.

The two oldest boys, aged 10 and 8, ice skate with their father in the wintertime, and enjoy long walks with him in summer. They're both in school. The youngest son is only a year old.

"Naturally, I'd like to see the boys go into this sort of work," Kurokami-san told me. "But I'm not going to influence them. They'll make their own choice."

I asked Mr. Kurokami if he thought conditions in Japan for a man in his position were better now than before the war. He gave me an "Are-you-out-of-your-mind?" sort of look.

"Yes," he said, and his emphatic tone turned every head in the room our way.

In another room we found pretty Yasuko Kuragaki, 19, testing radios. A graduate of a Tokyo girls' high school, she applied for a job at Sony a year ago on the recommendation of her sister, who worked there.

SUPER ANSCOCHROME BY MELVILLE BELL GROSVENOR © N.G.S.

In sculptured majesty, the Daibutsu, or Great Buddha, meditates in a park at Kamakura. Cast in 1252, the 42½-foot bronze figure survived typhoons and the 1495 tidal wave that swept away a sheltering pavilion. Lids half-closed over eyes of gold depict the passionless calm recommended by Buddhist doctrine.

"I had to pass a competitive examination to get this job," she told me. "This is a popular place to work. I was lucky to start at $20 a month."

Yasuko Works Six-day Week

Miss Kuragaki is now getting $30 a month, with the same bonus arrangement Mr. Kurokami enjoys. For this she works from 8:30 until 4:30 six days a week, with an hour for lunch and a 10-minute coffee break every afternoon. She pays her family about $5 a month for room and board, spends the rest for transportation and clothing.

In other large Japanese plants I found substantially the same story. But in many smaller firms outside of Tokyo conditions were considerably less impressive. Women workers were required to sleep in company dormitories and were furnished meals to supplement extremely low wages. Even here,

however, there was general agreement that conditions were better than in prewar days, and that they have been improving steadily.

Japan's cultured-pearl industry is another of the nation's leading dollar earners. In the days just after World War II, it was almost the only source of foreign exchange.

I talked with Mr. Yoshitaka Mikimoto, the tall, bespectacled head of the company that first brought cultured pearls to world markets. A few months before, Typhoon Vera had ripped up his great rafts of oyster cages, leaving nearly three out of four either broken or sunk.

Farmers Find Pearls in Eels

Salvage efforts had proved more fruitful than expected, however, and Mr. Mikimoto cheerfully estimated that not more than 20 percent of the total would be lost.

"One result has been that the farmers along the coast near our pearl farms are catching all the eels they can," he laughed. "Eels love oysters, and when the cages were broken open, they had a real banquet.

"The farmers, like most Japanese, are fond of eels. This year a couple of fishermen opened up a few eels and found a handful of pearls, and the rush was on. They were our pearls, of course, but who can trace a title through an eel?"

I asked Mr. Mikimoto why, with pearl tie tacks so fashionable in Japan, he wore none.

"My grandfather, who started the cultured-pearl industry, set that tradition for our family," he explained. "He would never let even his daughters or daughter-in-law wear pearls."

I asked why.

"Good business psychology," the Mikimoto heir explained. "He always said: 'If a Mikimoto wears a pearl, it must be the finest pearl in the world. And what would a customer think if the pearls we wore were better than the ones we sold?'

"In a way, it's a blessing," he mused. "I see and talk pearls all day. And if I wore a pearl and detected even the slightest defect in its luster or color, I'd be unhappy all evening!"

I asked the pearl king for some suggestions on the selection and care of his product.

"Several elements determine the value of a pearl," he said. "Size, color, luster, shape, and the skin. You should look first for color and luster. And you can study those qualities best under north light in the morning.

"For a hundred dollars you should be able to buy a single string of medium-size pearls of good color and quality. To take care of them, wash them twice a year in mild soapsuds and have them restrung at least twice a year. Nylon won't knot properly, so they must be strung on silk, which stretches. That's why they need regular restringing."

I visited Mikimoto's beautifully decorated retail store on the Ginza. There were strings of pearls for $50, strings of pearls for $5,000, and two magnificent single orbs of moonglow luster for $10,000 each. People who talk about cheap Japanese labor, I thought, don't realize the going price for a few years of an oyster's time.

Thousands Move to Frontier Hokkaidō

Japan's northern island of Hokkaidō is often described as the nation's last frontier, perhaps the only place where overcrowded islanders can find room. Since 1952 the government has appropriated close to 500 million dollars and resettled nearly 10,000 families from the crowded southern islands in an effort to develop Hokkaidō's resources.

Farming, timber, mining, and fishing are the backbone of Hokkaidō's economy. For the tourist there are magnificent mountain resorts and crystal lakes hidden in dense forests. Three national parks—Akan, Daisetsuzan, and Shikotsu-Tōya—offer unspoiled natural beauty and charming Japanese inns. A drive along the rugged coastline is a series of unsurpassed vistas interspersed with colorful fishing villages.

John Launois and I drove hundreds of miles over the island, visiting fishermen and farmers and workers in pulp mills and factories. In the factory town of Tomakomai on the south coast we were astonished at the forest of television aerials; one apartment house with 24 residential units had 24 TV antennas sprouting from its gabled roof.

We drove through miles of truck farms and

Young *Maiko*'s Ornate Make-up Brightens Kyōto's Ancient Gion District

After exacting training, this pupil displays the "divided-peach" hairdo of an apprentice geisha. Flowers and a symbolic head of rice adorn her hair.

ANSCOCHROME BY JOHN LAUNOIS © NATIONAL GEOGRAPHIC SOCIETY

Ponderous *sumo* wrestlers struggle to toss each other out of the ring

"*Storaiku!*" cries umpire Isao Kyuki, raising a white glove at a *beisu-booru* game in Komazawa Stadium, Tokyo (below). "*Booru!*" (ball) and "*seifu!*" (safe) equally belong to a sport introduced into Japan in 1873. Ceremonial greetings by flower girls precede the games, usually held under arc lights. Two leagues vie for the Japanese World Series title.

EKTACHROMES © NATIONAL GEOGRAPHIC SOCIETY

came out on open plains where rice and corn grew in adjoining fields. Then the road wound among thousands of acres of dense forest. As we neared the coast, the hills dropped sharply to the sea and the surf roared to the edge of the highway. Great racks of squid dried in the thin winter sunlight.

North of Atsunai we came into an area of rolling hills where small pastures lined the dirt road. There was fodder in the shock, and even here the Japanese love of order and beauty was evident. Every shock was a work of art, perfectly shaped, neatly finished, and carefully spaced in a regular pattern. But the farms themselves were most un-Japanese. They looked exactly like those of eastern Ohio. Gabled roofs, red silos, barns with haylofts—all typically American.

Motorcycle Gleams in Parlor

We stopped at one where Holstein cows made black-and-white patterns against the autumnal brown. Masaji Araki, 33, came from behind a silo to see if he could help us.

We explained that we wanted to see how a Hokkaidō dairy farmer ran his establishment, and he invited us inside. His wife, Sayoko, 29, shooed daughters Kyoko, 5, and Kayoko, 4, into a corner and popped a kettle of milk on the stove sunk in the middle of the kitchen floor. The daughters, in red corduroy trousers and pink sweaters, stared in big-eyed fascination from beneath coal-black bangs as we sat cross-legged around the stove.

Squash and pumpkins hung to dry from the low ceiling. Calendar pictures and advertising posters brightened the wall. But my eye wandered through the door into the neatly furnished parlor. There, in the center of the room beside the low dining table, stood a glistening new motorcycle, its chromium trim reflecting the afternoon sun (page 754).

"Nice, isn't it," beamed Mr. Araki. "I just got it last month. First I've ever had."

"Beautiful," I replied. "But do you always keep it there?"

"Oh, no," he smiled. "When we eat, we move it into the corner of the room. I don't want the babies to touch it when their hands are greasy."

This proud status symbol cost Araki-san $375, and he paid for it in cash.

"It's been a good year," he said, "and I needed transportation."

We sipped the warm milk from our bowls while Mr. Araki told us about his farm. His father had worked in a Hokkaidō coal mine and saved enough to buy a small tract. During the next 30 years the father and then the son had bought more; now they had more than 200 acres of rolling pasture land.

"We keep seven cows now, and I plan to buy three more this winter," the farmer said. "Last year we sold nearly $1,400 worth of milk, and since we raise our own fodder and most of our own food, I was able to buy the motorcycle and a little land as well."

Mr. Araki is up at four on summer mornings, five in winter, to milk the cows. Breakfast is at seven—rice and fish for father, rice and milk for the rest of the family. There's rice and fish for everyone at an early lunch, and the same for five-thirty dinner, with the addition of vegetables cooked in oil. Chicken graces the menu rarely in summer, more often in winter when the hens aren't laying.

When we left, Mr. Araki asked me to do him a favor. He handed me $35 in yen notes.

"You know about cameras," he said. "When you get back to Tokyo, please buy me a good one and mail it to me. I want to learn to take pictures."

If Japan has a farm problem, it certainly isn't centered around the home of Masaji Araki. I sent him his $35 camera, and I'll bet that the first picture he took was of that $375 motorcycle in the parlor.

Crabbers Risk Capture by Russians

Eastward we drove to Nemuro, the Ultima Thule of today's Japan (page 756). From this port brave little boats put out to seek king crab and squid off the Kuril Islands, now in Russian hands.

John and I were eager to take a trip with one of the crab fishermen who drop their nets near the Kurils. We knew that the Russians occasionally detained vessels accused of trespassing on their territorial waters, but the risk seemed slight. To our surprise, the officials of the Nemuro Fishing Association were firmly opposed to such a venture.

We spent the day going from official to official to press our request. Finally the director of a company which operates a number of crab boats relented.

"If you can get permission from the Coast Guard," he told us, "I'll get you a berth on one of our vessels."

It was dark when we knocked on the door of Kozo Saito, Deputy Commander of the Nemuro Coast Guard Station. Leaving our

Almost blind, 92-year-old Bungoro Naniwanojyo Yoshida still guides the company he created. His puppets enact Kabuki in miniature at Ōsaka.

Paper lantern (lower left) takes the shape of a house. Eighty-one-year-old Seiki Matsumoto, who works in Yamaga, Kyūshū, creates only five paper houses a year. Some become temple offerings; others are set afloat, alight, to drift downstream by night.

Window shoppers admire *sensu,* or folding fans, in a Kyōto store.

KODACHROME (ABOVE) AND EKTACHROME (CENTER RIGHT) BY JOHN LAUNOIS; OTHER KODACHROMES BY HORACE BRISTOL © N.G.S.

Paper umbrellas coated with tung oil dry on bamboo frames.

muddy shoes outside the door, we sat down with him beside a kerosene stove and explained our visit. Deputy Saito pointed to the figures on a blackboard.

"In the first ten months of this year," he said, "the Russians seized 62 of our fishing boats. There were 439 men in the crews. So far, 34 boats and 355 crewmen have been released.

"The rest were taken to Shikotan Island for trial. Those sentenced are in prison on Karafuto, the southern part of Sakhalin.

"If a boat were seized with Americans aboard," he said, "the Russians would accuse you of spying. It would go hard not only with you, but with the crew. And the boat owner would undoubtedly lose his vessel."

We didn't want that to happen. Nor did the idea of months or years in fog-bound and frozen Karafuto appeal to either of us. We withdrew our request.

A cold rain lashed our faces as we sloshed through a muddy courtyard to the home of Koichi Murayama, owner of one of the fishing boats posted as missing on Deputy Commander Saito's blackboard. A pleasant-faced woman, her hair wrapped in a kerchief, opened the door a crack. Two frightened little boys peered from behind her skirt.

John Launois's Japanese assistant explained our visit. At Mrs. Murayama's invitation we seated ourselves in the kitchen. An old woman with a face out of a Kabuki print glided noiselessly from an adjoining room. She was Tami Murayama, Captain Murayama's 76-year-old mother. Through the door I could see a small family shrine, a lamp burning at its base.

"He's been gone two months now," the 38-year-old Mrs. Hida Murayama

Mother-of-pearl, tortoise shell, and amber ornament an 8th-century *biwa* that belonged to the Emperor Shomu. Upon his death in 756, his wife and daughter dedicated the instrument to the Great Buddha of the Todai Temple, Nara. For twelve centuries it has reposed in the temple's *Shoso-in*, or treasure house.

Five strings make the instrument rare, if not unique; the usual biwa has four. Its origin is unknown, but Indian influence appears likely.

KODACHROME BY JOHN LAUNOIS © N.G.S.

薄野みなみ横
北の誉
北の誉
北の誉

told us, pointing to a picture of her husband on the rice-paper wall. "He was after codfish, and expected to be gone only a week. We haven't heard a word since the radio message that a Russian boat was coming alongside."

The captain's mother shook her head. "This is the third time the Russian patrol has picked him up," she said. "The first time he was in a prison camp for eight months, next time five months. Now—who knows?"

The younger Mrs. Murayama brought tea and seated herself on the other side of the stove. Her three sons—Hitomi, 13, Hitoshi, 7, and Yoshimitsu, 3—huddled close to their mother's side (page 757). She stroked the oldest boy's head as she talked.

Insurance Plan Protects Families

"My husband had 'capture insurance' with the fishermen's association," she said, "so we'll be able to get along for a few months. All the fishermen here pay a monthly premium, and if they are captured, their families get a monthly allowance. Since Murayama-san was a captain, I get 27,000 yen a month. The house is all paid for, so I don't have much to buy except food, and we'll manage. But it will be hard.

"It's not so much the money," she concluded. "But the boys need their father. It is not good for boys to have only women in the house. He must come back soon."

Outside the cold rain continued. The clock in the city hall tower struck ten. As the last stroke echoed across the harbor, the bells in the tower played the "Going Home" refrain of Dvořák's *From the New World*.

"They have a curfew here," John's assistant explained. "All the young people must be off the street by ten o'clock. Appropriate theme music, isn't it?"

I agreed. I wished, though, that the words could apply as well to Captain Murayama. And then, a week later, we read that he had been sent to the Russian prison camp on Karafuto. The story didn't give his sentence, but six others listed received from one to three years. The Murayama lads, I am afraid, will be without their father for a long time.

It took us nearly a week to drive back to Sapporo through intermittent snowstorms, and every day was an adventure. The countryside was like a Currier & Ives "Home to Thanksgiving" scene, with horse-drawn wagons carrying loads of fodder across snow-covered fields against a backdrop of smoke-gray mountains. The carefully spaced shocks wore white nightcaps of new snow jauntily tilted to one side, and the bare trees framed each small field with sun-gilded filigree.

And it was cold. How cold I didn't realize until one morning in Akan National Park, when John remarked to the maid who brought our breakfast that the eggs were very small.

"Ah so," she breathed. "Very small." She hunched her shoulders, her elbows hugged her sides, her knees drew together, and she crouched slightly.

"But so cold," she explained. "When so cold, very difficult for chicken!"

John and I returned to the main island of Honshū and followed the tourist trail. We visited Fuji and Nara, Hakone and Atami, and sampled mountain climbing, skiing, beaches, and hot springs. We returned to Tokyo and saw the Kabuki theater and the No plays. There is enough entertainment in the Land of the Rising Sun to keep a traveler busy for a year.

But there was one thing I had to do before leaving Japan. I parted from John in Tokyo and flew over the Inland Sea to a place which must have a special meaning to everyone in the world today.

Hiroshima: City of Tragedy

Hiroshima ceased to be a city on the morning of August 6, 1945. Much of the steel and concrete that disappeared on that cloudless day has been replaced, and people once again go about its busy streets. But the atomic blast that sealed Japan's defeat in World War II turned Hiroshima into a symbol and a warning, a dwelling place for the conscience of the world.

The New Hiroshima Hotel is strikingly modern, and the service is silent and efficient. Its dining room offers chicken Kiev, Kōbe beef, curried lobster, and the plump oysters from Hiroshima Bay that are among the finest in the world. There is no reason why it should seem strange to see on the walls plaques announcing that Rotary International and Lions International meet here weekly,

Shadowy Cutouts in a Cozy Window Invite Patrons to a Wine Shop

Neons in Japanese characters gild fresh snow in Sapporo, Hokkaidō's capital. Center of a ski-resort area, the city lies beneath a white blanket five months of the year.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

KODACHROMES BY JOHN LAUNOIS © NATIONAL GEOGRAPHIC SOCIETY

Tea ceremony preserves the traditions of an earlier era. Strict rules govern the ways of pouring hot water from the kettle, holding the teacup, and sipping the brew. Devoid of unnecessary gestures, the ceremony reflects the teachings of Zen Buddhism. Soju Takahashi, a tea master, instructs pupils above in the ritual.

Empty shoes await their owners outside a school. Japanese remove their footwear before entering a straw-carpeted room.

Bowing maids in Matsuyama bid farewell to a guest departing from his hotel.

but it does. In Hiroshima, one feels, things should not be as they are in other places.

A short walk from the hotel is a bright, new exhibit hall where the industrial products of a Hiroshima reborn are arranged in orderly array for potential customers. The variety is astounding: bug killers, tins of loquats and chicken kebab, electrical equipment, small machine tools, player pianos, rice harvesters, tennis rackets, stuffed toys, scrubbing brushes, and galvanized pails.

Downtown Hiroshima is a typical cluster of modern steel-and-concrete buildings, and streetcars clatter rapidly through heavy traffic. Business is better, storekeepers tell you, than before the war. There are no signs of destruction here, and seemingly no unpleasant memories. If there are, they are concealed beneath a scar tissue thicker even than that left by atomic burns.

Flowers Bloom Where Horror Reigned

Only a couple of blocks away, though, on the way back to the hotel, stands the twisted skeleton of the Industrial Exhibition Hall, a domed building which was near the center of the explosion. It has been left unrepaired, a permanent reminder of horror incarnate. In front, making a mockery of earlier predictions that atom-scorched earth would bear no plants for generations, bloom clusters of scarlet flowers.

From the hill called Hijiyama, one may look down on nearly all of Hiroshima. From here the extent of the damage is more impressive. Most reconstruction has taken place in the center of the city; on the outskirts there are still long stretches of temporary shacks.

The next day was Sunday, the first Sunday in December, and I went to the stucco Church of the Resurrection. I slipped off my shoes in the vestibule and walked across a bare floor to take my seat on one of the 20 plain pine benches, covered with thin green cushions. The walls were of plaster and unfinished pine, the lectern of plain wood. The Episcopal service began, and with my Japanese fellow worshipers I sang the familiar hymns to which they put unfamiliar words.

The lesson was from the 21st chapter of St. Luke—and it seemed strangely appropriate to that place and that day. The minister's voice was firm and clear, and I followed in my own King James Version:

"But when ye shall hear of wars and commotions, be not terrified: for these things must first come to pass; but the end is not by and by. . . . Nation shall rise against nation . . . and fearful sights and great signs shall there be. . . .

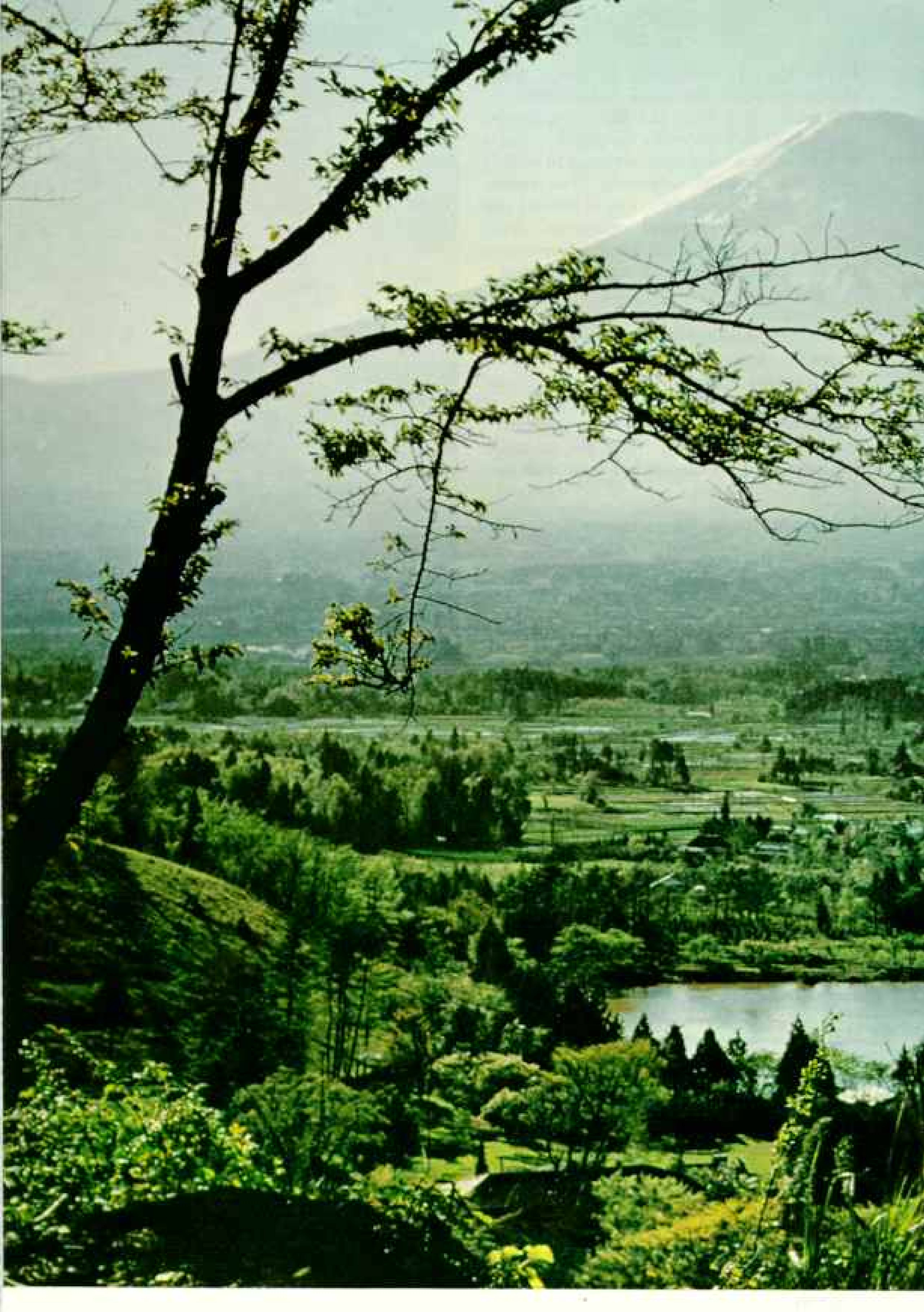
"Men's hearts failing them for fear, and for looking after those things which are coming on the earth: for the powers of heaven shall be shaken. . . . Verily I say unto you, This generation shall not pass away, till all be fulfilled.

"Heaven and earth shall pass away: but my words shall not pass away."

The pump organ began again, and we sang a final hymn. Outside in the cold sunshine several members of the congregation bowed politely to me as we parted. I walked back to the hotel, going out of my way to pass once more that blasted building and its defiant blossoms, symbols of man's power to destroy and nature's irresistible demand for rebirth.

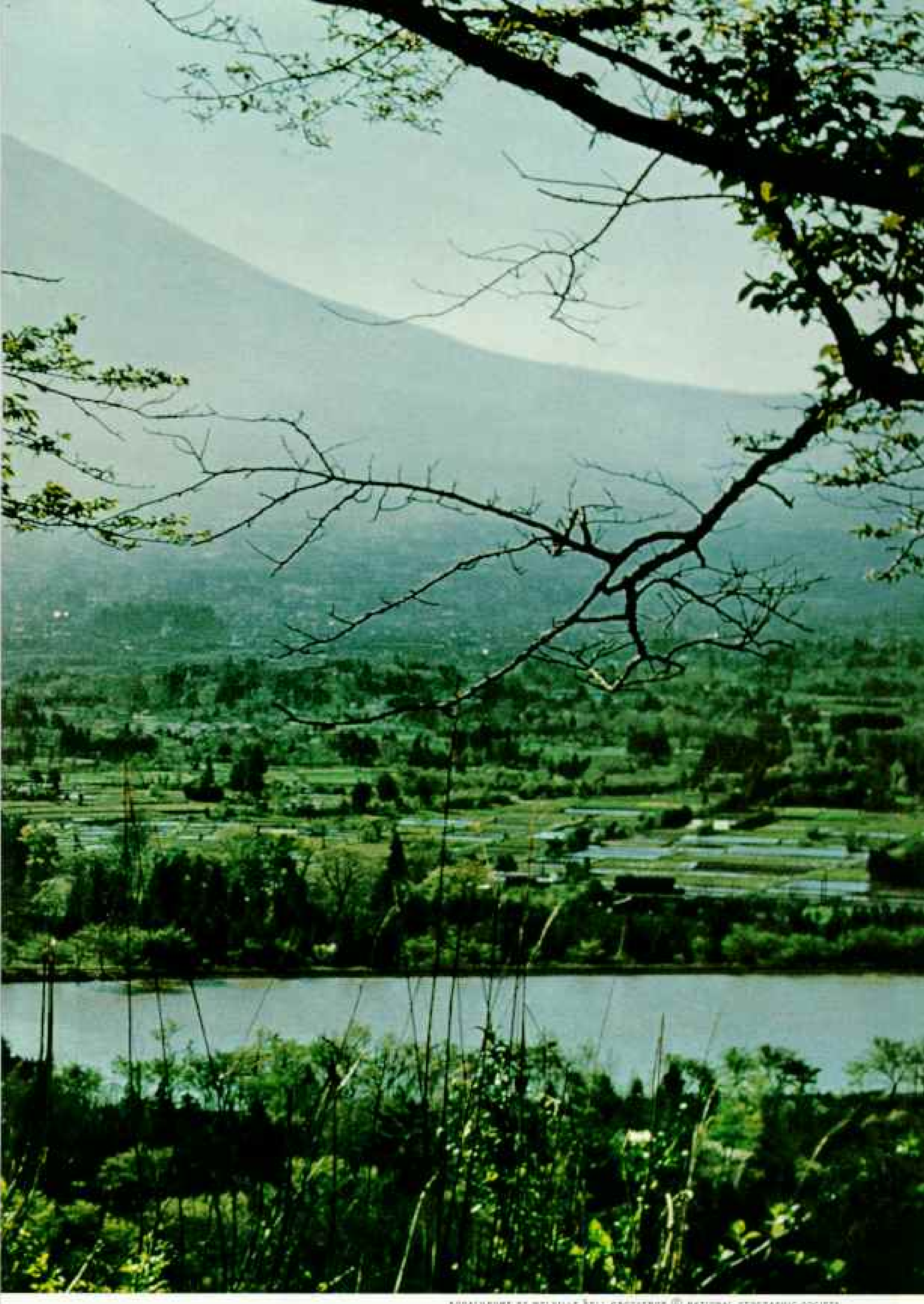
KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Hiroshima preserves the battered dome of its Industrial Exhibition Hall as a reminder of the historic atomic bombing of August 6, 1945. Not long after that holocaust, some scientists predicted that nothing would grow for 70 years. The prophecy proved unfounded; within three years trees were budding again. These cannas bloom a few hundred yards from the blast's center.



Fuji, Japan's Sacred Mountain, Takes Shape Behind a Veil of Haze

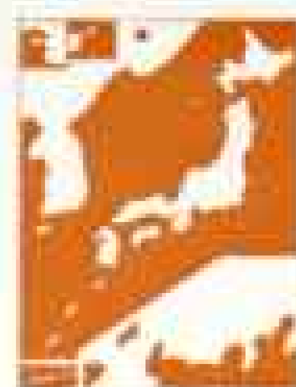
Pilgrims by the thousand ascend the 12,388-foot volcano each summer to visit a Shinto shrine at



KODACHROME BY MELVILLE BELL GROSVENOR © NATIONAL GEOGRAPHIC SOCIETY

the crest. Many climb by night in order to admire the spectacular sunrise from the snowy summit. Silent now, Fuji erupted last in 1707-08, covering Tokyo, 75 miles away, with six inches of ash.

JAPAN AND KOREA DOMINATE NEW ATLAS MAP



TWO LITTLE COUNTRIES laden with people and problems—and an importance to the world out of all proportion to their size—reveal themselves in the new National Geographic map **Japan and Korea**. Latest in the 10-color Atlas Series, it reaches The Society's 2,500,000 member-families as a supplement to this issue.*

Like a sore thumb on the great paw of Asia, Korea still wears a grim bandage—the cease-fire line where, since July 27, 1953, an uneasy peace has reigned between Communist north and non-Communist south.

Moated by Korea Strait and the Sea of Japan, the green islands of the Rising Sun stand aloof from the continent—as the British Isles lie aloof from Europe—yet so near, so populous, and so vital that often it has been said in the past: "As goes Japan, so goes the Orient."

All the Japanese islands together add up to only 142,500 square miles, less than the area of Montana. Yet they hold 94 million Japanese—140 times Montana's population.

Japan's land is so mountainous and so poor that barely a sixth of it grows food. Now Japan, like the Netherlands, is working hard to reclaim land from water with the aid of Dutch experience and counsel.

A dike is being built to cut off the bay east of Isahaya, northwest Kyūshū, so that it can be drained to create 18,250 new acres of farmland.

Already draining is Japan's second largest lake—Hachirō Gata, in northwest Honshū—to provide 42,500 acres and an estimated 1,500,000 bushels of rice a year.

When the Japanese built the new two-level motor and pedestrian tunnel linking Honshū with Kyūshū, little if any dirt went to waste. With the 14½ million cubic feet of rock and earth dug from under the sea, they added a few precious acres.

Red stippling on the map locates at a glance Japan's 19 national parks, meccas alike for Japanese and visitors from abroad.

Marks over the letters "o" and "u" in many Japanese place names help guide pronunciation—and more. For instance, Osaka, with an O pronounced quickly—"aw"—means Little Hill, a calm village in Gifu Prefecture; Ōsaka, with a long O pronounced "aww," means Big Hill, the bustling seaport.

A large inset on a scale of 20 miles to the inch focuses on Japan's most populous region, including nine-million-strong Tokyo, world's second largest city.

In another inset, red dots separate Japanese Hokkaidō and the Soviet-occupied southern Kuril Islands. Similar red dots set off United States-administered Okinawa and the Sakishima group, the latter in an inset at lower left.

Troubled and still-divided Korea labors to recover from the war of 1950-53, which split its industrial north from the agrarian south.

Above the cease-fire line, at about the 38th parallel, North Korea's Communist regime claims to have restored the war-wrecked industrial complex left by the Japanese, including some of the world's largest hydroelectric plants along the Yalu River.

Prosperity Returns to Korean Capital

To the south, 2½ billion dollars from the United States and other nations has helped the 23 million citizens of the Republic of Korea to rebuild ruined cities and utilities in their 38,000 square miles of the peninsula.

Much remains to be done. But Seoul, the capital, twice lost and recaptured, today is more prosperous than ever. A new railroad shortens the distance between Seoul's port, Inch'on on the west coast, and Samch'ok on the east coast. (The apostrophe represents an aspirate for which there is no English equivalent.)

Like storm clouds in the map's northwest corner loom the Communist colossi—Red China and the Soviet Union.

*Twenty-first in the series of uniform-sized maps issued free as supplements in the past three years, this new map forms Plate 51 in the National Geographic Society's Atlas Series. To bind their maps, nearly a quarter-million members have ordered the convenient Atlas Folio, at $4.85. Single maps of the series, at 50 cents each, or a packet of the 21 maps issued in 1958-60, at $8.25, may be ordered from the National Geographic Society, Dept. 56, Washington 6, D. C. A combination of map packet and folio is available at $12.50.

Tame Deer Nibble *Osembei*—Honorable Rice Cake—in a Park at Nara, Japan

By day the animals beg food from sightseers. A trumpet blast at dusk calls them to their pens. Their benefactress is Yukiko, the Japanese wife of photographer Launois.

ANSCOCHROME BY JOHN LAUNOIS, BLACK STAR © NATIONAL GEOGRAPHIC SOCIETY

CENTRAL PARK

Manhattan's Big Outdoors

By STUART E. JONES
National Geographic Staff

Illustrations by
National Geographic photographer
BATES LITTLEHALES

MY NEW YORK TAXICAB DRIVER had been a silent, faceless figure in an aloha shirt. Then a red light stopped us at a pedestrian crossing in Central Park, and he spoke.

"See those swings?" He jerked his head toward a playground that seethed with children. "They have to be plenty tough to take that treatment. Know what? They're tried out on gorillas first."

"Gorillas?" I asked. "Do you mean to say that Central Park uses gorillas to test playground equipment?"

"That's right, Mac. Gorillas. Over at the zoo. To see if they're strong enough. The swings, I mean." He shook his head and chuckled. "Boy, these New York kids. . . ."

"Drop me off at the zoo," I said.

I found John Galm, Supervisor of the Central Park Zoo, and his staff rejoicing over the birth of twin aoudads, or Barbary sheep. This was the fourth time the aoudads had twinned, bringing the zoo's total population to 134 animals of about 50 species.

"Our zoo is small, as zoos go," said Mr. Galm, "but we take great pride in the fine health of our animals. The mortality rate is remarkably low."

He showed me a 26-year-old camel, an Australian catbird, spry at 21-plus, and several lions that were fairly long in the tooth but still in roaring good spirits.

"And here are a couple of the nicest girls I've ever known," Mr. Galm said as we fetched up at an indoor cage housing Carolyn and Jo-Ann, Central Park's 20-year-old lowland gorillas. "Lovely, aren't they?"

Apes Earn Their Keep—and Their Own Swing

Carolyn squatted in a corner, gravely scratching her massive black chest. Jo-Ann, in an opposite corner, eyed us thoughtfully as she ate crisp raw string beans with a clashing of teeth and a smacking of lips.

"A cab driver," I said, "was telling me some preposterous yarn about gorillas testing playground swings, and I wondered. . . ."

"Preposterous? Not at all. You might call Carolyn and Jo-Ann a sort of anthropoid bureau of standards.

