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NOVEMBER, 1958

Ten-Color Atlas Map, North Central United States

Seventy Pages of Illustrations in Color

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NATIONAL GEOGRAPHIC FACT-FINDER AT WORK . . .

As The Magazine's Chief of Editorial Research, Miss Margaret G. Bledsoe enlists the aid of Joseph V. Columbus and his 20-power magnifier at the Textile Museum in Washington, D. C. She is there to make sure that Kashmiri weavers can indeed achieve identical designs on both sides of a fabric, as stated on page 619. The same day she heard from a government department in New Delhi: yes, those trees on page 644 *are* Himalayan silver fir.

Why dig so deep? Because each statement to be published in the NATIONAL GEOGRAPHIC MAGAZINE must pass the test of thorough research. If it doesn't, out it goes.

Hunting the best sources of information, Miss Bledsoe and her seven seasoned sleuths choose among some 41 million books, pamphlets, and manuscripts available in Washington. They consult outstanding scholars and experts everywhere —by letter, cable, and telephone. When you receive your copy, just about every word bears an invisible check mark.

Serious and lighthearted tributes reward this tireless trailing of the facts. Carefully preserved National Geographics form a lasting reference work in thousands of libraries, in millions of homes. Wrote a governor of South Dakota: "'I saw it in the Geographic' carries practically conclusive and absolute confirmation." Over the years the Geographic's research has changed books, museum labels, even plaques on historic buildings. And then there was the cartoon showing two explorers about to boil in a pot; one asked: "Are you sure the National Geographic said these people were vegetarians?"

RECOMMENDATION FOR . . . AND INQUIRY ABOUT *Membership*

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Members of The Society roam the world through the pages of their official journal, the NATIONAL GEOGRAPHIC MAGAZINE. Annual dues of **$6.50** include subscription to the Magazine, and bring frequent 10-color map supplements. Members' enthusiastic nomination of friends for membership explains The Society's phenomenal growth.

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Members and others may make gifts or bequests of money, securities, or other property to The Society for "the increase and diffusion of geographic knowledge." Such gifts are deductible for tax purposes.

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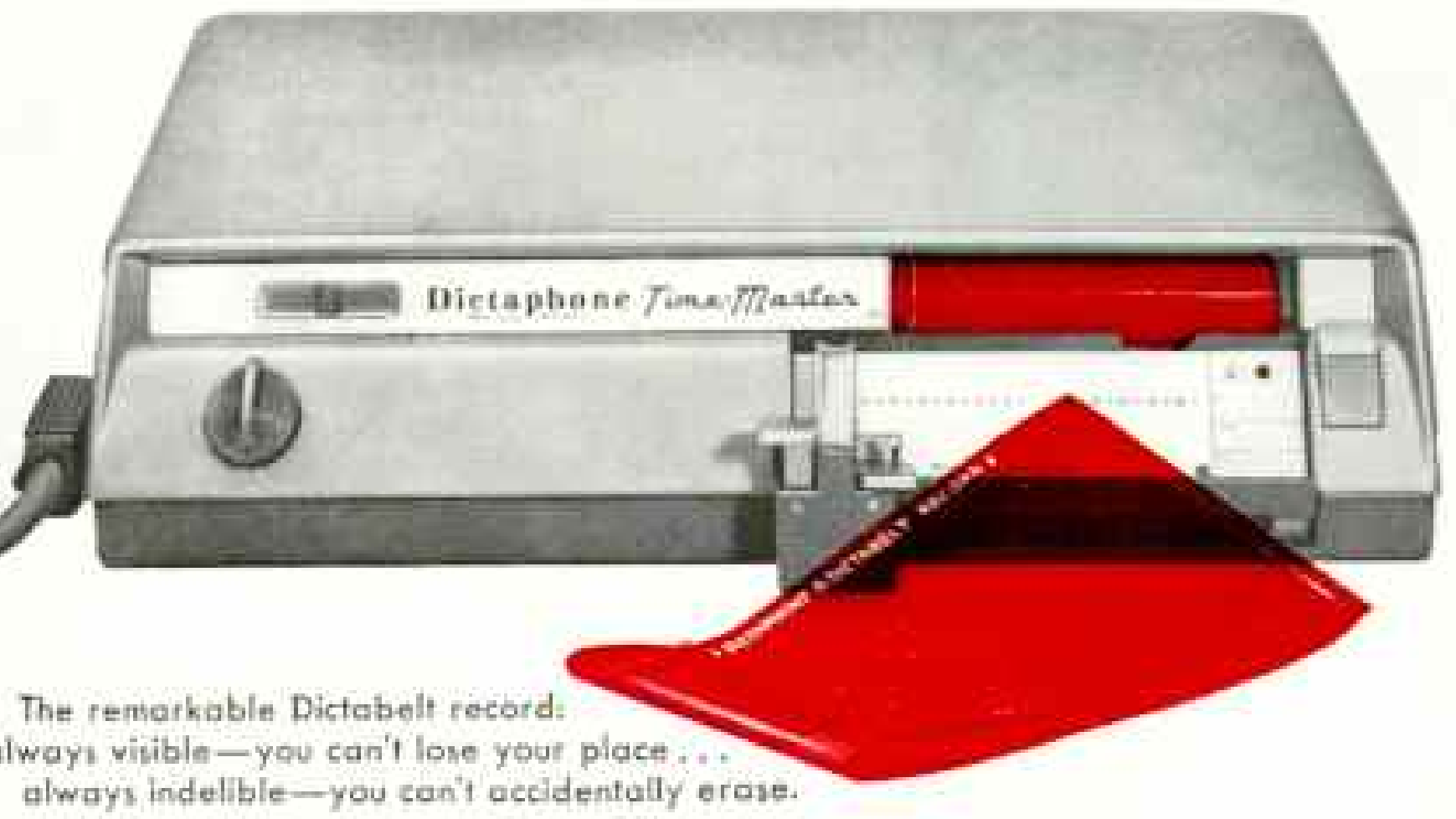

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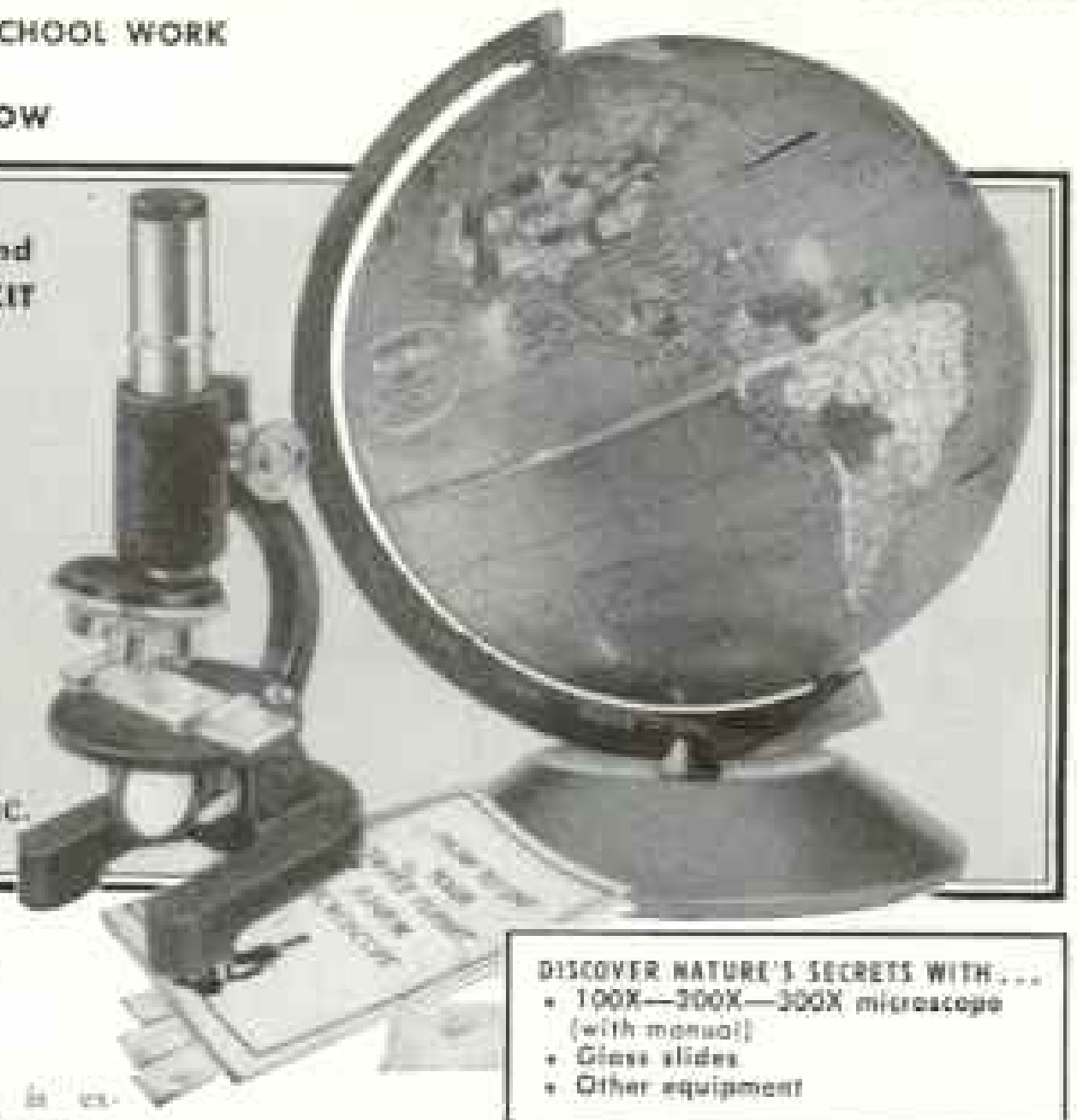

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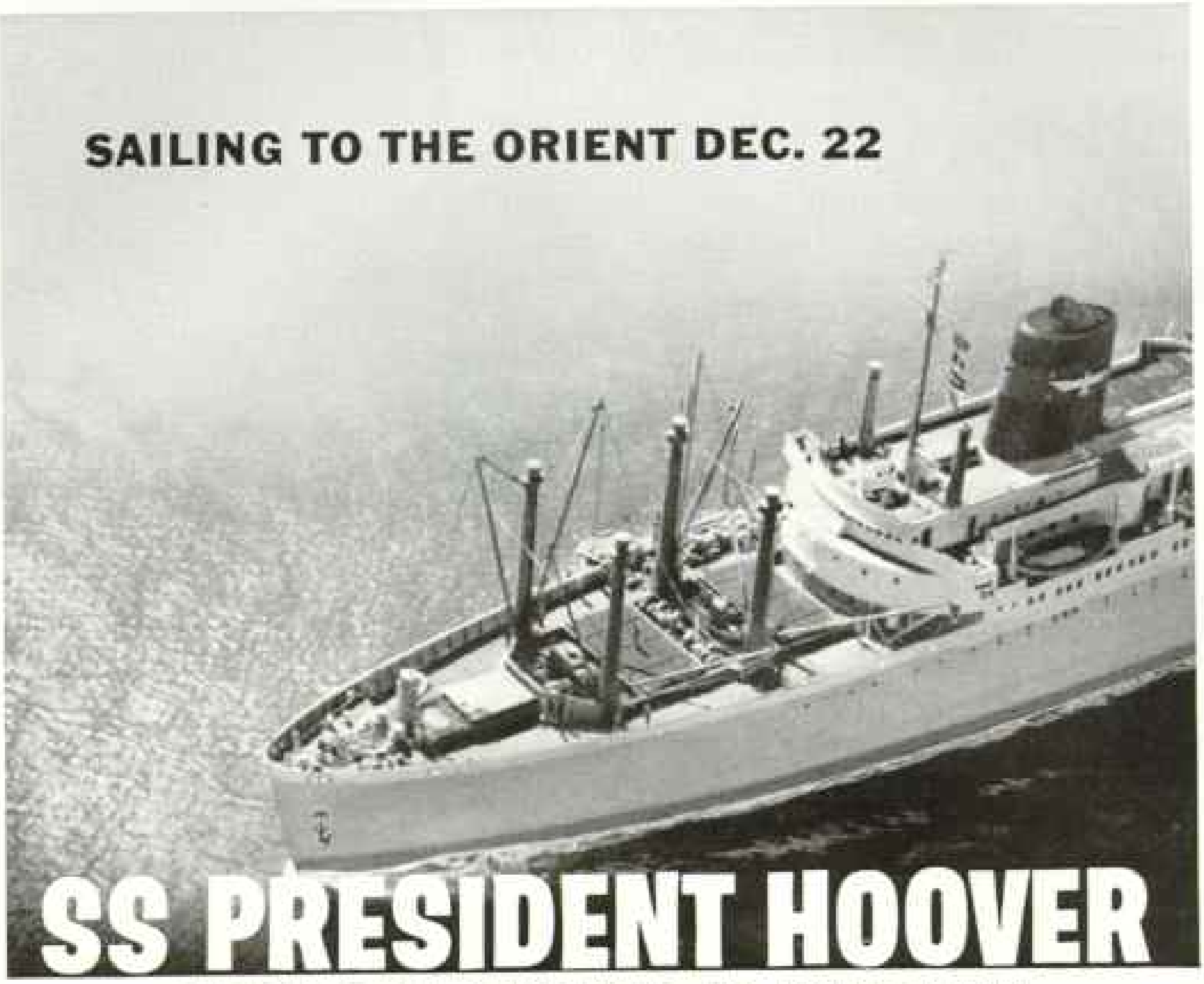

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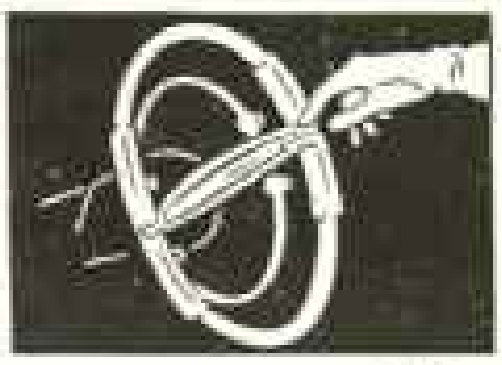

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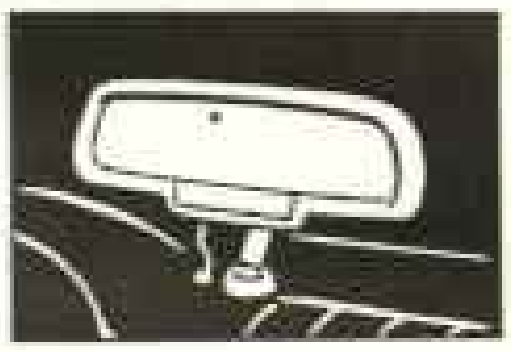
They don't bob their noses or scrape their tails when you start and stop fast . . . and they take corners flat and steady as if they were on rails. Only the cars from Chrysler Corporation have Torsion-Aire Ride. It gives you a firm, sure-footed ride, even over railroad tracks and rough country roads. (And for '59 you can also get The *Forward* Look cars with added *air units* in the rear. This gives you automatic leveling—so even if you have a heavy load, the car rides level.