"Our maintenance people," Mr. Galm went on, "had been having some trouble with swings. After a few months of use they fell apart. So we developed a new swing, made of heavy-gauge aluminum reinforced with steel. We hung two of them in the cage with Carolyn and Jo-Ann. The theory was that if a couple of 350-pound apes could not break up the swings, neither could the children."

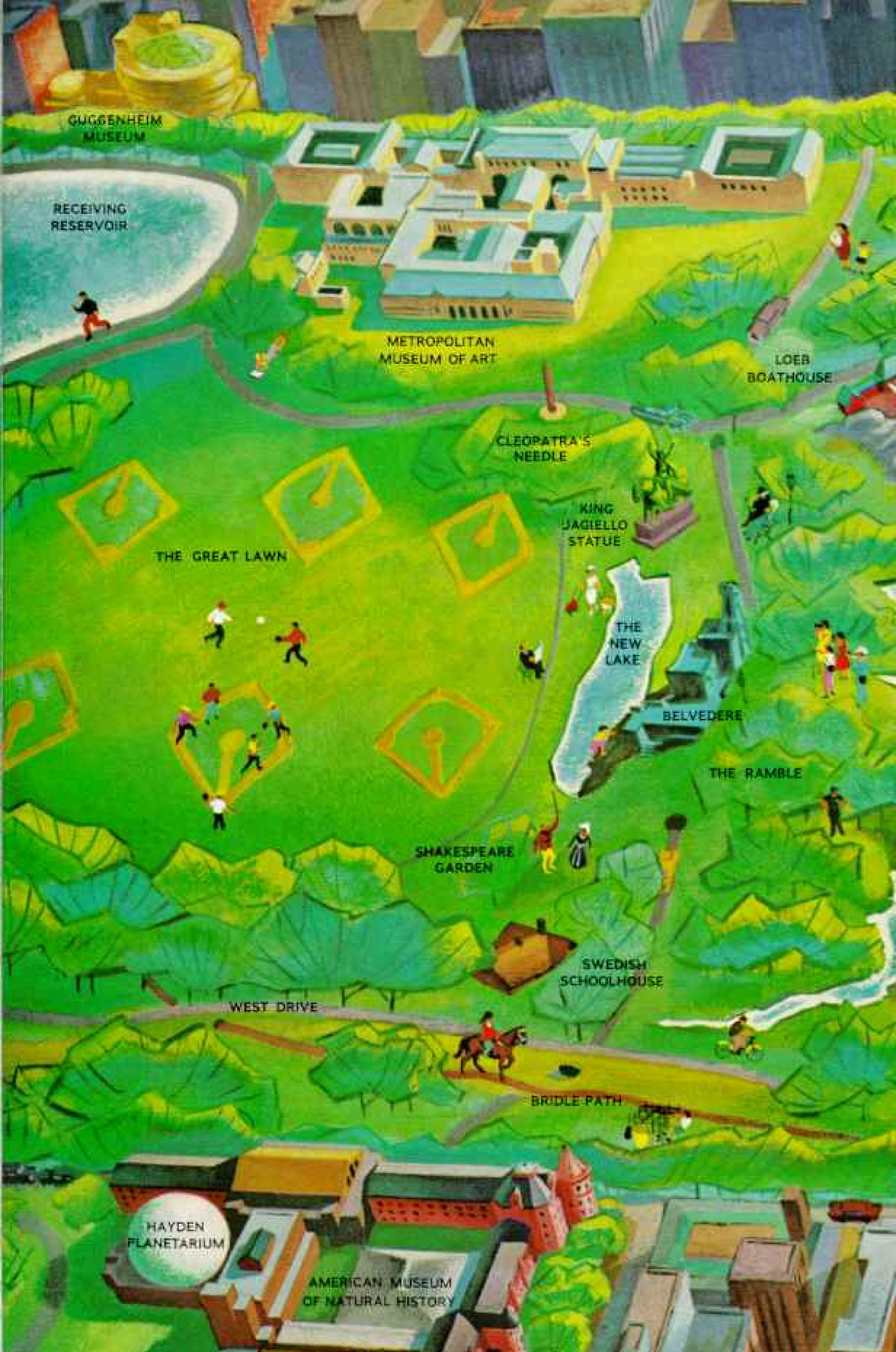
The gorillas began by inspecting the swings carefully, Mr. Galm said. Then they went to work.

"They banged the swings against the walls," said Mr. Galm. "They tried to chew them to pieces. They twisted them on their chains, then stood back to watch them spin. They twisted the chains so tight that the eyebolts pulled out of the seats. We installed stronger fittings. Finally the girls gave up. They couldn't do any more damage."

As a reward for a job well done, Carolyn and Jo-Ann were allowed to keep a swing (page 795).

"Lots of interesting things in this park, if you only know (Continued on page 788)

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY


GUGGENHEIM MUSEUM
RECEIVING RESERVOIR
METROPOLITAN MUSEUM OF ART
LOEB BOATHOUSE
CLEOPATRA'S NEEDLE
KING JAGIELLO STATUE
THE GREAT LAWN
THE NEW LAKE
BELVEDERE
THE RAMBLE
SHAKESPEARE GARDEN
SWEDISH SCHOOLHOUSE
WEST DRIVE
BRIDLE PATH
HAYDEN PLANETARIUM
AMERICAN MUSEUM OF NATURAL HISTORY

FIFTH AVENUE
FRICK COLLECTION
KERBS MODEL BOATHOUSE
CONSERVATORY POND
ALICE IN WONDERLAND STATUE
HANS CHRISTIAN ANDERSEN STATUE
ARSENAL
SHERMAN STATUE
THE ZOO
BALTO STATUE
THE PLAZA
THE POND
SHAKESPEARE STATUE
EAST DRIVE
MARY HARRIMAN RUMSEY PLAYGROUND
BIRD SANCTUARY
THE MALL
WOLLMAN RINK
KINDERBERG
CHESS AND CHECKER HOUSE
BETHESDA FOUNTAIN
FRIEDSAM CAROUSEL
CENTRAL PARK SOUTH
THE SHEEP MEADOW
THE LAKE
HECKSCHER PLAYGROUND
BOWLING ON THE GREEN
TAVERN-ON-THE-GREEN
SAN REMO APARTMENTS
CENTRAL PARK WEST
ROBERT C. MAGIS STAFF ARTIST
© NATIONAL GEOGRAPHIC SOCIETY

HS EKTACHROME (ABOVE), EKTACHROME (LEFT), AND KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHER BATES LITTLEHALES © N.G.S.

Elbow room for the spirit

For miles brick-and-concrete canyons cleave Manhattan. Suddenly, the avenues' walls yield to grass, trees, and mirror lakes. From elegant 59th Street to crowded Harlem (map, left), Central Park greets the eye like a miracle. To the park's 840 acres, asphalt-jaded New Yorkers flee for renewal.

The sprawling young sailor in cowboy boots launches his sloop and, in imagination, sails in the America's Cup Race. A bench dozer soaks up sun. Children, some in the statue's lap, surround Hans Christian Andersen to hear his tales retold.

Bird watcher with binoculars (page 787) scans the Ramble, in whose tangle rookie policemen have been known to lose their way. The artist works beside Conservatory Pond, where model schooners cruise in sight of Fifth Avenue towers.

An awninged victoria on 59th Street makes a U-turn into the park, thereby halting traffic. The girl in grass and sunshine grooms her dog.

To these and many more, the pigeon and sparrow above appeal for handouts, and not in vain, for the park warms the hearts of its visitors.

THIS PAGE FOLDS OUT

KODACHROME BY STUART E. JONES, NATIONAL GEOGRAPHIC

AN EKTACHROME (ABOVE) AND KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

where to look for them," Mr. Galm said. This view was shared by Dr. James A. Oliver, Director of the neighboring American Museum of Natural History. He urged me to join one of the museum's nature walks in Central Park.

And so, on a chill mid-April morning, I arose shortly after dawn and hurried to the park to meet Miss Farida A. Wiley of the museum staff.

Miss Wiley, jaunty in a trench coat and black beret, greeted about 50 of us at a gate opposite the museum, on Central Park West. At her signal we formed a loose column and ambled into Manhattan's big outdoors.

Almost overnight the park had cast aside the drab sackcloth of winter. Fountains of forsythia spouted living gold, and weeping willows wore their spring frocks of virginal green. Magnolias and fruit trees were in full flower, and dogwood buds swelled with the promise of pink and white glory to come.

The hikers listened to Miss Wiley talk of these splendors, but seemed impatient to get on to the business of the day—birds. Central Park has more than 200 species, migratory and year-round, not counting the peregrine falcons that perch on high buildings and occasionally swoop down for a pigeon dinner.

I fell in behind a middle-aged couple from Morningside Heights, the woman a seasoned birder, her husband new to the sport.

"There's one!" exclaimed the husband, pointing to a purplish-black bird on the ground a few yards away. "What is it?"

"A purple grackle," said his wife. "We don't count those, or starlings or pigeons. Too common."

"It's a bird, isn't it?" he demanded.

Cardinal Competes Against Aircraft

"Listen!" cried our leader, and the column halted. "A cardinal! Hear it?"

We all listened, and finally recognized the cheery whistle against the racket of a westbound DC-7 and a helicopter. Then we saw it, a brilliant scarlet male flashing from branch to branch of a sycamore.

The birders presented a solid front of staring binoculars. As we watched, the cardinal was joined by his mate, and the pair flew off toward West 77th Street.

For the most part, the hikers were unknown to one another. Yet they conversed freely—a rare sight where strangers gather in New York. They ranged from a Wall Street executive, who took binoculars from an attaché case, to a tall blonde in a skiing outfit.

After a cautious crossing of the park's West Drive, we found ourselves on a footpath overlooking the Lake, where sailors spend their liberty hours rowing boats.

The sighting of a red-winged blackbird, gleaming in the sunlight high in an elm, produced a chorus of delighted oohs and ahs, and a busy scribbling in notebooks.

Soon we were in the Ramble, the dense little mid-park glade that nature lovers claim as their own preserve. Some of our hikers were veterans of the 1955 "rumble over the Ramble," when bird watchers staged mass protests and defeated a plan to make the 25-acre tract a recreation center for the elderly.

Gnatcatcher Crowns Successful Day

There was a commotion near the head of the column, and a cry from Miss Wiley.

"Look! A blue-gray gnatcatcher!"

Voices rose in a confused, excited babble. "Where?" "I can't see a thing." "Get out of my way, please." "Where did it go?" "There it is—over there by that Crackerjack box!"

Pressing forward, we saw the blue-gray gnatcatcher as it hopped from the ground to a low hackberry limb and obligingly stood there waggling its long tail.

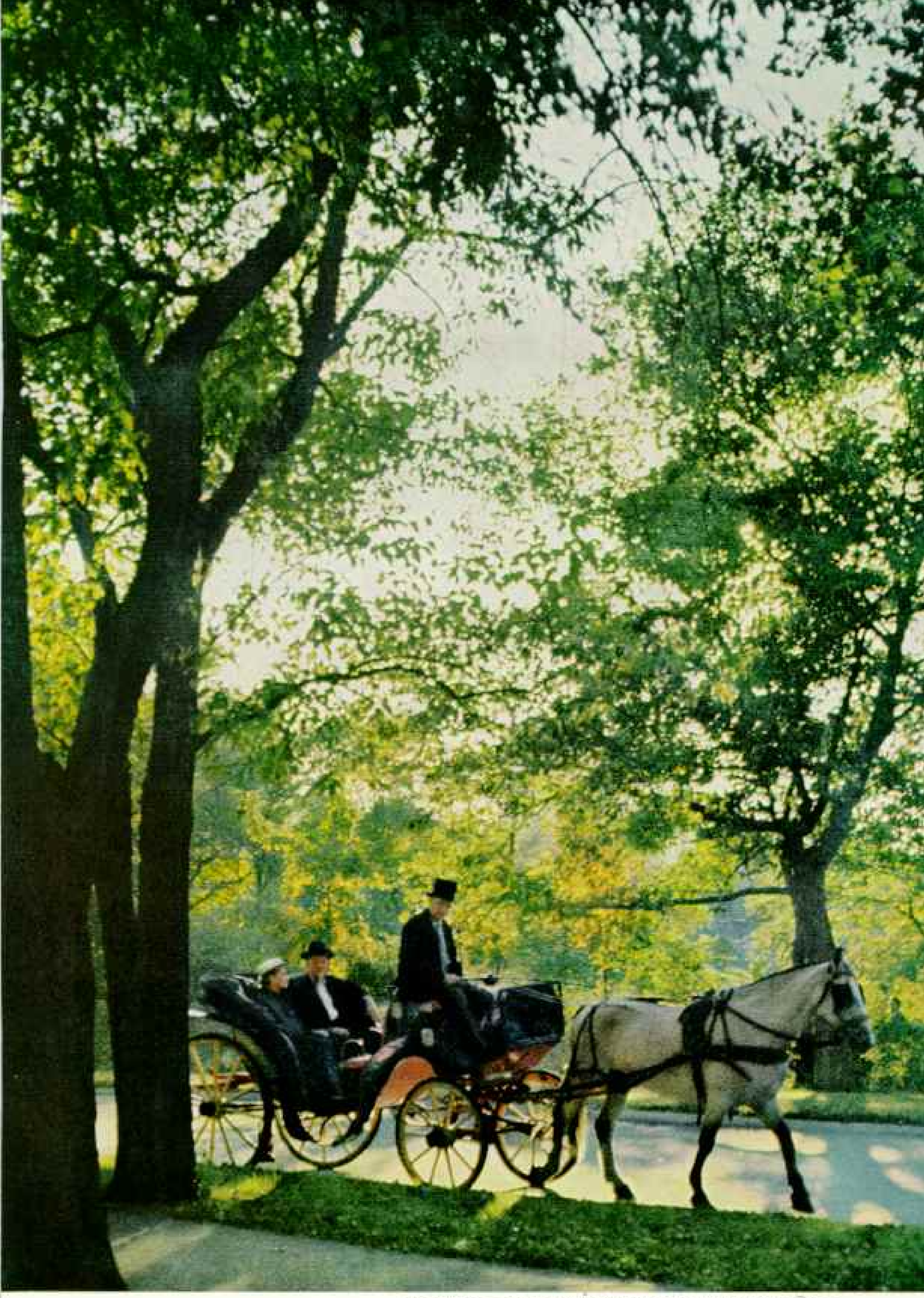
"What a day!" exclaimed Miss Wiley. "I'll tell you, it isn't every day you see a blue-gray gnatcatcher in Central Park!"

Two hours later we were back on Central Park West comparing notes on the day's sightings. We had seen about 30 species in all. There had been only one untoward incident. Near the end of the walk, a youth sneaked into the rear ranks of the birders and exploded a firecracker. One of our group labeled him a black-capped nuisance, an immature specimen of *Homo sapiens*.

The Wall Street man—a pin-striped market analyst—put his binoculars back in his attaché case and faced up to the prospect of going to work. We shared a cab downtown.

"Well, it's back to the Dow-Jones averages for me," said my companion. "I don't know what I and a lot of others would do without Farida Wiley. She is one of the people who make Central Park really worthwhile for New Yorkers."

These excursions and others, over the course of a year, led me to a judgment: The abiding miracle of Central Park is the simple fact that it exists.



EKTACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER BATES LITTLEHALES © N.G.S.

Hoofs clop, leather creaks. Morning sun sheds gold on a Central Park drive

Alice in Wonderland Rubs Noses With an Admirer

The little girl who tumbled down a rabbit hole into a topsy-turvy world holds court in the park. Her courtiers are the principals of a tea party as celebrated as the one in Boston harbor. The Mad Hatter wears his trademarks: stovepipe hat and a delightfully demented look. The Dormouse tries to stay awake, always a losing effort. Alice, oblivious to her companions' quirks, plays with her kitten Dinah. The company sits on six giant mushrooms that form an irresistible jungle gym for youngsters.

Publisher George T. Delacorte, Jr., gave the bronze group in memory of his wife Margarita. Fernando Texidor designed it, José de Creeft sculptured it, and Hideo Sasaki landscaped it. Children who clamber over it are gradually polishing the surface to a high sheen, a testament to their affection.

Mad Hatter submits to a friendly nose wiping. Other Wonderland characters include White Rabbit, Cheshire Cat, and Caterpillar.

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

There it lies—840 verdant acres a maharaja could not buy (painting and map, pages 782-785). Around it roars the busiest, richest, maddest, gayest city the world has ever known. On all sides, wreckers tear New York apart and builders put it together again, reaching ever higher with brick and stone, steel and glass.

Unruffled by all this noisy hustle and bustle, the park goes the way it has gone for about a century. Serenely it offers harassed millions its one great gift—room to breathe, refuge from the pressures and tensions of big-city living.

As a frequent visitor to New York, I had never paid much attention to Central Park. I knew it was there; I had glimpsed it from taxis, buses, airplanes, even from a helicopter at 1,500 feet. But mere survival in this incredible city took all a man's ingenuity and stamina. Who had time or energy to roam what seemed to be just another park?

My own explorations proved that finding time and energy was well worth the effort. Just as rewarding were side trips to the great

Theodore Roosevelt in bronze hails visitors to the American Museum of Natural History on Central Park West. T. R., his father, two sons, and a daughter have served as trustees. Manhattan Square, site of the museum, was renamed Theodore Roosevelt Park.

Trunk Upraised, a Bull Elephant Scents a Threat to His Herd

Lifelike displays in the museum's 58 exhibition areas spirit imagination to earth's far reaches. Towering dinosaurs, the Olympic Peninsula rain forest, and a sky full of oceanic birds vie for attention. The mammal collection alone includes 100,000 specimens. Hayden Planetarium's panorama of the heavens turns thoughts to space.

Akeley Memorial African Hall (right) offers sights once reserved for the adventurer. The gripping centerpiece consists of a herd of elephants, two of them bagged by President Theodore Roosevelt's sons, Theodore and Kermit.

cultural centers on the perimeter: The Metropolitan Museum of Art, the H. C. Frick Collection, the gemlike Museum of the City of New York, the boldly avant-garde Solomon R. Guggenheim Museum (page 808), and the American Museum of Natural History.

On a warm Saturday in September, I entered the park at its southeast corner, leaving behind the hotels and apartment houses of Fifth Avenue and Central Park South. Traffic throbbed and honked along these near-by streets. Faint tremors and a faraway rumble told of subway trains on their thundering errands deep in the earth. In the solitude of Central Park these sounds blended into a drowsy, pleasant hum.

The setting represented New York at its best: the suave Rolls-Royces and Mercedes-Benzes ranked outside the elegant Plaza Hotel, pigeons wheeling about the Pulitzer Memorial Fountain, horse-drawn carriages clip-clopping into and out of the park with cargoes of sightseers (page 789).

Under a canopy of tall elms and oaks I sauntered around the Pond, also called the 59th Street Lake, one of five such jewels that sparkle on Central Park's green bosom. Although many thousands of people visit Central Park daily, my neighbors seemed remarkably few. Toddlers and pram-borne infants took the air with mothers and nursemaids; citizens walked their leashed dogs; others read or just loafed.

A few bench sitters held sheets of aluminum foil mounted on cardboard. While dreams of tropical beaches filled their heads, they let the sun's reflected and concentrated rays turn Manhattan pallor into rich outdoor bronze.

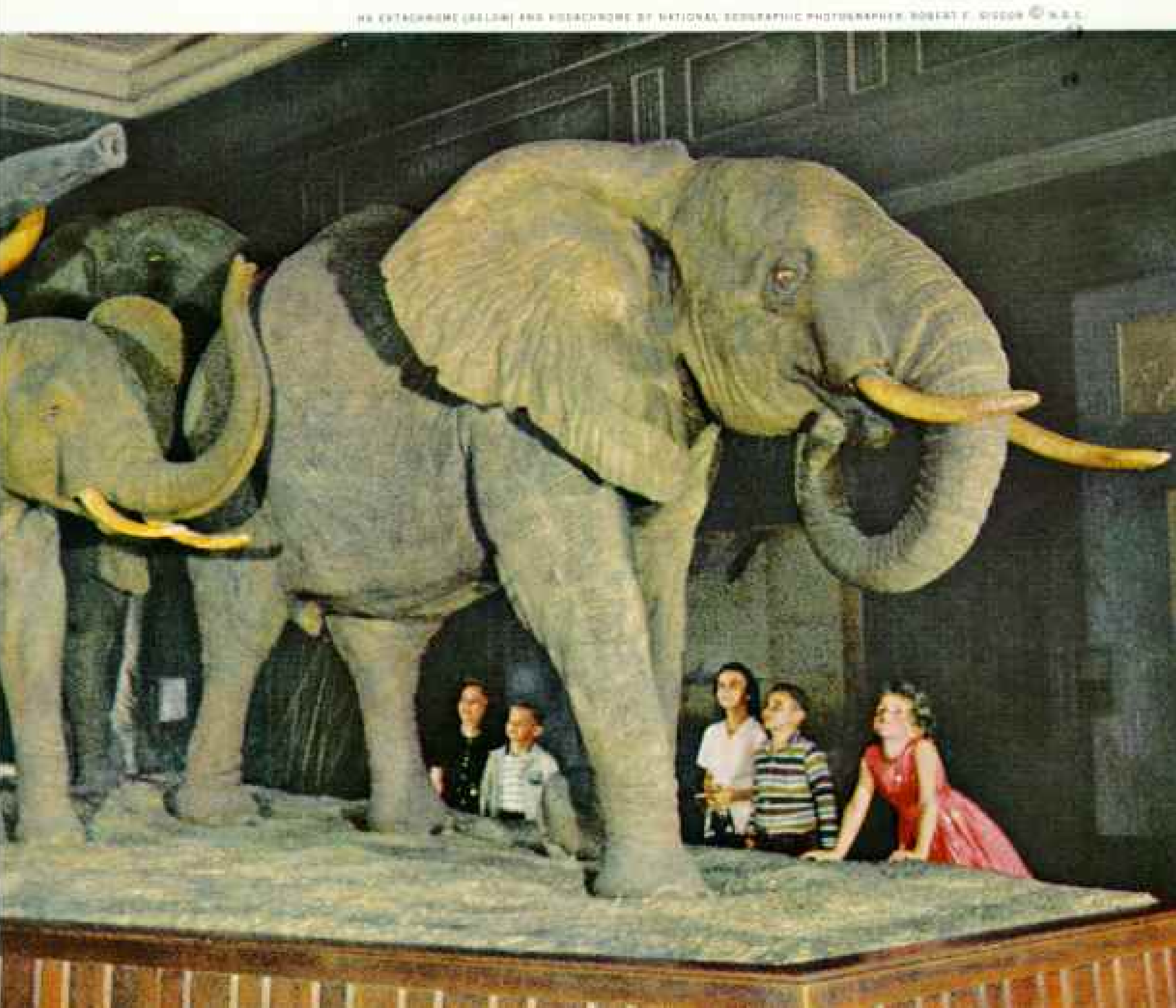
Cyclists Cause Uproar at Model Pond

After a while I strolled northward to the Conservatory Pond, arriving just in time to find custodian Frank Liggio dealing with a small crisis.

Four boys on bicycles had dashed the length of the broad promenade fronting the pond. Children ran screaming to their mothers. A little girl dropped an Eskimo Pie in her flight to safety. Dogs yelped in terror.

The cyclists, observing the uproar caused

AN EKTACHROME (BELOW) AND KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON © N.G.S.



Kindergarten Boys Make Friends With a Harmless Pilot Black Snake

The American Museum's Natural Science Center introduces children to the sight, sound, and touch of creatures found in city parks and near-by shore and forest. "Snakes feel warm and dry, not cold and slimy," exclaims many a surprised youngster.

by their deed, raced along the path again.

At this point Mr. Liggio intervened. Cycling on pedestrian walks was strictly illegal, he explained, and if it happened once more he would have to call a policeman.

Three of the boys disappeared. The fourth took a seat at the edge of the pond and watched the model yachts scudding to and fro like white-winged moths. Soon he took a small wire slingshot from his pocket and began shooting paper clips at the boats.

Instantly there was a new outcry, this time from the boat owners. Mr. Liggio reached the scene just as a paper clip bounced off a tiny barkentine's varnished deck.

"Look," Mr. Liggio told the boy, "these people have spent months building these boats, and now you come along spoiling their fun. Why don't you build a boat of your own?"

The youth muttered a reply, and Mr. Liggio led him into the Kerbs Memorial Model Yacht Boathouse, crowded with sloops, schooners, caravels, galleys, junks, and frigates, all built precisely to scale.

When the boy emerged 15 minutes later, he carried a sheaf of catalogues and model-building instruction booklets. He mounted his bicycle and rode off with purposeful look.

"Maybe he'll be back with a boat some day," remarked Mr. Liggio, watching from the boathouse doorway. "Let's hope so."

For every man or boy who comes to sail model yachts, dozens more come to watch. Sometimes as many as a hundred miniature craft may be seen beating to windward, coming about, or running downwind, each with its own self-steering rig (page 787).

I watched young Brian Hicks, who earns his living selling salted peanuts in a Times Square shop, tenderly launch a 62-inch model of a Gloucester fishing schooner. Building it had taken two years of spare time, he said.

Brian gave his little ship a gentle push and let the light breeze waft it away close-hauled on a starboard tack.

It was easy to see that Brian, in spirit, was far from Central Park, Times Square, and salted peanuts. He might have been one of Kipling's Captains Courageous on the Grand Banks of Newfoundland, fighting the wheel of *We're Here* as she pounded along with her lee rail awash and a smother of spray flying up from her forefoot.

A shout from a friend shattered Brian's dream and brought him abruptly back to the Conservatory Pond. He turned to help get a huge, cumbersome model of Columbus's *Santa Maria* into the water.

Young and Old Listen to Storyteller

Overlooking the Conservatory Pond from the west stands the Hans Christian Andersen Memorial Statue. Here I listened in as Miss Jean Lloyd conducted a storytelling hour.

Standing before the seated bronze Andersen, Miss Lloyd read from his works and others. Several score children, many with their equally fascinated parents and grandparents, listened raptly (page 786).

As part of the program, Miss Lloyd invites the children to tell stories of their own. Usually they respond with masterpieces of childish fantasy. Sometimes there is stark realism, as when a small girl stood up and recited this somber short story:

"My brother is bad. He eats all his Jell-o and then he eats mine. I would like to put him in the garbage can and put the lid on."

Georg Lober's sculpture shows Andersen holding one of his books opened to "The Ugly Duckling." At the writer's feet stands the Ugly Duckling itself; frequently it serves as a stool.

"This statue will never acquire a patina," Miss Lloyd told me. "The children enjoy climbing on it probably as much as they do hearing the stories."

From four years of polishing by many youthful knees and hands, Andersen and the Duckling gleam like a bright new penny.

Wearing an equally high gloss, and even better designed for climbing, the new Alice in Wonderland group overlooks the pond from the north. Sculptor José de Creeft has captured Lewis Carroll's fanciful characters in wonderfully lifelike attitudes (pages 790-791).

Pinafored Alice, her arms widespread as if inviting everybody to climb up with her, sits atop a mushroom. The Mad Hatter, with a "10/6" price tag on his hat, looks completely mad. The Cheshire Cat grins from a bronze tree. The White Rabbit, hurrying along, looks anxiously at his watch. The Dormouse just looks sleepy.

A plaque on the base of the statue, placed by the donor, George T. Delacorte, Jr., says simply: "In memory of my wife, Margarita Delacorte, who loved all children."

A westward route led to the New Lake and the Belvedere, the castlelike structure housing a U. S. Weather Bureau station. In summer the Belvedere serves as a backdrop for out-

NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON

Carolyn, the swing-testing gorilla, makes park equipment safe for children. Officials, seeking a break-proof swing, hung models in the cage of Central Park Zoo's lowland gorillas. Two 350-pound apes gave chains and seats a slam-bang test that quickly revealed flaws.

door Shakespearean dramas (page 804). A new theater soon will rise on the site.

Crossing the Great Lawn, I walked the scene of a bitter chapter in Central Park's history. A reservoir formerly occupied the site, and when it was drained, homeless and jobless victims of the 1930's depression used it as a refuge. Later, the tar-paper hovels were razed and the reservoir was filled with earth and converted into a smooth expanse of turf.

Atop a slight rise stood the Obelisk, widely known as Cleopatra's Needle although it has no recorded connection with the Queen of the Nile. First erected at Heliopolis, Egypt, about 1500 B.C., the Obelisk was removed to Alexandria and placed before a temple by the Romans more than 14 centuries later.

When New York City accepted the Obelisk from the Khedive of Egypt in 1880, it also accepted a formidable transportation job. With much toil and trouble the 200-ton granite shaft was unloaded from a ship at Staten Island, then towed on pontoons up the Hudson River to 96th Street. There it was placed in a huge cradle and rolled on cannon balls to the park site. The Obelisk's twin, also called Cleopatra's Needle, stands on the Thames Embankment in London.

Soon I found myself on the 1½-mile footpath encircling the big Receiving Reservoir,

KODACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHER BATES LITTLEHALES © N.G.S.

Snow Summons Muffled Sledders and a Small Sculptor to Cedar Hill

City soot and snowplows deal harshly with winter's mantle, but the park extends a gay welcome. On this hill near East 79th Street, where kites flew on spring's milder breezes, red-cheeked children puff up white slopes and skim back down. Sleds predominate, but toboggans, skis, and plain boards sometimes claim right of way.

Plump snowmen mount guard by the paths, inviting destruction in the cross fire of a snowball melee.

THE HARRY T. PETERS COLLECTION, MUSEUM OF THE CITY OF NEW YORK

Skaters a Century Apart Waltz in the Park

Long skirts brush ice; mustaches and mutton chops shield masculine faces against cold. The Currier & Ives print depicts the Lake in 1862, five years after work on the park began. Distant bridge endures to this day, but the flag-topped boathouse has vanished.

Skaters still glide in the park, as the Kodachrome shows, but they no longer depend on cold weather for ice. A refrigerant flowing through 16 miles of pipes in Wollman Memorial Rink keeps a 1½-inch layer frozen in temperatures up to 90°. Since 1950 the rink has operated from October through April. In summer roller skaters and theatrical groups take over (page 805).

A thousand skaters at a time may use the 214- by 175-foot rink. Warming lounge, dressing room, skate shop, and cafeteria occupy the low red-brick building. Heavy sales of pizza pies, hot dogs, and French fries reflect the appetites whetted by the sport.

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where water from upstate pauses on its way to millions of New York faucets. Prize fighters and other athletes trot around the reservoir on their early-morning workouts, and some New Yorkers go there for a quaint form of exercise—walking.

After crossing the North Meadow and passing the sites of old Fort Clinton and Fort Fish, I reached the Harlem Meer and 110th Street, where the park borders on Spanish Harlem, home of many of the Puerto Ricans who have swarmed into New York in recent years.

Headed south again, I followed winding paths to a high ground with a name that harks back to the days of Manhattan's Dutch patroons—the Kinderberg, or children's mountain. Children seldom climb the Kinderberg these days. Atop it stands the modern Chess and Checker House, with its concrete tables for games generally favored by older people.

Central Park's chess and checkers enthusiasts formerly pursued their pastime outdoors, with no protection from heat or cold. Then, in 1951, a philanthropist who insisted upon anonymity agreed to finance a special pavilion.

Identity of the donor remained a secret for several years. Finally he was revealed as Bernard M. Baruch, financier and adviser to Presidents. The benefactor then disclosed that long ago he courted Annie Griffen, the future Mrs. Baruch, on the site of the Chess and Checker House.

In gratitude, park authorities gave him his own "elder statesman's bench" marked with a plaque that reads "Reserved for Bernard M. Baruch."

Throughout Central Park I found countless statues honoring historic figures ranging from William Shakespeare to

Boaters relax on the peaceful Lake not far from the twin towers of the San Remo Apartments on Central Park West.

The park gives haven to dumb creatures, too, including a duck that escaped from a market-bound truck. Instead of swimming in gravy, the bird wound up paddling in a mid-Manhattan pond.

Wet fun results when city children turn a playground sprinkler into a make-believe bronco.

KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Balto, the heroic Alaskan sled dog that helped rush antitoxin from Nenana to diphtheria-stricken Nome in 1925. Existence of the statues conflicts sharply with the ideas of Frederick Law Olmsted and Calvert Vaux, the landscape architects who designed the park.

"Where building begins, the park ends," was the designers' creed, and by building they meant anything man-made. Olmsted and Vaux saw Central Park as a place of rural recreation. A visit to it was to be a substitute for a trip to the country.

Even the need for cutting roads across the park bothered Olmsted and Vaux. They compromised by ingeniously sinking the four transverse roads below ground level, making them virtually invisible except to people actually on them.

Over the years, guardians of the park's rural character have scored some notable victories over threatened encroachments. One of the most painful crises occurred shortly after the death of Gen. Ulysses S. Grant in 1885. New York City had agreed to provide a site for a mausoleum. The general's admirers favored a spot on the Mall.

Samuel Parsons, then superintendent of the park, yielded to no one in respect for the Civil War hero and 18th President, but he felt that the tomb belonged elsewhere. An accomplished diplomat, Parsons adroitly steered the site selectors to a large green plaza on Riverside Drive. And there Grant's Tomb stands today.

Parsons also blocked erection of a statue of Gen. William Tecumseh Sherman on the

EKTACHROME (ABOVE) AND KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

Close play at first base marks a softball game between the companies of two Broadway shows, *A Raisin in the Sun* and *My Fair Lady*.

Each May the Broadway Show League opens a 12-week schedule with a gala parade to the park.

The zoo's hit show takes place at the sea-lion pool. Three seals, presenting a rowdy ballet, dive, leap, and bark for their daily mackerel and catch it in mid-air.

Mall. Instead, Sherman on his charger rides forever down Fifth Avenue atop a high pedestal near the southeast entrance. Later, Parsons foiled attempts to build race tracks in the park. At other times there have been efforts to establish a permanent circus there and to convert the whole area into an outdoor paleontological museum.

The latest dispute over what should or should not be in Central Park broke out this year. A. Huntington Hartford donated $862,500 for the building of a cafe just inside the southern rim of the park.