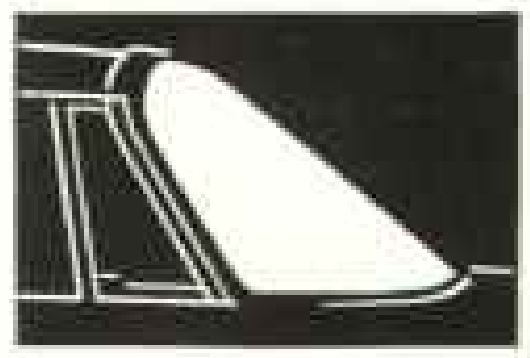
The seats swivel to let you in and out. These are the easiest cars you've ever seen to get in and out of. Front seats turn like an office chair, on noiseless nylon bearings—lock in place while you drive. Our new, roomier body for '59 gives you extra head and knee room besides—especially in back.



New Mirror-Matic Electronic Mirror and Automatic Beam Changer give you new night driving security.

Mirror and headlights adjust themselves for night driving. You've never driven a car that did so much to make you feel secure at night! The headlights dim automatically when another car approaches. And the rear-vision mirror adjusts itself electronically to "dim" lights coming from behind.

A few of the other safety features: an outside fender mirror you can adjust from *inside* the car . . . electric windshield wipers that don't slow to a gasp on hills or when you step out to pass somebody . . . and Safety-Rim Wheels, designed to keep the tire from jumping the rim if you ever have a sudden blowout.



Compound windshields, introduced first by Chrysler Corporation, let you see all around—even watch overhead signals without having to crane your neck.

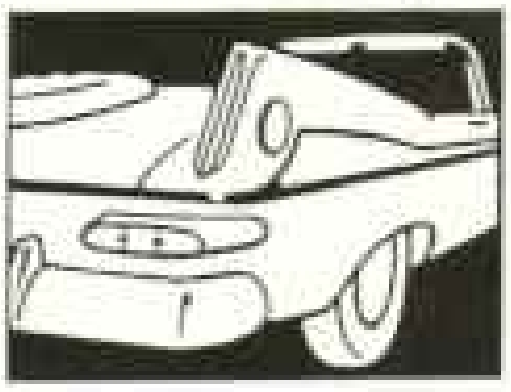
Compound windshields that sweep all the way across your field of vision—and curve up into the top of the car, so you have clear vision in all directions—can even see overhead signals without craning your neck. And there's safety glass all around.

New power up front—and brakes with the muscle to hold it. Chrysler Corporation cars walked off with top performance honors in the famous Mobilgas Economy Run for the past two years—with every other major car in America pitted against them. The '59 models

look like they can do

New swivel seats, available only on Cars of The *Forward* Look, make them the easiest cars to get in and out of you ever saw.

are available with new engines—even better than those that set the pace in '57 and '58! And they've got the brakes to go with 'em—Total-Contact brakes. *Two* hydraulic cylinders up front, where other cars have only one. Touch the brake pedal—and you STOP.



True aerodynamic styling not only sets the pace for design; but also makes a real contribution to your car's driving stability on the highway.

The Look that started the trend is handsomer than ever in the '59 Cars of The *Forward* Look. There's no mistaking them on the road, with their low, sleek, powerful look, and true aerodynamic design that helps keep the car steady on the road.

And to protect their looks (and your investment)—even the paint is new this year. New "Lustre-Bond" super-enamel finishes, so tough and glossy they can go years without waxing! Inside—new textured upholstery fabrics and trim are more beautiful than ever before.

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But words are a poor substitute for the real thing when it comes to describing cars like these. You've got to *drive* one to believe it!

Stop in this week. The dealer has a car waiting for you and the family to try out. Take a new 1959 Plymouth, Dodge, De Soto, Chrysler or Imperial and put it through its paces. Pick the roads *you* know are toughest. One drive will convince you—these *are* the cars that can do what they look like they can do!

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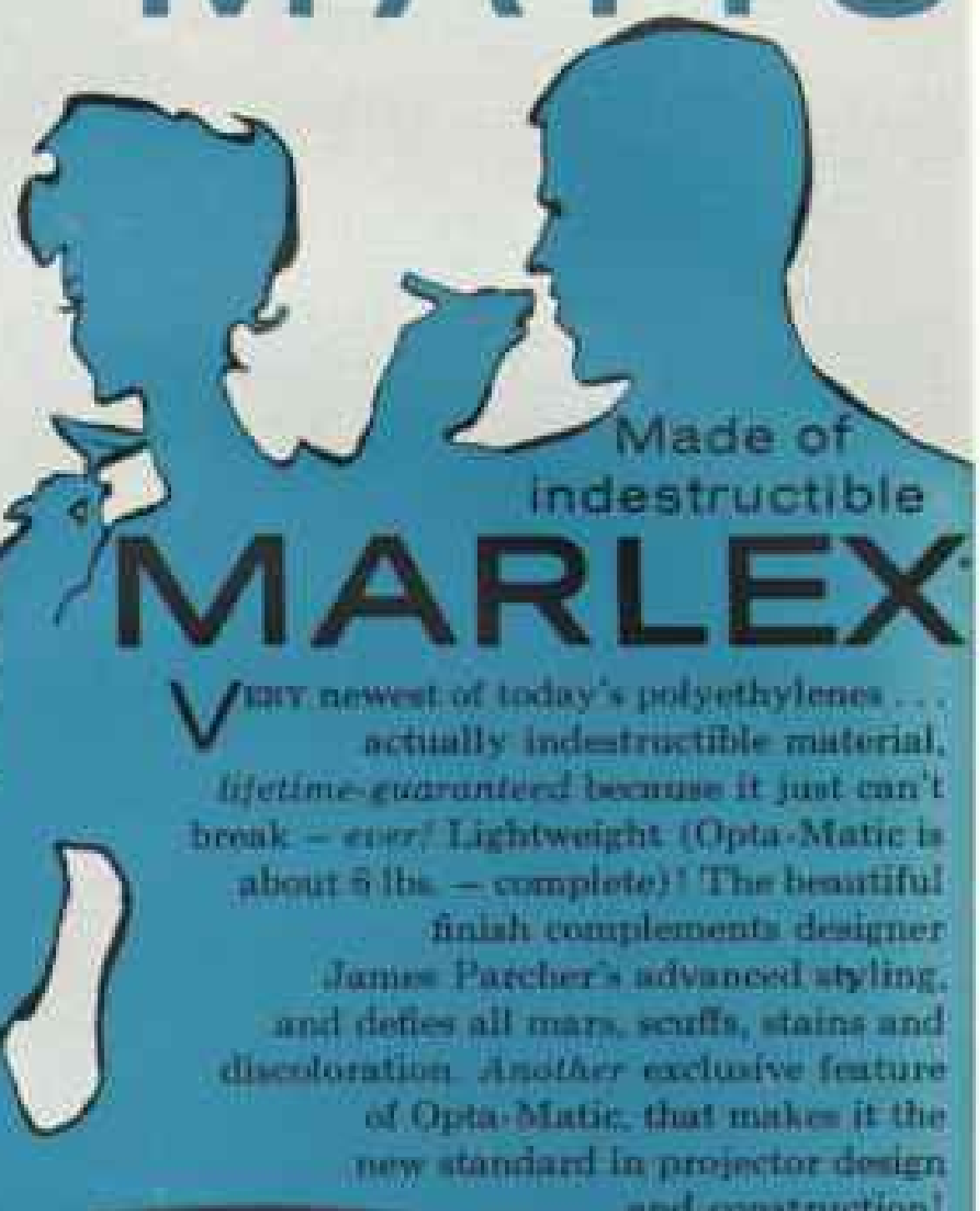

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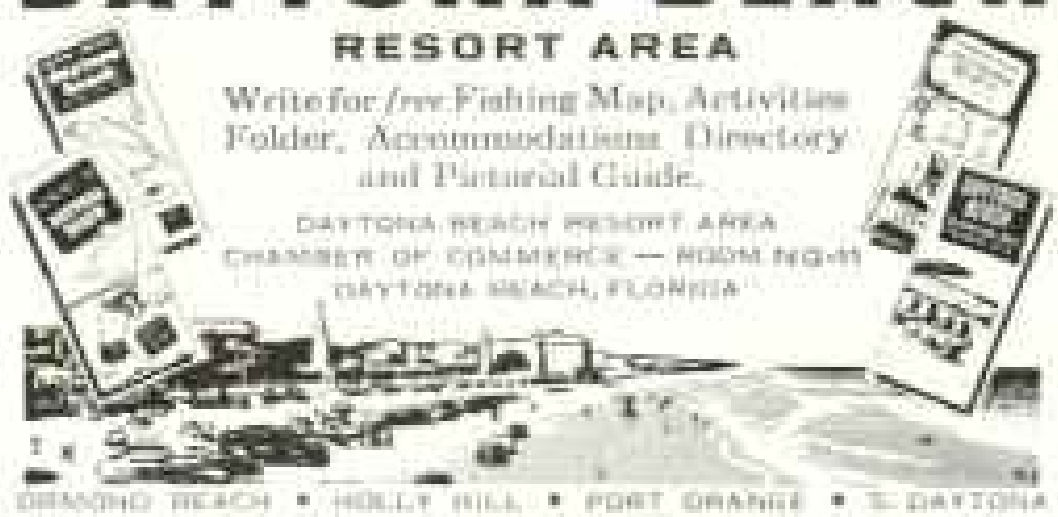

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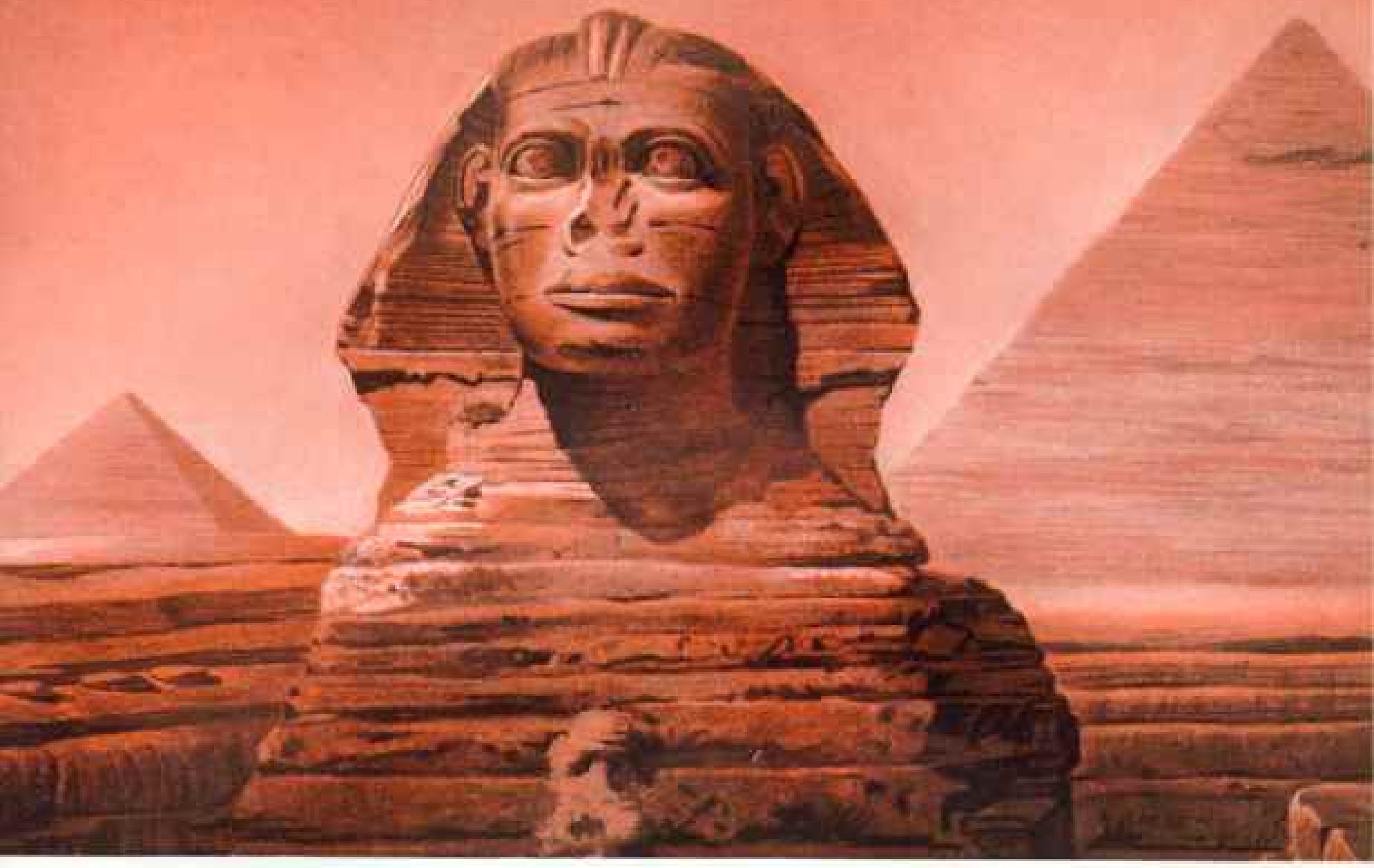

Why is ARTHRITIS called "the Sphinx of diseases"?