Mayor Robert F. Wagner and then Parks Commissioner Robert Moses instantly accepted the gift. Just as speedily, the scheme was attacked by merchants, civic groups, and newspapers. Tiffany and Company, the famous Fifth Avenue jewelers, filed suit to block the project, claiming it would "cheapen" the neighborhood.

The question was debated publicly for months, with heated arguing of the pros and cons in letters to newspaper editors. The pros were supported by Newbold Morris, who became Parks Commissioner after Mr. Moses resigned to serve as director of the 1964 New York World's Fair.

Finally, after public hearings before the Board of Estimate, Mayor Wagner and Commissioner Morris approved the Hartford Pavilion, which will be a handsome structure of concrete and glass designed by architect Edward Durell Stone.

Appropriately enough, the green park within a vast, crowded city was a poet's idea. The poet was William Cullen Bryant, who in 1844 was editor of the New York *Evening Post*. On July 3 of that year he declared in an editorial:

"The heats of summer are upon us, and while some are leaving the town for shady retreats in the country, others refresh themselves with short excursions to Hoboken or New Brighton. . . . If the public authorities . . . would do what is in their power, they might give our vast population [about 400,000 in 1844] an extensive pleasure ground . . . which we might reach without going out of town."

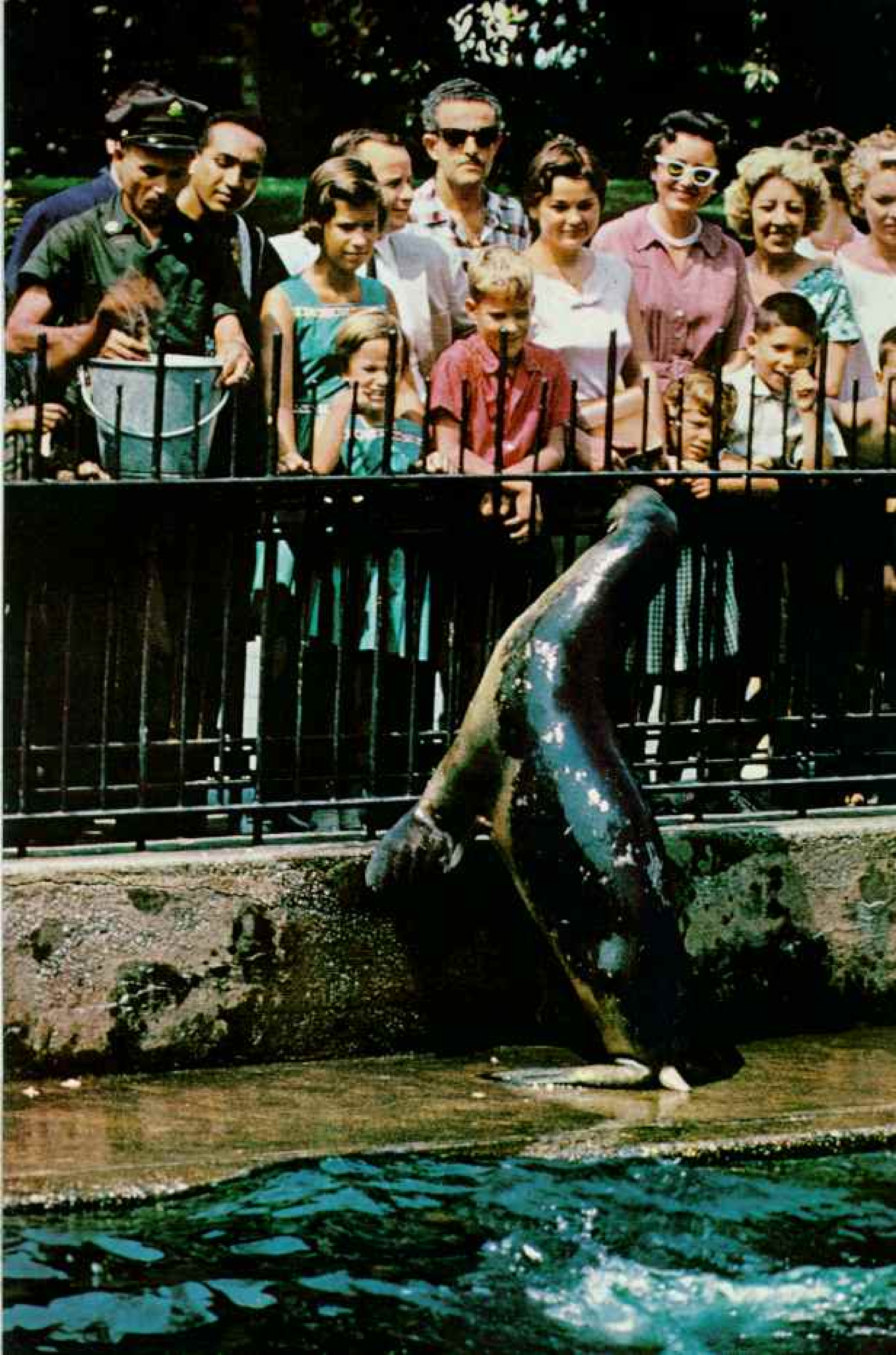
Squatters, Resisting Eviction, Hurl Rocks

Bryant recommended a 160-acre tract known as Jones's Wood, east of Third Avenue. He won immediate support from Andrew J. Downing, editor of the *Horticulturist* and a leading exponent of the outdoor life.

Opposition developed immediately. Some objected to the Jones's Wood site on the ground that it was too small; others wanted no park at all. Finally, the Jones's Wood plan was scrapped and the area between Fifth Avenue and Eighth Avenue was chosen and purchased parcel by parcel. The land cost about $7,000,000. Today its assessed value exceeds $500,000,000; its actual value soars off into astronomical realms.

The Olmsted-Vaux plan was declared the

(Continued on page 807)



Free Shakespeare in the Park: Henry V Hears His Archbishop Urge War on France

As Fifth Avenue's buildings catch day's last fading gleam, 2,500 playgoers expectantly face an outdoor stage, while other thousands turn away for lack of seats. The shirt-sleeved crowd hushes as spotlights illuminate the story of King Henry V.

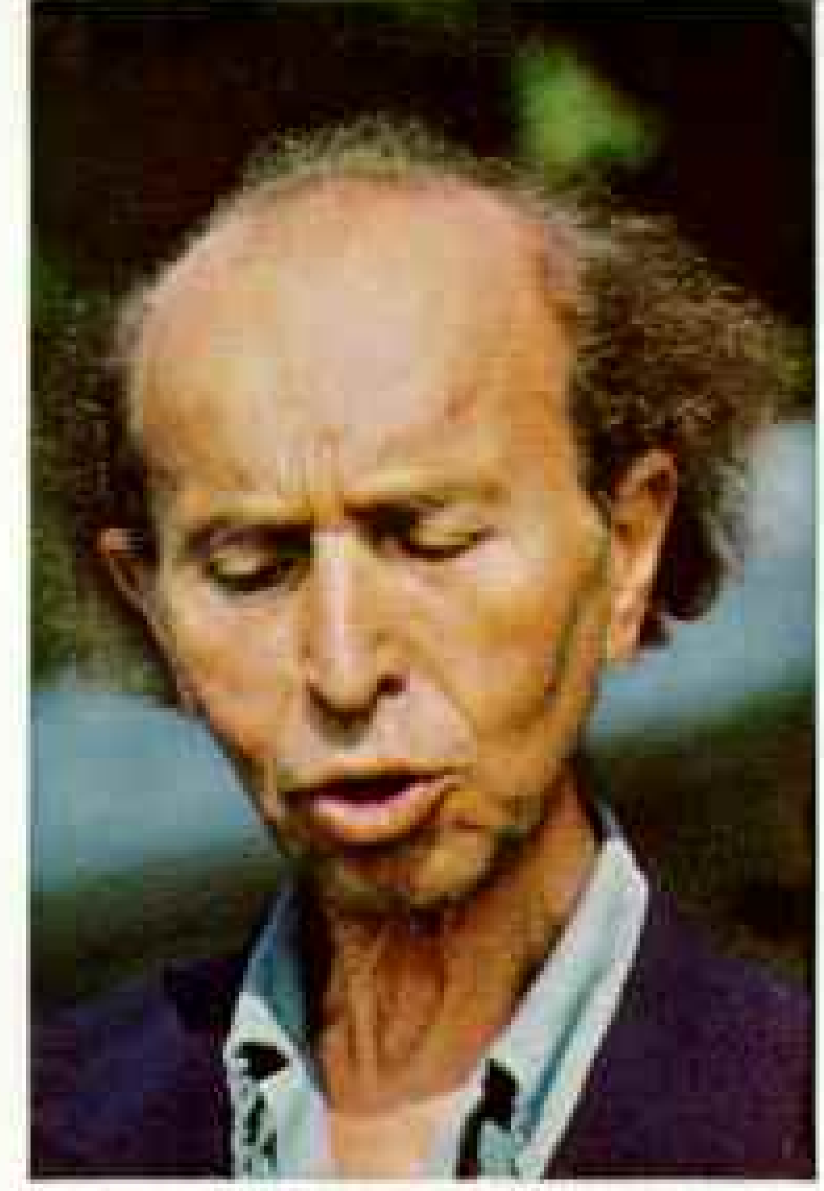
Performed with little scenery but much imagination, the open-air productions win praise for their vitality and warmth.

Joseph Papp, the producer, staged his first plays in a church basement seven years ago. In 1957 he moved to a makeshift theater in Central Park. Asserting that culture need wear no price tag, he financed the program with donations and

HS EKTACHROME (ABOVE) AND KODACHROMES © NATIONAL GEOGRAPHIC SOCIETY

defeated all attempts to force him to charge admittance. Next summer his company will perform in a permanent theater built with New York City funds.

In this scene the mitered Archbishop of Canterbury, surrounded by the royal court, urges his seated king to wage war for the French throne, to which he asserts Henry has lineal rights.



Strolling poet treats the photographer to a Shakespeare recitation from a park bench. "He didn't need a crowd," says Bates Littlehales. "One listener was an audience."

Estonian-Americans below polka at Wollman Memorial Rink, which in summer serves as a dance pavilion.

winner in a competition, and in 1857 Olmsted, as superintendent, started 3,600 men and 400 horses on the immense job of transforming a few gaunt farms and a rocky wasteland into a park. Many acres had to be wrested from squatters, who resentfully threw rocks at surveyors and engineers.

By the mid-1860's the work had progressed so far that Central Park could be said to exist. No formal opening was ever held, for the park was never regarded as finished. Improvement has continued over the years.

Maps Ignore Gilhooley's Lawn

Olmsted and Vaux probably would enjoy a visit to the park today—even though they might wonder why, among all the statues, there are none honoring themselves or William Cullen Bryant. They might find special pleasure, as I did, in rattling around in a pickup truck with foreman Artie Siebrecht, who introduced me to landmarks that do not appear on any maps or official records—Paddy's Walk, Gilhooley's Lawn, and Feldman's Rock. All were named for park employees.

"And here," said Mr. Siebrecht modestly, "is the Siebrecht Memorial." He pointed to a row of large stones along a pedestrian walk.

"Policemen used to take a short cut by driving their jeeps across the lawn, bridle path, and sidewalk onto West Drive," Mr. Siebrecht explained. "I got fed up with finding tire tracks in the grass, so I put the stones there to block them. I know you're not supposed to have a memorial unless you're dead, but there's mine."

Many New Yorkers regard the park as their communal patio, and the analogy holds true up to the point of the cookout. Basket picnics are allowed, but anyone attempting a barbecue probably would be halted before he had his charcoal lighted.

"The fire hazard would be too great," I was told by Richard C. Jenkins, Borough Director of Manhattan Parks.

Recalling ominous stories I had heard recently, I asked Mr. Jenkins about Central Park's reputation as a hotbed of crime.

"There have been a few muggings and other incidents," he said, "but actually the park's crime rate is much lower than that of other Manhattan police precincts."

Police discourage strolling in the park after nightfall, and at midnight they ask everyone to leave. More than 100 officers of the 22d Precinct, which constitutes the park itself, maintain 24-hour patrols on foot and horseback, by prowl car and jeep, even by outboard motorboat on the larger lakes.

Police often have to deal firmly with a lesser miscreant, the apartment gardener who stealthily helps himself to the park's rich topsoil, bearing it away in boxes and baskets and

Mounted Knights Guard Armor Hall in The Metropolitan Museum of Art

Facing Fifth Avenue, the museum occupies park land under a lease granted by the city. Since 1878 it has grown to a series of galleries containing 364,000 art objects. Yearly four million persons, including young art students (above), enter its doors.

EKTACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHER BATES LITTLEHALES © N.G.S.

leaving large holes. When caught, such offenders are rebuked and made to replace their divots.

If Olmsted and Vaux could be on hand on a certain Thursday in May, they might enjoy seeing the colorful world of Broadway make its annual descent upon Central Park. For the opening of their 1960 softball season (page 802), the people of show business paraded up Fifth Avenue on horseback, in open carriages, on motor scooters, in vintage automobiles and fire engines. One group of actors rode in a turn-of-the-century street cleaning cart.

Most of all, Olmsted and Vaux would enjoy an encounter with a group of youngsters using a miniature rock-walled canyon as an arena for a Wild West drama.

Approaching such a tumble of giant boulders in the park's southwest section, I heard sounds of battle. Then I saw a band of good guys—small-fry Wyatt Earps, Bat Mastersons, and Wild Bill Hickoks—standing off as rascally a passel of varmints as ever dry-gulched a wrangler.

Suddenly the warfare ceased. The leader of the good guys holstered his pearl-handled Colt .45 and signaled for an armistice.

BY EKTACHROMES © NATIONAL GEOGRAPHIC SOCIETY

"Hey!" he announced. "It's almost time for dinner!"

The chief of the bad guys, who had been busy loading his long, menacing Buntline Special with a fresh roll of caps, looked at his wrist watch.

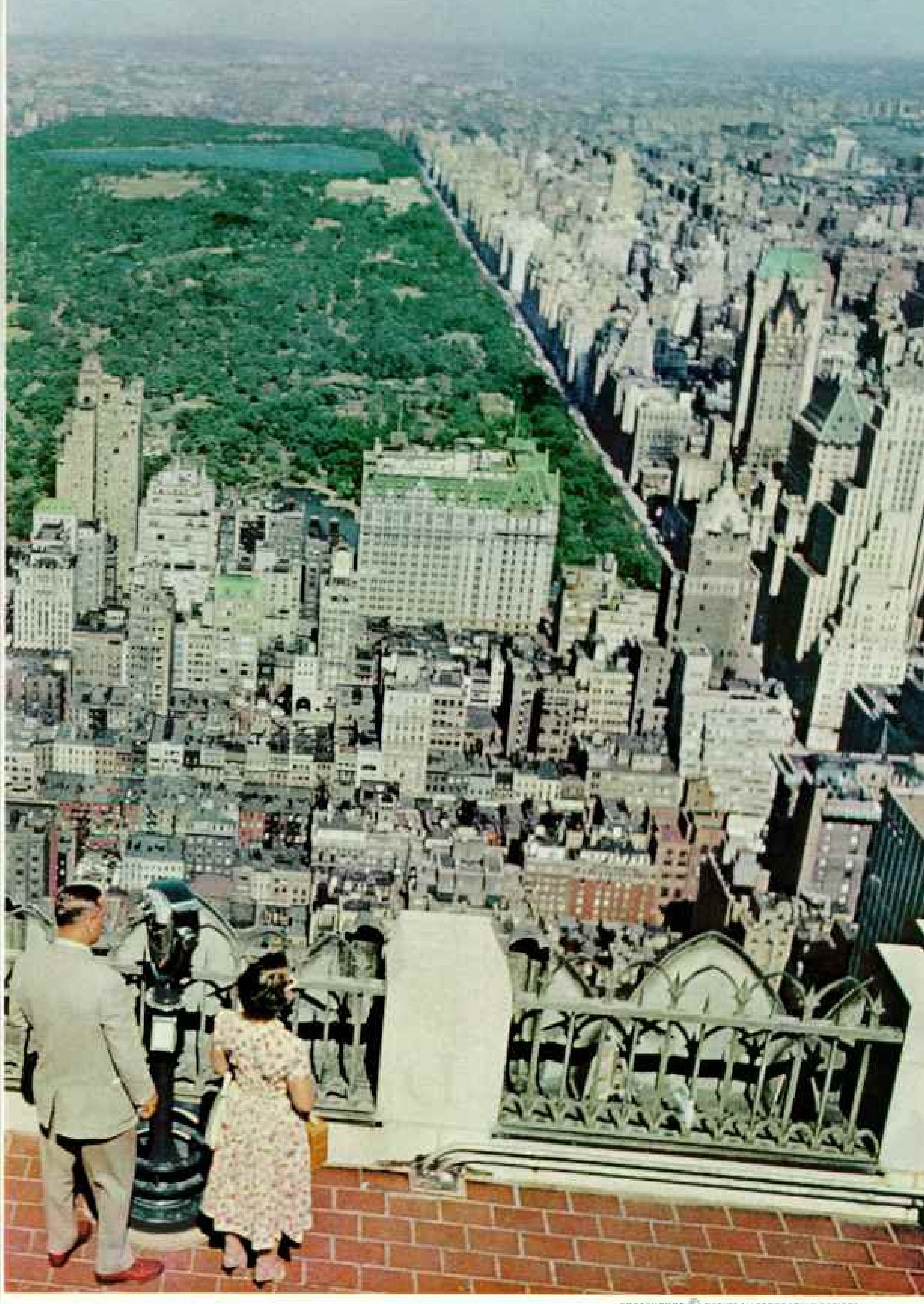
"Yep," he said, "I reckon we'd better be a-moseyin' along."

Friend and foe moseyed along into the setting sun, toward the Columbus Circle subway station.

Bands of Light Wrap the Guggenheim Museum

"A hot cross bun in concrete," say critics of the Fifth Avenue building, Frank Lloyd Wright's only New York monument, seen at dusk from Central Park. "The perfect setting for modern art," proponents reply. Thousands tour the structure daily to view the late Solomon R. Guggenheim's collection of works by Picasso, Kandinsky, Modigliani, and many others. Visitors take an elevator to the top of a spiral ramp, then follow a corkscrew course downward past paintings that seem to float on walls of light. Brancusi's "Sorceress" (below) occupies a pedestal on the ground floor.

Green carpet in a stalagmite jungle, Central Park spreads 2½ miles north to Harlem;



KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

From the 70-story RCA Building, Hudson River lies at left, Fifth Avenue at right

Thus all the work that Solomon made for the house of the Lord was finished —II Chronicles 5:1

KING SOLOMON 3,000 years ago erected in Jerusalem a magnificent temple that stood for almost four centuries. This painting combines Biblical and archeological information.

Stone walls ten feet thick allowed the edifice to double as a fortress, as did earlier Canaanite shrines excavated at Megiddo and Shechem.

White-clad priests, some playing trumpets and harps, carry the Ark of the Covenant into the "most holy place." Others prepare to sacrifice sheep and oxen on the altar of burnt offering.

The "molten sea," an immense bronze basin resting on the backs of 12 bronze oxen, holds 10,000 gallons of water for priestly ablutions. Ten smaller basins on wheels surround it.

The Last

By G. ERNEST WRIGHT, PH.D.

DURING OUR SUMMERS of excavation at the site of ancient Shechem in Jordan, a strange delegation regularly straggled out from the near-by city of Nablus. They came in the cool of the evening—bearded, long-haired, impoverished men led by a turbaned high priest.

They were Samaritans, a once-mighty people now reduced to some 200 scattered souls. Serenely convinced that they alone follow the pure Mosaic law, they have fought a losing battle for survival through 2,500 years.

PAINTING BY PETER V. BIANCHI, NATIONAL GEOGRAPHIC STAFF © N.G.S.

Thousand Years Before Christ

With paintings by H. J. SOULEN and National Geographic artist PETER V. BIANCHI

We explained that Shechem, often destroyed and often rebuilt, had once been the Samaritan capital – a city their ancestors had raised from the dead to rival Jerusalem. The Samaritans humored us with smiles and nods. Then, mildly amused, they filed back toward their synagogue in Nablus. Centuries ago the last memory of Shechem's ancient greatness had faded from their tradition.

Thus it is throughout the Near East. The descendants of Babylonians, Assyrians, Hittites, and Samaritans still live here, but they have lost their past. Only the ruins beneath their feet bear witness to the civilizations that flourished here in the land of the Bible.

History was born in the Fertile Crescent that curves from Egypt through Syria to Mesopotamia. The numerous flat tells, or mounds, dotting the countryside mark the ancient cities that cradled civilization in its infancy – Nineveh . . . Megiddo . . . Jericho. For more than a century the picks of archeologists have been biting into these tells. The carvings, inscriptions, and artifacts recovered

from the ruins now make it possible to reconstruct—sometimes in amazing detail—the environment that produced the Old Testament.

Between 1300 and 1200 B.C., while barbarian invasions immobilized the power centers of Egypt and Mesopotamia, the nomadic Hebrews gained a foothold in Palestine. In the 10th century, King David unified the tribes under a strong monarchy and reduced neighboring states to satellites. For a moment in history, the tiny empire of Israel stood as the strongest force between the Nile and the Euphrates.

Solomon Sought Power as a Trader

David's son Solomon succeeded him on the throne. Israelite tradition celebrates Solomon for his wisdom and the splendor of his reign. The great temple he erected in Jerusalem, vividly re-created in the painting on the preceding pages, was an architectural and religious glory for almost 400 years.

The Bible indicates that Solomon's main efforts were economic, not military, and excavations—notably that of the king's copper smelter at Ezion-geber—bear this out.* Israel straddled the main trade routes connecting Africa with Asia, and Solomon attempted to make his nation the middleman of the ancient world (map, page 821). But his dream, as well as his modest empire, died with him. His smelter, as I saw it from an airplane this summer, appears as a hole in the ground—a tiny scar inflicted by archeologists upon the grim frontier separating Israel and Jordan.

With Solomon's death, the northern Hebrew tribes rose against the royal policies of heavy taxation and forced labor. Under Jeroboam they formed a new kingdom with its capital at Shechem (page 816). Only the tribe of Judah in the south remained faithful to Jerusalem and to the dynasty of David. The northern kingdom retained the name Israel, while the southern state called itself Judah. This division ended the Hebrews' brief excursion into empire.

For almost half a century civil war flared sporadically along the borders of the two Hebrew nations. The painting on page 818 depicting the fortification of Mizpah illustrates one incident in this conflict. About 918 B.C., however, a common disaster struck. According to the brief account in the Bible's First Book of the Kings, "Shishak king of Egypt came up against Jerusalem: And he took away the treasures of the king's house."

Fortunately for historians, Pharaoh thought

(Continued on page 820)

*See "On the Trail of King Solomon's Mines," by Nelson Glueck, NATIONAL GEOGRAPHIC, February, 1944.

Article and Paintings Reflect Latest Archeological Research

IN THESE PAGES the NATIONAL GEOGRAPHIC brings to life the crucial thousand years of Biblical history that preceded the coming of Christ.

This article, with 13 original paintings, is the second on life in Old Testament times. The first, in the December, 1957, GEOGRAPHIC, covered the 1,000-year period from the patriarchal age to the reign of King Solomon in the 10th century B.C.

The millennium presented here is one of struggle and turmoil, of bloodshed, enslavement, and rebellion. After the death of King Solomon, conquest after conquest devastated the Holy Land. Through recurrent defeat and dispersion, the light of Hebrew monotheism often flickered but never failed. After a thousand embattled years, it flared triumphantly into the new day of the Christian Era.

Both text and paintings draw upon all the resources of Biblical archeology, a relative infant among sciences that has already revolutionized our knowledge of Old Testament days. Excavations as far afield as Egypt and Iran have clarified and supplemented the testimony of the Bible.

G. Ernest Wright, author of both articles and consultant in preparation of the paintings, is Parkman Professor of Divinity at Harvard Divinity School. An outstanding authority on the Old Testament, he is also a noted field archeologist. His excavations at Shechem in Jordan have filled in several blank pages of history, and his book *Biblical Archaeology* is widely regarded as a definitive work.

More than five years of research underlie the paintings of Henry J. Soulen and Peter Bianchi. All are based upon the best archeological data, and virtually every object faithfully mirrors an unearthed original. —THE EDITOR

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Solomon Judges, Meets the Queen of Sheba, Builds the Temple, and Teaches

The French illuminator of this 14th-century manuscript depicted the king's career in a contemporary European setting; he gave the temple a Gothic look. First owned by the Duc de Berry, brother of a French king, the book now rests in the Walters Art Gallery, Baltimore, Maryland.

ANSCOCHROME BY LEE ELLENBERGER, DREW-MC CORMICK EXPEDITION

EKTACHROME BY LEE ELLENBERGER

KODACHROME BY G. ERNEST WRIGHT

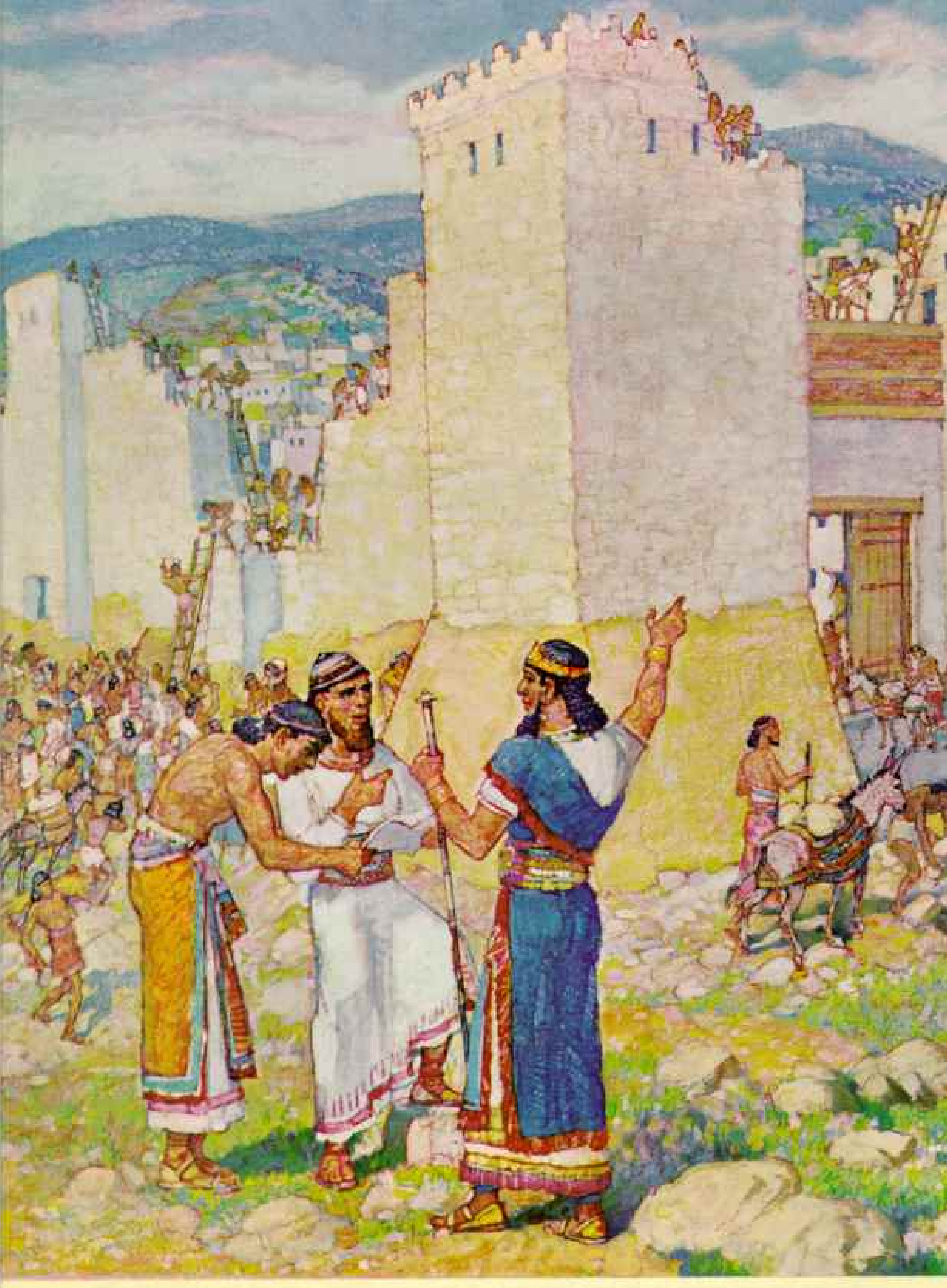
Scarred by ancient catastrophes, the ruins of Shechem brood against the hills of Jordan. Shechem, founded some 6,000 years ago, commanded a pass between Mounts Ebal and Gerizim. Egyptians smashed the city in the 16th century B.C. Rebuilt, Shechem served as the first capital of Israel, the northern kingdom. Captured by the Assyrians, it declined again

KODACHROME BY JACK HOLLADAY, DREW-MC CORMICK EXPEDITION

until the Samaritans made it their principal city. Just before 100 B.C., the author believes, the citadel fell for the last time, to a Judean army.

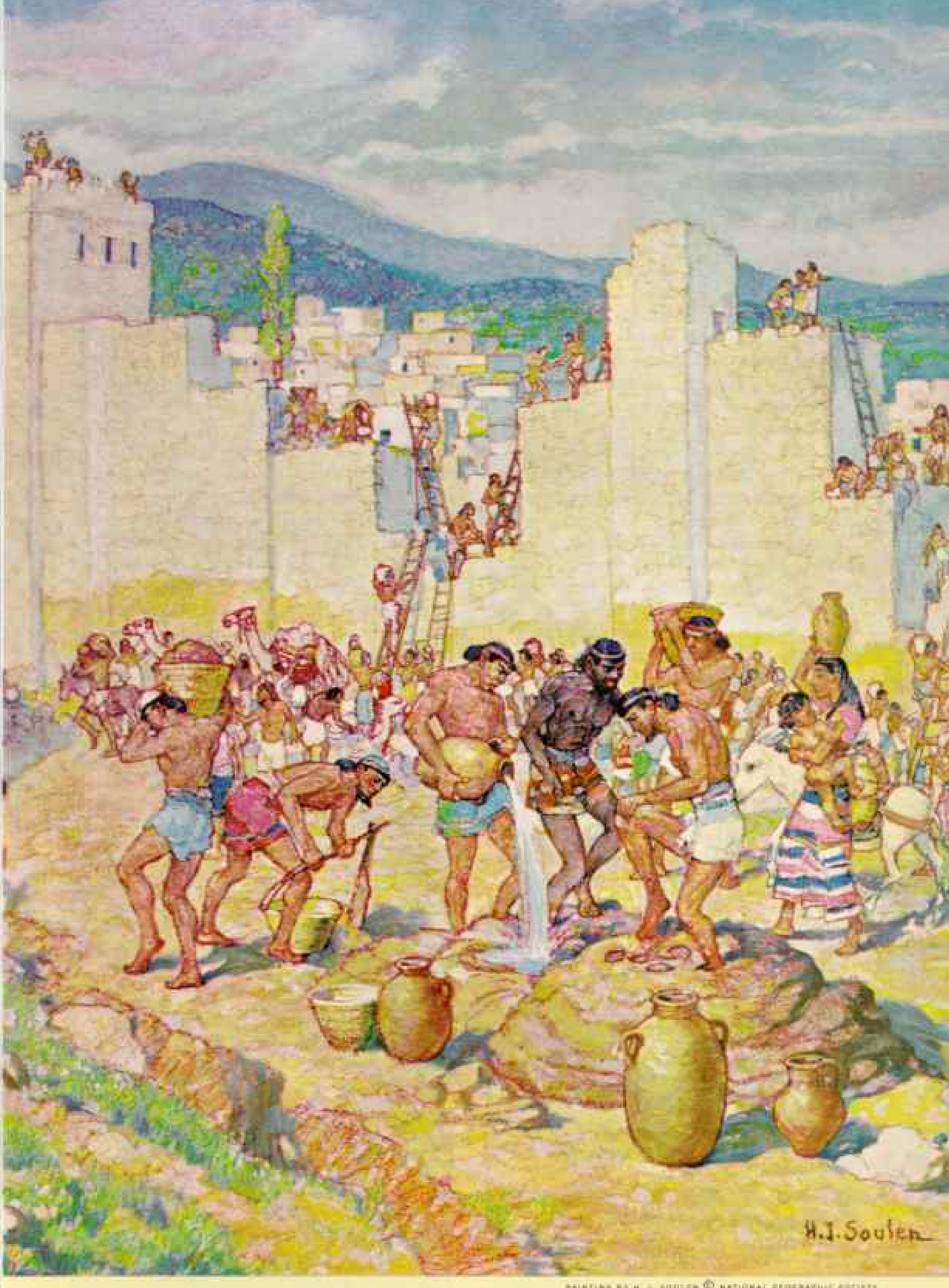
Here Dr. Wright, whose Drew-McCormick Archeological Expedition has spent three years excavating the site, stands in the East Gate and points out a crumbling guardroom wall.

Artifacts found in the ruins include a 4th-century B.C. Persian seal impression (top, left) showing a hunter and the crosslike symbol of the Zoroastrian god Ahura-Mazda. A hoard of silver and silver alloy (center), including earrings, was lost or hidden during Joshua's era; it represents a citizen's currency, which he weighed on a scale to make a purchase. Oldest coin yet found in Palestine (lower) was struck by Greeks about 500 B.C. Says the author, "Note how some suspicious person struck the coin a blow to test its genuineness."



King Asa Fortifies Mizpah to Guard Judah's Frontier Against the Israelites

An American expedition between 1926 and 1935 excavated Tell en Nasbeh, eight miles north of Jerusalem, dated the 20-foot-thick walls to approximately 900 B.C., and tentatively identified the ruin



PAINTING BY H. J. SOULEN © NATIONAL GEOGRAPHIC SOCIETY

as ancient Mizpah. The discoveries gave detail for H. J. Soulen's painting, including the wall plan and the tower sites. The great gate had two entryways; any enemy who breached the first faced another just as formidable. Here King Asa, identified by crown and staff, confers with his architects. Laborers at right mix mortar with their feet while masons set stones in place on the walls.

◀ *And there was war between Asa and Baasha* —I Kings 15:16

AFTER SOLOMON'S DEATH, about 922 B.C., his kingdom split into two states, and civil war between them lasted some 50 years.

Freedom-loving tribes of the north, smarting under the king's policies of heavy taxation and forced labor drafts, established a separate monarchy called Israel. Judah, the southern state, adhered to the dynasty of David.

Archeologists of the Pacific School of Religion, Berkeley, California, have found apparent confirmation of an incident recorded in I Kings.

Baasha, king of Israel about 900 B.C., began to fortify the town of Ramah, just inside Judean territory, in order to blockade the southern kingdom.

Asa, who mounted the Judean throne about 913 B.C., stripped the Temple of its treasure and sent it to Damascus with a request for aid. Damascenes, attacking Israel north of the Sea of Galilee, forced Baasha to abandon Ramah and defend his border.

"Then," the Bible continues, "king Asa made a proclamation throughout all Judah; none was exempted: and they took away the stones of Ramah, and the timber thereof, wherewith Baasha had builded; and king Asa built with them Geba [probably Gibeah] of Benjamin, and Mizpah."

When American archeologists dug into the ruins at Tell en Nasbeh, they were astonished to find this mere village defended by a massive wall and a well-preserved city gate. The slot for the iron bar that once secured the heavy wooden doors remained, as did the benches where townspeople met to gossip or to observe the legal cases that Old Testament judges always tried "in the gate."

Excavations show the fortifications date from the period of Baasha and Asa. Both Bible and archeology point to Tell en Nasbeh as the probable site of Mizpah.

well of this campaign; on the walls of the great temple of Karnak in Egypt, carvings show him smiting an array of Asiatics beneath the benevolent eye of the God Amon. That he overwhelmed both Israel and Judah is clear, for the accompanying list of his conquests includes cities throughout Palestine. Archeologists have also unearthed a broken stele, or monumental stone, he raised at Israel's great fortress of Megiddo.

In Israel the national capital shifted to Tirzah, and king succeeded king in a disorderly progression until, following a series of assassinations, Omri seized the throne about 876 B.C. The fame of this able, energetic monarch apparently spread throughout the Near East, because Assyrian records—some dating from long after his death—refer to Israel as "the Land of Omri," or "the House of Omri."

Accompanied by members of the Shechem expedition, I visited the ruins of Tirzah last summer. There French archeologist Père Roland de Vaux showed us a sizable building he had recently unearthed. He believes it to be a palace begun by Omri, but left unfinished when the king decided to move his capital to the hill of Samaria, nine miles west.

Between 1908 and 1935, excavations at

THE HOLY LAND

Samaria—a site intensively occupied well into the Christian Era—revealed traces of the pioneer work of Omri and his successors. In visiting Samaria, however, I was disappointed to find that local landowners had had most of the early remains covered over. Yet, beneath and behind a great temple to Caesar Augustus built by Herod the Great, I could still see portions of the Israelite palace and city fortifications. A magnificent stretch of wall—once the approach to the city gate—is also clearly visible. In beauty of workmanship, the stone masonry of this wall equals any yet found in Palestine.

The excavators of Samaria discovered ivory fragments strewn through the foundations of one building. A Biblical passage (I Kings 22:39) mentions that Omri's son, the notorious Ahab, built an "ivory house."

During the reign of Ahab, the Assyrians—a cruel warrior race destined to dominate the ancient world for more than two centuries—first swirled across the eastern horizon. Leading them was Shalmaneser III, who refers to himself in cuneiform inscriptions as "the legitimate king, king of the universe, the king without a rival, the 'Great Dragon,' the only power within the four rims of the world ... who has smashed all his foes like pots."

Thoroughly alarmed, the squabbling kingdoms of Syria and Palestine joined forces to face the new threat. In 853 B.C., at Karkar on the Orontes River in western Syria, they met the Assyrian whirlwind head on. The Bible makes no mention of this battle; but on a stele found in 1861 beside the Tigris, Shalmaneser III listed among his foes at Karkar "1,200 chariots, 1,200 cavalrymen, 20,000 foot soldiers of Hadadezer of Damascus ... 2,000 chariots, 10,000 foot soldiers of Ahab, the Israelite. ..."* Ahab's chariots outnumbered those of any of his allies—a striking testament to Israel's power at that time.

Shalmaneser also recounts the battle's outcome: "I slew 14,000 of their soldiers with the sword. ... I spread their corpses everywhere. ... With their corpses I spanned the Orontes before there was a bridge."

Despite this boast, it is probable that the coalition of kings checked the Assyrians. After the battle, Shalmaneser III withdrew. Twelve years were to pass before he would

*This and many subsequent translations are taken, with permission, from *Ancient Near Eastern Texts Relating to the Old Testament*, edited by James B. Pritchard, Princeton University Press, 1955.

A bridge between the Mediterranean Sea and Arabia's deserts, ancient Palestine beckoned conquerors marching from Egypt, Mesopotamia, and the north. Armies swept across the land for 2,000 years before Christ. War and threat of war plague the Holy Land to this day.

OLD TESTAMENT LANDS WITH MODERN BOUNDARIES

PALESTINE ARCHAEOLOGICAL MUSEUM

Kneading dough in a trough, a clay figurine demonstrates the ancients' method of making bread. Found in a Phoenician tomb near the Biblical town of Achzib, in northern Israel, the three-inch-high figure took shape between the 9th and 6th centuries B.C.

Israeli Arabs use the baking techniques of their remote ancestors. As one kneads dough in a basin, the other lifts a loaf from the hot stone that baked it. These crusty loaves, called *pitta*, closely resemble the bread of Old Testament times. They are common in the Near East.

EFREM ILANI

succeed in even exacting tribute from Israel. However, petty wars soon raged once more throughout Palestine, and three years after Karkar, Ahab met death in a skirmish with his erstwhile ally, the king of Damascus.

During the reign of Ahab's son Joram, King Mesha of Moab—one of the last Israelite vassals—successfully rebelled. In 1868 a Prussian missionary journeying beside the Dead Sea noticed an inscribed slab of black basalt in an Arab village. This discovery, later hunted down by the great French scholar Charles Simon Clermont-Ganneau, proved to be a spectacular relic of ancient Palestine—Mesha's account of his reign.

He describes his rebellion thus: "As for Omri, king of Israel, he humbled Moab many years, for Chemosh [the Moabite deity] was angry at his land. And his [grand] son followed him and he also said, 'I will humble Moab.' In my time he spoke thus, but I have triumphed over him and over his house, while Israel hath perished forever!"

Archeology Reconstructs Everyday Life

Amid these swirling cycles of victory and defeat, destruction and reconstruction, the people of Palestine patiently pursued their everyday lives. Archeology shows that, by the time of Ahab, not all women had to trudge to the city spring; virtually every house boasted a cistern for water. Rudimentary sewage systems drained many towns.

The carpenter eased his toil with iron axes and adzes; sharp, durable tools of the same metal replaced the farmer's crude sickles of flint and wood. Most ruins contain jewelry, and, come war or peace, caravans wound tirelessly from Arabia with spices and fragrant gums. The painting on page 827 illustrates the dyeing industry that made Palestinian fabrics famous, while new techniques that revolutionized pottery production are depicted on page 832.

In a typical household, the Hebrew family inhabited the upper story, employing the ground level for work and storage space. Bread was the basic food, wine the common beverage, fresh or dried fruit the ordinary dessert. On rare occasions stewed meat graced the menu. The traveler stuffed his pack with parched grain, the ancient equivalent of a sandwich.

Politically, no people of the ancient world were better protected from tyranny than the Hebrews. Between subject and king stood a small succession of dedicated men—the prophets. Nathan denounced David to his face; the

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She . . . eateth not the bread of idleness —Proverbs 31:27

BREAD, staple of the Hebrew diet, was baked daily. Women ground wheat or barley into flour on a saddle quern, a stone hand mill used since time immemorial. Next they added water and kneaded the dough. Finally they placed the bread in a heavy clay pan and, putting it on the coals, baked it at the bottom of a pit oven. Occasionally they added olive oil to the dough or made wafers flavored with honey.

Shapes of the pottery vessels place this scene in a Judean town of the 7th century B.C. Houses differ little from those found in Arab villages today, save for the flat roofs and the square door lintels.

PAINTING BY H. J. SOULEN © NATIONAL GEOGRAPHIC SOCIETY

And Ahab said to Elijah, Hast thou found me, O mine enemy?
—I Kings 21:20

KING AHAB OF ISRAEL and his queen Jezebel possessed a winter palace near the village of Jezreel in Esdraelon, Palestine's great northern plain. Ahab coveted a vineyard next door, but owner Naboth, heeding an Israelite law forbidding the sale of ancestral property to one outside the clan, refused Ahab's offers. The king, whom the Bible portrays as sullen and resentful, then "laid him down upon his bed, and turned away his face, and would eat no bread."

Thereupon Jezebel formulated an elaborate plot: Her agents "set Naboth on high among the people" and hired scoundrels to accuse him of blasphemy. Inflamed, the people stoned him to death, and the crown confiscated his property.

Mr. Soulen's painting shows Ahab entering the vineyard, only to confront Elijah, the conscience of the nation.

"I have found thee," thundered the prophet. "Hast thou killed, and also taken possession? ... In the place where dogs licked the blood of Naboth shall dogs lick thy blood, even thine."

When Ahab heard these words, "he rent his clothes, and put sackcloth upon his flesh, and fasted, and lay in sackcloth, and went softly."

Elijah wears a short leather skirt, as described in the Bible, and a sheepskin mantle. Ahab is depicted in fashionable garb: a fringed robe above a fine white tunic, a kind of stocking cap, and sandals curving upward at the toe.

Costumes of this type were worn by Israelites portrayed on the Black Obelisk left by King Shalmaneser III of Assyria a few decades later (following page).

Wine making was a basic industry in Old Testament Palestine. Workers in this scene trample grapes in a vat.

gaunt figure of Elijah stalks through the reign of Ahab like the conscience of the nation (opposite); Jeremiah pronounced doom upon Jerusalem in the royal court of Judah itself.

King and commoner alike recognized that the prophet's tongue could not be silenced, for they saw him as an official of the divine government that controlled Israel's destiny. When the prophets spoke, they spoke with the voice of Yahweh (Jehovah in the English Bible). Beneath their unflinching surveillance, no king could rule unchecked.

Scholars have long searched for a counterpart of Israelite prophecy in ancient societies. Cuneiform tablets from the ruins of Mari in eastern Syria report that, about 1700 B.C., temple officials in that area regularly appealed to the kings as spokesmen of their deities.

However, the divine communications recorded on the tablets are generally demands that the king placate the gods by presenting additional gifts to their sanctuaries.

Other scholars have sought the background of prophecy in religious ecstasy. In an Egyptian narrative of 1100 B.C., a youth experiences a seizure in the presence of the prince of Byblos in Phoenicia. Because the youth thereupon uttered a message from the god that "seized" him, the Egyptian scribe interprets this as a divine revelation.

Neither example, however, relates directly to the Israelite prophets. Their role continued through 400 years of history. Ever ready to castigate injustice and to defend Yahweh's covenant with his people, these selfless men forced the Hebrew rulers to remain the world's first constitutional monarchs.

Assyrians Humble the Israelite King

By 841 B.C., the Omri dynasty had vanished and Jehu occupied the throne of Israel. But the menacing shadow of Assyria again darkened the land. On his Black Obelisk, Shalmaneser III portrays Jehu kissing the ground before his feet while a long line of Israelites bear tribute.

A brief respite came between 801 and 746 B.C. Momentarily untroubled by the Assyrian kings, who had scores to settle at home, Jeroboam II—the last great ruler of the north—once again conquered Damascus.

Israel's resurgence proved short-lived. About a year after the death of Jeroboam II, a new Assyrian king, Tiglath-pileser III—known also in the Bible as Pul—mounted the throne in Nineveh and turned a cold eye toward the west.

Catastrophe soon came to Palestine on the

swift chariots of the Assyrians. Even now the names of these conquerors—Sargon, Sennacherib, Esarhaddon—ring hard and warlike on the ear. To a cruel age, the Assyrians brought greater cruelties. They flayed enemies and mounted their skins on city walls; they led prisoners on leashes fastened to rings piercing the nose or mouth; they originated the policy of mass deportation brought to such tragic perfection in our own day.

Grim Trophy Shown in Carving

Visitors to the British Museum will see a relief excavated at Nineveh showing King Ashurbanipal feasting in a quiet arbor with his queen as musicians play softly on harp and drum. From a near-by tree dangles a trophy of his last campaign—a human head. In his annals, Esarhaddon describes the grisly fate of two defeated kings: "I hung the heads . . . around the neck of their nobles . . . and paraded [thus] through the wide main street of Nineveh with singers [playing on] . . . harps."

Of the two Hebrew kingdoms, Israel first felt the stinging lash of Assyrian power. Terrified by Tiglath-pileser's reputation, King Menahem capitulated without a struggle.

II Kings 15:19-20 says: "And Pul the king of Assyria came against the land: and Menahem gave Pul a thousand talents of silver. . . . So the king of Assyria turned back, and stayed not there in the land."

Tiglath-pileser's annals, excavated in the 1840's, place the event in the year 738 B.C., and agree in virtually every detail with the Biblical account. "As for Menahem I overwhelmed him like a snowstorm and he . . . fled like a bird, alone, and bowed to my feet. I returned him to his place and imposed tribute upon him, to wit: gold, silver, linen garments with multicolored trimmings. . . ."

But the resilient Israelites had not wholly abandoned the field. Israel's next king, Pekah, and Rezin, king of Syria, hatched an anti-Assyrian plot. When King Ahaz of Judah refused to join them, Pekah and Rezin attacked him in Jerusalem.

"So," relates II Kings 16:7-9, "Ahaz sent messengers to Tiglath-pileser king of Assyria, saying, I am thy servant and thy son: come up, and save me out of the hand of the king of Syria, and out of the band of the king of Israel, which rise up against me.

"And Ahaz took the silver and gold that was found in the house of the Lord, and in the treasures of the king's house, and sent it for a present to the king of Assyria. And the

Jehu, King of Israel, Kneels Before Shalmaneser III of Assyria

Unearthed at Nimrud in 1846, the Black Obelisk illustrates the annals of Shalmaneser's reign (858-824 B.C.). This panel contains the only contemporary portrait of an Israelite king. The cuneiform inscription proclaims: "The tribute of Jehu . . . I received from him silver, gold . . . a golden vase with pointed bottom . . . a staff for a king. . . ."

© BRITISH MUSEUM

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And he made the vail of blue, and purple, and crimson

—II Chronicles 3:14

ASSYRIAN ANNALS frequently mention fabrics from Palestine as prime items of booty. Craftsmen of Phoenicia and Canaan, both of whose names mean Land of the Purple, extracted from the murex shellfish a rich tinting agent that varied from blue to purple to crimson. Cloth dyed with Tyrian purple was so expensive that the color is still synonymous with royalty.

Archeologists digging at Tell Beit Mirsim, in southern Palestine, uncovered a Biblical town called Debir that appeared to have been dedicated to weaving and dyeing. The painting reconstructs one of Debir's dye plants. A worker dips threads successively into two dye vats, following each with a water rinse. Another man, pulling a weighted lever, presses excess dye from the thread. Helpers carry water from the cistern at the far right.

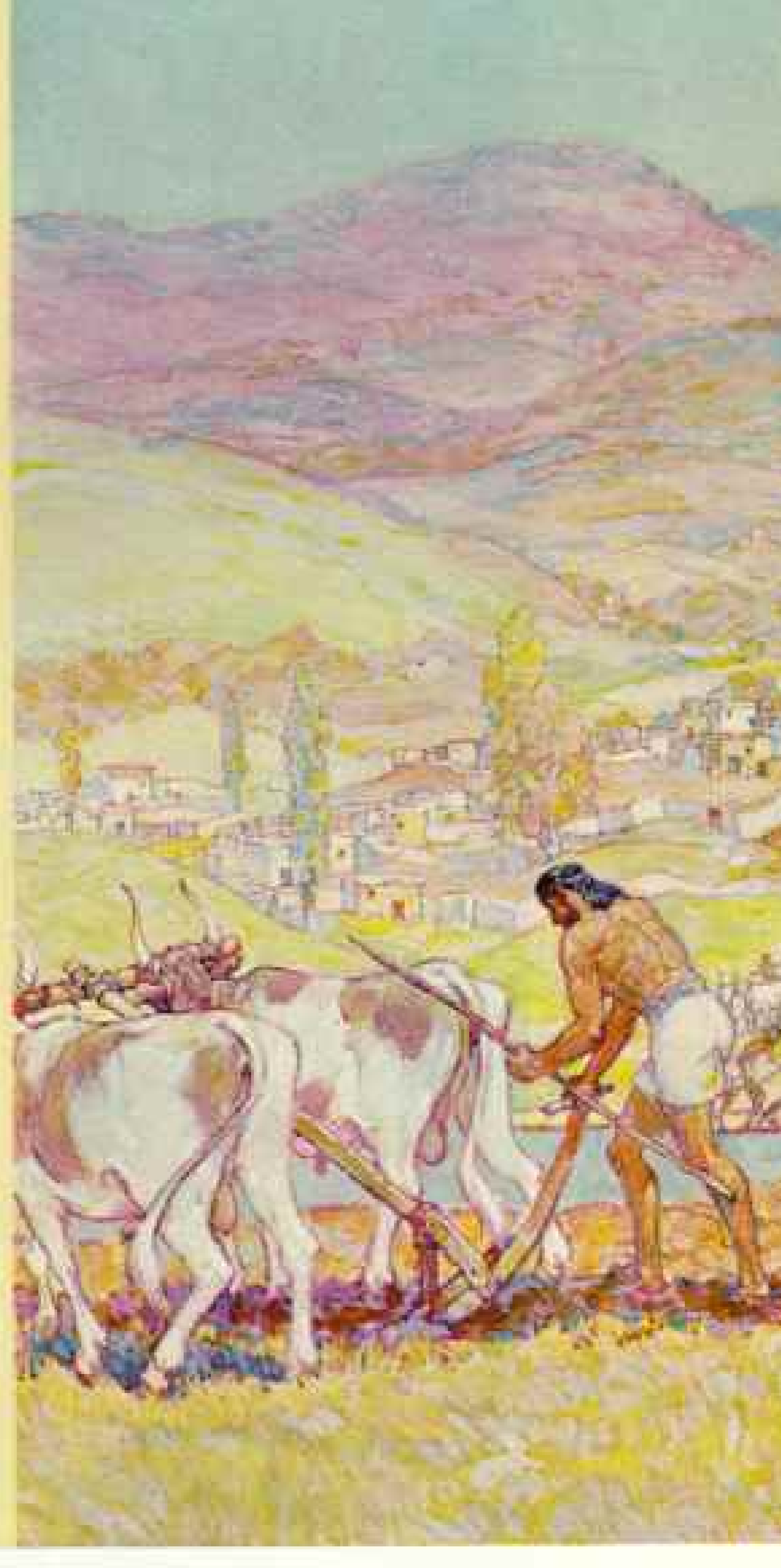
And Elijah . . . cast his mantle upon [*Elisha*] –1 Kings 19:19

THE ECONOMY of the ancient world depended upon agriculture, and the turning of the seasons controlled the rhythm of life.

A schoolboy's limestone plaque inscribed in the 10th century B.C. and found in the ruins of Gezer outlines the farming cycle in Palestine. The year began with the autumn harvest, as it still does in the Jewish calendar.

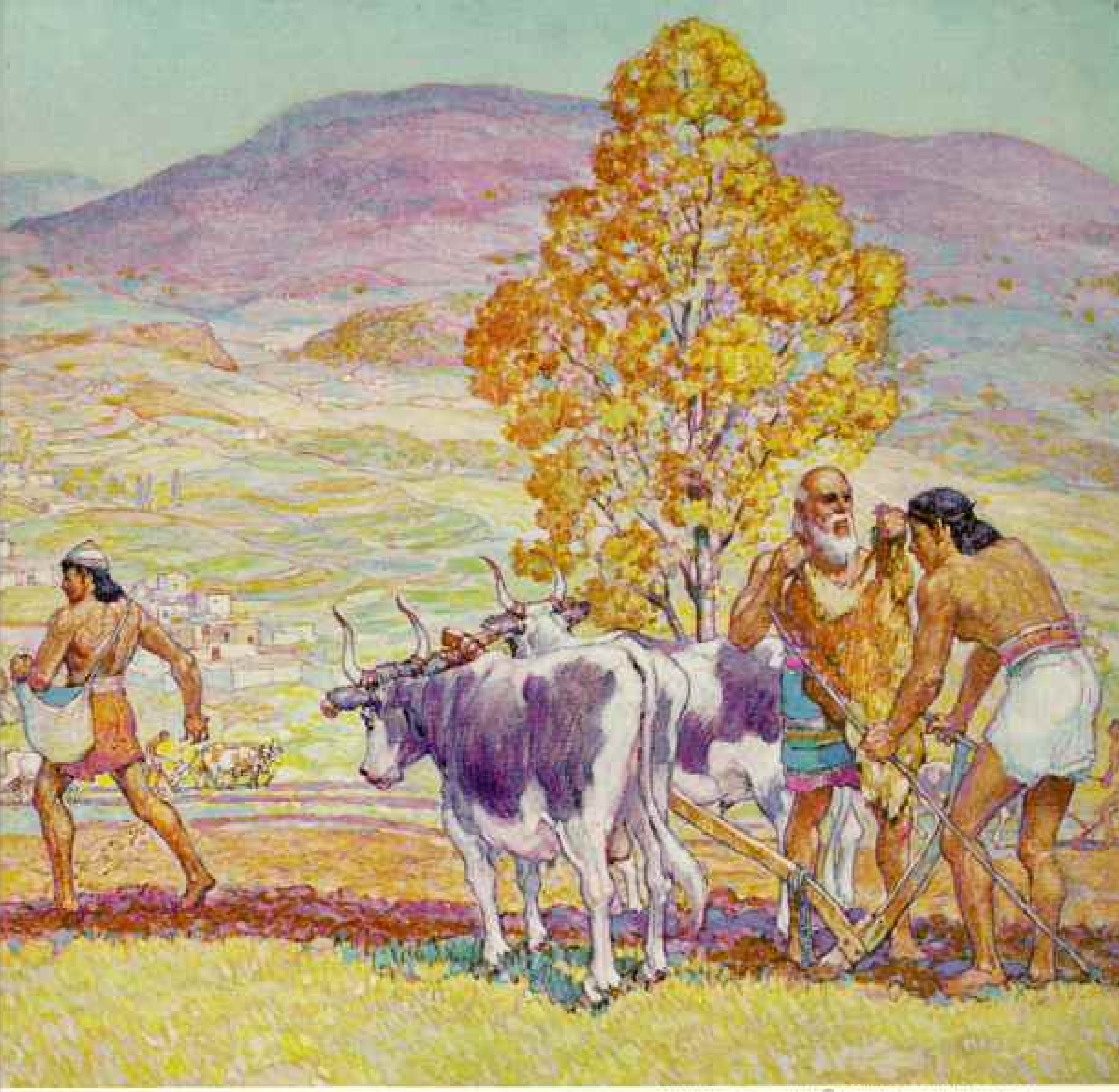
The painting depicts a planting scene during the November rainy season. Young Elisha (right) grasps the plow, a small beam tipped with iron that has been used in the Holy Land for more than 4,000 years. Incapable of turning a furrow, the implement merely scratches the stony soil. As his comrades scatter the seeds, Elisha covers them with a fresh passage of the plow.

The prophet Elijah, grown old in his role as the voice of justice, designates Elisha as his successor by placing upon his shoulders a mantle of animal skin. Zechariah 13:4 indicates that such a robe marked a prophet.



Israeli youths plow in a manner not unlike that of their Biblical forebears.

KODACHROME BY BRIAN BRAKE



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king of Assyria hearkened unto him...."

Once again the Assyrian inscriptions corroborate the Biblical narrative. In 733 B.C. Tiglath-pileser swooped down upon Damascus and killed Rezin. He took Galilee from Israel, united it with Assyria, and "officers of mine I installed as governors upon them."

In 1956 and 1957 I visited the ruins of Hazor, where Israeli archeologists working on the site showed me vivid evidence of Tiglath-pileser's Galilean conquest (following page). Charcoal debris choked the devastated palace of the Israelite governor, while above the ruin stood a small fort and check point erected by the Assyrian army during the course of its rapacious occupation.

Pekah's failure cost him his throne, for the disillusioned Israelites rose in revolt. The Assyrian annals continue: "They overthrew their king Pekah and I placed Hoshea as king over them. I received from them 10 talents of gold, 1,000 [?] talents of silver as their tribute...."

A talent in ancient times was both a monetary denomination and a unit of weight. Although exact translation is impossible, we know that to an ordinary Hebrew a single talent of gold represented a fortune.

Ahaz of Judah remained a faithful vassal, and Tiglath-pileser's records duly list him among the subservient western kings. But Assyrian friendship came high; Ahaz's financially sapped kingdom slid into decline. Embittered against Yahweh, the god he thought had failed him, Ahaz "shut up the doors of the house of the Lord.... And in every several city of Judah he made high places to burn incense unto other gods."

Excavators Trace the Tragic History of Hazor, Once "the Head of All Those Kingdoms"

Egyptian texts as early as the 19th century B.C. mention the Canaanite city in northern Palestine. Six hundred years later, when the Israelites captured Hazor and its 40,000 people, Joshua "smote all the souls that were therein with the edge of the sword, utterly destroying them: there was not any left to breathe: and he burnt Hazor with fire" (Joshua 11:11).

From the time of Solomon, who rebuilt the city, Hazor played a vital role in Israelite history until 732 B.C., when Tiglath-pileser III and his Assyrians destroyed it. Israeli archeologists in 1956 found the spot where Assyrians had breached the citadel. Ashes three feet deep covered every room; fire blackened every stone.

These workmen dig in the center of the city. Bare columns remain from a storehouse erected perhaps during Ahab's reign.

Prof. Yigael Yadin, under a wide-brimmed hat, conducts visitors through Hazor. Chief of Staff of the Israeli Army during the war with the Arab states, the onetime general directed the Hazor excavations. He is one of Israel's leading archeological scholars.

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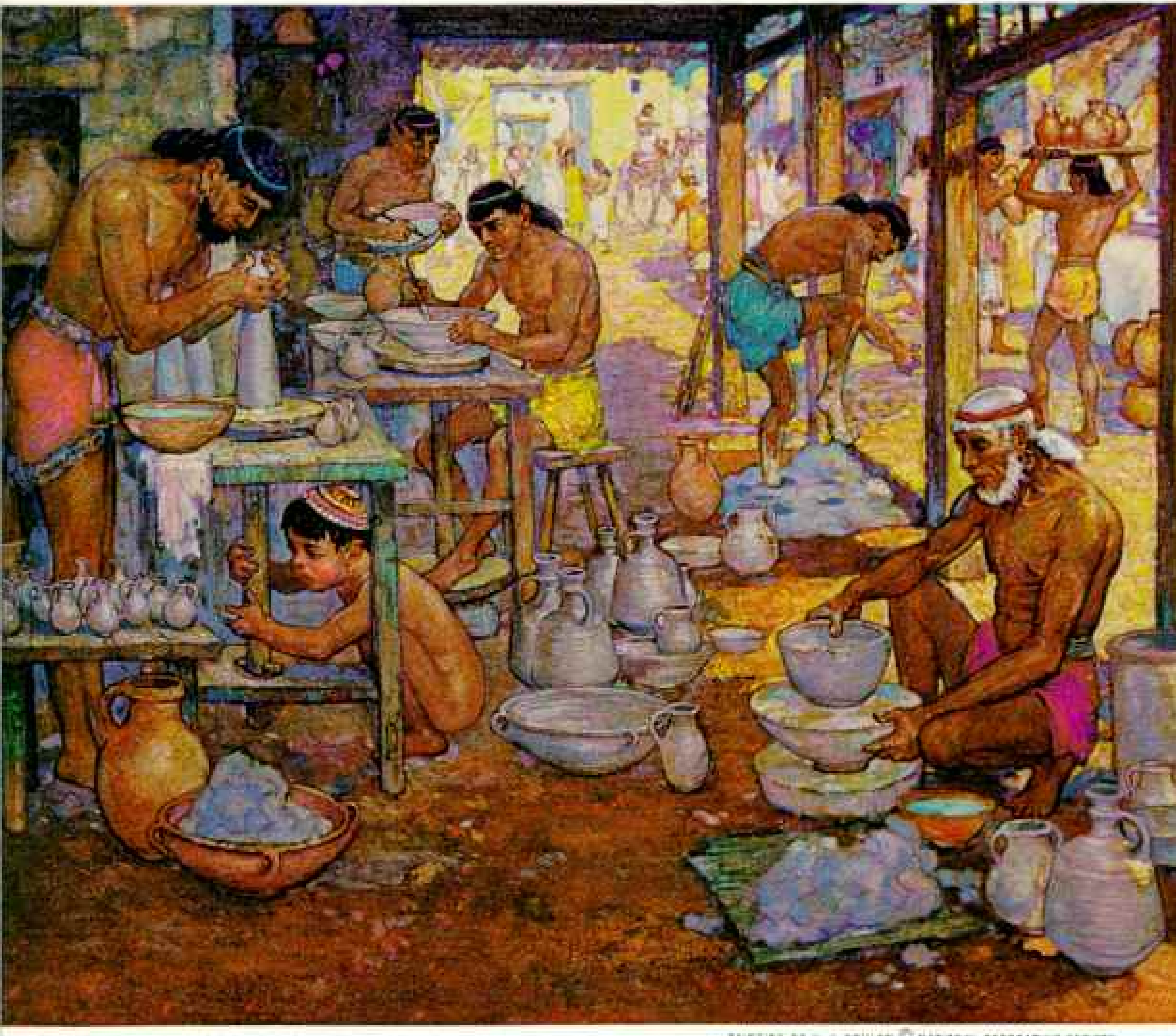

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Israel, dismembered and depopulated, tottered on the edge of national oblivion. Death claimed Tiglath-pileser III in 727 B.C., but Shalmaneser V, who followed him on the throne, continued to exact heavy tribute. Finally, lured by promises of Egyptian aid, Hoshea rebelled. Shalmaneser struck back; in quick succession he captured Hoshea, "shut him up, and bound him in prison," and besieged Samaria. For three years the last doomed stronghold of Israel fought off the Assyrians, but the result was inevitable. Late in 722 or early in 721, the Assyrian host streamed in through the city gates.

At about this same time, Shalmaneser V died, and his successor, Sargon II, assumed credit for the victory. Digging at Dur Sharrukin (Khorsabad) in Iraq in 1843, a French archeologist came upon the remains of Sargon's palace. Here the king had inscribed accounts of this triumph. One proclaims: "I besieged and conquered Samaria, led away as booty 27,290 inhabitants of it. . . . I installed over them an officer of mine and imposed upon them the tribute of the former king."

Sargon Leveled Samaria's Cities

At Shechem during this past summer, we unearthed dramatic proof of the violence of the final Assyrian assault upon Israel (page 816). Immediately below the earliest Samaritan houses, three to four feet of debris covered the last Israelite floors. Gradually we managed to distinguish the mud bricks from the mud plaster that had sloughed from the walls, while we easily separated both from the great

Then I went down to the potter's house, and, behold, he wrought a work on the wheels —Jeremiah 18:3

POTTERY is the calendar of prehistory. So thoroughly have archeologists catalogued its changing styles that the shards culled from ruins may date a city's rise, zenith, and fall within half a century. In Biblical times the potter shaped his vessels with consummate craftsmanship. Common household wares—bowls, plates, jugs, and pitchers—combined utility and beauty.

A Judean pottery of about 700 B.C. comes to life in Mr. Soulen's painting. The man at center right prepares raw material by treading a mixture of water and clay, a process mentioned in Isaiah 41:25. His elderly colleague completes a bowl on a potter's wheel. This wheel, the oldest yet discovered, consists of two stones, the topmost turning on a tongue protruding from the nether. Since the potter had to shape the vessel with one hand while spinning the top stone with the other, he must have possessed extraordinary skill.

Other machines shown in the painting allow the operator to use both hands. Archeologists have unearthed no such examples from ancient Palestine, but other evidence makes their existence seem certain. By presumption, then, the artist depicts the man at the left mass-producing small jugs on a wheel turned by the crouching boy. Another craftsman turns his wheel by foot and burnishes a bowl by holding a spatula against the soft rotating clay. When fired in an oven, the lines left by the spatula produced a spiral design that enjoyed great popularity in Judah.

slabs of tumbled roof. Heavy vessels stored on the roofs had smashed in falling, while below them on the fire-blackened floors we found smaller household vessels. This, I concluded, was the devastation of conquerors who had not only put the city to the torch, but had demolished every building that would not burn.

When the last Israelites straggled across the horizon on the dusty road to exile, behind them stretched a lifeless landscape of sacked cities and wasted fields. Thus history came full circle. Israel, born of rebellion, died in rebellion.

"There was none left but the tribe of Judah only," mourns the Bible. For more

(Continued on page 838)

An ancient art revived contributes to Israel's 20th-century balance of trade.

Sixteen factories turn out items ranging from specialized laboratory tiles to bathtubs. In 1959 the young nation exported more than $500,000 worth of such products, largely to the burgeoning African market.

In 1954 Israel completed a plant near Beersheba to utilize gypsum, sand, and clay from the parched Negev for ceramics.

This potter shapes a vase in a Haifa factory.

EFREM ILANI

Sennacherib Reviews Captives and Spoils From Fallen Lachish

Digging in Nineveh more than a century ago, A. H. Layard unearthed 13 stone panels depicting King Sennacherib's siege and conquest of the Judean city of Lachish in 701 B.C.

Assyrian soldiers at the left in this bas-relief herd Hebrew captives, some on their knees, toward the enthroned king, who awaits their obeisance.

Prisoners wear short-sleeved, ankle-length garments; their beards and hair are tightly curled. Sennacherib holds bow and arrows; he is fanned with fly whisks. The royal tent rises behind the throne; Assyrian chariots stand in battle array.