ARTHRITIS . . . the oldest disease of which we have evidence . . . has been likened to the ancient Sphinx. For arthritis is still strange and mysterious in many ways.

For example, the *exact* cause of some types of arthritis is unknown. Nor do doctors fully understand why it flares up in certain patients and smoulders or develops gradually in others . . . why treatment may help one victim and not help another . . . why rheumatoid arthritis strikes women three times as often as men.

Despite such mysteries, when proper treatment is started early . . . or before the affected body joints have been severely damaged . . . there is great likelihood of lasting relief and marked improvement.

Proper treatment for arthritis and other rheumatic diseases . . . affecting about eleven million Americans 14 years of age and older . . . must be based on the needs of the *individual* patient.

At least 50 different forms of arthritis are known to medical science. But only two of the forms together make up more than seventy percent of all rheumatic complaints. These are *osteoarthritis* and *rheumatoid arthritis.*

Osteoarthritis, or degenerative joint disease, begins as a rule in the thirties or forties as part of the process of aging. It usually attacks joints that undergo greatest wear and tear. Under proper medical care, a great deal can be done to lessen discomfort and reduce further damage to joints.

Rheumatoid arthritis may be more serious. It strikes in the prime of life, generally between the ages of 20 and 50. Though it involves the joints, it also affects the body.

If neglected, rheumatoid arthritis can cause severe crippling. But when it is diagnosed early and treatment is faithfully followed, many patients can be spared disability and helped considerably.

Even if the disease does not yield to treatment, rehabilitation can often help a badly handicapped individual continue a useful life.

If your joints become sore, stiff, painful or swollen, consult your doctor . . . and always avoid self-treatment.

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Two days out from Fiji on Orient & Pacific's Orsova. Photograph by Tom Hollyman.

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Orient & Pacific Lines: 210 Post St., San Francisco. Cunard Line: General Agents in U. S., Canada.

VOL. CXIV, No. 5 WASHINGTON NOVEMBER, 1958

THE NATIONAL GEOGRAPHIC MAGAZINE

Unknown heroes of two wars receive a Nation's tribute in reverent ceremony at Arlington National Cemetery

'Known but to God'

By BEVERLEY M. BOWIE

Assistant Editor, National Geographic Magazine

THEY WERE two women, with a single yellow rose.

It was a Peace rose; it had bloomed for the first time in four years, and Mrs. Frank Goodwyn had plucked it that morning from the bush in her front yard in Silver Spring, Maryland. Now she stood with her mother, rather uncertainly, under the immense dome of the Capitol's Rotunda.

In the center of the hushed chamber, guarded by men from the Army, Navy, Air Force, Marines, and Coast Guard, lay on catafalques the flag-draped caskets of the unknown servicemen of World War II and of the Korean conflict.

The Living Honor the Lost

The day before, the Vice President, the Justices of the Supreme Court, leaders of Congress, the diplomatic corps, and the Joint Chiefs of Staff had rendered the homage of officialdom. Against the walls were massed their offerings—carnations, scarlet and white; clumps of chrysanthemums; great sheaves of lilies and sprays of gladioli.

"We just wanted to leave it quietly," Mrs. Goodwyn said of her flower. But the enlisted man on duty carefully inscribed her name after those of the dignitaries, and an officer contrived a small stand for the rose. Then one officer took up his position flanking Mrs. Goodwyn, another stood next to her mother, Mrs. James R. Miller, and two others brought up the rear. The little delegation moved forward to the twin biers, and Mrs. Miller, tears blurring her eyes, laid the rose on one of the coffins.

The two women came to honor Capt. John R. Miller, veteran of World War II. He disappeared in his Air Force bomber on June 12, 1952, on a flight over North Korea. Hope died hard, but after four years his mother and sister accepted in their hearts what their minds had long acknowledged.

They brought their grief to the Rotunda, but not alone for Captain Miller, known and loved. They bestowed it as well upon two men, nameless and forever unknown, symbols of a Nation's manhood. They wept for the waste of war. They honored in the death of two men the sacrifice of many.

Not the oratory of officeholders, not the salutes of beribboned generals, not even the

---

The Author: Beverley M. Bowie's name is already familiar to members for his many articles published in the NATIONAL GEOGRAPHIC MAGAZINE. In this moving tribute, he writes from firsthand knowledge of many of the battlegrounds where Americans died. During World War II he served as a Lieutenant (jg.), USNR, in Africa, Italy, and Romania. Intelligence assignments for the cloak-and-dagger Office of Strategic Services took him far north in the Balkans and into the Carpatho-Ukraine.

eloquent prayers of the clergy, but the unrehearsed, impulsive tribute of humble people hallowed these rites. It was they who gave substance to what might otherwise have been merely a show.

Patriotism is not an emotion to be turned on like a tap when the flag goes up or the drums roll. It is more shy, more rare, than the sentimental suppose.

But one could see it during these high ceremonies in the eyes of the young veteran who had traveled all the way from Pennsylvania to pay his respects, his left arm dangling by his side and ending in a hook. One could see it on the faces of the 92-year-old brigadier and of the baby-cheeked Medal of Honor winner supporting his elbow. One could read it in the tired brow of a commander in chief whose orders had once sent millions forward to play at dice with death.

The two servicemen at the focal point of these observances had been chosen with a passionate concern for anonymity. World War II left 8,494 unidentified American casualties; Korea added 853 more. From among these were selected candidates who were not only anonymous but about whom no particulars were known.*

In consequence, to those whose sons had crossed the water and never returned, the two who now came back in somber triumph

(*Continued on page 601*)

* See "Our War Memorials Abroad: A Faith Kept," by General of the Army George C. Marshall, and "Here Rest in Honored Glory . . ." by Howell Walker, NATIONAL GEOGRAPHIC MAGAZINE, June, 1957.

Equal in honor, men of two wars lie in state in the Rotunda of the United States Capitol. As symbols of the 397,740 Americans who gave their lives in World War II and in Korea, the unknown warriors receive the Nation's homage before their entombment in Arlington National Cemetery on Memorial Day, 1958.

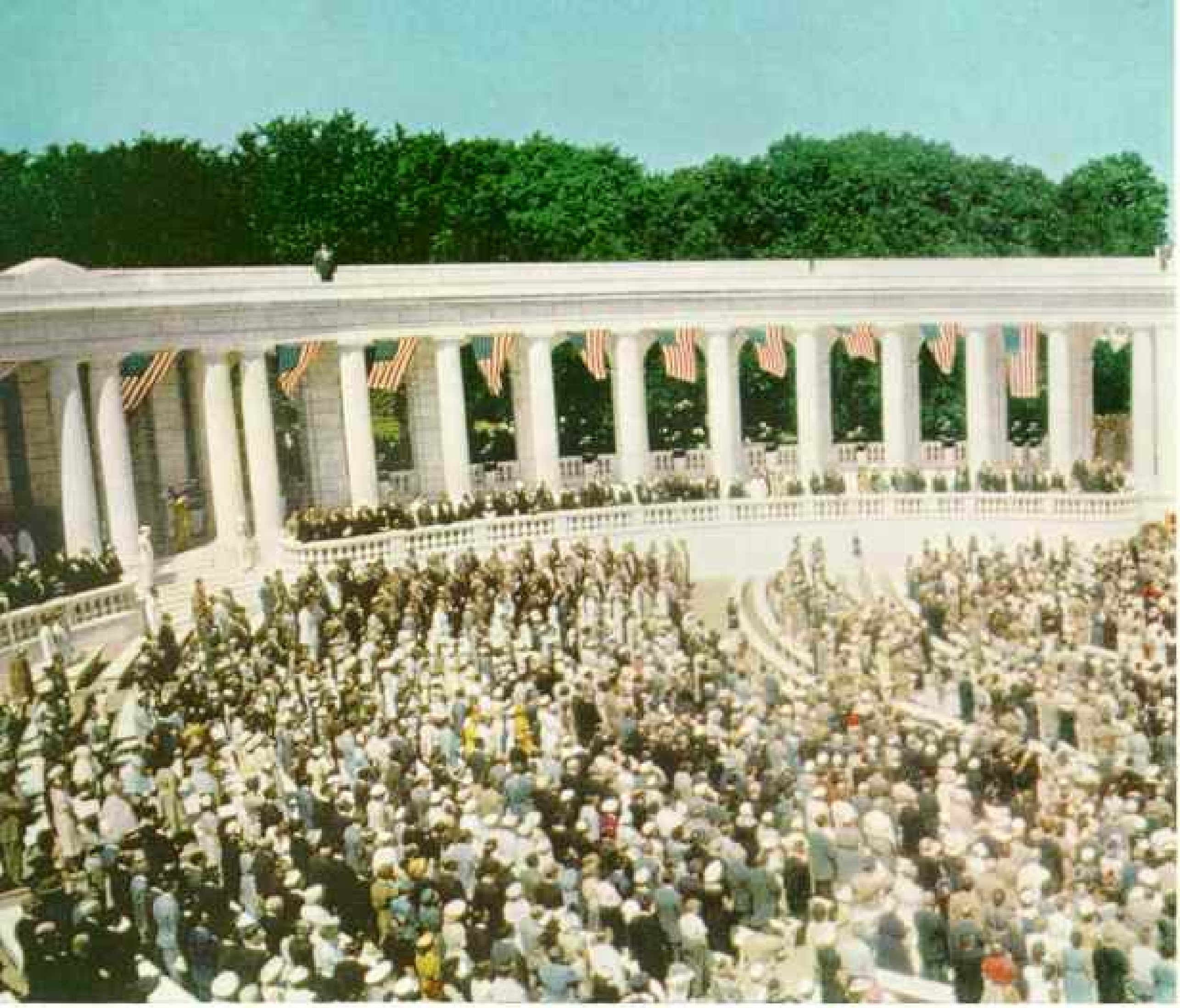
OVER-RECTANGULAR BY NATIONAL GEOGRAPHIC PHOTOGRAPHER JOHN E. FLETCHER © N. G. S.

Leaving the Capitol, the Fallen Heroes Begin Their Long March to Arlington, America's Valhalla

Within the Rotunda (right), below John Trumbull's "The Surrender of Lord Cornwallis at Yorktown," mothers whose sons died in their country's wars pay silent tribute.

As servicemen salute (below), the caskets are borne to caissons for an escort with full military honors along Washington's Constitution Avenue.

Passing Lincoln Memorial (lower right), the cortege crosses Arlington Memorial Bridge to Virginia.



AQUACHROMES BY GILBERT M. GROSVENOR (TOP) AND JOHN E. FLETCHER, NATIONAL GEOGRAPHIC STAFF © N. G. S.

"How Sleep the Brave, Who Sink to Rest, By All Their Country's Wishes Blest!"

In Arlington's Amphitheater the many and the great pay the Nation's ultimate tribute. Flag-mantled caskets rest in the apse. United States Marine Band in scarlet tunics plays the national anthem.

The quotation above is from an 18th-century ode by the English poet William Collins.

Stepping forward, President Dwight D. Eisenhower places upon each casket a black pillow bearing a medal with its ribbon of blue and white. "On behalf of a grateful people," he said, "I now present Medals of Honor to these two Unknowns who gave their lives for the United States of America."

A living recipient of the Medal of Honor, Sgt. Jerry K. Crump assists in the rite. During an engagement in Korea, Sergeant Crump fell upon an enemy grenade to protect four wounded comrades.

could well personify the rest. Being no one, the Unknown could be anyone.

Each mourner brought to this blank portrait his own remembered likeness. To one, perhaps, the missing figure was a tired major who stumbled out of shattered Bataan on the Death March, hands tied behind him, parched, hungry, prodded by the bayonets of his derisive captors; a man who died in a ditch 10 miles short of the Japanese prison camp.

To another, it may have been a gunner's mate trapped in the green maelstrom of the sinking "Lady Lex"—the carrier *Lexington*, casualty of the Coral Sea. To still another, the image may have come of a GI storming the gray stone massif of Hill 609 in Tunisia, under the guns of the 5th Panzer Army.

The geography of heroism offers a wide range for remembrance. We think of those who ferreted out the enemy in fogbound Attu, westernmost of the Aleutians; of those who flew the Hump, droning over the thunderheads of the Himalayas; of those in submarines who hunted in lonely silence the Pacific wastes.

The unknown fighter met his fate on no immaculate parade ground. He met it in the mad lunar landscape of shell-blasted Cassino; he met it in the mud and muck of Bougainville's decaying jungles; he met it on that "beachhead in Hell," the volcanic shores of Iwo Jima.

Was he one of those who braved the flak above the smoke pots of Ploeşti? Did he hit Omaha Beach in Normandy and cling to it by his eyelashes as the German barrage rolled down? Was he among those stubborn few who held the Nazis at Bastogne and flung back a sardonic "Nuts!" to any mention of surrender?

Whoever he was, undoubtedly he knew fear. He had ample opportunity to become acquainted with its chill and paralyzing grip in World War II; if he needed any postgraduate course, he would have found it in Korea.

A good place to learn it would have been Taejon, that "Thermopylae of the rice paddies," where the bruised and reeling Eighth Army traded space for time. And he could have run across it during the long counterattack up the length of the "Land of the Morning Calm," as the infantry slogged up one sullen, lead-swept mountain after another.

He knew hope in the march to the Yalu, near-despair in the retreat from Yudam-ni, a kind of elation in the breakout through the snow at Koto-ri. He experienced, if he was a Corsair or a Sabrejet pilot, the compressed excitement of a few minutes in "MIG Alley."