The king faces a cuneiform inscription stating: "Sennacherib, king of the world, king of Assyria, sat upon a . . . throne and passed in review the booty taken from Lachish."

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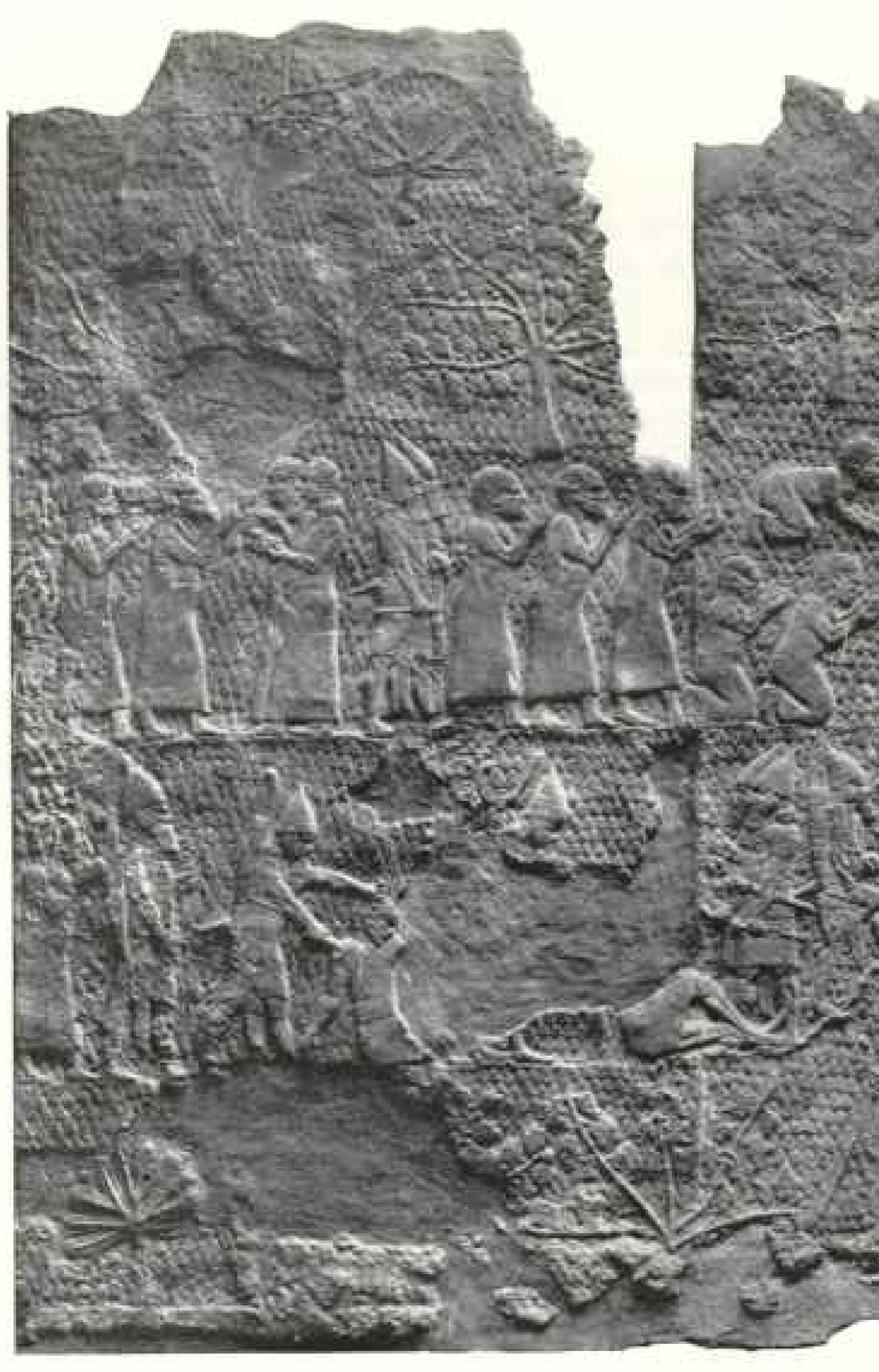


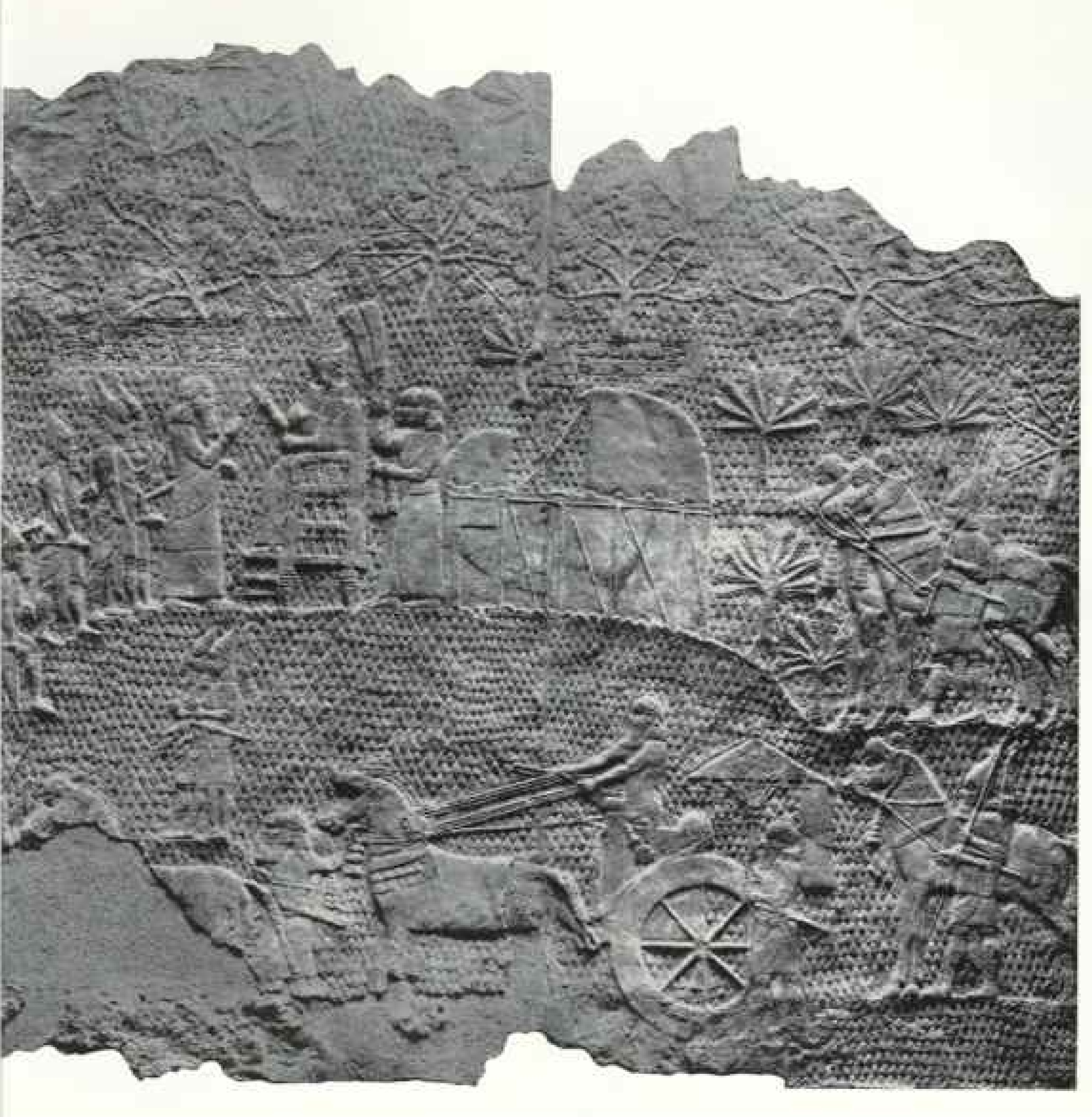
He hath thrown down in his wrath the strong holds . . . of Judah

– Lamentations 2:2

BY 721 B.C. the Assyrians had destroyed the northern kingdom of Israel and reduced Judah to a vassal. In 705 King Hezekiah of Judah withheld tribute, and Sennacherib in 701 struck back harshly.

In his annals the Assyrian monarch recounts: "As to Hezekiah, the Judean, he did not submit to my yoke. I laid siege to 46 of his strong cities, walled forts and to countless small villages in their vicinity, and conquered them by means of well-stamped earth ramps, and battering rams . . . and the attack by foot soldiers using mines, breeches as well as sapper work. I drove out . . . 200,150 people, young and old, male and female, horses, mules, donkeys, camels . . . cattle beyond counting, and considered them booty."

Of these conquests, Sennacherib relished particularly his victory at Lachish, a city then larger than Jerusalem. He ordered



his artist to commemorate the city's fall in stone and made Lachish his headquarters until he finished the Judean war.

Hezekiah perforce sued for peace. The Second Book of the Kings (18: 14-16) quotes his entreaty: "And Hezekiah king of Judah sent to the king of Assyria to Lachish, saying, I have offended; return from me: that which thou puttest on me will I bear. And the king of Assyria appointed unto [taxed] Hezekiah king of Judah three hundred talents of silver and thirty talents of gold. And Hezekiah gave him all the silver that was found in the house of the Lord, and in the treasures of the king's house. At that time did Hezekiah cut off the gold from the doors of the temple of the Lord . . . and gave it to the king of Assyria."

Seldom has archeology so thoroughly buttressed Biblical history. Sennacherib's annals parallel II Kings' account almost exactly, and J. L. Starkey's excavations of Lachish in the 1930's revealed a double-walled city that Sennacherib's sculptor portrayed even to specific towers.

The painting on the following pages combines information from all these sources.

Assyrian Siege Engines Batter Lachish; Judean Prisoners Yield to Sennacherib

In the manner of ancient Assyrian art, successive events merge to form one picture. Even as Lachish's defenders rain firebrands and boiling oil on the

PAINTING BY H. J. SOULEN © NATIONAL GEOGRAPHIC SOCIETY

siege engines, an attacking column pours through a breach in the open wall, and forlorn Hebrews stream through the open gate of the surrendered city. Enthroned before his tent, the Assyrian king inspects captivès on their way to exile. His chariot stands ready.

These very stones, still clinging together after nearly 2,700 troubled years, felt the wrath of Lachish's Assyrian conquerors.

than a century and a quarter longer, the southern kingdom clung to its precarious existence. From approximately 715 to 687 B.C., the ambitious Hezekiah reigned in Jerusalem. Biding his time, he formed a coalition of small states and plotted against Assyria with Egyptian and Babylonian emissaries. When Sargon II died in 705, apparently Hezekiah felt that his moment had arrived. Thereafter he withheld tribute from the new king, Sennacherib.

The annals of the Assyrian monarch—discovered in the ruins of Nineveh—offer a vivid picture of the events that followed. In 701, Sennacherib took the field against "the overbearing and proud Hezekiah." In response to the latter's call for aid, his Egyptian allies sent "an army beyond counting," but, says the Assyrian, "I fought with them and inflicted a defeat upon them."

After describing his conquest of outlying Judean cities, Sennacherib continues:

"Himself I made a prisoner in Jerusalem, his royal residence, like a bird in a cage.... I reduced his country, but I still increased the tribute... to be delivered annually.

"Hezekiah himself, whom the terror-inspiring splendor of my lordship had overwhelmed... did send me, later, to Nineveh, my lordly city, together with 30 talents of gold, 800 talents of silver, precious stones... and all kinds of valuable treasures, his own daughters, concubines, male and female musicians."

Sennacherib seems to have been proudest of his victory at Lachish, for in his palace he erected a bas-relief depicting the siege and the surrender of the great fortress city (page 834). This ancient record furnished the details of the painting on page 836.

Digging at Tell ed Duweir, between 1932 and 1938, a British expedition uncovered

EFREM (LAR)

Remnants of the governor's palace, they stand today atop a hill in Israel.

Lachish. In the ruins, archeologists read the tale of Sennacherib's siege: wooden battlements reduced to charcoal, earth piled against the city wall to form a ramp for the attackers, the helmet crest of an Assyrian soldier. On the northwest slope of the tell, they also excavated a pit containing the bones of at least 1,500 bodies intermixed with broken pottery. A further layer of animal bones, mostly from pigs, covered this strange agglomeration.

J. L. Starkey, the expedition leader—who was murdered in 1938 by Arab enemies—suggested, rightly in my judgment, that this curious deposit represents the corpses and rubble swept out of the city when the victorious Sennacherib lifted his siege. Since Hebrew dietary laws forbade the eating of pork, I would also suggest that the pig bones might well have been left behind by the Assyrians.

Not until 70 years later did Assyria's power begin to decline. Then a succession of feeble rulers in Nineveh combined with a Babylonian renaissance under the founder of the Chaldean Dynasty, Nabopolassar (626-605 B.C.), spelled doom for the hated Assyrians. In 616 B.C. Nabopolassar attacked Assyrian territory in the middle Euphrates valley. Thereafter, the Assyrians reeled back beneath a succession of blows from the Babylonians in the south and the Medes in the east. Then, in the spring of 612 B.C., Medes and Babylonians joined in a climactic attack upon Nineveh itself.

With the fall of Nineveh, a cry of joyous relief re-

Lachish's gate, forced by several conquerors, notches the horizon. A visitor inspects the socket of an ancient door.

KODACHROMES BY EFREM (LAR) © NATIONAL GEOGRAPHIC SOCIETY

PAINTING BY H. J. SOULEN © NATIONAL GEOGRAPHIC SOCIETY

Thou didst wash thyself, paintedst thy eyes, and deckedst thyself with ornaments

—Ezekiel 23:40

VIRTUALLY no portrayals of the dress and manners of ancient Palestine's well-to-do women have survived. The only information available stems from two sources: the Hebrew prophets and archeology.

Biblical prophets unflaggingly excoriated the wealthy classes for materialism, and their writings give us a glimpse of contemporary styles.

Late in the 8th century B.C. Isaiah (3:16) railed against the haughty "daughters of Zion," who "walk with stretched forth necks and wanton eyes, walking and mincing as they go, and making a tinkling with their feet." He then offers a catalogue of anklets, headbands, crescents, pendants, bracelets, scarfs, armlets, amulets, robes, mantles, cloaks, handbags, veils, garments of gauze and linen, signet rings, and nose rings.

The artist's portrayal of the royal harem in Jerusalem draws both upon Isaiah's list and upon recovered artifacts, including ivory combs, bronze mirrors, and alabaster ointment boxes.

Preparing for a party, the king's wives rouge lips, darken eyes with antimony, and arrange their elaborate coiffures. Salves, oils, and creams anoint their bodies. Sweet spices and aromatic gums perfume them.

Musicians and dancers in background start the entertainment. Chairs, tables, and the general decor reflect Phoenician craftsmanship.

YADIN, DE ROTHSCHILD EXPEDITION

Ivory stopper for a perfume flask, found at Hazor, dates from the 15th century B.C. Egyptians made it or influenced the design.

sounded across the entire ancient world. The prophet Zephaniah delivered an exultant epitaph: "This is the rejoicing city that dwelt carelessly, that said in her heart, I am, and there is none beside me: how is she become a desolation, a place for beasts to lie down in! every one that passeth by her shall hiss, and wag his hand."

However, a detachment of Assyrian warriors managed to escape Nineveh's death agony. Fleeing westward to Haran, they set up a shadow empire under Asshuruballit. Surprisingly enough, their traditional enemies the Egyptians sprang to their support—or tried to. Alarmed by the growing might of the Medes and Babylonians, Pharaoh Necho rushed reinforcements to the Assyrians.

But as he sped north through Palestine, Josiah—Judah's last great king—intercepted him at Megiddo. It was a delaying action, and it worked; while Necho deployed at Megiddo the Babylonians defeated Asshuruballit at Haran.

But Josiah's courage cost him his life; the Egyptians slew him on the battlefield. "And his servants carried him in a chariot dead from Megiddo, and brought him to Jerusalem, and buried him in his own sepulchre."

Scholars have long puzzled over why this politically sophisticated monarch risked him-

self and his kingdom in a foredoomed attempt to halt Necho's powerful forces. A careful scrutiny of all the Biblical and archeological evidence has convinced M. B. Rowton that "the last of the great Jewish kings laid down his life in a truly heroic and entirely successful bid to avenge the dreadful wrongs his nation had suffered at the hands of Assyria."

The small states of the Near East soon learned that the extermination of Assyria merely meant exchanging one foreign tyranny for another, and still another. The Egyptians poured in first; their domination lasted until 605 B.C. Then the Babylonians crushed Pharaoh Necho at the Battle of Carchemish, in what is now Turkey, and their chariotry clattered down the valleys of Palestine to the Egyptian border.

The Judean king, Jehoiakim, humbled himself immediately. But, playing a dangerous political game, he rebelled in 599 B.C. According to the Jewish historian Josephus, writing seven centuries later, "upon hearing that the king of the Babylonians made an expedition against the Egyptians, he [Jehoiakim] did not pay his tribute, yet was he

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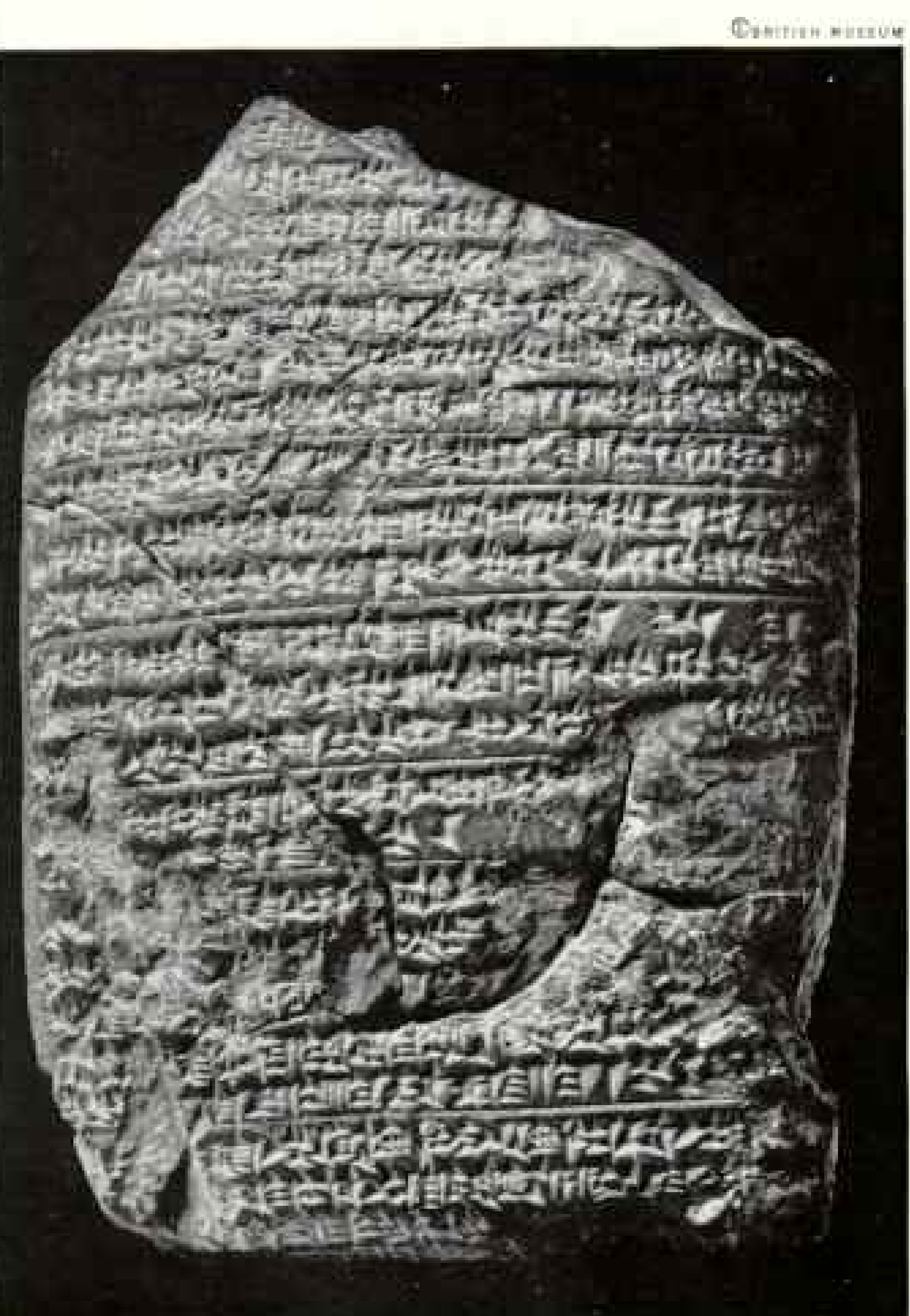

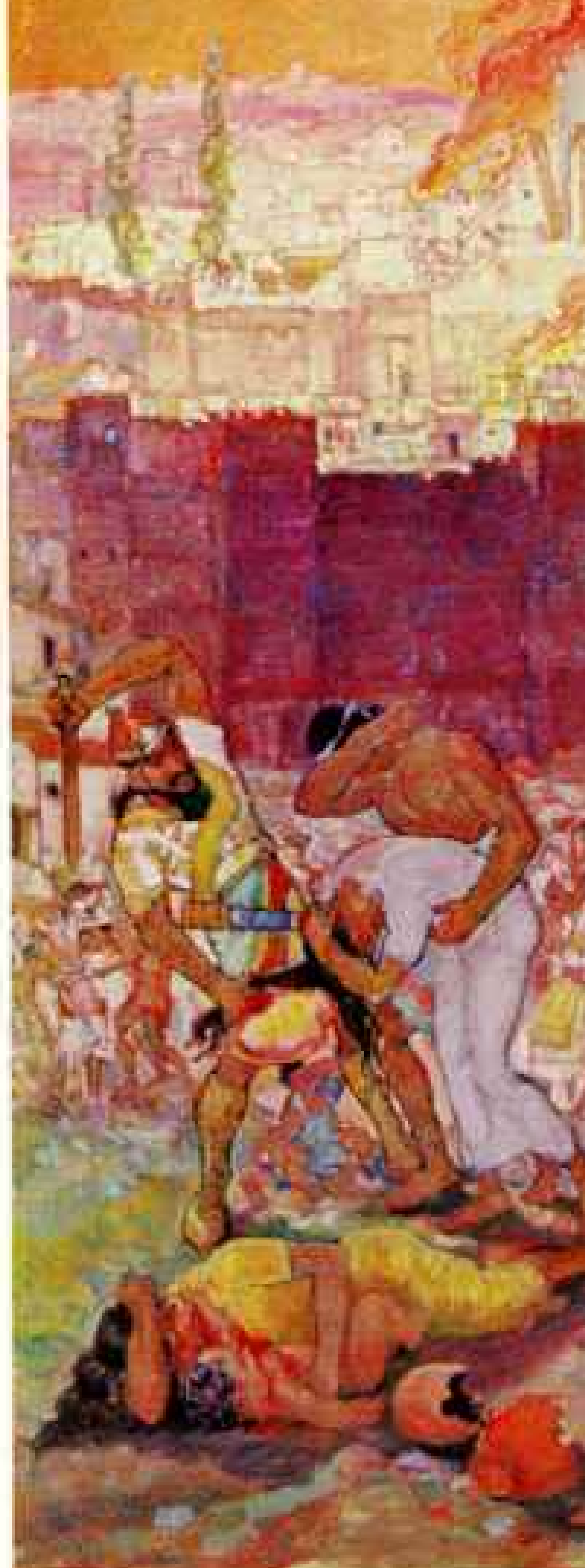

Babylonian Chronicle described Nebuchadnezzar's capture of Jerusalem in 597 B.C. with the words:

"In the seventh year, the month of Kislev, the king of Akkad [Babylonia] mustered his troops . . . and encamped against the city of Judah and on the second day of the month of Adar he seized the city and captured the king. He appointed there a king of his own choice, received its heavy tribute and sent them to Babylon."

Date mentioned by the cuneiform script corresponds to the Christian calendar's March 16, 597 B.C.

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Then shall this city be given into the hand of the Chaldeans

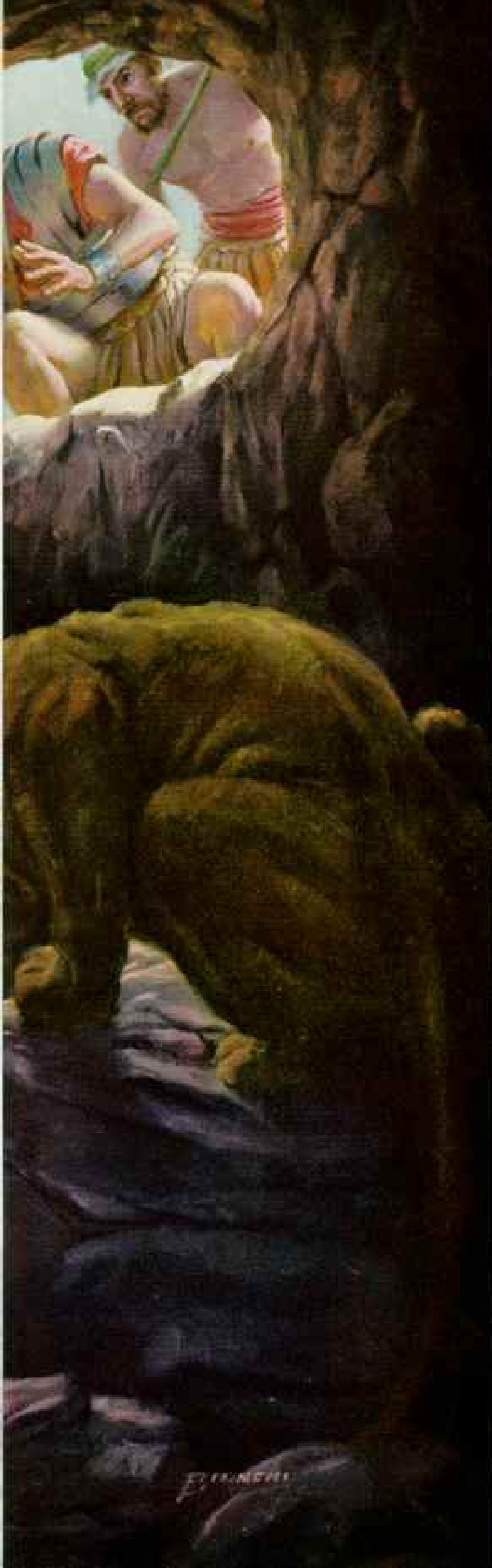
–Jeremiah 38:18

LESS THAN TEN YEARS after Nebuchadnezzar's chastisement of Jerusalem, as recorded on the Babylonian Chronicle at left, the Judeans revolted against Babylon again. Nebuchadnezzar, reinvading Judah, destroyed every major city and annihilated most of the population. His army besieged Jerusalem for a year and a half before famine-weakened defenders surrendered in July, 587 B.C. In August the Babylonian officer Nebuzaradan demolished the city and leveled its walls; he did not spare Solomon's Temple.

The artist envisions Jerusalem aflame. Harried by Babylonian troops, the few survivors trudge out of the great gate on their way to exile. Babylonian scribe at lower right tallies the plunder.

In the center stands white-bearded Jeremiah, who had denounced the revolt and predicted Jerusalem's fall. "They shall burn it with fire," he said. Truly a prophet without honor, he was imprisoned during the siege.

On liberating Jeremiah, Nebuchadnezzar instructed Nebuzaradan to "look well to him, and do him no harm." Here, as slaves take food and drink to the stern old prophet, Nebuzaradan offers the choice of going in honor to Babylonia or of remaining in Judah. Jeremiah chose to stay.



Then the king commanded, and they brought Daniel, and cast him into the den of lions

—Daniel 6:16

DURING THE LAST three centuries of the pre-Christian era, Hebrews in Palestine circulated heroic stories about their forefathers exiled in Babylon. Lacking tangible evidence, archeology cannot substantiate these narratives.

Best-known hero of these Old Testament classics was Daniel, a young captive whom the Babylonians called Belteshazzar. When King Nebuchadnezzar "dreamed a dream" and demanded that his magicians and astrologers describe and interpret it, only Daniel could evoke the "great image" and make known to the king "what shall come to pass."

When Prince Belshazzar was feasting from golden vessels his predecessor, Nebuchadnezzar, had taken from Solomon's Temple, and a disembodied, moving hand wrote upon the palace wall the words "*Mene, mene, tekel, upharsin,*" Daniel alone could read them. "God," he translated, "hath numbered thy kingdom.... Thou art weighed in the balances, and art found wanting.... Thy kingdom is divided, and given to the Medes and Persians." That night, says the Bible, Belshazzar was slain, and the enemy took the kingdom.

King Darius, adds the Bible, made Daniel a president over princes, who, seeing him preferred, induced the monarch to decree that for the next 30 days no one should petition any man or god except the king, lest he be thrown to the lions. As the conspirators expected, they found Daniel praying to his God, and, informing the king, asked him to apply the "law of the Medes and Persians, which altereth not." Though "sore displeased," Darius felt compelled to order Daniel cast to the lions.

After a sleepless night, Darius returned to the den and cried out, "O Daniel... is thy God... able to deliver thee from the lions?" When Daniel answered, "My God hath... shut the lions' mouths," his accusers were thrown into the den, "and the lions had the mastery of them...."

Lions in Biblical times were not confined to Africa; they roamed from the Balkans to India. In Syria and Iran they survived into the 20th century.

PAINTING BY PETER V. BIANCHI, NATIONAL GEOGRAPHIC STAFF © N.G.S.

disappointed of his hope, for the Egyptians durst not fight. . . ."

But by the time Nebuchadnezzar of Babylon retaliated in the following year, Jehoiakim had died and his young son Jehoiachin ruled in Judah. Apparently Nebuchadnezzar first seized the fortress cities of Lachish and Debir that guarded the Judean hill country. Excavations at both sites show that he destroyed the gates, fortifications, and citadels of both cities, but otherwise left them relatively intact. Then, as attested by the Babylonian Chronicle—cuneiform inscriptions recording the yearly events of each king's reign—he proceeded to Jerusalem and captured it on March 16, 597 B.C. (page 842).

The 24th chapter of II Kings describes the sequel: "And he carried away Jehoiachin to Babylon, and the king's mother, and the king's wives, and his officers, and the mighty of the land, those carried he into captivity from Jerusalem to Babylon."

Both the Bible and the Babylonian Chronicle agree that Nebuchadnezzar then appointed a new king: Zedekiah, Jehoiachin's uncle.

Nebuchadnezzar held the deposed youth and his retainers as hostages. But the Judean propensity for revolt, backed by grandiose promises of Egyptian aid, soon reasserted itself. In less than ten years Zedekiah had taken arms against Babylon.

The Babylonians showed no mercy, and this time the clash of their swords sounded the requiem of Judah. Pitilessly, methodically, they burned Lachish and Debir to the ground. Wrote Dr. William F. Albright, the archeologist who excavated Debir: "How terrific the conflagration by which it was destroyed may have been can be gauged by the fact that limestone was calcined and slivered, while adobe was burned red."

For a year and a half, the nation's last lonely citadel—Jerusalem—withstood the battering rams and siege engines of Nebuchadnezzar; but in July of 587 B.C., the capital finally fell. After a month of pillage and slaughter, the thoroughgoing Babylonians deported all but a handful of the surviving Judeans to Mesopotamia. Then they demolished the city. When the proud columns of Solomon's Temple toppled into the rubble, Judah lay crushed in the ruins. The painting on page 843 captures this dramatic moment in history.

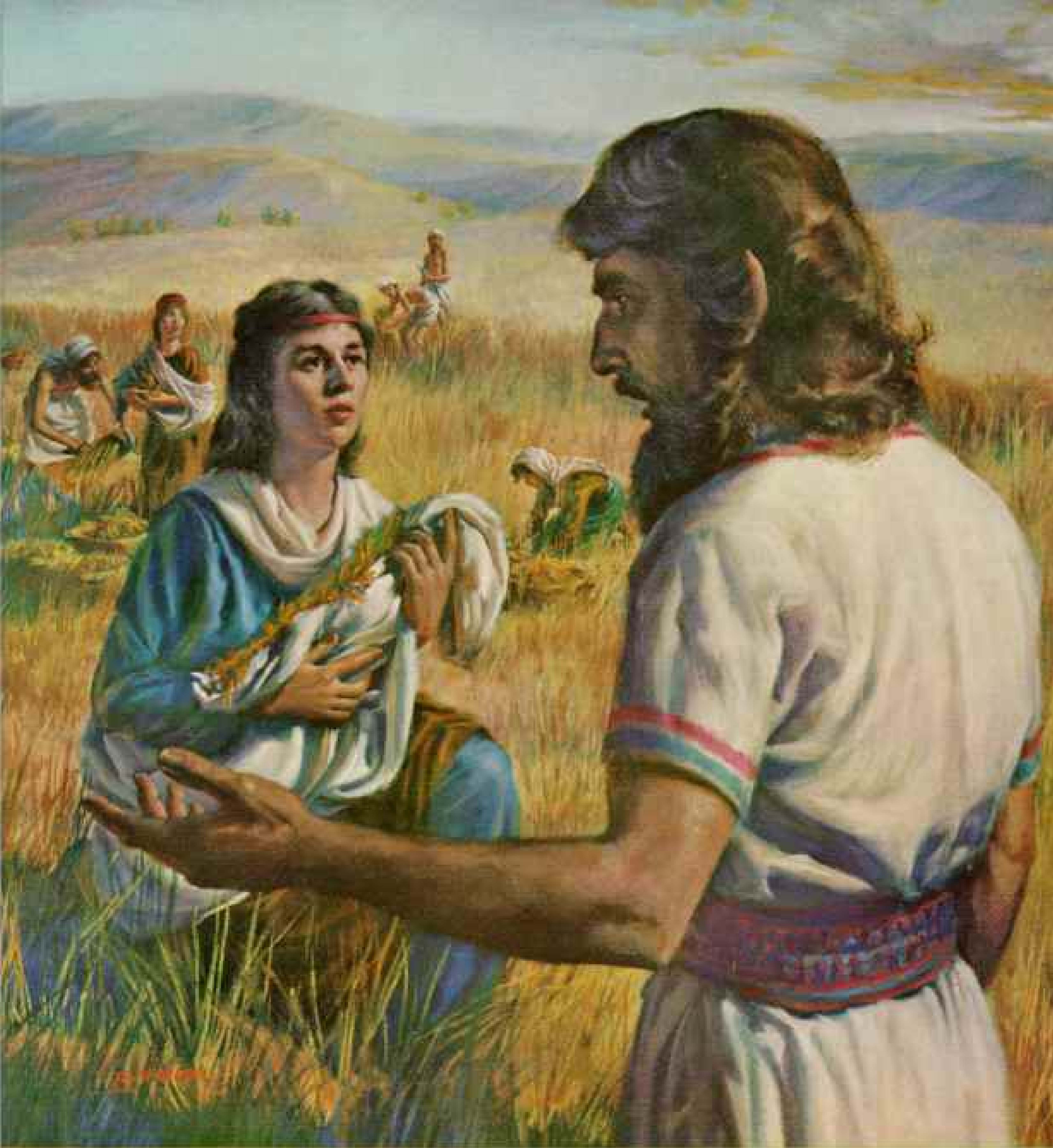
Living relic of Biblical days, a villager stands silhouetted on a Lebanese plain as she winnows grain in the East's age-old fashion. A fat-tailed sheep grazes sparse terrain.

ANSCOCHROME BY THOMAS J. ABERCROMBIE, NATIONAL GEOGRAPHIC STAFF © N.G.S.

Judah's King Died a Captive

Jehoiachin, the unfortunate hostage taken earlier by Nebuchadnezzar, lived out his life as a Babylonian prisoner. Archeology again buttresses the Biblical account by attesting, rather poignantly, the presence of the king and his family in the Chaldean capital. German excavators have discovered cuneiform tablets listing rations issued by the crown to aliens between 595 and 570 B.C. Among a motley assemblage of musicians, monkey trainers, and craftsmen appears Yaukin (Jehoiachin), "king of Judah," five royal princes of his house, and "eight men from Judah."

However, archeology also shows that not all the Judean exiles languished in captivity. Beginning in 1889, a series of American expeditions dug up Nippur, southeast of Babylon, and uncovered 30,000 clay tablets. Of



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Go not to glean in another field . . . but abide here —Ruth 2:8

THE BOOK OF RUTH relates a cherished story of ancient Israel. During the time of the Judges a woman called Naomi emigrated with her husband from Bethlehem to Moab. There the husband died; later her two sons married Moabite women. When both sons died, Naomi returned to Bethlehem. Ruth, one of her Moabite daughters-in-law, insisted on accompanying her, saying: "Whither thou goest, I will go; and where thou lodgest, I will lodge: thy people shall be my people, and thy God my God."

Once in Bethlehem, Ruth followed the reapers of the wealthy Boaz, gathering overlooked barley to support herself and Naomi. When Boaz learned that he was a kinsman of the Moabitess's dead husband, he married her in accordance with the ancient tradition that made him responsible for her care.

Here Ruth kneels before Boaz. She holds sheaves cut short in the ancient manner. Other workers wield sickles and gather grain in baskets.

The king loved Esther above all the women, and she obtained grace and

IN 539 B.C. Cyrus II descended upon Babylon with a formidable Persian army. Before "his widespread troops—their number, like that of the water of a river, could not be established—" the Chaldean dynasty collapsed, and Babylon capitulated without a battle.

"All the inhabitants . . ." continues a cuneiform inscription, "as well as of the entire country of Sumer and Akkad, princes and governors [included], bowed to [Cyrus] and kissed his feet, jubilant that he [had received] the kingship, and with shining faces."

Cyrus ruled with relative benevolence. Repudiating the Babylonian practice of relocating subject populations, he permitted the Jews and other captive peoples to return to their homelands. The prophet Isaiah hailed the monarch as the "anointed" of the Lord, who had "made him rule over kings."

At its zenith the Persian Empire stretched from northern Greece to India.

On a tablet found in the ruins of the Persian capital at Persepolis, a successor to King Cyrus proudly proclaimed: "I am Xerxes the Great King . . . King in this great earth far and wide."

PAINTING BY PETER V. BIANCHI, NATIONAL GEOGRAPHIC STAFF © N.G.S.

favour in his sight . . . so that he set the royal crown upon her head —Esther 2:17

Scholars identify this same Xerxes as the King Ahasuerus of the Book of Esther.

This Biblical romance, widely circulated throughout Palestine in the waning centuries before Christ, commemorates a Jewish heroine who became a Persian queen, bravely foiled a plot against her cousin Mordecai, and saved her people from persecution. Jewish communities to this day celebrate her deed at the Festival of Purim.

Persian historical records, however, fail to mention queens, and archeology has no way to check on the story's source.

Artist Bianchi's painting shows the queen dining with Xerxes on a colonnaded terrace overlooking verdant orchards. Attendants with fly whisks hover near Esther, while the king's guards stand with spears.

Fluted columns of the palace mirror those excavated at Persepolis, the Persian capital sacked and burned by Alexander the Great in 330 B.C. (following page).

The king's garments, as well as the soldiers', faithfully follow those portrayed in Persepolis bas-reliefs.

Chairs are modeled on the Persian throne.

these, some 700 dated from the 5th century B.C. They were the records of a great Babylonian banking house, Murashu Sons. Hebrew names figure prominently in their documents. This fact, plus bowls with Hebrew inscriptions found among the ruins, indicate that a Jewish colony lived on in Nippur for several centuries.

In due time, the ebb and flow of empire swamped the Chaldean monarchs just as it had their predecessors. Insanity struck the last king, Nabonidus, and he retired to Arabia; the crown prince, Belshazzar—as he is known in the Book of Daniel—guided the shaky empire in his stead. When Cyrus the Persian marched out of the north with a mighty army, Babylon fell like an overripe pomegranate. On October 12, 539 B.C., the Nabonidus Chronicle records that "the army of Cyrus entered Babylon without battle." Seventeen days later, Cyrus himself arrived.

"My numerous troops walked around in Babylon in peace," Cyrus inscribed for posterity, "I did not allow anybody to terrorize [any place] of the [country of Sumer] and Akkad." This conciliatory entry into a conquered capital set the tone for the reigns of Cyrus and the enlightened Persian emperors who followed him in the next two centuries.

Among Cyrus's first acts was the liberation of captives and the restoration of their shrines: "I returned to these sacred cities on the other side of the Tigris, the sanctuaries of which have been ruins for a long time, the images which used to live therein and established for them permanent sanctuaries. I also gathered all their former inhabitants and returned to them their habitations."

Thus, during the century that followed, groups of Jewish exiles journeyed back to their homeland. They rebuilt Jerusalem and, between 520 and 515 B.C., erected a modest

BY NATIONAL GEOGRAPHIC PHOTOGRAPHER J. BAYLOR ROBERTS © N.G.S.

Ruined Persepolis Witnessed the Triumph of Alexander and the Fall of the Persians

Founded by Darius the Great in the 6th century B.C. as the ceremonial capital of the Persian Empire, Persepolis stands on the desolate Marv Dasht plain beside the Zagros Mountains in Iran. Here Persian kings erected magnificent palaces and carved their names and deeds. Alexander's troops, celebrating their victory over Darius III, looted the royal city and put it to the torch.

Massive stairway at left leads to the remains of Xerxes' palace; colossal winged bulls flank the entrance. Fluted columns mark the royal audience hall, in whose foundations archeologists discovered the annals of Darius I inscribed on golden tablets, with duplicates in silver.

Xerxes as a crown prince stands behind his father Darius I in a Persepolis relief.

temple. With Persian permission, Jerusalem became the capital of a small province of some 50,000 population. Later, Nehemiah, a Jew born in exile who rose to high office in the Persian government, rebuilt the city walls and instituted several religious reforms.

However, the old north-south cleavage lingered on. The returning Judeans ignored those who claimed to be Jews in the Persian province of Samaria to the north. Once they had constructed their new temple, the stiff-necked Judeans summarily barred it to the Samaritans, engendering a hostility that continues to this day.

This rivalry provided me with a key for understanding our own excavations at Shechem. The ruins tell us that, between the Assyrian destruction in the 8th century B.C. and the time of Alex-

Timeless Jerusalem Endures; Arab and Jew Divide the City

Romans during Herod's day laid the lower courses of walls seen here; most of the superstructure dates from the 15th century A.D. Now sealed, the Golden Gate in center marks the traditional point of Jesus' entry into the city on Palm Sunday. The massive Dome of the Rock, a Moslem shrine, stands on the site of Solomon's Temple.

The Bedouin shepherd tends his flock on the Mount of Olives.

Arab leads a pilgrim to the traditional spot on the Jordan where John the Baptist baptized Jesus.

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER DAVID S. BOYER

KODACHROME BY BRIAN BRAKE © NATIONAL GEOGRAPHIC SOCIETY

ander the Great, 400 years later, the city lay fallow. But wherever we dug into the surface layers of debris, we uncovered shattered household vessels dating from the 3d and 2d centuries B.C.

Our excavations of this past summer produced three strata, or layers, of houses from this period; often we found floors and streets intact. We could date these buildings accurately, not only through the styles of the pottery, but also by means of the coins accidentally dropped by the ancient inhabitants. One prudent man had even hidden 35 large silver tetradrachmas under his floor, proving that times change but human beings do not. Clearly, Shechem had been rebuilt and occupied from about 325 to 100 B.C. But by whom? And why?

When Alexander conquered the Persian Empire in 331 B.C., history informs us, he presented Samaria as a prize to several of his warriors and deported many of the Samaritans to Shechem. I am convinced that herein lies the explanation of Shechem's mysterious resurrection.

But what ended its occupation, about 100 B.C.? Again history comes to our aid. The Hasmonean priest-kings, who ruled in Judah from 166 to 63 B.C., sought to reunite the country—politically and religiously—by the sword. Repeatedly they invaded the northern territory with the avowed aim of converting the Samaritans. From the ancient record I infer that John Hyrcanus destroyed Shechem just before the turn of the 1st century B.C.

Rome Conquers, and Jesus Is Born

The rubble of cities like Shechem bears stark witness to the unremitting violence that racked the ancient world in the last pre-Christian centuries. And when the sandals of Roman legionaries trod like measured thunder through the gates of Jerusalem in 63 B.C., the last act in a drama millenniums old neared its climax.

There remained only the final paroxysm of a paranoia-driven Herod the Great murdering his wife, executing his sons, and bathing his kingdom in blood, before the birth of Jesus ushered in a religious revolution that was to shake the world. Through thousands of years the Fertile Crescent had occupied the center stage of history. But thereafter the focal points of power moved west.

Today, the tell-strewn Near East stands like an abandoned bivouac. The conquerors sleep beneath the blighted soil of their conquests, and there is a kind of desperate poignance—a crying out against mortality—in their inscriptions: "O man, whosoever thou art and whencesoever thou comest, for I know that thou wilt come, I am Cyrus, and I won for the Persians their empire." Thus Plutarch records the king's long-vanished epitaph.

The glory, like the kings, perished long ago. Babylon is a mound; Nineveh lies buried beside the Tigris; lizards dart across the lonely stones of Samaria. And over every tell echoes the lamentation of Jeremiah: "How doth the city sit solitary that was full of people! how is she become as a widow! she that was great among the nations, and princess among the provinces...."

The Long, Lonely Leap

World's highest jump tests a new type of parachute for high-altitude flyers and scientists returning from the threshold of space

By CAPT. JOSEPH W. KITTINGER, JR., USAF

Illustrations by National Geographic photographer VOLKMAR WENTZEL

OVERHEAD my onion-shaped balloon spread its 200-foot diameter against a black daytime sky. More than 18½ miles below lay the cloud-hidden New Mexico desert to which I shortly would parachute.

Sitting in my gondola, which gently twisted with the balloon's slow turnings, I had begun to sweat lightly, though the temperature read 36° below zero Fahrenheit. Sunlight burned in on me under the edge of an aluminized antiglare curtain and through the gondola's open door.

In my earphones crackled the voice of Capt. Marvin Feldstein, one of our project's two doctors, from ground control at Holloman Air Force Base:

"Three minutes till jump, Joe."

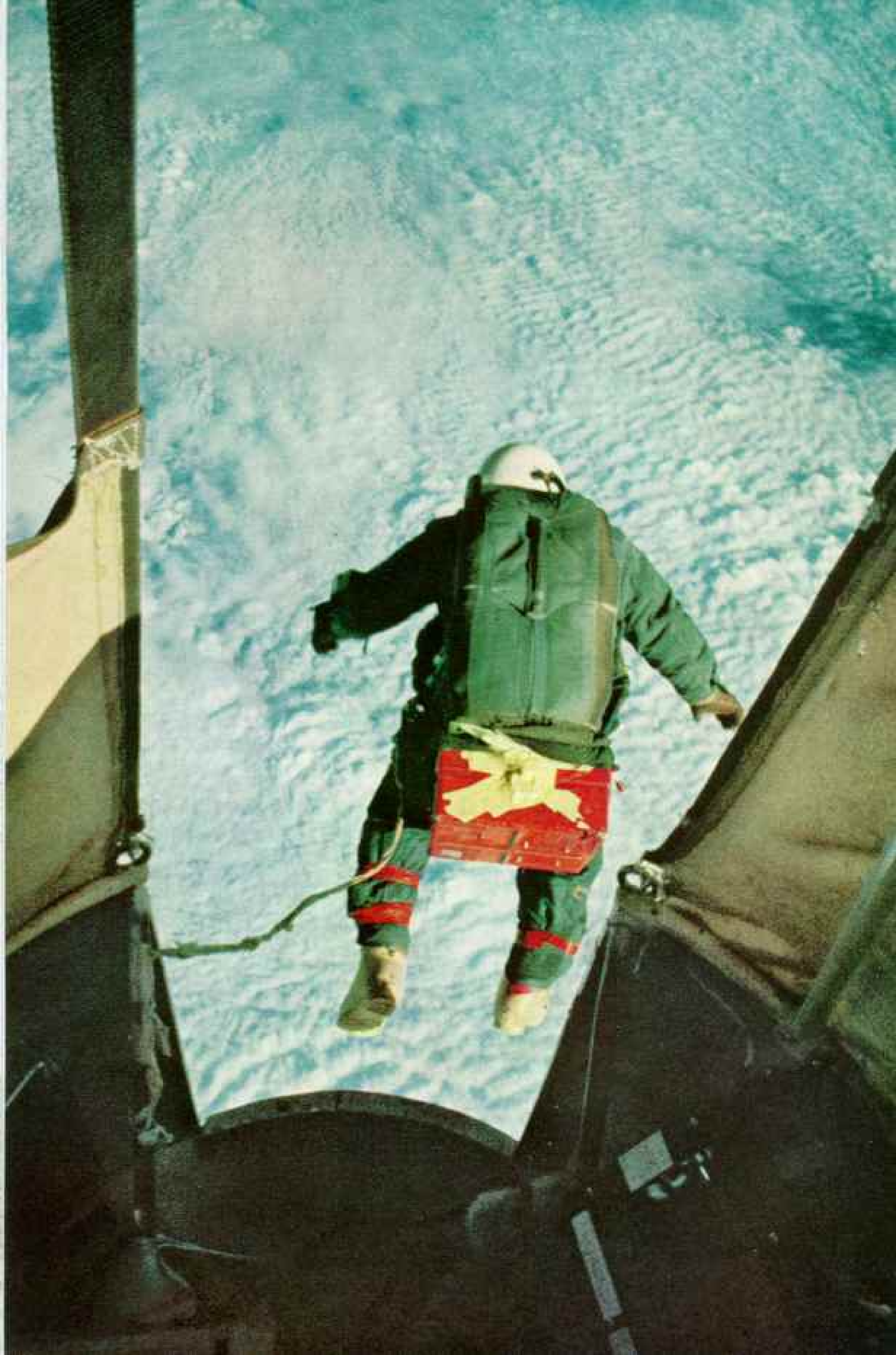
I was ready to go, for more reasons than one. For about an hour—as the balloon rose from 50,000 to 102,800 feet above sea level—I had been exposed to an environment requiring the protection of a pressure suit and helmet, and the fear of their failure had always been present. If either should break, unconsciousness would come in 10 or 12 seconds, and death within two minutes.

In our altitude-chamber flights at the laboratory, I always

"Lord, take care of me now," I pray, then take the big step-off that begins my return from the edge of space, a 13-minute, 45-second plunge to an earth wrapped in clouds. The lanyard attached to my parachute pack is my last link with the gondola. It starts a timer on a small stabilization chute that will open 16 seconds later and prevent horizontal spinning. Without stabilization, man could not survive a jump from these high altitudes.

A National Geographic camera mounted above the gondola took this remarkable photograph at 102,800 feet.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY



From speedboats to jets to balloons

THE AUTHOR raced speedboats as a teenager in his native Florida, became an Air Force jet pilot in his 20's, and turned space prober in his 30's.

Captain Kittinger, now 32, learned the fascination of research in Project Manhigh, riding a balloon's pressurized gondola to 96,200 feet in 1957. The flight tested equipment for Lt. Col. David G. Simons's ascent to 101,516 feet.

Two years earlier Kittinger flew the observation plane that monitored Col. John Paul Stapp's rocket-sled run of 632 miles an hour. Kittinger was impressed by the dedication of Colonel Stapp, a pioneer in space medicine. Stapp, in turn, noted the flyer's zeal and skillful jet piloting, recommended him for space-aviation work, and fostered the high-altitude tests that led to Kittinger's record leap last August 16. The colonel provided the project's Latin name, Excelsior, meaning "ever upward."

For an open-gondola jump from 14 miles in 1959, Kittinger received this year's Harmon Trophy for aeronauts and the Leo Stevens parachute medal. He also added an Oak Leaf Cluster to his Distinguished Flying Cross.

Mrs. Kittinger is the former Pauline Bauer, whom the author met while serving in Germany. They have two sons, Joseph III, 8, and Mark, 5.

knew that if something went wrong, the chamber pressure could be increased immediately, returning me to safety. Doctors stood just a few feet away, watching through a porthole for any sign of malfunction. But here in the eerie silence of space, I knew that my life depended entirely upon my equipment, my own actions, and the presence of God.

Aerodynamically, space begins about 120 miles from earth. Physiologically and psychologically, however, it starts only 12 miles up, where survival requires elaborate protection against an actual space environment. Thanks to my dedicated Project Excelsior team, I had twice before penetrated this realm in an open gondola to make test jumps from 14-mile heights. Now I had climbed to 19½ miles above sea level, where the physical and mental hazards were much greater, for a more conclusive test of our space-survival and parachute escape systems.

The idea of men reaching toward space with balloons and parachutes in the age of jet planes and rockets may seem strange. Actually, it makes the best kind of sense. No powered aircraft can put man into a space environment and keep him there for a sustained period of time. But the lighter-than-air balloon, man's oldest flight vehicle, can.

Twenty-five years ago last month, two Army Air Corps captains, Albert W. Stevens and Orvil A. Anderson, took the balloon *Explorer II* to the then unprecedented height of 72,395 feet—13.71 miles. Their pressurized gondola and its instruments constituted a two-and-a-quarter-ton payload. Results of this famous National Geographic Society-U. S. Army Air Corps stratosphere flight are studied by airmen to this day.*

To understand the need for a high-altitude escape system, consider the plight of an airman who has to bail out above 20,000 feet. He faces two choices, either of which could be fatal. Should he open his chute immediately after bail-out from a speeding craft, he risks death from his canopy's opening shock, from lack of oxygen, or from severe cold.

Flat spin imperils him if he tries to fall free to lower, livable altitudes before opening his chute. His body may whirl like a runaway

*See "Man's Farthest Aloft," by Capt. Albert W. Stevens, NATIONAL GEOGRAPHIC, January, 1936; also "The National Geographic Society-U. S. Army Air Corps Stratosphere Flight of 1935 in the Balloon 'Explorer II,'" a volume of technical papers published by The Society (out of print but available in many libraries).

No wind whistles or tugs at me in the initial drop. I accelerate with the speed of an object falling in a vacuum. Every second I drop 22 miles an hour faster but have no sensation of velocity. In eerie silence, earth, sky, and departing balloon revolve around me as if I were the center of the universe. I feel like a man in suspended animation.

Though my stabilization chute opens at 96,000 feet, I accelerate for 6,000 feet more before hitting a peak of 614 miles an hour, nine-tenths the speed of sound at my altitude.

An Air Force camera on the gondola took this photograph when the cotton clouds still lay 80,000 feet below. At 21,000 feet they rushed up so chillingly that I had to remind myself they were vapor and not solid.

HIGH SPEED EKTACHROME BY UNITED STATES AIR FORCE © N.G.S.

© NATIONAL GEOGRAPHIC SOCIETY

That red hunting cap has now accompanied me to the launch site on three balloon jumps. I'm not superstitious, but why change a winning combination? Three hours before take-off, I discuss details with the Air Force's most experienced test parachutist, George Post.

To prevent the bends, I begin to breathe oxygen two hours before launch to decrease my body nitrogen. T/Sgt. R. A. Daniels adjusts a belt that monitors pulse, heart, and breathing. Dr. Richard Chubb, with earphones, checks the belt.

propeller. Flat spin is a characteristic of any falling object that is aerodynamically unstable. Dummies dropped from balloons up to 100,000 feet have attained 200 revolutions per minute, whereas tests show that 140 r.p.m. would be harmful, possibly fatal.

The problem was to get a man down fast to lower levels before opening his chute, but at the same time to safeguard him against flat spin. The answer came from Francis Beaupre of the Air Force's Aerospace Medical Division. His organization is part of the Air Research and Development Command's Wright Air Development Division, which directed our project. Beau asked himself: Why not use a small parachute to stabilize a man during free fall, as a sea anchor steadies a ship? He started to work on what was to become the Beaupre stabilization parachute, one of the few major innovations in parachutes since the seat-pack type won the approval of the Army back in 1919.

Beau's chute consists of three units: a conventional, spring-type chute to catch the wind and provide the pull to open the next unit; a 6-foot-wide stabilization canopy to prevent flat spin during free fall; and finally a conventional 28-foot chute to open at about 18,000 feet.

Parachute Opens Too Soon

In October, 1959, we made the first jumps with the Beaupre parachute, leaping from a C-130 Lockheed Hercules at 28,000 feet. I made the first leap, M/Sgt. George A. Post the second, and Capt. Harry Collins the third. The chute worked beautifully, and we felt ready for higher altitudes.

But something went wrong on my first bail-out from a balloon, on November 16, 1959. Before I jumped from the gondola at 76,400 feet, the timer lanyard of the stabilization unit was pulled prematurely and the 6-foot canopy and shrouds popped out after only two seconds of free fall, instead of 16, promptly fouling around me.

At first I thought I might retard the free spin that began to envelop me, but despite my efforts I whirled faster and faster. Soon I knew there was nothing I could do. I thought this was the end. I began to pray, and then I lost consciousness.

I owe my life to my emergency parachute, set to open automatically at 10,000

KODACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER VOLKMAR WENTZEL © N.G.S.

Lest blood bubble like champagne, I put on a partial pressure suit for the near-vacuum where I am going. To combat 94°-below-zero cold, I wear two layers of underwear, the inner set having a waffle weave to trap insulating air. Quilted garments and winter flying suit go on last. Helping me to dress, clockwise from left, are Daniels, Dr. Chubb, Post, and T/Sgt. Eugene Fritz.

feet. When I came to, I was floating lazily down beneath the beautiful canopy of the emergency chute. I want to tell you I had a long thank-you session with the good Lord right then and there.

I knew that Beaupre's ideas were sound, despite the results of the first jump, and by December 11 we were ready to prove it. This time I jumped from the gondola at 74,700 feet, and everything worked perfectly.

Next came the big test, Excelsior III, from above 100,000 feet. The date was August 16, 1960. Vivid in my mind as I swung there were the events of the past few hours.

Jump Project Goes Into High Gear

Our project really begins to gain speed on the eve of the jump. Alerts go out to the launch crew, ground control station, Holloman base weathermen, and all support units. Clearance for use of the White Sands Missile Range, the approximately 100-by-40-mile test basin, is obtained from the Army. We brief our own crew and the pilots of the support aircraft.

Technicians swarm around the 4½-foot-wide gondola. First Lt. Don Fordham and civilian Don Griggs check the electronics control systems. Airman 1/c Frank Hale, a parachutist himself, joins Beau in testing canopies, shrouds, cables, and lanyards. Another veteran jumper, Capt. Billy Mills, our cigar-chewing assistant project officer, oversees prelaunch check lists of more than 1,000 entries.

The gondola's 12 camera eyes—including one provided by the National Geographic Society—are mounted by Ken Arnold and Gene Gallatin. Plastic water bottles and aluminum foil shield the cameras and other equipment against the cold.

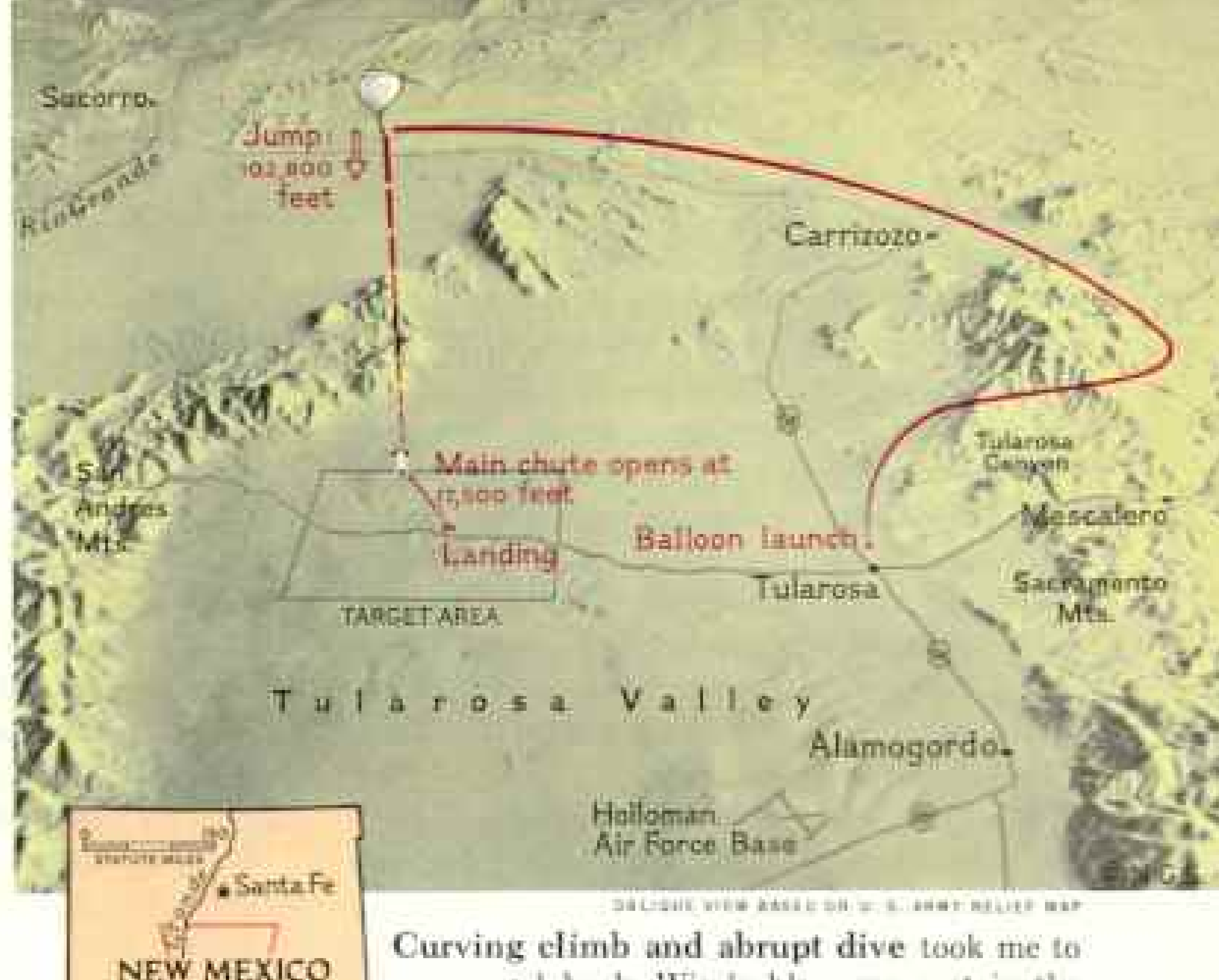
As launch-day-minus-one progresses, I come under the close scrutiny of our two project physicians. For a week I have been on a high-protein, low-residue diet, and I avoid gas-producing foods. Gas expands with increasing altitude, so that air trapped in my stomach or intestines could cause pain so severe that I could be forced to jump prematurely. The diet is mainly meat and potatoes.

The doctors also take a final look at ears, nose, and throat. Any air pocketed in the body could force me down too soon.

Limp balloon in its red plastic cover scarcely looks like a space vehicle. Directed by T/Sgt. Melvin Johnson (left), launchers thread the upper portion through the launch arm and install a helium release valve in the top before starting inflation.

KODACHROME © NATIONAL GEOGRAPHIC SOCIETY

By afternoon, work halts for most of our team, but our weathermen, Duke Gildenberg and Ralph Reynolds, are facing their most intricate task. They must bring me to earth in an 11-mile-square target area about 25 miles northwest of Holloman. They must predict weather conditions for the following morning high aloft as well as on the ground, and decide if surface winds will permit a safe take-off. Checking with Holloman base weathermen, they reach a favorable decision and choose an abandoned dirt airstrip 18 miles from the base as the launching site.



Curving climb and abrupt dive took me to space and back. Winds blew me east in the troposphere, west in the stratosphere, so that I landed on target. Air at the jump point thinned to an eightieth of sea-level density.

Forty-five minutes before midnight a convoy of some 20 vehicles heads northeast through Alamogordo. Frightening jack rabbits as they turn onto the old airstrip, vehicles wheel into position amid mesquite and greasewood. Mobile generators start, communications antennas are mounted, and the first of the hourly pilot balloons, called pibals for short, wavers aloft to provide a wind reading.

The gondola, on a flat-bed truck, becomes the center of activity as it gets a final grooming. Some 300 feet away, T/Sgt. Melvin D. Johnson directs the balloon launching crew.

Ground Crew to Monitor Flight

At Holloman the men who operate the ground control station begin reporting for duty at midnight. They will monitor my progress over radio and radar networks, plot my position, advise me when to valve and when to ballast, and, finally, give the word on when to jump.

Ten minutes after I bail out, ground control will beam the signal that will cut the gondola from the balloon, returning it and its valuable instruments to earth by parachute.

At first this method was risky because chance radio signals could also act as a trigger. In 1955 a balloon gondola—luckily with no human passengers—was cut down when a commercial station blared "Tiger Rag."

Dave Willard, electronics chief of the Holloman Balloon Branch, solved the problem. He developed a transistorized device that serves, in effect, as a skyborne lock which only a special electronic key transmitted from the ground station will open. I can go up now with full assurance that no burst of jazz or rock 'n' roll will end the flight prematurely.

I am the only man who gets a chance to sleep late before a launch. About 1:30 on the afternoon preceding the flight, Marv Feldstein hands me two sleeping pills and a medical journal, his sure prescription for sleep.

About 7 p.m. I awake for a steak supper. Still sleepy, I rest four hours longer. Then Beau Beaupre announces: "Captain Joe, time to wake up."

It has become a tradition that Beau and Ken Arnold drive me to the launch site. It is also traditional that we stop for breakfast, which this time consisted of orange juice and strawberry shortcake. As I finish my meal, I tell Beau:

"That sure was a good breakfast, and it's nice of you to pay for it."

Of course, Beau hasn't yet offered to pay, but he does, because this also is traditional. I always like to be in debt when I jump.

We reach the launch site at 2 a.m. and find Duke Gildenberg uneasy. Clouds moving up from Texas complicate weather prediction.

George Post tells me the flight clothing is ready. The Air Force's most experienced test parachutist, he has been jumping since 1943

and wears the Distinguished Flying Cross. It is good to know that he will be watching every piece of my gear (page 858). He, better than anyone else, knows the stress to which I and my equipment will be exposed.

One item of business remains. The previous week, my five-year-old son Mark was eating breakfast at our Dayton, Ohio, home when he noticed a car license plate printed on his box of cereal. He decided that his father's gondola should be properly licensed, so he clipped the tag from the box and had his mother mail it to me. As I watch, it is carefully taped to the gondola.

The license tag is that of the State of Oregon. Our Project Excelsior group is stationed in Ohio, we are launching in New Mexico, our team members hail from several States. Truly we have a national effort.

Oxygen Guards Against Bends

At 3 o'clock I enter the trailer that we use as a dressing room. Here I start breathing oxygen, and I will not take a breath of natural air until I reach lower altitudes on my descent, some four hours later. This gets most of the nitrogen out of my body. With increasing altitude, nitrogen forms bubbles that expand, cause severe pain, and can be fatal—an ailment known as the bends, which also threatens divers.

As I begin breathing oxygen, I relax on a cot before beginning to dress. I am profoundly aware of the activity around me, and I feel strengthened at the thought of our team's thoroughness and enthusiasm. Some people may wonder how I could enjoy any degree of equanimity in view of the job ahead, and I think that the answer lies in a four-point philosophy that I have developed:

I must have confidence in my team.

I must have confidence in my equipment.

I must have confidence in myself.

I must have confidence in God.

Secure on these four points, a man can face almost anything. In fact, I had been able to doze off for a few minutes at the launch site before my jump in November of 1959.

At 3:30 o'clock, T/Sgt. R. A. Daniels and T/Sgt. Eugene Fritz start to dress me (page 859). Outside, our mobile cooler roars to life, and a blast of cold air lowers the dressing room temperature to 50° F. The chilled air keeps me from sweating as I put on layer after layer of clothing. Perspiration would cause trouble in the cold realm where I am going.