Navy Brings Two Warriors Home

Well, and in the end he died.

A hero's death? Perhaps. No one will ever know. But we do know he gave that life for his country, and we take this sacrifice to stand for all the unseen, unrecorded deeds of courage and compassion performed in these conflicts by the obscure many. We honor not the men of the Pacific, as such, or of the European theaters; we honor the Marines no more than the Air Force. We honor not merely the medal winners. We honor them all.

The manner of our honoring is now history. One bright morning in May the destroyer *Blandy* steamed up Chesapeake Bay into the Potomac and Anacostia Rivers, on her torpedo deck the caskets of the Unknowns of our last two wars.

Pomp and martial fanfare greeted *Blandy* when she berthed at Washington's Naval Gun Factory. From Wednesday till Friday the bodies she brought lay in state in the Rotunda. Then, at 12:59 p.m. on Memorial Day, 1958, the march began which was to end in the simple splendor of Arlington's Amphitheater.

Massed on the east plaza of the Capitol, some 7,500 people watched the dozen bearers from all the military services emerge at the top of the sunlit steps, carrying the two

The Eminent Living Pay Final Tribute to the Anonymous Dead

Bareheaded, President Eisenhower and Vice President Richard M. Nixon stand for two minutes of reverent silence after an honor guard places the caskets in the apse of the Amphitheater. Earl Warren, Chief Justice of the United States, stands immediately behind them. Members of the Army Chorus occupy the last rows. A relentless May sun felled nearly 400 spectators, including 40 servicemen.

Servicemen Hold Flags over the Coffins in Arlington Cemetery (Next Page)

Unknowns of World War II and of Korea take their last stations flanking the crypt that shelters the nameless soldier of World War I. Here they will lie beneath simple marble slabs. The honor guard presents arms as the flags are lifted.

caskets. From the opposite end of the Mall, at 1 p.m. sharp, boomed the first of 200 rounds, one fired each minute, by howitzers deployed beside the Washington Monument.

Bayonets flickered as the honor cordon's rifles snapped to "Present arms!" and the band broke into "Eternal Father, Strong to Save." Expertly, the bearers lushed the caskets to two velvet-mantled artillery caissons drawn by six gray horses each.

A curious hush fell over the crowd. In the sudden vacuum of silence the starlings could be heard chattering in the trees; somewhere a telephone rang; a child broke into tears. Here and there a man placed his hand or his hat awkwardly over his heart.

The procession moved slowly off. Crepe-wrapped drums beat a muted cadence for 1,500 troops from every branch of the Defense Establishment. Nine abreast, they swung into line, taking up the parade pace of 120 steps to the minute.

Along tree-mantled Constitution Avenue some 115,000 citizens stood two and three deep, quiet, almost contemplative. As the cortege passed, an occasional sob broke out; but for the most part the only sounds were the clack of the horses' hoofs, the shuffle and stomp of soldiers' boots, the slap of palm on rifle stock as units lining the route came to attention.

Jets Pass in Last Salute

As the procession rounded the Lincoln Memorial and crossed the Potomac to the Virginia shore, a flight of 15 F-100 jets roared upriver at 1,500 feet, followed by five B-57 bombers. From each formation a plane was missing, symbolizing a lost comrade.

Within the chaste white colonnades of the Amphitheater the leaders of Government, of the Military Establishment, and of the diplomatic services had taken their places.

Then, from one portico, filed 218 of the Nation's 318 living holders of the Medal of Honor. Some were in uniform; some in mufti. Some bore stars on their shoulders, some only chevrons on their sleeves, but each wore around his neck the sky-blue riband carrying his country's highest decoration.

A man or two limped; a few propelled themselves in wheel chairs; several moved with the curious directness of the blind. There were enlisted men who looked as if they should be home playing sand-lot ball; and there were frail officers in the khaki and Sam Browne belts of Pershing's AEF.

No cue, no prompting from the wings, brought the spectators to their feet. A sense, instantly shared, of what was due these men moved them simply to rise and, in the presence of proven greatness, stand.

A moment later the President of the United States entered, alone, and took his appointed seat in the apse. Ruffles and flourishes from without, and from the caissons the bearers lifted the great caskets and carried them to their catafalques.

President Delivers Medals of Honor

A prayer for grace followed, a three-fold flare of trumpets, and then a two-minute period of silence. The flags along the colonnades rippled gently in the breeze. Along the neat white rows of Arlington's 97,000 graves a few mourners in the distance strolled unobtrusively, flowers in their arms. A fire siren wailed over toward Anacostia.

On black pillows the President brought forward two Medals of Honor and laid one on each bier. The Army Chorus softly launched upon Walt Whitman's "Dirge for Two Veterans," and presently the Navy Chief of Chaplains pronounced the benediction. The ceremony shifted to the plaza on the east, where the caskets were lowered onto rods above their last home—crypts on each side of the Unknown Soldier of World War I.

In Latin, English, and Hebrew the three service chaplains intoned their words of burial: "... from sea and shore, from camp and field, we bring home our beloved dead."

The President came forward with a great wreath of red and white carnations and blue irises. At once a battery of guns near the Lee Mansion opened up with a 21-round salute, and the honor guard raised its rifles and sent three volleys crashing across the field. Purest and most poignant of salutes, "Taps" brought the ceremonies to a tranquil conclusion.

"Let Us Cross Over the River and Rest Under the Shade of the Trees"

Stonewall Jackson's dying words describe the homecoming of the unknown warriors. Here the caissons pause outside the Amphitheater. At parade rest, platoons of sailors, soldiers, and servicewomen stand in the dappled shade. On Veterans Day, November 11, as well as each Memorial Day, the Nation honors its fallen in ceremonies at Arlington.

THE EMPEROR'S
PRIVATE GARDEN:

Kashmir

By NIGEL CAMERON

Photographs by BRIAN BRAKE, Magnum

THE GREAT MOGUL Emperor Jahangir, "Conqueror of the World," lay dying.

"Is there anything Your Majesty desires?" his courtiers asked.

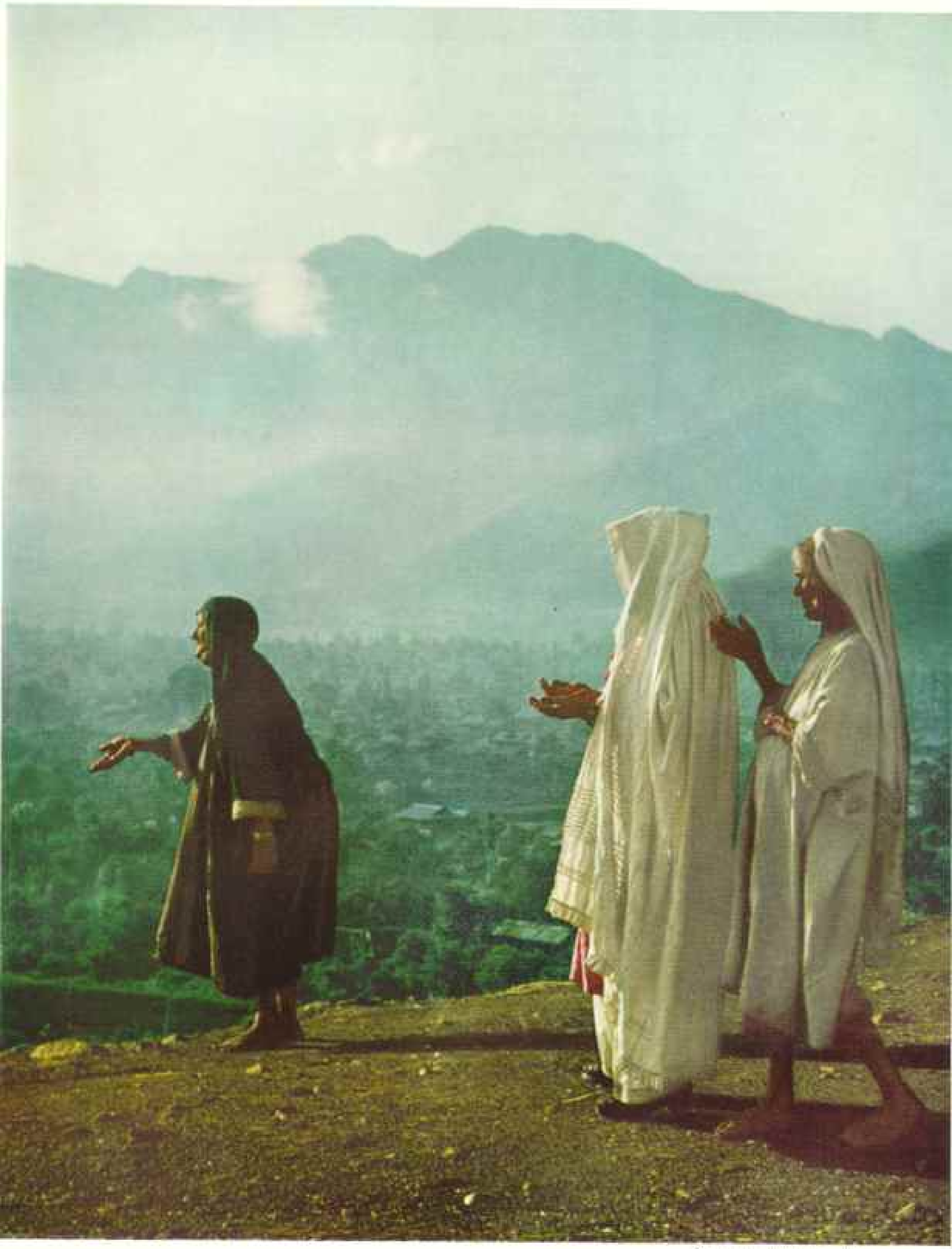
With a plaintive sigh, Jahangir replied, "Only Kashmir."

After a few days in this loveliest of Central Asia's hidden lands, I thought I understood what he meant. The Emperor, tired of the world's troubles, yearned for peace. And Kashmir was the nearest thing to paradise he had ever known.

With photographer Brian Brake, I had come up from the dust and heat of the parched south. We had been traveling for more than a year; we were very tired, and we looked forward to a month or more in the peace of Jahangir's paradise.

As we crossed the blistering apron of the airfield at Delhi toward an Indian Airlines

Moslem Women Pray at Dawn
Above the Vale of Kashmir



The forbidding Himalayas, highest mountains in the world, guard this green Central Asian land bordering India and Pakistan (map, page 615). Like an enormous slab of jade, the valley of Kashmir winds shimmering some 85 miles through the heart of the country. In the shadow of the Himalayan foothills, these women gather for prayers on Hari Parbat, a hill overlooking Srinagar, the capital. Woman in red headdress (opposite) brightens a Srinagar market place.

The Author and Photographer: Nigel Cameron is an adventurous 38-year-old Scot with two strangely unrelated professions—dentistry and writing. After wartime service as a Royal Navy dental surgeon, he practiced for a dozen years in London. Then, abandoning the dentist's drill in favor of the typewriter, he set out to see the world. A book about his adventures will be published this year; another is in production.

Brian Brake, as a member of the New Zealand Government Film Unit, made two documentary movies which won awards at the 1954 Edinburgh Festival. In addition to photographing Kashmir for the National Geographic Magazine, he has carried out assignments in Nigeria, Soviet Russia, Malaya, Australia, China, southern Arabia, and many other parts of the world.

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plane, the shade temperature stood at 110° F. Inside the cabin it was considerably higher.

We flew north over the flat, exhausted plains. Not a gleam of water showed in the stream beds. Fields were baked reddish brown, as though dying under the brazen sky.

After an hour a faint smudge appeared on the horizon and gradually formed into a range of hills. We climbed slowly, the hills grew clearer, and we could see drifts of thin snow in the highest ravines.

Suddenly it was cooler. Then we were flying over 9,000-foot Banihal Pass, one of the few safe air routes into the Vale of Kashmir and the only one from the direction of Delhi.

Vale Ringed by Snow-clad Peaks

From the air the Vale of Kashmir is an astonishing sight. Astonishing because it is green, and what you have just left was brown. The mountains part, revealing a valley 85 miles long and a third that in breadth, a platform 5,000 to 6,000 feet above the sea, shaped like an irregular ellipse (map, page 615). It is a valley flashing with lakes and webbed with canals. Around it the snow barrier glistens, filtering the heat out of the tropical air, so that the sun's impact is no fiercer than in the south of France.

Looking down on this verdant land, set between worlds of heat and eternal snow, I found it easy to understand how for 2,000 years neighboring rulers coveted Kashmir. Here was not only beauty but a climate to bless and invigorate a man rather than burn the energy out of him before midday.

The mighty Akbar, father of Jahangir, was typical of these overlords. Kashmir was, he declared, "my private garden," and he relegated the inhabitants to the duties and status of gardeners. But 16th-century Akbar was tolerant where religions were concerned—more so than some of his predecessors, and, indeed, some of his successors. Buddhist and Hindu, Moslem and Sikh rulers propagated their own religions. Nor did some of them hesitate to uproot and burn such weeds of heresy as they encountered.

But of this tangled history of glory and calamity, tolerance and oppression, no visitor can think for long, at least not in his first hours of savoring Kashmir's delights. As the plane flies closer to the heart of the vale and lands at Srinagar, one thinks first of the beauty of the place. It is still as tempting to the modern traveler as it was to the emperors of yesterday.*

Houseboat Offers New Way of Life

Our tourist brochure had exclaimed: "The weather is ecstatic!" And so it was. Along sunlit, flower-scented lanes we drove to our chartered houseboat *Triumph*, awaiting us on Nagin Lake (page 610). This was our introduction to a way of living which comes near to perfection in comfort and surroundings.

Undoubtedly the best way to live in Kashmir is on a houseboat. This institution goes back to the time when the British and their families discovered the delights of the valley. Here they came by hundreds from April to October, escaping the heat of the plains. They built themselves long boats, elegant versions of the flat-bottomed *bahats* normally used for transporting heavy loads. On these were constructed frame houses.