As Johnny and his crew begin to inflate the balloon (page 860), the prospect of cancellation arises. The cloud build-up is continuing, and Duke Gildenberg advises a brief wait. The decision is up to Maj. Irving Levin, Holloman Balloon Branch chief.

At this point the air conditioner sputters and seems about to die. With two possible causes for cancellation, our spirits fall.

By 4:30, however, weather prospects have brightened, and take-off time is reset from 5 o'clock to 5:30. And the air conditioner is coaxed back to life. Everyone cheers up.

The inflation of a large balloon is a dramatic sight. The big bag seems so lifeless as it lies formless on the ground. But now it begins to mount skyward like some giant plant, its crown blooming like a flower. When I see its silhouette in the pale dawn, I know the mission is nearing reality (page 865).

Just before 5 o'clock I leave the dressing trailer, a bent and shuffling figure under 155 pounds of gear—just three pounds less than my own weight. Beau and Daniels lift me to the truck bearing the gondola, then up that "highest step in the world" (opposite).

Red Flare Signals Warning

I am still breathing oxygen. The air-conditioner hose, with an eight-inch diameter, is shifted from the trailer, and its flow is directed over me. Team members make final checks: electrical circuits, safety plugs, radios, parachutes, cameras, partial pressure suit, oxygen. The helmet is lowered over my head, and suddenly I feel a man apart.

A red flare arcs across the desert, announcing to all that take-off is just 10 minutes away. The truck trundles me and the gondola to a spot directly beneath the balloon—now towering 360 feet, tall as a 33-story building.

Balloon and gondola are connected. Dan closes and locks my face plate, two layers of clear plastic separated by an almost trans-

"Highest step in the world," says the sign beneath the gondola door. The statement holds true whether you are getting in, as I am here, or jumping out. Francis Beaupre (left), developer of my stabilization parachute, and Sergeant Daniels struggle to lift me aboard. With full gear I total 313 pounds, almost twice my actual weight. The check list shows 40 minutes until launch.

HS EKTACHROME © NATIONAL GEOGRAPHIC SOCIETY

My space helmet allows scant head turning, as this dress-rehearsal photograph shows. If I turn an inch to the right, the headpiece wrinkles my skin. Safety demands a tight fit, however. Plastic visor locks down over my face.

parent film of gold through which an electric current passes to prevent fogging. The aluminized curtain is hung around the gondola above my head to reduce my exposure to solar radiation.

"Well, I believe we're about ready to go," says the Virginia drawl of Billy Mills over the interphone.

"Fire one!" Sergeant Johnson snaps.

The explosive squibs that hold balloon to crane boom fire sharply, cutting the lines, and the rig is now restrained only by straps that connect the tugging gondola to the truck.

"Fire two!" comes the final command.

A second round of squibs fires, cutting the truck straps. At 5:29 a.m. I am on the way up, rising at 1,200 feet a minute.

In statistical terms, a 1,069-pound, helium-filled balloon has begun to lift a 1,250-pound payload from a launch elevation of 4,500 feet to a maximum altitude of 102,800 feet. My interest in 158 pounds of that payload goes beyond the statistical, however. I ponder the maxim known for some reason as Murphy's First Law: "What can go wrong, will go wrong." And I wonder what could go wrong.

At 43,000 feet I find out. My right hand does not feel normal. I examine the pressure glove; its air bladder is not inflating.

The prospect of exposing the hand to the near-vacuum of peak altitude causes me some concern. From my previous experiences, I know that the hand will swell, lose most of its circulation, and cause extreme pain. I also know, however, that I can still operate the gondola, since all the controls can be manipulated by the flick of a switch or a nudge of the hand.

I am acutely aware of all the faith, sweat, and work that are riding with me on this mission. I decide to continue the ascent, without notifying ground control of my difficulty.

Tropopause Barrier Looms Above

I am already approaching the halfway mark in vertical distance, but in terms of obstacles to be faced, I still have far to go. One is the tropopause, an atmospheric boundary where I will encounter the coldest temperatures of the flight. There the balloon's polyethylene fabric—only two-thousandths of an inch thick and of the same filmy material used to contain some frozen foods and dry-cleaned clothes—will become almost brittle from the cold. Any undue strain can cause a rupture. About half of balloon failures occur at the tropopause.

The temperature drops steadily until it reaches −94° F. at 50,000 feet, then starts to rise. I have safely passed the tropopause barrier.

Propelled by the prevailing westerlies, the balloon has drifted 15 miles east of the launch site. However, easterlies start me back toward the target area as predicted (map, page 861). But the clouds, now far below me, fail to act according to forecast. Instead of thinning under the sun's heat, they thicken.

Every balloon has a drag limit, the point at which its upward velocity creates a drag strong enough to threaten damage. At 60,000

As the Countdown Nears Zero, the Expanding Balloon Reflects a Pale Dawn

Under the white helmet, I sit in the open, unpressurized gondola on an abandoned airstrip northeast of Holloman Air Force Base, New Mexico. Teammates cluster around to make final checks, review flight procedures, and wish me luck. Cameras mounted above the gondola hold film to capture man's most dramatic leap from space.

HS EKTACHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER VOLKMAR WENTZEL © N.G.S.

feet, my ascent rate approaches 1,300 feet per minute, only 100 short of the balloon's limit. Gildenberg, back at Holloman, is monitoring my ascent and asks me to valve off some helium. I do so, and my climb slows to a safe 950 feet per minute.

As Marv Feldstein continues to advise me from ground control, I can sense that the tension there is growing. Our weathermen have spotted a small hole in the clouds, west of the target area, and are figuring whether the hole will enlarge and whether the balloon will drift above it.

The device that traces my pulse and breathing on a paper tape has broken, and two pretty nurses have been recruited to record the audio heart-respiratory signal. In effect, they are taking my pulse by remote control, but I think I prefer the old-fashioned way.

An hour and thirty-one minutes after launch, my pressure altimeter halts at 103,300 feet. At ground control the radar altimeters also have stopped—on readings of 102,800 feet, the figure that we later agree upon as the more reliable. It is 7 o'clock in the morning, and I have reached float altitude.

Help Lies Too Far Away

A mixed feeling of awe and remoteness has been building up all through the ascent, and now it almost overcomes me. I feel awe at the thought of floating easily at a height that man has never achieved before without the protection of a sealed cabin. I feel remoteness because I am beyond reach of help and friends if anything should go wrong.

I want to describe my impressions of this high, alien world. Striving for the right words, I send a message to ground control:

"There is a hostile sky above me. Man will never conquer space. He may live in it, but he will never conquer it. The sky above is void and very black and very hostile."

I am grateful that the balloon revolves slowly, because I have a chance to sweep the horizon through the gondola's open door.

I note the change in the sky's hue: normal blue to about 15 degrees above the horizon, then increasingly dark until it attains the inky depth of night around the balloon. Such a dark sky without stars seems strange, but I stare in vain to find just one.

I make one exciting discovery. There are clouds at my altitude. They are so thin that I see them only when my vision comes within 30 degrees of the sun, but then they reflect the light with a dazzling whiteness. I remember reports of clouds this high, but the actual sight of them is fantastic.

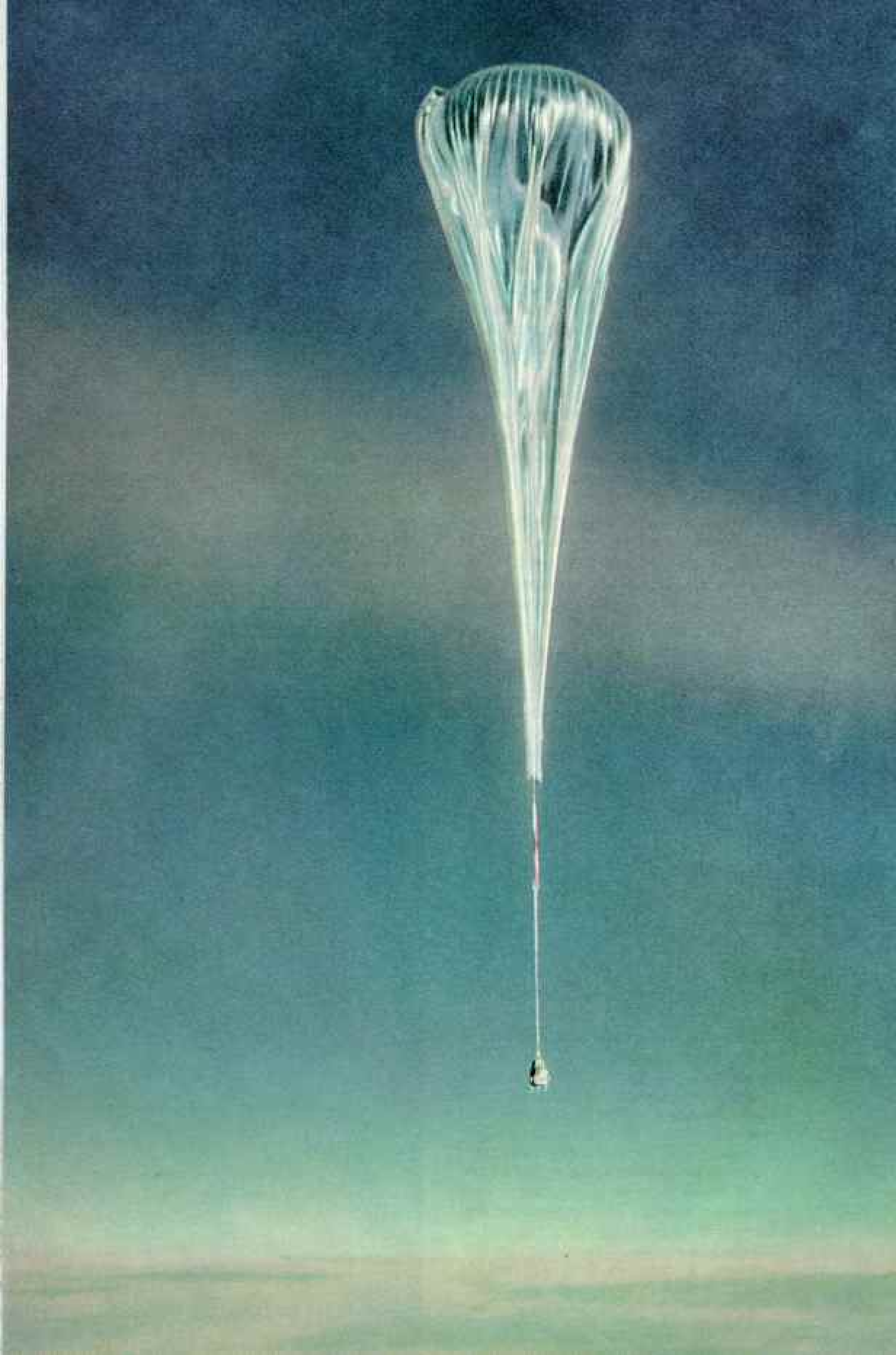
I turn my gaze to the earth below me. I should be able to sweep a 780-mile-wide circle of the surface, but haze curtains the horizon, and large segments of clouds blot out much of the nearer landscape. I easily make out the towering head of a thunderstorm that a weather check later plots near Flagstaff, Arizona, 350 miles distant.

Burdened by heavy clothes and gear, I

KODACHROMES BY UNITED STATES AIR FORCE © N.G.S.

Blinding sun compels me to shade my eyes at 102,800 feet. At peak altitude I am exposed to solar radiation almost twice as intense as that at sea level. The aluminized antiglare curtain above my head provides only partial protection; it does not cover the gondola's open door, through which sunlight now streams. An automatic camera took this picture.

The balloon swells with height. At peak altitude its diameter will span two-thirds the length of a football field. M/Sgt. H. S. Coker, in a jet bomber, snapped this final photograph at 40,000 feet; the horizon is lost in haze. Suspended in the gondola 360 feet below the balloon's crown, I soon observe that my right pressure glove isn't working, but I keep the worry to myself.



begin to pay the physical toll for my altitude. Every move demands a high cost in energy. My eyes smart from the fierce glare of the sun. When it beams in the gondola door on my left side, I feel the effect of strong radiation and begin to sweat. On my right side, mostly in shadow, heat escaping from my garments makes a vapor like steam. Circulation has almost stopped in my unpressurized right hand, which feels stiff and painful.

After nine minutes at peak altitude, I begin to think of the descent and call ground control for an estimate on jump time.

The hole in the clouds has failed to enlarge. Meanwhile, a 30-knot wind speeds me west. Duke decides that I should step out over the target zone, despite the thick blanket that covers it. Mary relays the word:

"Three minutes till jump, Joe."

The words are welcome. Activity comes as a relief to the surge of emotions I have experienced, despite the big drop ahead of me. Besides, the big drop is the only way home.

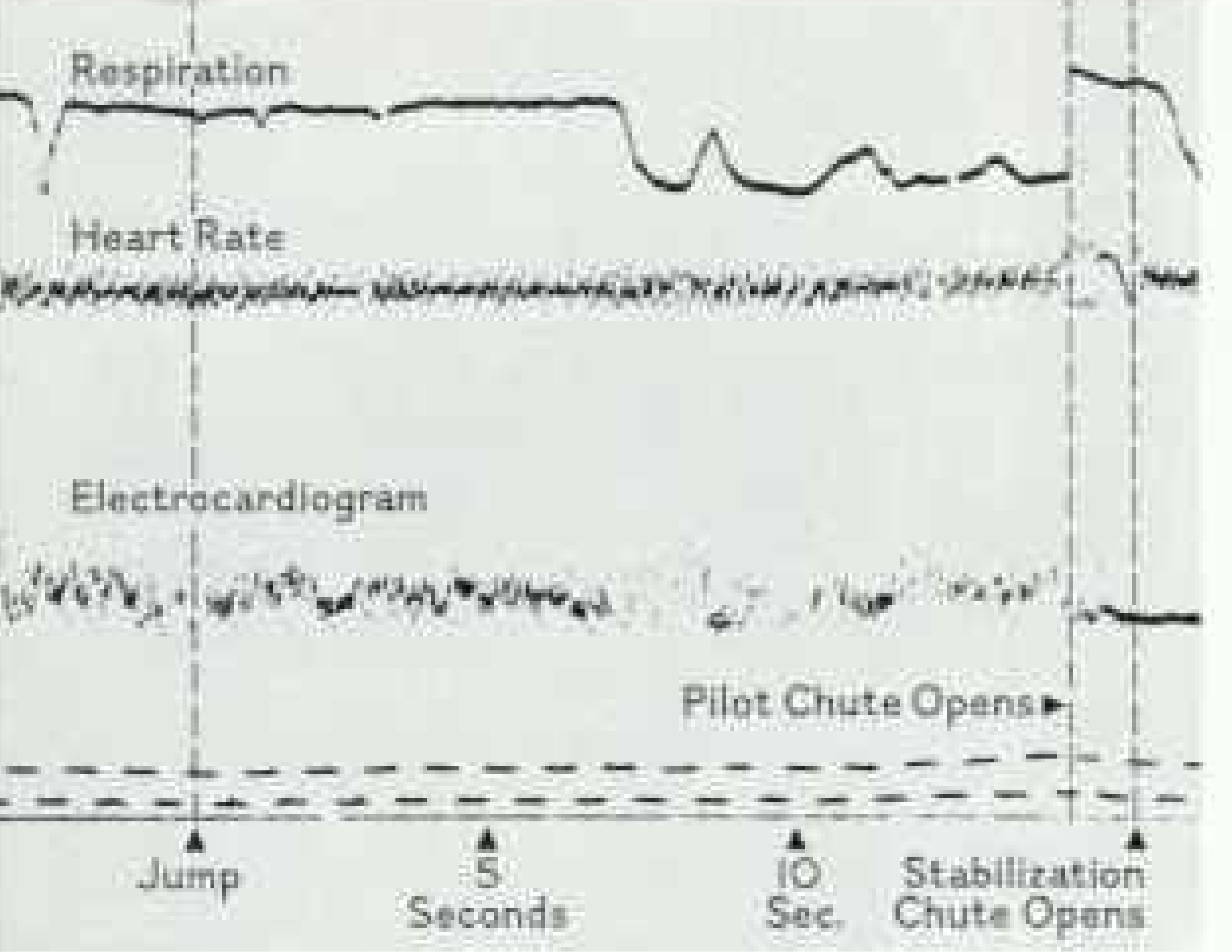
At X-minus-70-seconds, I drop the trailing antenna, cutting communications with the ground. I begin my countdown, severing one by one my ties to the gondola. My seat kit with its instruments and camera takes over the functions of supplying my oxygen, recording my heart and respiratory rate, keeping records of my altitude and azimuth.

I start the cameras in the gondola, and their clicking makes me abruptly aware of how silent my stay in space has been.

At zero count I step into space (page 855). No wind whistles or billows my clothing. I have absolutely no sensation of the increasing speed with which I fall.

I drop facing the clouds. Then I roll over on my back and find an eerie sight. The white balloon contrasts starkly with a sky as black as night, though it is 7:12 in the morning and I am bathed in sunshine. Again I look for stars, but see none.

When the 6-foot stabilization canopy pops out, I already have dropped to about 96,000 feet. I am delighted to find myself perfectly anchored against the dreaded flat spin. I



I make one breath last through virtually the entire unstabilized free fall, a reaction of which I was unaware until I saw the graph above. A sharp break at 15 seconds marks my gasp when the pilot chute opened with a pop before pulling out the stabilization chute a second later. The pulse trace shows up to 156 beats a minute; my normal is 80. Static blurs the electrocardiogram's measure of exertion. Instruments in my seat kit recorded these data.

Film in a gondola camera shows me falling away at distances of 50, 100, and 165 feet, all in the first 3.2 seconds.

turn with ease by sticking out an arm and leg.

However, a new danger threatens. Soon after I become stabilized, I feel a choking sensation. I had experienced the same thing on a previous jump, and we had devoted countless tests to eliminating it. As I plummet lower, the sensation eases but worry remains.

Free Fall Ends in Blanket of Clouds

The clouds, which seconds before seemed motionless and remote, now rush up at me. I have never entered clouds in a free fall before, and I have to persuade myself that they are mere vapor and not solid earth.

At 21,000 feet the thick blanket envelops me. Some 3,500 feet lower, and 4 minutes, 38 seconds after my fall began, my main canopy pops open. I can see neither sky nor ground, but I know the worst is over.

As I disarm my emergency chute and begin disconnecting my seat kit, I escape clouds at 15,000 feet and behold a beautiful sight—two helicopters circling attentively. I know that recovery trucks speed toward my landing site.

I detach the seat kit except for a single line. My swollen right hand lacks the strength to unfasten that final tie, and I can't reach it with my left. A thousand feet above the desert, I stop trying. I will have to land with the heavy box dangling awkwardly at my side.

The landing is as hard as any I have ever made in my life. The seat kit strikes my leg, inflicting a severe bruise. But I am on the ground, apparently in one piece. I am surrounded by sand, salt grass, and sage, but no Garden of Eden could look more beautiful. The elapsed time since bail-out is 13 minutes, 45 seconds.

The helicopters land, and George Post, Gene Fritz, Beau, and Dr. Dick Chubb dash toward me, all wearing big smiles. They remove my helmet and heavy flight garments.

Dick looks at the swollen hand with concern (page 872). Three hours later the swelling will have disappeared with no ill effect.

As clean, fresh air washes over me, I say, "I'm very glad to be back with you all."

Just before jumping, I had said a prayer,

UNITED STATES AIR FORCE

"Lord, take care of me now." After the main chute opened I said, "Thank you, Lord, for taking care of me during that long fall."

Now that I am safely down, I realize once again how dependent upon the protection of the Almighty are all seekers of the unknown.

Next day we plunged ahead with plans for a jump by George Post, which was to be an exact duplicate of mine. First we had to pinpoint the cause of the choking experience that worried me during my descent.

We held a "hanging," a test in which we put on full equipment and suspended ourselves by parachute harness from overhead hooks. We found a tentative cause: The steel cable that anchored helmet to pressure suit seemed to be riding up, forcing the helmet and front of the neck ring against the throat.

But other possibilities had to be eliminated before we could risk a man's life. Reluctantly we decided to cancel George's jump.

Balloons Float High and Long

We are convinced, however, that the potential of balloons for high-altitude research has barely been scratched. Consider, for example, that my balloon had by no means exhausted its ability to keep me at peak altitude. It could have kept me there for hours. Though experimental aircraft have taken men higher, they have held their peaks for mere seconds.

Consider, also, just one finding of my Excelsior III jump. Doctors now know that, although my pulse rate hit 156, a healthy man properly equipped can safely expend tremendous energy in space for brief periods.

Consider that solar radiation quickly caused me to perspire, though the temperature at float altitude read −36° F. This experience backs evidence that temperature definitions break down in space. You can bake on one side, freeze on the other, regardless of what the thermometer says.

Consider that my open-gondola ascent and parachute jump exposed me to space conditions longer than any other man, without harmful effects.

A happy jumper swings under his parachute. While in clouds at 17,500 feet, my main chute blossomed, and now I float into sight of a New Mexico desert dotted with ponds from recent rains. My stabilization chute, so vital during the free fall, lies collapsed atop the main canopy. The three-foot pilot chute dangles below it.

NG EKTACHROME TAKEN FROM HELICOPTER BY NATIONAL GEOGRAPHIC PHOTOGRAPHER VOLKMAR WENTZEL © N.G.S.

For the future, I can see at least three distinct categories in which manned balloons can play a valuable role in space research.

First, there is astrophysics. The earth's atmosphere, a curtain of diffuse substances, bends light rays, hides entire galaxies from view, and makes stars seem to twinkle when they don't at all. If we could put an astronomer with a telescope in a gondola and take him aloft for an unimpeded view, we would see the heavens with new eyes.

Second, the balloon can test life-support systems for space. A complete life-sustaining system can be taken up, component by component, and be proved under actual performance conditions.

Third, the balloon can be a perfect trainer for spacemen. Though you isolate men in laboratory spaceships, the trainees know that help is just a few feet away. In a balloon miles above the earth, assistance is a long way off, and the trainee would learn his job with that fact in mind.

When I think of the great possibilities of the balloon, I marvel that it has been so little utilized in man's bid to enter space. I earnestly hope we will not fail to take advantage of the lessons high-altitude balloon flights can teach us before we commit a man to the infinite reaches beyond the world we know.

EKTACHROMES © NATIONAL GEOGRAPHIC SOCIETY

Sprawled on the ground where I fell, I hear a helicopter land. Then Beaupre, Post, Gene Fritz, and Dr. Chubb surround me, remove heavy flight clothing, and assure themselves that I am safe. Remembering my hard, awkward impact, I remark:

"That was no landing; I just came down the best way I could."

"Any landing that you walk away from," Post replies, "is a good landing."

My swollen right hand, result of the pressure-glove failure, gets immediate attention from Dr. Chubb, who compares it with my left. In three hours the swelling vanished with no ill effect. A break in helmet or pressure suit would have snuffed out my life.

Back from the unknown, I count the gains: knowledge that man can work in space for limited periods and parachute back to earth. Profoundly grateful, I relish the luxuries of companionship and security.

A message from your Society's President and Editor tells how new web presses and electronic marvels bring a better National Geographic to our expanding membership

Exploring an Epic Year

The Annual Message of

MELVILLE BELL GROSVENOR, LL.D., D.Sc.

President and Editor of the National Geographic Society

OUR FAN MAIL had been heavy. Teachers, artists, and printers especially were writing letters of congratulations and thanks. Then a long-time member of the National Geographic Society challenged me in person:

"What have you done with the pictures in our magazine? They're so much brighter and clearer—almost stereoscopic. Are you using a new kind of photography or something?"

"We're using a new kind of everything. New presses, new paper, new inks," I replied. "In fact, you've put your finger on one of the wonder stories of the printing world. We've switched from old presses in Washington to new ones in Chicago. And we improved quality even during eight months of moving!"

"This is amazing when you consider an edition of 2½ million copies each month," he said. "Why don't you tell us about it in the GEOGRAPHIC sometime?"

His enthusiasm thus suggested a theme for this report on The Society's epic year of 1960. The next few pages show you in action the world's finest high-speed presses. You also have a few glimpses of Geographic riches in store for 1961.

Certainly one of the most remarkable developments of 1960 has been your Society's continued growth. As in the past, this increase is due purely to your enthusiastic nomination of friends and to thousands of others—fascinated by travel, exploration, and the adventure of far places—who have joined our efforts to increase geographic knowledge.

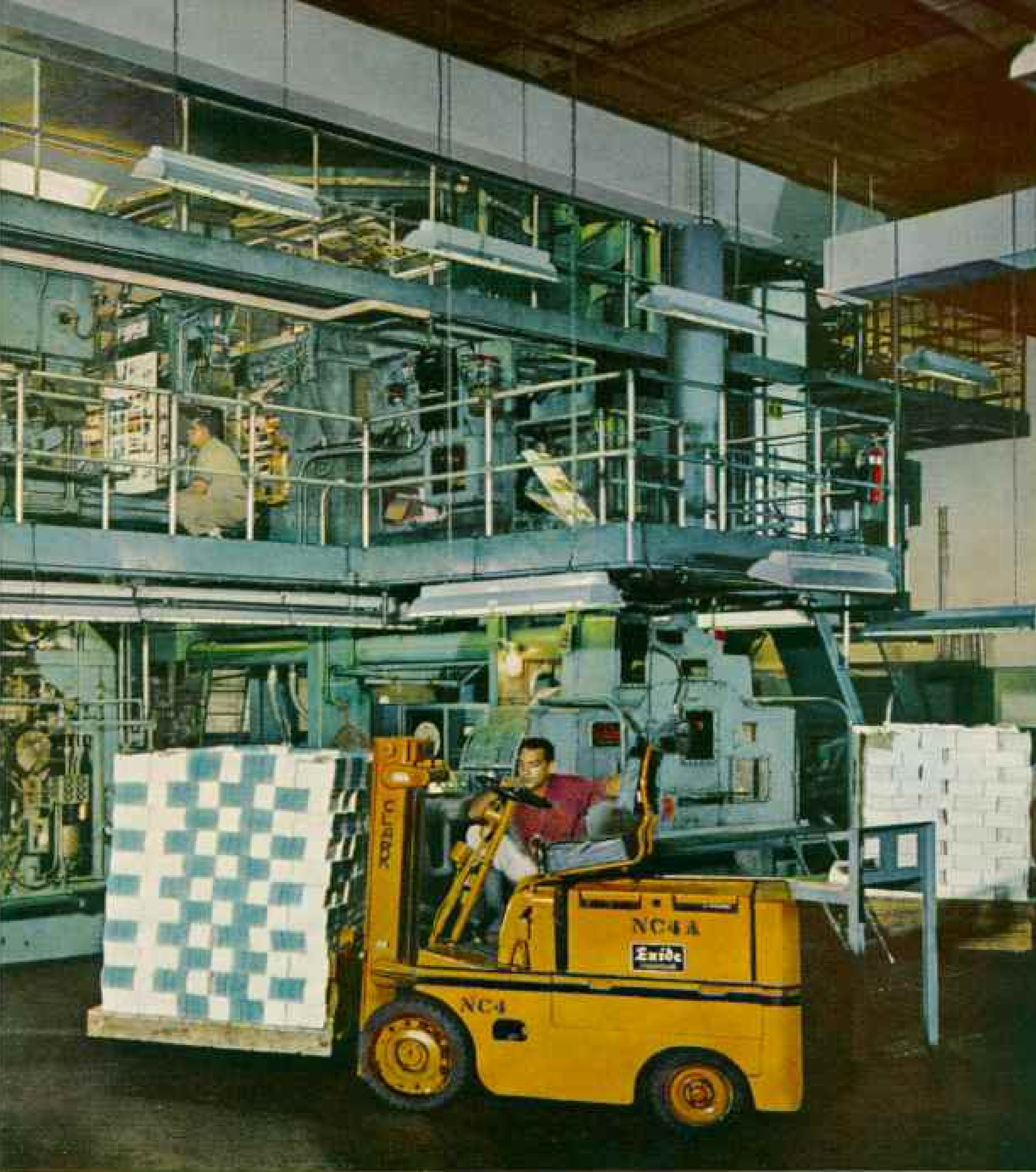
Your Secretary is now tabulating thousands of Christmas-gift memberships that promise to increase our rolls to a record 2,600,000. Those who act promptly can still send gift memberships; a Christmas-card notice and the January GEOGRAPHIC will start these new members on their adventures for 1961.

Famous Africa issue of September, 1960, rolls off one of four new presses. This year The Society transferred the monthly printing of two and a half million magazines from Washington, D.C., to Chicago. The move was accomplished without a hitch.

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

Push-button printing! Pressman Frank Christen (left) mans the electronic console that controls one of four new Society-owned high-speed presses. In a special Geographic building at the Chicago plant of the R. R. Donnelley & Sons Company, each of the four presses turns out more than 10,000 pages a minute.

The web of paper moves in and out from the far right to the enclosed rollers, watched by the standing pressman. Inked with as many as six colors, the paper rides up to a revolving steam-heated drum, where 550° temperature flash-dries the ink; then the web turns over and returns to the rollers for printing the reverse side.



EKTACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHERS B. ANTHONY STEWART AND JOHN E. FLETCHER © N.G.S.

NEW PRESSES became vital this year. Our growing membership outstripped the capacity of old, slow, sheet-fed presses. But we had foreseen this and long ago consulted the Nation's foremost printing engineers.

"The Society needs high-speed presses," we told them. "But we must also have better quality in our color illustrations."

These demands started an industrial adventure story. Brilliant engineers and executives of the R. R. Donnelley & Sons Company, in Chicago, The Society's new printers, helped us plan the presses. The Cottrell Company in Westerly, Rhode Island, custom-built the precision machines.

Not everyone was optimistic. One pessimist called our projected press "a great big confetti-maker." Temporarily, the pessimists were right: No manufacturer then produced a coated paper having sufficient smoothness, strength, and other qualities to meet GEOGRAPHIC standards.

The Oxford Paper Company solved the

EKTACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHERS
B. ANTHONY STEWART AND JOHN E. FLETCHER © N.G.S.

With a Watchmaker's Touch a Pressman Adjusts a Plate

Between brightly inked rollers of the open printing unit, the make-ready man turns a worm gear to move a curved printing plate on the red cylinder just a thousandth of an inch. When he has brought its tiny dots into perfect alignment —or register—with those of the blue, yellow, and black plates, he will close the unit for a press run.

White paper will then rush over these plates, moving from one color to the next in one-sixteenth of a second. Cylinders, each inked by its own temperature-controlled rollers, must exactly match the speed of the paper web. The smallest variation in speed or balance may blur the impression.

paper problem by developing a radically new coating process with their giant North Star Coater (page 884).

You can judge the engineers' success by your own GEOGRAPHIC. In an average copy the color register varies *only two-thousandths of an inch.* Yet the press was printing *more than 10,000 pages per minute.*

When moving day arrived, your editors braced themselves for a new kind of Geographic expedition. During the next eight months, the magazine was printed in two different plants, one in Washington and one in Chicago. Parts of the same article were often printed 600 miles apart. To bind the issues, we shipped 138 truck-trailer loads of pages between the District of Columbia and Illinois. Yet we made every deadline, and members noted an improvement in quality.

When the move was complete, your Board of Trustees traveled to Chicago for an inspection. During our tour we saw a dramatic, unscheduled example of quality control. Over the roar of the press, petite Mrs. Audra Sherman, a Donnelley inspector, called to one of the pressmen: "Frank! You're running with a defect on page 75." With magnifying glass in hand she pointed out a pea-sized spot on a color page.

The pressman dived for the electronic controls, a bell clanged, the roar diminished, and the press stopped. A tiny woman had stopped this great machine so that a particle of dirt could be removed from a printing plate. The flawed pages were immediately set aside and flagged with a red sign, "Rejected."

In moments the plate had been cleaned, and the press rolled again. Looking down from the upper deck, I saw the white web of paper pick up speed. Suddenly a ghostly yellow appeared on the pages—then a glowing orange as the red roller came into play. A moment later the blue plate added realism, and finally—as the black plate began to ink—I saw again the sharp, pristine color of a NATIONAL GEOGRAPHIC page (page 875). Then the web became a flashing rainbow rushing by at 1,200 feet per minute.

Human and Electric Eyes Control Quality as the Printed Web Flashes By

The tug of a 170-ton machine can stretch paper or twist a web off course. Seven strategically placed photoelectric cells in each of The Society's new presses keep all alignments constant.

Here a scanner trains its beam on the edge of the web at left. When the paper wavers, the scanner signals a correction, and the press automatically adjusts its rollers. Group Superintendent Herman Detert checks the press.

A beam trained between two pages (right) is activated by black guide marks that are trimmed off after the binding of the magazine.

EKTACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHERS B. ANTHONY STEWART AND JOHN E. FLETCHER © N.G.S.

EKTACHROMES BY NATIONAL GEOGRAPHIC PHOTOGRAPHERS B. ANTHONY STEWART AND JOHN E. FLETCHER © N.G.S.

Metal Arms on a Conveyer Belt Deal Out the Pages That Build a Magazine

In this automatic gathering machine, your NATIONAL GEOGRAPHIC is born. As many as 30 mechanical "hands" grip signatures—groups of pages—and add them for assembly on the moving belt, which carries Siamese-twinlike double magazines down the line for binding and cutting in two. Here 210,000 reprints of the July, 1960, GEOGRAPHIC article, "Exploring Tomorrow With the Space Agency," pour forth to fill a Government order for the National Aeronautics and Space Administration.

THE BINDERY was assembling the last copies of the June issue when the Board of Trustees made its tour. Dr. Leonard Carmichael watched pages of his own Smithsonian article flutter down the conveyer belt in endless procession. Meantime, the presses were whirring with the July issue and its story of NASA. Dr. Hugh L. Dryden, Deputy Administrator of the space agency, found his own picture still warm from the ink-dryer.*

Like the other distinguished Trustees, these two men had taken time from busy schedules to make the Chicago trip—the first formal meeting that your Board has held outside the Nation's Capital.

Together, the Board represents a remarkable cross section of American leadership. And each man contributes a keen personal interest to all The Society's work.

In a dozen fields of human knowledge your editors need go no farther than The Society's Board of Trustees to consult leading authorities. On the Board and always available for advice on a wide spectrum of science are the Secretary of the Smithsonian Institution and his immediate predecessor; the Deputy Administrator of the National Aeronautics and Space Administration, which is making such enormous strides into space; the former Directors of the National Bureau of Standards, U. S. Geological Survey, and U. S. Coast and Geodetic Survey.

Even the Chief Justice of the United States, the Secretary of the Treasury, the Director of the National Park Service, and the Vice Chief of Staff of the United States Air Force find time to help direct the work of The Society as Trustees. So do the Editor of the Washington *Star*, who is also the President of the Associated Press, and several of the country's foremost financiers, attorneys, and executives.

These men of imagination and affairs watch over the fiscal health of The Society, and from them come innumerable ideas for

(Continued on page 884)

*See "The Smithsonian, Magnet on the Mall," by Leonard Carmichael, June, 1960, and "Exploring Tomorrow With the Space Agency," by Allan C. Fisher, Jr., July, 1960.

Freshly printed magazines await mailing. A Donnelley secretary takes copies for inspection.

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EKTACHROMES BY DEAN CONGER (RIGHT) AND W. E. GARRETT, NATIONAL GEOGRAPHIC STAFF © N.G.S.

AN EKTACHROME BY W. E. GARRETT, NATIONAL GEOGRAPHIC STAFF © N.G.S.

Society Trustees Meet in the Printing Plant

IN 1960, for the first time in the National Geographic Society's 72-year history, its Board of Trustees held a regular meeting outside Washington. Journeying to Chicago for a tour of The Society's new printing facilities, the Trustees sat in the Gothic library of R. R. Donnelley & Sons Company for a business session.

President and Editor Melville Bell Grosvenor, at the head of the table, faces Vice President and Associate Secretary Melvin M. Payne. To Dr. Grosvenor's right: Robert V. Fleming, Vice President and Treasurer of The Society and Chairman of the Board, Riggs National Bank; Conrad L. Wirth, Director, National Park Service; Elisha Hanson, The Society's general counsel; Alexander Wetmore, Research Associate and former Secretary, Smithsonian Institution; Hugh L. Dryden, Deputy Administrator, National Aeronautics and Space Administration; and Lyman J. Briggs, Director Emeritus, National Bureau of Standards.

Left, from head of table: Thomas W. McKnew, Executive Vice President and Secretary; Gen. Curtis E. LeMay, Vice Chief of Staff, U. S. Air Force; Lloyd B. Wilson, Honorary Board Chairman, Chesapeake & Potomac Telephone Co.; Rear Adm. L. O. Colbert, former Director, U. S. Coast and Geodetic Survey; and Leonard Carmichael, Secretary, Smithsonian Institution. H. Randolph Maddox, Vice President (ret.), American Telephone and Telegraph Company, also was present.

After this session the Trustees met Chicago business and cultural leaders at a luncheon given by Gen. C. C. Haffner, Jr., Donnelley's Board Chairman and Chief Executive Officer.

The Editor (top of opposite page) discusses production details with Gaylord Donnelley, President of the printing firm.

Executive Vice President McKnew (lower left), with Dr. Grosvenor, inspects the "flying paster," where rolls of paper are pasted together and fed into the press as a continuous sheet, saving long and costly interruptions. Each 1,600-pound roll forms a single sheet of paper more than seven miles long.

Dr. Dryden (center right) receives a copy of his picture published in the NASA article.

Vice President Fleming hears Stanley Hubbard of Donnelley's describe operation of the press.

Quality paper gets its level surface on the revolutionary new coater at Rumford, Maine. Like a knife spreading butter, blades apply a specially developed mixture to paper moving two thousand feet a minute. Executives of the Oxford Paper Company inspect their product: right to left, President William H. Chisholm, Vice Presidents Donald Appleton and Andrew M. McBurney, Mill Manager Charles L. Ferguson, Vice President Philip L. Hovey, and Assistant Mill Manager Harry B. Conner.

increasing its contributions to knowledge. The Chairman of The Society's Board of Trustees, Dr. Gilbert Grosvenor, served as Editor of the magazine through 55 phenomenal years of growth and headed The Society as President from 1920 to 1954.

Worldwide Research Program for '61

For the coming year the Board of Trustees has approved many ambitious research projects. Archeological expeditions in Yucatán and Mesa Verde National Park are uncovering ruins of ancient Indian cultures. A Society grant aids glacial studies and the collection of weather data on Sir Edmund Hillary's new Himalayan expedition. Capt. Jacques-Yves Cousteau continues his famed undersea researches with the backing of your Society.

In last September's GEOGRAPHIC, you read Dr. L. S. B. Leakey's story of how he found the skull of *Zinjanthropus boisei*, who lived and made tools more than 600,000 years ago — hence the world's earliest known man. With Society support, Dr. Leakey has extended excavations in Tanganyika's Olduvai Gorge.

Digging through layers of rock to the living floor, he has found more tools — and at least seventeen human bones. From this evidence he even estimates the physical build of earliest man — a creature who weighed only 85 pounds and stood less than five feet high. A full report will present the latest findings.

Planning far ahead for the magazine, your officers and editors foresee a 1961 studded with fascinating articles on subjects ranging from New Zealand to the City of London, from the birds that gladden our gardens to the story of how the sun gives life to the sea.

Great States, including Texas and North Carolina, will pass in review. All Canada

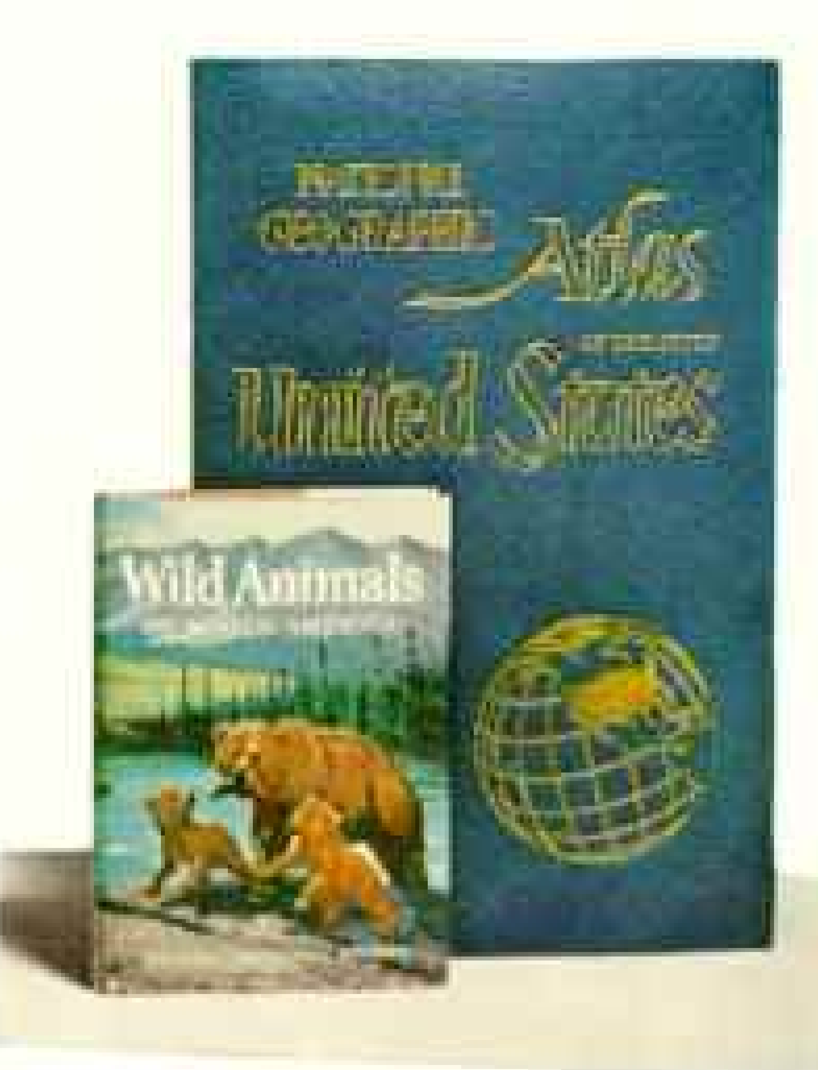
New Electronic Linofilm Discards Hot Metal, Sets Type on Film

Pioneering new fields of printing, your Society has installed at its Washington headquarters the first production model of the Mergenthaler Linotype Company's Linofilm, a system for setting type with an automatic camera. Using a typewriter keyboard, the operator, Mimi Morris, has a wide choice of type faces and sizes. After each galley is typed, a coded tape runs through an automatic typesetter, whose flashes of light expose the shadows of letters on photographic film. This annual report of The Society's President is itself an example of Linofilm composition.

Here H. J. A. C. Arens (center), phototypographic director, and Robert Ellis, supervisor, inspect a transparent page set on film for The Society's new U. S. Atlas. Next steps are plate making and printing.

Layout man makes up the title page for The Society's new book, *Wild Animals of North America*, entirely composed on Linofilm.

KODACHROME (RIGHT) AND EKTACHROME (BELOW) BY DAVID S. BOYER; EKTACHROME BY ROBERT F. SISSON, NATIONAL GEOGRAPHIC STAFF © N.G.S.



E. THOMAS GILLIARD

Magic of the tape recorder delights a New Britain child who hears his own voice in the earphones. Mrs. E. Thomas Gilliard, member of a husband-wife expedition sponsored by The Society and the American Museum of Natural History, plays the tape.

spreads before us in a major article. Old-new Iran, next door to Russia; remote, almost out-of-this-world Bhutan; ever green and inviting Ireland; Yugoslavia, Israel, Australian wildlife—these are just a few of the subjects planned for the color-filled 1961 GEOGRAPHIC.

Writer-explorers Range Far

Last summer I had the pleasure of sailing the storied coast of southern England with writer-of-the-sea Capt. Alan Villiers. His recent cruises from Cowes to Cornwall, around Scotland, and far up the Brahmaputra in India and East Pakistan will yield new tales of adventure for coming issues.

Dr. Paul Zahl's close-up nature photography will show us plants that devour insects. Perfectionist bird photographer Fred Truslow eavesdrops on American eagles.

Leading a National Geographic-American Museum expedition, intrepid Dr. E. Thomas Gilliard and his equally fearless wife find new species of birds—and wild tribesmen—in the high heart of little-known New Britain.

Members will meet these and other old friends, as well as new luminaries of lens and pen, as The Society's contributors and staff members roam the world of 1961.

The 100th anniversary of the Civil War's outbreak will find The Society contributing a 10-color map as a magazine supplement, showing vividly, with numerous annotations, the whole area of the conflict that wracked the Nation's soul, but made it one. Other timely maps will carry The Society's World Atlas program a long step nearer completion.

These are only a few of the research studies and projects approved for 1961. All are made possible by your modest dues, The Society's only endowment.

Recently I was pleased—but not surprised—by a magazine study completed by the Bolger Company, a research firm in Chicago. Eleven magazines were rated by their readers in a nationwide survey involving more than 4,000 interviews. Readers of NATIONAL GEOGRAPHIC ranked it first in all these categories: enjoyable, informative, interesting, cultural, rememberable, intelligent, authoritative, thorough, reliable, unbiased, and clear.

Such opinions are high compliments—and a challenge to even greater effort.

Melville Bell Grosvenor

Russia Today

NATIONAL GEOGRAPHIC'S NEW LARGE-SCALE WALL MAP DEPICTS A CHANGING SOVIET UNION

OF ALL COUNTRIES on the globe, none claims the attention and interest of the Free World more than the Soviet Union. It fills our news columns, air waves, and conversations; it affects our politics and preoccupies our foreign policy.

For all these reasons, there is a tremendous demand for accurate geographical information about this vast nation and the changes occurring there in recent years. To meet the demand, the National Geographic Society—drawing upon the latest and most dependable cartographic data—has compiled an entirely new, up-to-date 10-color wall map, entitled **The Union of Soviet Socialist Republics.**

The new map is not being issued as a supplement to the magazine but will be mailed in response to orders.*

This full-length cartographic portrait of Russia supplements two eyewitness articles on the Soviet Union that appeared last year in the NATIONAL GEOGRAPHIC: "A Firsthand Look at the Soviet Union," by Thomas T. Hammond, September, 1959; and "Russia as I Saw It," by Vice President Richard M. Nixon, December, 1959.

On a scale of 142 miles to the inch, the wall map includes all the 15 Soviet Republics, and shows the administrative subdivisions of the Russian Soviet Federated Socialist Republic, largest of the 15. Shown, too, are Russia's European satellite neighbors and a portion of Communist China.

One-seventh of Earth's Land

Covering half of Europe and a third of Asia, the U.S.S.R. occupies more than one-seventh of the earth's land surface.

To show so vast a nation on a 42-by-29½-inch sheet presented an unusual problem. Your Society's cartographers chose a transverse polyconic projection as the one that would portray this immense expanse of the globe with a minimum of distortion. As a result, the scale change over the Soviet Union's 8½ million square miles is held to a minimum.

The map reveals that the Soviet Union touches 12 other nations; yet the country's seacoasts outstretch its land frontiers. Its longest coast—16,000 miles—borders the Arctic Ocean, frozen and unnavigable for surface ships most of the year.

The Soviet Union has harbors on the Black and Baltic Seas, although winter ice closes many Baltic ports. Warm currents in the far-north Barents Sea, however, make Murmansk a year-round port. On the Pacific side, icebreakers keep Vladivostok open all year.

Within Soviet territory, but shared by Iran, sprawls the world's largest lake, the Caspian Sea. Eastward, in the Mongol region, lies Lake Baykal, the world's deepest—5,315 feet.

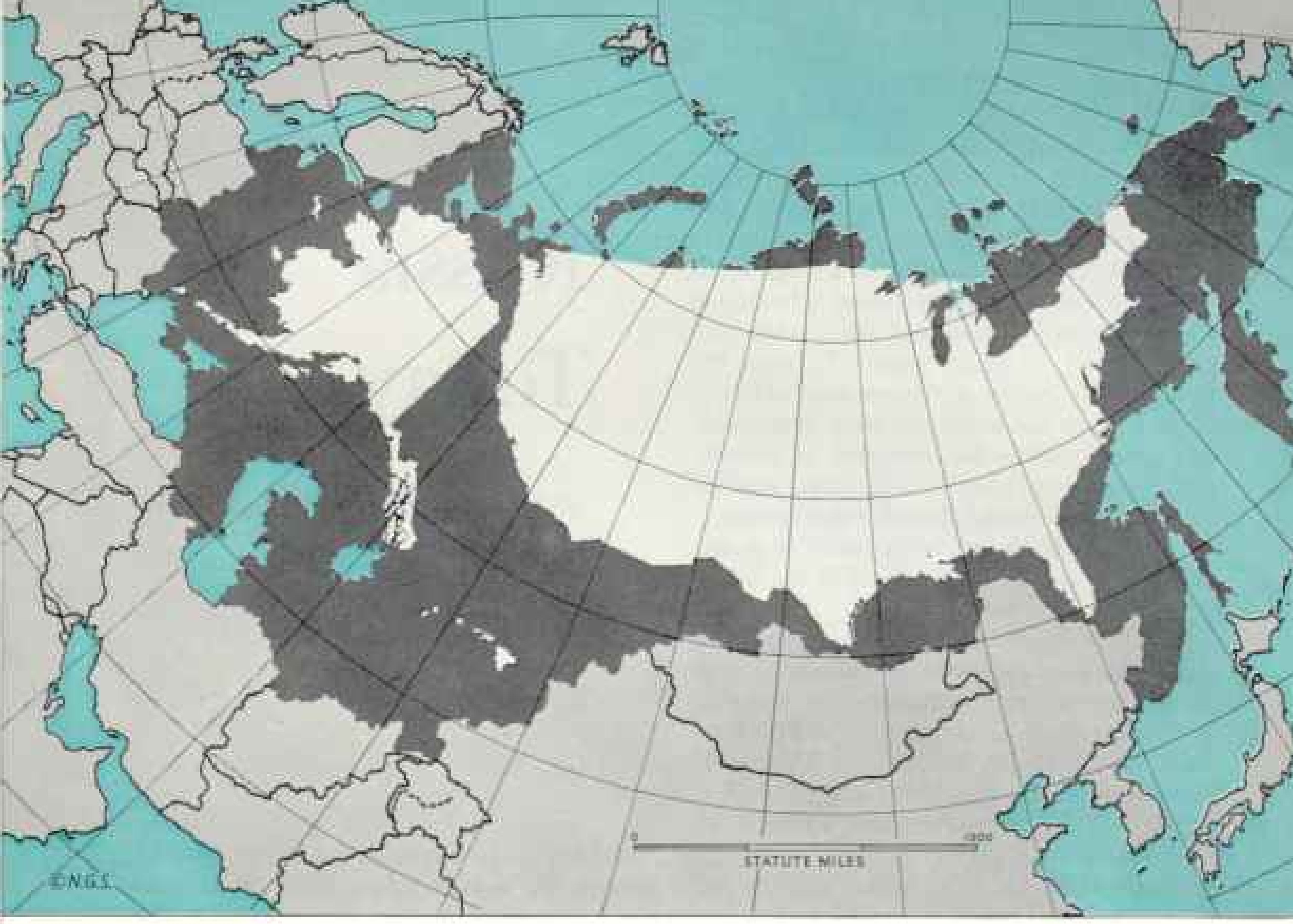
By far the greater portion of the Soviet Union's 209 million people are concentrated in Europe, west of the Ural Mountains. During recent years, however, the Russians have intensified their efforts to exploit the resources of Siberia, a relatively empty land of five million square miles.

Since 1954, for example, the "new farms" program in southern Siberia and adjacent Kazakhstan has turned 90 million acres of virgin soil into cropland, mainly wheat. Within Siberia's forests and across its bleak tundra, Soviet pioneers have discovered iron ore, gold, diamonds, tin, and other minerals.

New Dams Will Boost Power Output

One important key to Siberia's development is hydroelectric power. The map locates two enormous new dams: one at Bratsk on the Angara River; the other at Krasnoyarsk on the Yenisey. Each is designed to generate more than four million kilowatts of power, twice the output of Grand Coulee Dam, largest producer in the United States.

*Orders for the new wall map, **The Union of Soviet Socialist Republics,** should be addressed to the National Geographic Society, Department 54, Washington 6, D. C. Price: $1.00 on paper; $2.00 on fabric; index to place names, 50¢; postage prepaid to all countries.



How the United States Compares in Size to the Soviet Union

Colossus of Eurasia, the U.S.S.R. stretches 6,000 miles from Polish border to Bering Sea. It engulfs the U. S. (superimposed), 8½ million square miles to 3½ million. This illustrative map covers exactly the same area as The Society's new 42-by-29½-inch 10-color wall map of the Soviet Union and is drawn on the same projection.

While the new lands have taken from the Ukraine its title "breadbasket of the U.S.S.R.," that region has become the heart of Soviet industry. Here is the rich Donets coal basin, and here rise iron, steel, chemical, and machine manufacturing cities. Other industrial centers feed upon the ore-rich Urals.

Oil derrick symbols on the map sprinkle the eastern Ukraine, Turkmenistan, Kazakhstan, and Uzbekistan, where the Soviets have tapped new reserves. Another rich petroleum field lies between the Volga and the Urals. The Soviet goal for oil by 1965 is 4½ million barrels a day; the United States now produces 7 million barrels daily.

A spreading web of oil and gas pipelines brings the power of these wells to Soviet cities. The world's longest oil pipeline stretches from the Volga to Lake Baykal—2,315 miles. Soviet plans call for 16,500 miles of oil and gas pipelines by 1965. The United States already has some 700,000 miles of such lines.

Rocket symbols printed in red on the map mark Russia's known intercontinental ballistic missile bases. Kapustin Yar, only 60 miles east of Stalingrad, and Aral'sk are test centers.

Airports marked by red stars stud the map, indicating increased aerial communications in the U.S.S.R.—a land still limited in modern highways and railroads.

Notice of change of address for your NATIONAL GEOGRAPHIC *should be received in the offices of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your February number, The Society should be notified of your new address not later than January first. Please give BOTH your OLD and NEW addresses, including postal-zone number.*

HARVEY and the Circulation of Blood—one of a series of original oil paintings commissioned by Parke-Davis.

Great Moments in Medicine

The English physician William Harvey scientifically demonstrated his revolutionary theory of blood circulation to students at the College of Physicians of London. Published in book form in 1628, Harvey's theories and proofs upset the traditional followers of Galen and brought new concepts of circulation and anatomy to medicine.

Modern medicine is a living science. What was accepted yesterday will be discarded today if scientific research reveals a better medicine or a better way. Today, your physician gives you the best possible treatment and care, as indicated by the most recent developments in those many fields of knowledge related to the health professions.

At Parke-Davis, research scientists are continually seeking to improve upon yesterday's discoveries. The resultant new medicines and methods of treatment will better enable medical men to combat disease and the destructive processes of aging. This is one of the ways Parke-Davis contributes to the longer life and better health that come with better medicines.

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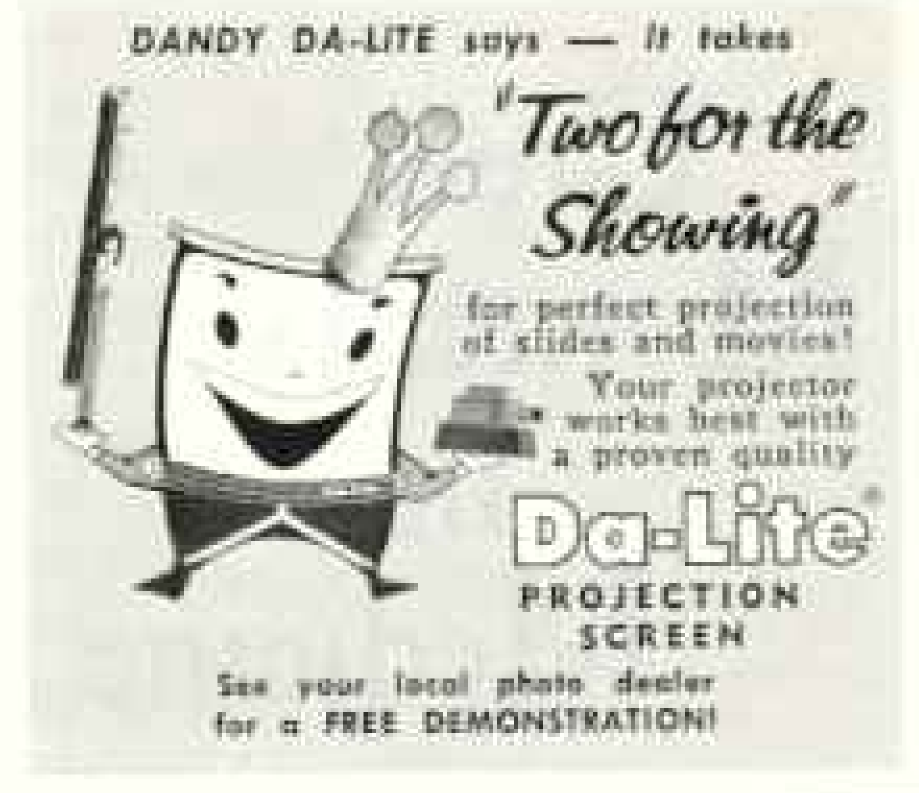

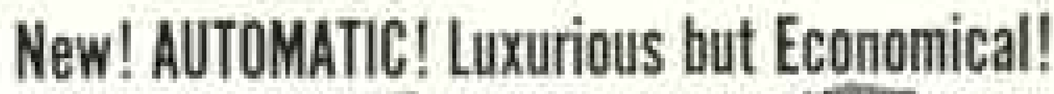

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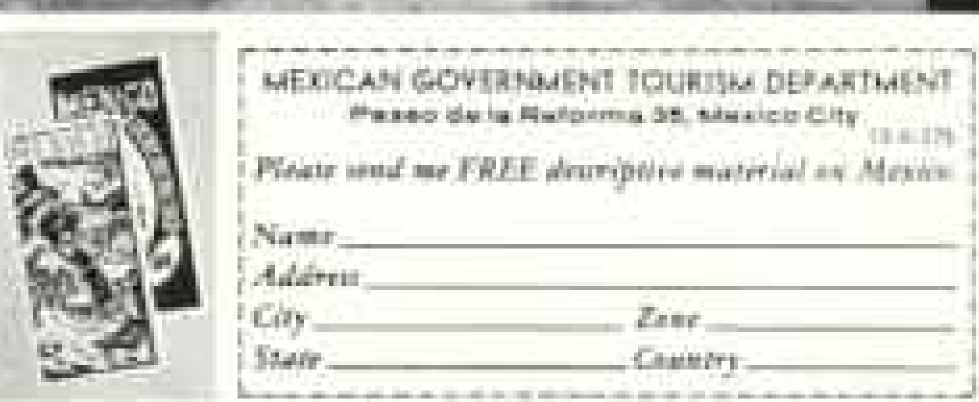

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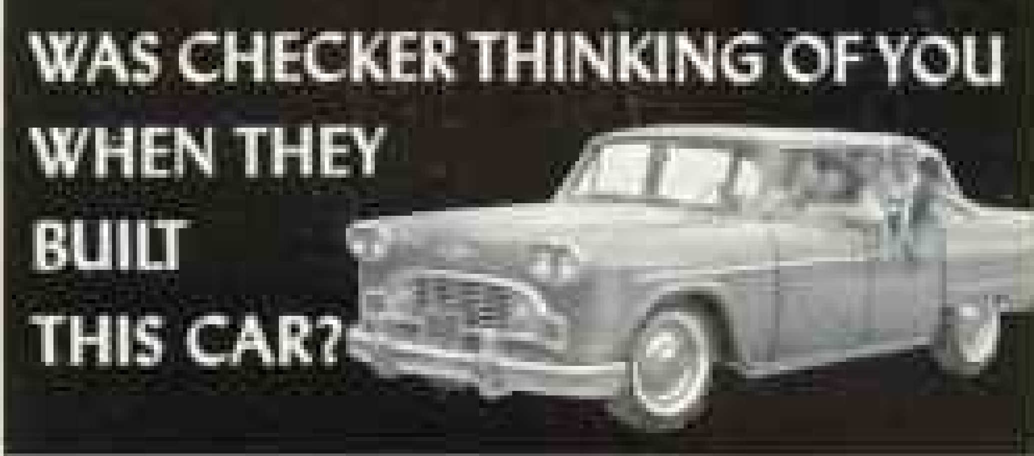

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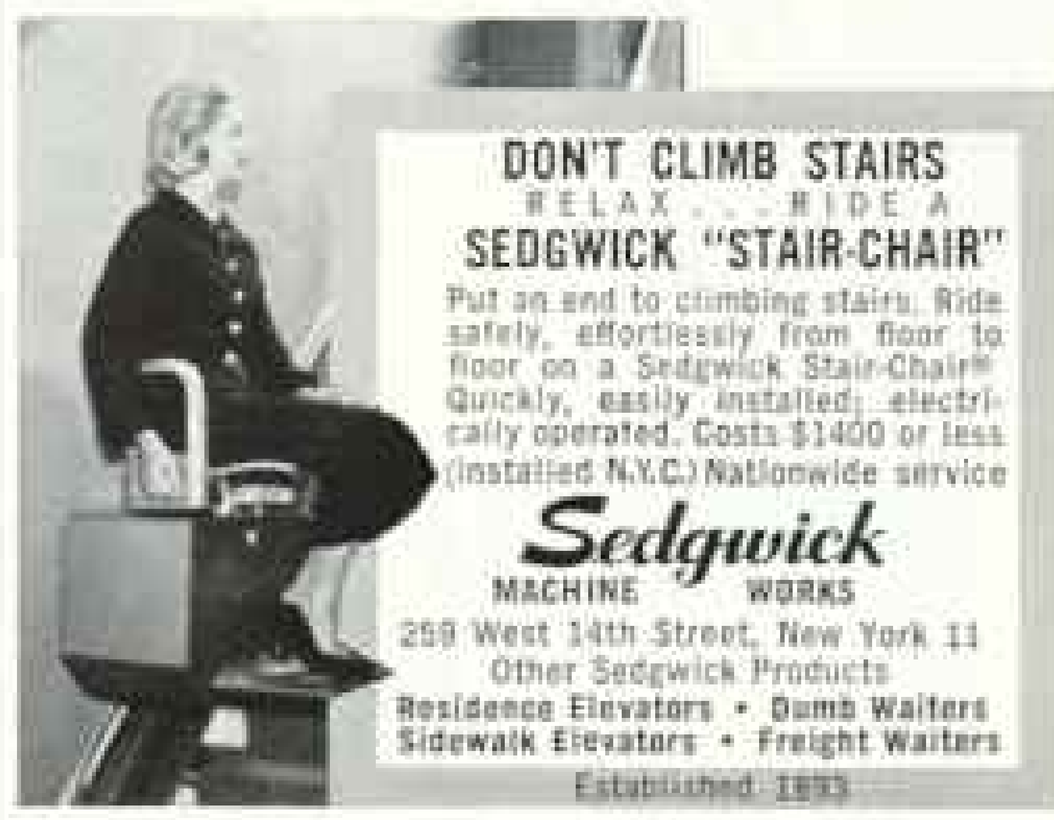

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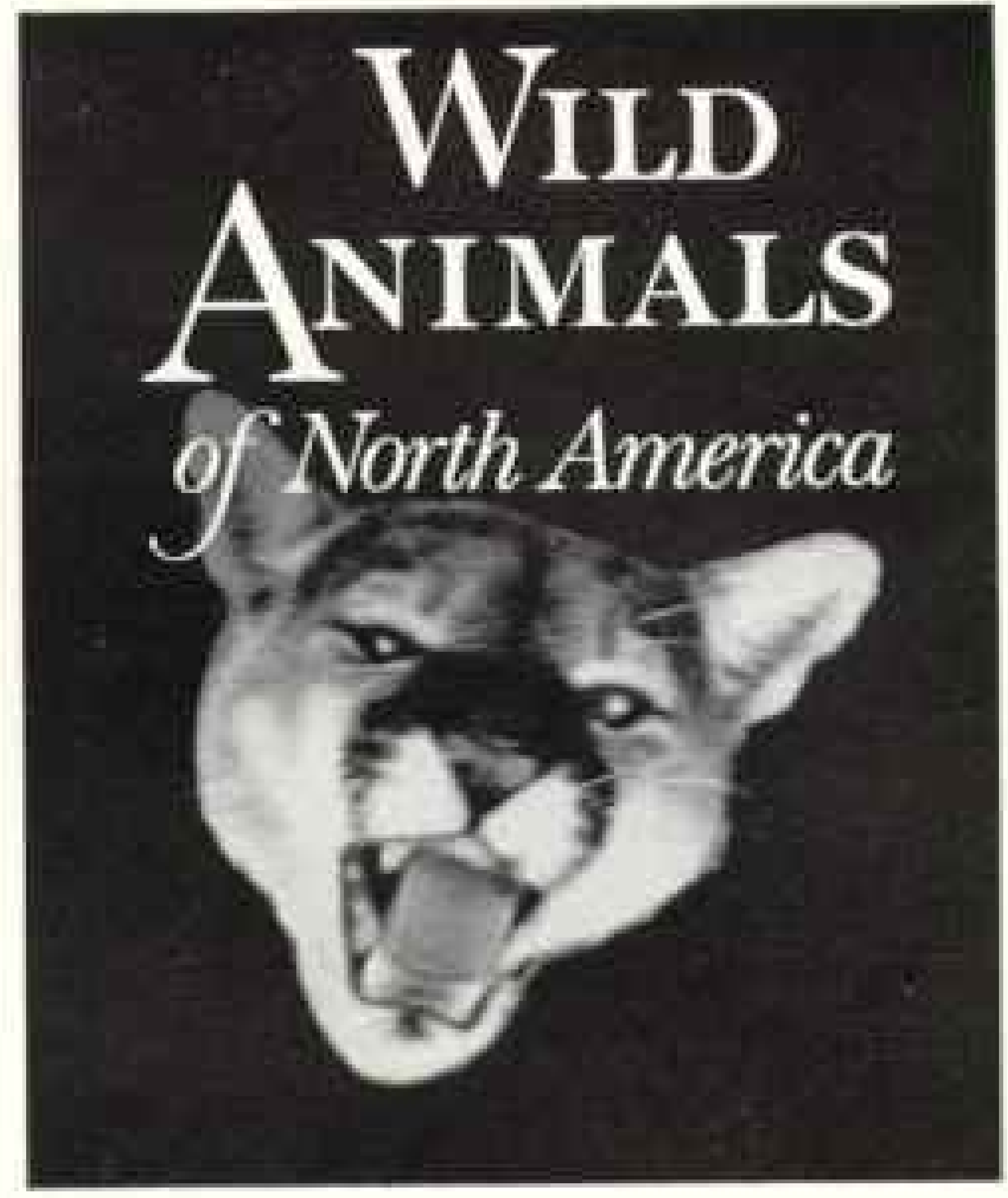

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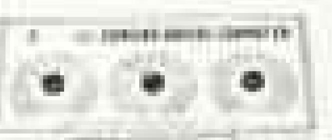

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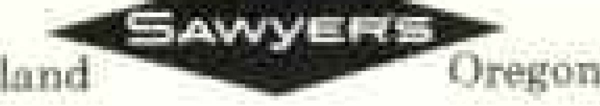

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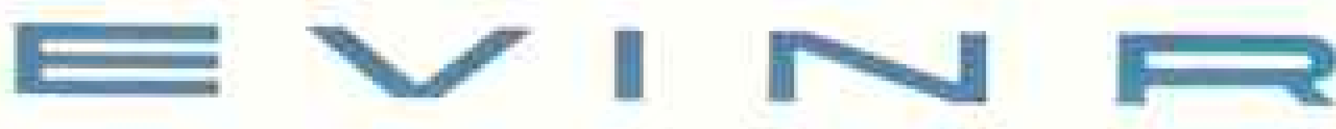

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