The boats on the lakes are made of durable deodar, or cedar, in huge planks clipped together with iron staples. The house on top is of the same wood, unpainted and paneled. The simple design provides living room, dining room, and several bedrooms, one behind the other, with a corridor along one side.

* See "The Idyllic Vale of Kashmir," by Volkmar Wentzel, National Geographic Magazine, April, 1948.

Bearded Hindu Holy Men Pause on a Pilgrimage in the Himalayas

Kashmir's population, largely Moslem, includes Hindu, Sikh, and Buddhist minorities. These ascetics, known as *sadhus*, renounce the world, carry their meager possessions on the road, and live on gifts. The author met them on their way to Amarnath Cave, an ice-columned grotto venerated by Hindus. Man at left holds a brass pot for alms.

Our kitchen was a separate boat astern, with a chef who would cook for us in either European or Kashmiri style. Four servants came with *Triumph*, so that we enjoyed more luxury aboard her than in many hotels. And if we tired of the view, it was a simple matter to move to another anchorage.

When India gained independence, many British left for home. The houseboat trade, which largely depended on their patronage, was so badly hit that many owners sold out.

The owner of our houseboat, Ahmed Wangnoo, was one of those who held on. Time proved him right. Despite the political dispute between India and Pakistan that hangs like a threatening cloud over Kashmir and deeply affects the thoughts and lives of the inhabitants, the houseboat trade is reviving. British visitors still come, but the majority are American and Indian tourists.

Ahmed spoke good English, although unable to read or write, and he was an excellent guide. Moreover, he seemed to me a typical Kashmiri, passionately fond of his native land, and a devout Moslem—as are about 80 percent of the population. I liked his teasing humor and his thoughtful turn of mind.

Floating post office calls at the *Triumph*, the author's houseboat, to pick up mail. A converted *shikara*, the post boat carries clerk, boatmen, mailbox, weighing scales, and a bell to announce arrivals. License plate above *Triumph*'s veranda says the craft has modern sanitary equipment.

Merchant's price book, a file of sales records and letters of recommendation, accompanies every transaction. Here Ahmed, the houseboat owner, holds a bearded peddler's ledger. "The price is fair, sahib; it's up to you," he tells the author.

Coming of an old family of houseboat owners, he was well known and respected, and his word was a passport for us to places it would have been difficult to enter otherwise.

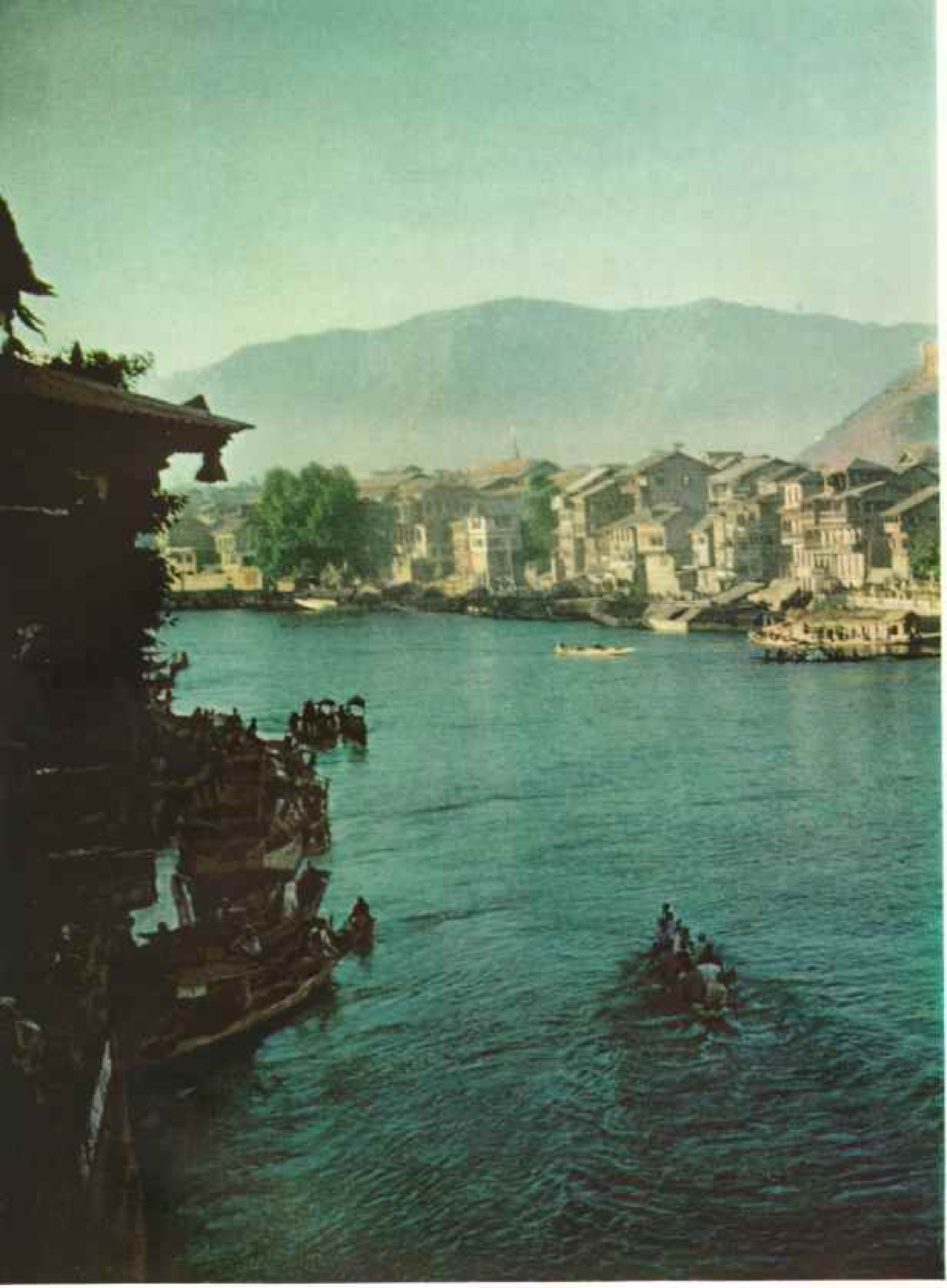
On our first afternoon, after a good luncheon aboard *Triumph*, we set off on a tour aboard a smaller craft, a *shikara* (page 626).

There is a distinct elegance about a shikara. Less sleek than a Venetian gondola, it resembles a curtained palanquin on water. The passengers recline, Oriental fashion, on cushions. The guide sits facing them, and astern squat tough, smiling Kashmiri paddlers.

Astern, too, sat the charcoal stove where our food was cooked on extended trips and where tea flavored with cinnamon was brewed for us on even the shortest water journey.

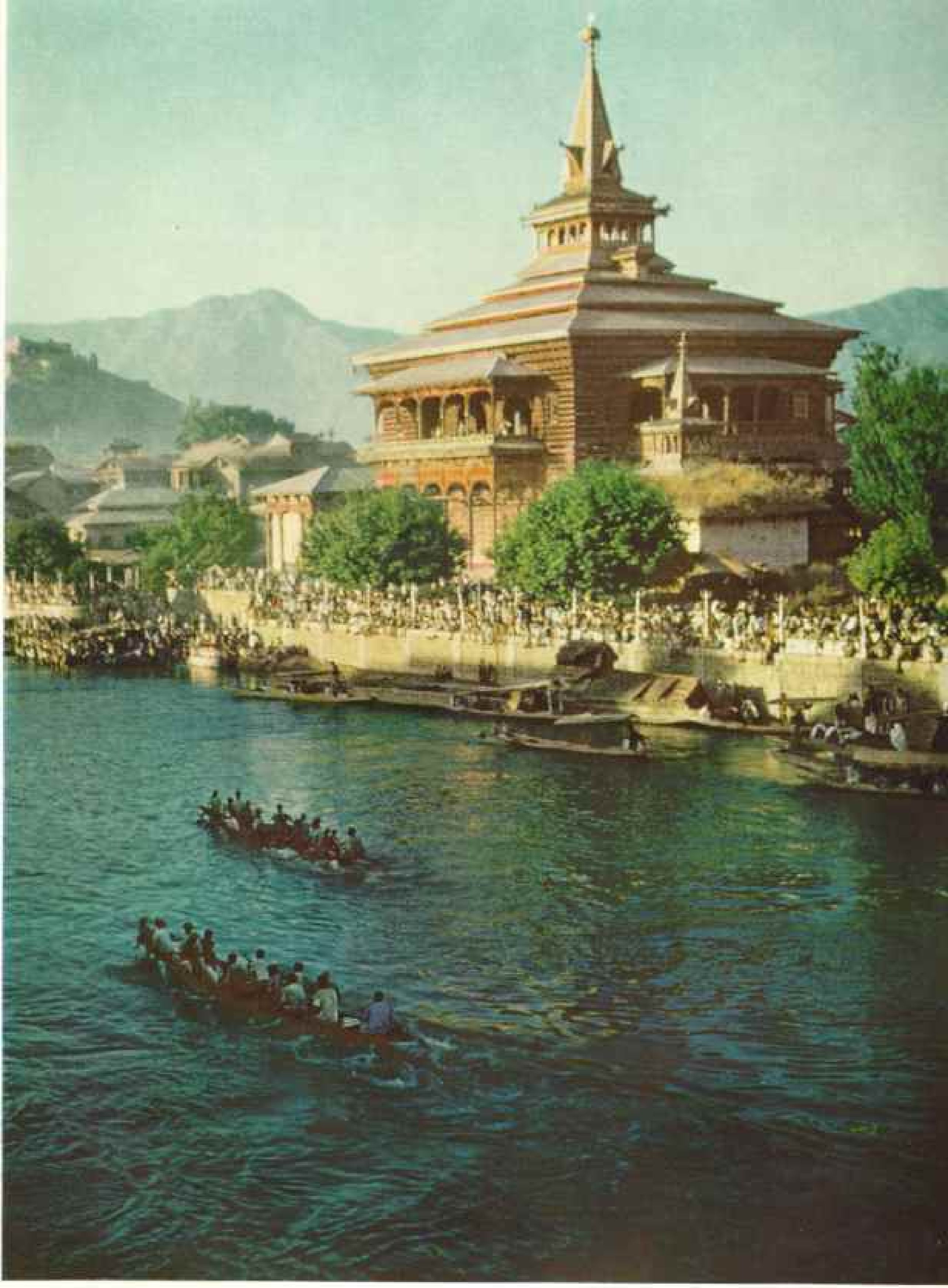
It was July; the lakes were spread with lotus leaves and the canals choked with water milfoil—a tiny plant that later in the month turns the surface into a green carpet. The mountains looked down as if smiling, and the poplars nodded in the wind.

Most lakes in the vale drain through a complex net of canals into the Jhelum River, which itself rises in Kashmir. The great lakes —Dal and Wular—and many smaller ones, too, are fed by streams descending from the Himalayan foothills. Not all the water from melting snows and glaciers arrives by surface routes; I was told subterranean streams emerge in the beds of some lakes. This may



Like a Spacious Avenue, the Jhelum River Bisects Srinagar, City of Canals

To the 19th-century Irish poet Thomas Moore, the Vale of Kashmir was "the Eden of the Earth." Waterways, outnumbering roads, earn the country's capital city the title "Venice of the East."



The Jhelum serves as Srinagar's main thoroughfare, shopping center, and triumphal route of state visitors. This view looks past the pagodalike Shah-i-Hamadan Mosque, built of timbers without nails or screws, to the fortified hill of Hari Parbat. Crowds jam banks, wharves, houseboats, balconies, and a floating stage to cheer their favorites in a festive boat race.

well be true, for while we lived on Nagin Lake its level rose about two feet in a short time for no apparent cause.

During this first afternoon we were introduced to some of the most typical sights of the lakes and canals. On Dal Lake the farmers worked from shallow boats among the floating gardens, gathering tomatoes and pumpkins.

Farmers Tow Gardens Home

These gardens are composed of topsoil, grass, and weeds, the whole forming a solid mass attached to the bank of some undisturbed waterway. Choosing his moment, the farmer cuts off a long strip and tows it away to his garden area on the lake. Here he tethers it with stakes to the shallow bed.

In a country where good flat land for cultivation is scarce, the floating garden permits an unusual use of water area for growing extra crops. Ahmed said the life of a garden is about ten years, after which it decays and sinks. Just how mobile it can be was proved to us later. After a storm we discovered floating around the houseboat several gardens that had slipped their moorings.

Our afternoon passed like a peaceful dream. There was nothing in life but the sounds of water, the cries of the fishermen as they threw their nets (page 622), the shouts of naked children bathing, the sight of greenery reflected in the lake.

"There are three things," said Ahmed, "which ease the heart from sorrow—water, green grass, and the beauty of women." He smiled at me rather sadly. "That is what the proverb says. We have all of these in Kashmir; yet ours is a poor country."

Poor—but a bone of contention since the dim time before Alexander the Great began his invasion of India in 326 B. C. The latest quarrel over Kashmir is still in progress between India and Pakistan.

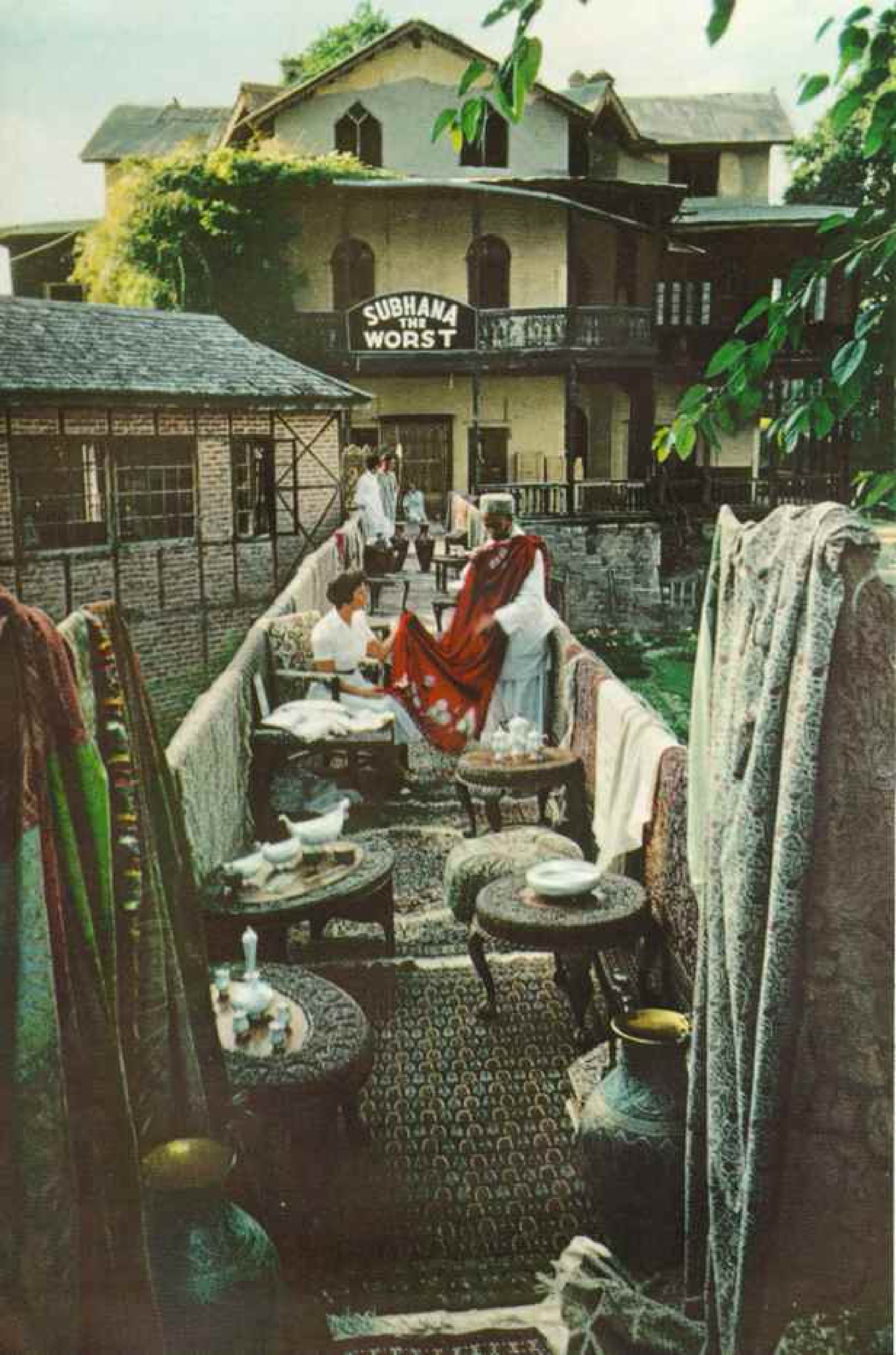
The issue arose in 1947. For a century Kashmir had been governed by Dogra chiefs

Bandipura
Handawar
Haramukh
Gulf of Corpses
Wular Lake
Jhelum
Sopur
Kangan
Gagangir
Gund
Sonamarg
Sumbal
Gandarbal
Baltal
Amarnath Cave
Baramula
Pattan
Hazrat Bal Mosque
Dal Lake
Shalimar Garden
Mahadeo
Kolahoi
Nagin Lake
Nishat Garden
Id Gah
Hari Parbat
Magam
Mar Canal
Chashme Shahi Garden
Dal Gate
Arau
Shishai Lake
Shah-i-Hamadan Mosque
Shankaracharya (Takht-i-Suleiman) (Solomon's Throne)
Gulmarg
Tangmarg
Srinagar
Elevation in feet
Apharwat
Badgom
Pampur
Khreuh
Pahlgam
Srinagar Airport
Drang
Batakut
Qasba Nagum
Awantipura
Tsrar Sharif
Pulwama
Aish Muqam
Yus
Bijbiara
Tatakuti
Shupiyan
Bawan
Anantnag (Islamabad)
Achhibal
Kulgam
Qasba Naubug
Doru
Vernag
Thanna Mandi
Banihal Pass
Elevation in feet
Hera Ahlan
STATUTE MILES
©N.G.S. Victor J. Kelley

Mountainous Kashmir: a Divided Prize

Controversy plagues the Himalayan state, whose four million people live in a land contested by India and Pakistan. Dotted line (lower map) indicates partition, the result of a cease-fire in 1949 between Pakistani and Indian troops. Difference in shading indicates the parts of Kashmir administered by Pakistan and India under the cease-fire agreement.

Students bob for apples (opposite) during a festival in Srinagar; they wear their school's uniform. Chief Minister Bakshi Ghulam Mohammed, in dark tunic, enjoys the outing.


SUBHANA
THE
WORST

from south of Kashmir; the arrangement had been drawn up and sanctioned by the British. But when India gained her freedom just after World War II, the last of the Dogra rulers, Maharaja Sir Hari Singh, found himself in a difficult position.

Hari Singh himself was a Hindu; his subjects were predominantly Moslem. Should Kashmir become a part of largely Hindu India, or of Moslem Pakistan?

The maharaja remained in this quandary until riots and internal violence in Kashmir, followed by raids by pro-Pakistani tribesmen, caused him to seek India's protection. Asking military aid, he formally ceded the state to India. Indian authorities accepted, with the proviso that as soon as law and order were restored, Kashmir's accession should be ratified by a vote of the people. Hari Singh signed the necessary papers, and Indian troops airlifted to Srinagar halted the Moslems just outside the city.

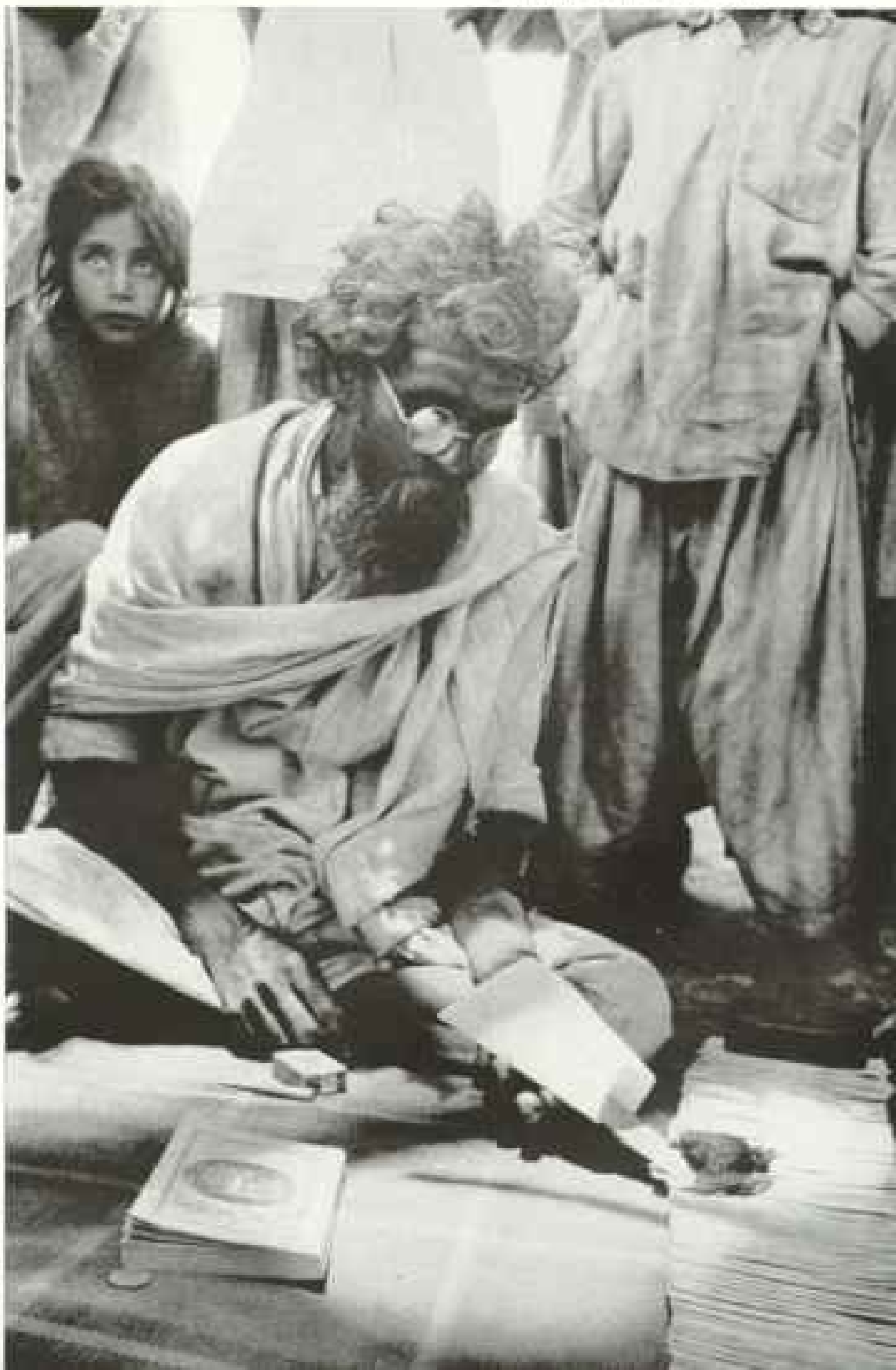
Pakistani army regulars forthwith engaged the Indian forces, and a full-scale war threatened, until India appealed to the United Nations. A cease-fire line was established in 1949; U.N. mediators for the past 10 years have tried unsuccessfully to arrange for a plebiscite.

Today India regards Kashmir as an integral part of the Indian union. Pakistan declares that the issue will not be settled until there is a plebiscite. Meanwhile, armies of the two nations continue to face each other uneasily across the cease-fire line.

One thing has always been quite obvious to the Kashmiris: their fate lies as little as ever in their own hands. The great decisions are made in New Delhi and Karachi and in the corridors of the United Nations.

Meanwhile, they go about the more pressing matter of earning a living. Judged by Srinagar alone, they would seem to be a nation of traders. Actually, more than 80 percent live by farming. By far the most important crops are rice, maize, and wheat, and everyone with a patch of land grows vegetables for his family and for the markets of town and village. Goats and sheep make up the meager meat supply.

The present division of Kashmir by a cease-fire line has radically affected the economy



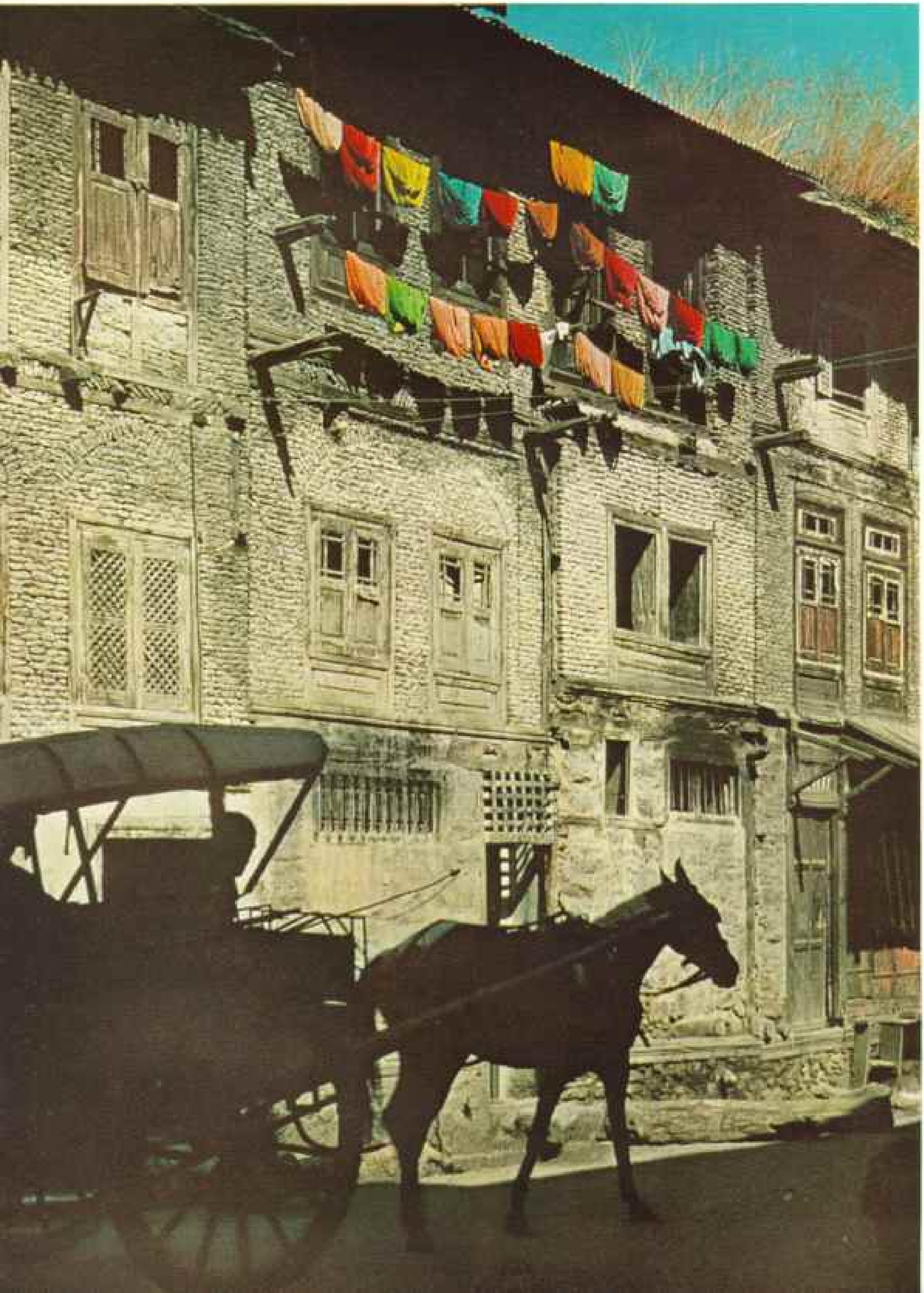
An outdoor bazaar displays the riches of Kashmir. Srinagar craftsmen apply age-old skills to the creation of exquisite jewelry, woven goods, copperware, wood carving, embroidery, and papier-mâché objects (pages 619 and 621). Visitors are hopelessly torn between scenic tours and shopping expeditions.

Merchants attract the buyer's eye with such self-assumed titles as Cheap John, Suffering Moses, and Cheerful Charlie. Subhana's sign warns customers that he is the toughest bargainer of all.

Spectacled fortuneteller lures crowds with a trained bird, which selects a client's fortune from the stack of envelopes and withdraws the message for its master to read.

Skeins of Lustrous Kashmir Wool Festoon a Mud-brick House

Vivid strands en route to the loom or the embroiderer's needle (opposite) dry in the sun. Mud roofs sprout shrubbery and grass. The two-wheel tonga holds four passengers.



Team of Embroiderers Sets Needles Flying to Adorn a Tablecloth with Birds

Carved kingfisher (below) clutches its prey amid flowers on a box. Figures, polished with agate, stand almost two inches in relief.

Stylized flowering plant enriches a lady's shawl of ibex wool. Skillful embroiderers stitched identical designs on either side of the cloth.

of the country. Trade with Pakistan has ceased, and so even has commerce with the Pakistan-administered section of Kashmir itself, north and west of the vale. It is common to find Kashmiri families divided by the artificial barrier (map, page 615).

Bordering Tibet on the east of the vale lies Ladakh, a mountainous part of Kashmir whose sparse population has always been Buddhist. Here it is possible to trade, but trade with Ladakh has always been slight.*

Hill Sprang from a Pebble

One morning soon after our arrival, we strolled out onto the balcony of our houseboat to finish our breakfast coffee. Nagin Lake shone in the sun, and beyond it the fort of Hari Parbat, like a storybook castle, dominated the scene from its mound (page 647). There is a legend that the hill grew from a pebble dropped by the goddess Parvati to crush a demon.

Weed gatherers were working from small, flat boats that looked in danger of sinking under their loads, as the men pulled greenery from the lake with long poles. With this weed they fertilize the floating gardens.

Here and there shikaras were passing, and not far away a woman crouched in the bow of her boat gathering foliage to feed her cow. We sat there content, planning the day.

Suddenly the sharp prow of a shikara edged along at our feet. A head in a skull cap bobbed up and smiled.

"Salaam, sahib. I general merchant. Tooth paste, razor blades, orange squash, ink, hair cream, aspirin, process cheese . . . you need cigarettes this morning?"

And then there was a whole fleet of similar boats surrounding us, each with its expectant owner in the bow. A chorus of "Salaam, sahib" sounded on all sides. Word of a new arrival on the lake had gone around, and all the tradesmen turned up.

There is nothing you can do when ten people want to sell you a hundred different things at once; so we retreated and called for the indispensable Ahmed. The vendors were sorted out, and, as we sat in something approaching state, they came in and spread their handsome wares on the floor.

There must be few places as small as Kashmir where craftsmanship is so skilled and so varied. Weaving, embroidery, carpetmaking, silverwork, carving, leatherwork are all common skills. On that and other mornings, the merchants came thick and fast. When we were old hands and saw other visitors get the same treatment, we realized how much of a ritual it is—a sort of initiation to local commerce, and not at all unpleasant.

But you are never safe. After lunch, as you doze in a chair, a head will pop up at your side. "Good afternoon, sahib. I show you some things. Sahib just look. Best papier-mâché in Kashmir, all old designs. Just look. Don't buy now."

A Floating Florist Named Marvelous

And toward evening a white-turbaned head will appear at your elbow.

"Sahib like massage? Very nice for sahib. Make sahib feel good. My name Satara. . . ."

"Sahib. You take look my flowers. My name Marvelous. Gladiolus, carnation, lilac. All fresh." Marvelous, his shikara stacked with flowers, edges up to the window, his son—aged four—standing in the boat with a marigold in his hand.

"He give you present," says Marvelous, and inspects the vases in the room. "All flowers," he calculates, indicating the dozen receptacles, "all flowers three rupees."

We found it very hard to resist (page 628).

And there was the furrier, a plump figure appearing from time to time over the edge of the balcony, beaming, draped in furs. Gulam spoke excellent English and had an air about him of the British officer rather than of the Oriental.

His range of furs was surprising, most of them from animals indigenous to Kashmir. Perhaps the best were the stone marten capes and stoles, but the most attractive to me was

(*Continued on page 633*)

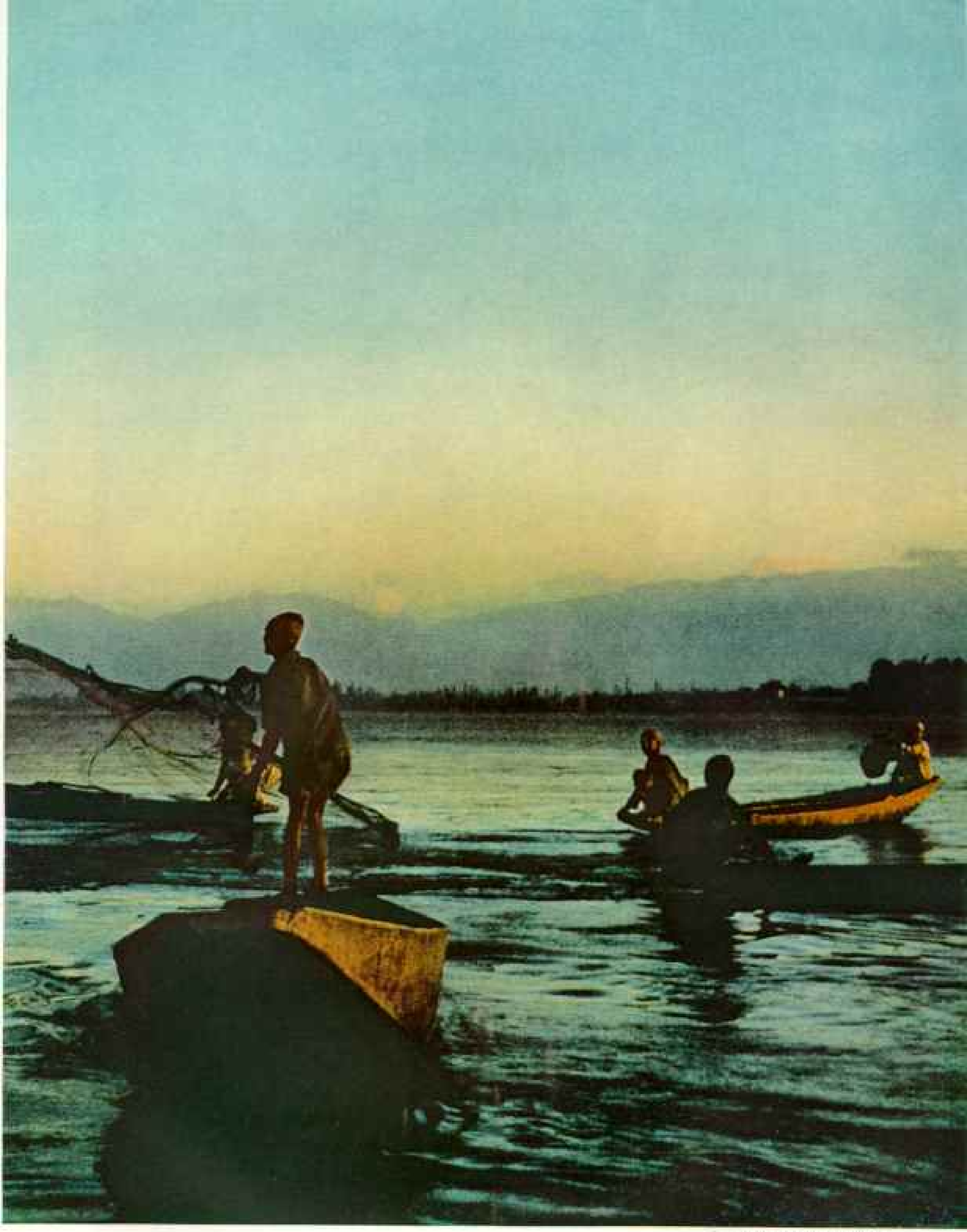
*See "A Journey to Little Tibet [Ladakh]," by Enakshi Bhavnani, National Geographic Magazine, May, 1951.

Papier-mâché Knights Fight with Lances, Bows, and Arrows

Kashmiris adopted papier-mâché making from the Persians and made it a high art. Artisans create durable trays, boxes, candlesticks, and bowls, coating them with varnish. This painted cartoon on a box copies a motif of the Moguls, 16th-century Mongol conquerors of India and Afghanistan. Spearmen and archers duel to the death, littering the ground with sabers, shields, quivers, and severed arms and heads.

Sunset Bathes a Tableau of Fishermen Casting Their Nets on Dal Lake

Kashmir's lakes add fish to the native diet of rice, fruit, and vegetables. Fishermen, among Kashmir's poorest classes, earn the meagerest of livings with net and spear. Entire families crowd skiffs equipped only with charcoal braziers and



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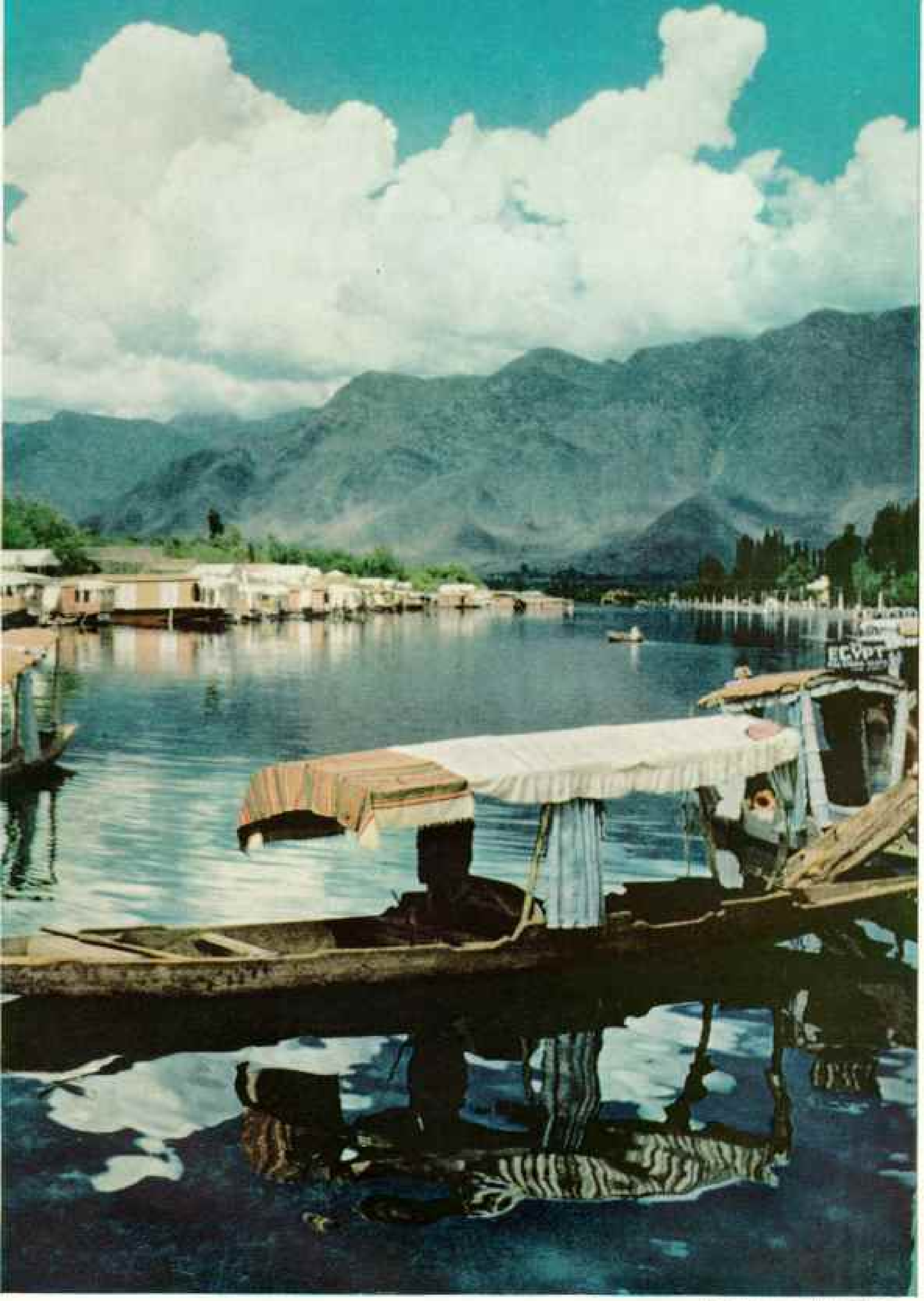
flimsy canopies. These men work as a team, converging on a school of fish and hurling tent-size nets in a circular pattern that leaves small room for escape. Boatmen in center have made their casts; one at far left stands with net poised for the throw. In the background looms the hill of Shankaracharya, known to Moslems as Takht-i-Suleiman—Solomon's Throne. Srinagar weavers, believing Dal Lake to be exceptionally pure, dip finished shawls in its waters to soften the wool.

Children frolic in Shalimar Garden, once the park of Mogul emperors, now a public recreation area in Srinagar. Shady bowers, shimmering pools, and fountains attract holiday crowds.

Gardener adorns a waterfall with lotus blossoms while his helper diverts the flow. Emperor Jahangir, architect of Shalimar, likened its blooms to "dark amulets on the arms of the beloved."

Canopied Houseboats Crowd the Shore of Tranquil Dal Gate

European visitors to Kashmir conceived the lavish homes and built them above the hulls of barges. Houseboat conveniences include bedrooms, salons,



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sun decks, running water, and electricity wired from shore. Household staffs come with the rent. Tenants tiring of a location cast off moorings and engage a tow to the lake or canal of their choice. Slender shikaras, dwarfed by the floating apartments, maneuver like tugs among ocean liners.

Water-borne Hatmaker Crochets His Wares

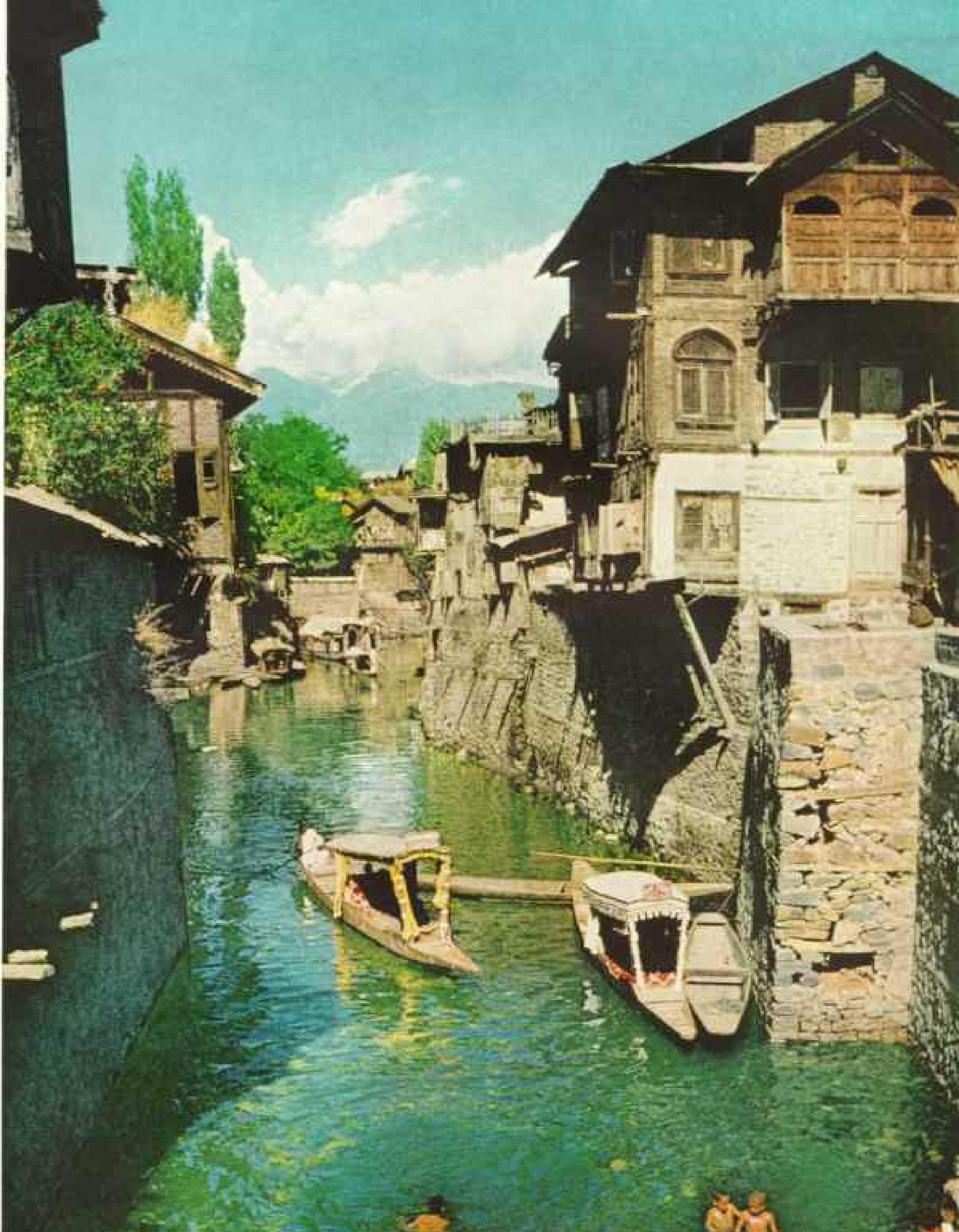
Srinagar merchants in well-stocked shikaras endlessly cruise the houseboat moorings, offering everything from aspirin to snow leopard furs. Astute and tireless bargainers, they ignore sales resistance, insisting the customer "not buy now, just look."

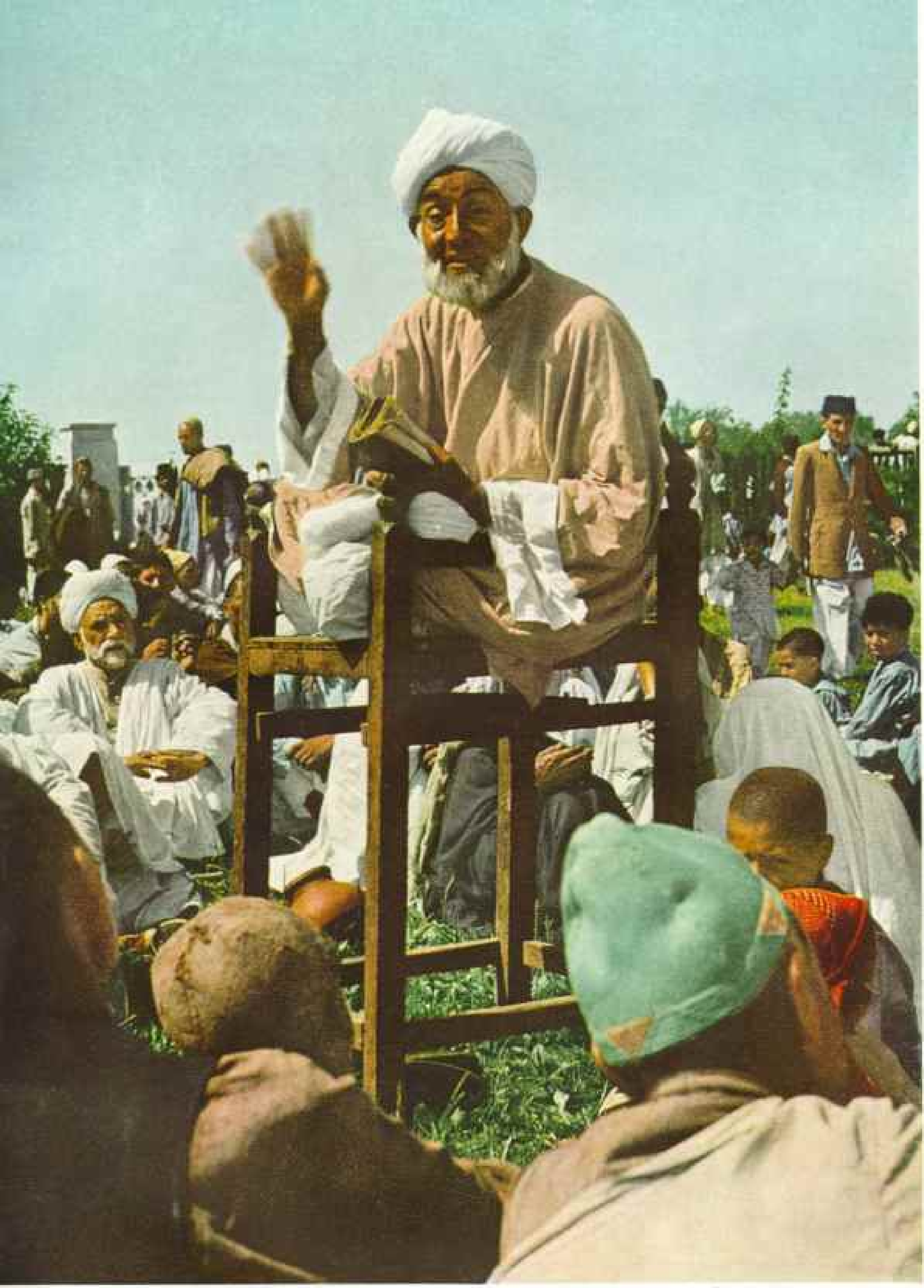
This man on Nagin Lake crochets and embroiders helmetlike hats that cost less than his own lambskin cap. Girl's earrings of silver and wool thread hang from the canopy. The hubble-bubble, or water pipe, standard equipment on all shikaras, serves master and paddler. Water taxis park by the bank.

Dazzling cargo loads the canoe of "Marvelous," a floating florist of Srinagar. Like many of his colleagues, Marvelous intrigues customers with an outlandish assumed name. Here he quotes a price on a bouquet of blood-red gladioli.

Each morning hawkers paddle skiffs from houseboat to houseboat, offering dahlias, carnations, snapdragons, roses, marigolds, zinnias, and hyacinths.

Children splash in Mar Canal beside shikaras with cake-frosting canopies. Merchants' houses overhang the walls. Residents use the canal as a trash and garbage dump.





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Turbaned Scholar Interprets the Koran to the Faithful at Id Gah

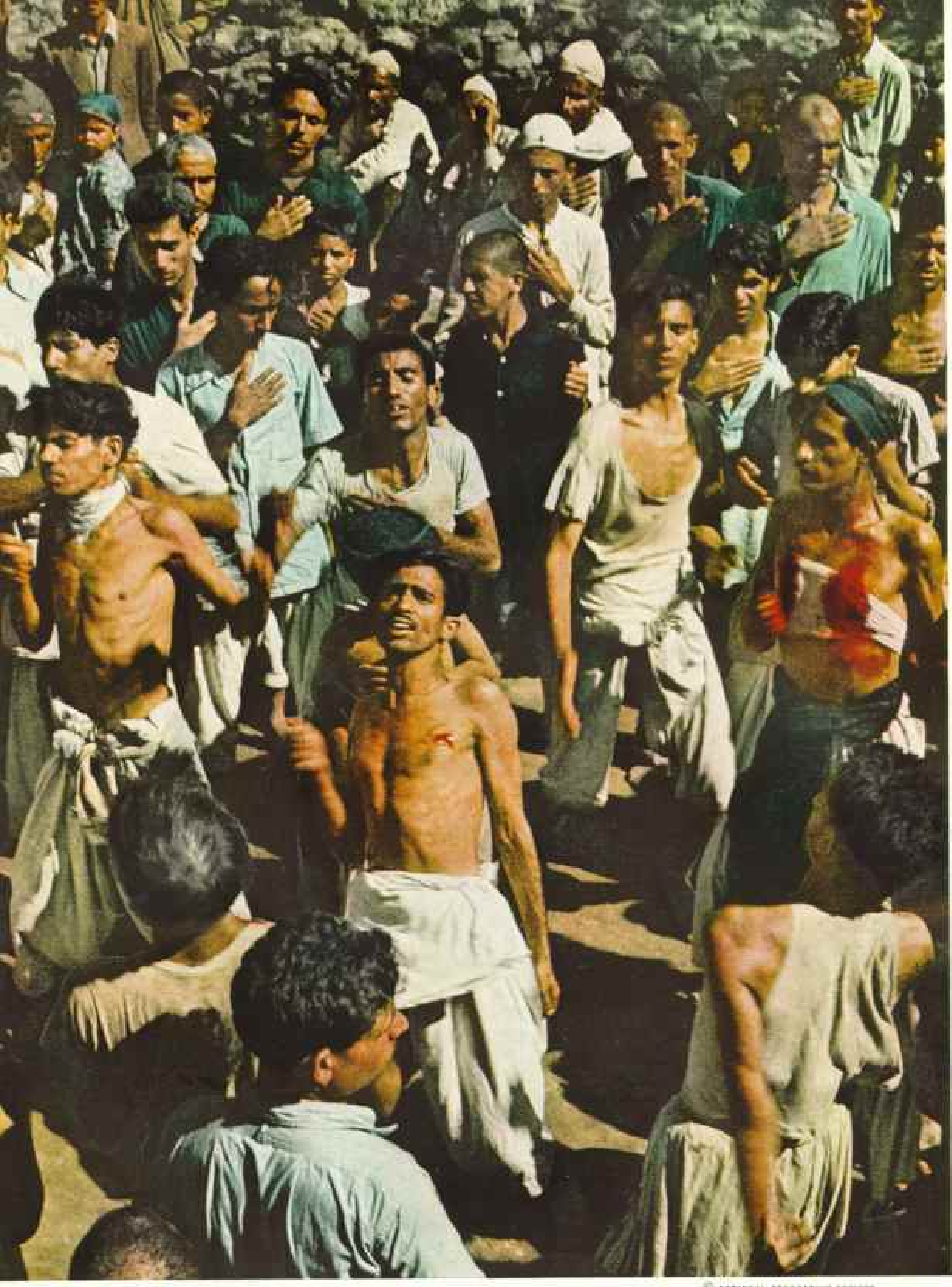
Moslems gather in this field at Srinagar to celebrate the chief holy days of their religion. Here, cross-legged on a platform, the teacher quotes sacred writ.

Veiled Moslems Peek over Their Shoulders at the Photographer

These heavily swathed young women steal a sidelong glance during prayers at Id Gah. Mesh peepholes in the fabric permit the wearer a view of the world while ensuring modesty.

Moslems call the flowing cloak a *burqa*. Its use in Kashmir is not widespread. Though some girls still adopt the covering at the age of 11 or 12, workers and the poorer classes frequently go unveiled in public as well as at home.

Massed worshipers at Id Gah present a sea of backs. Services, too heavily attended for use of the mosque, take place in the field. Worshipers remove their shoes, as they would in a holy shrine.



Shias in Religious Ecstasy Flail Themselves with Slashing Knives

Each year Shia Moslems the world over observe the anniversary of the martyrdom of Husain, a grandson of the Prophet Mohammed. These Srinagar marchers appear not to feel the pain inflicted by blades attached to chains. Followers chant and beat chests.

the white snow leopard with its occasional markings of inky black.

Gulam also acted as scribe to his old friend Ahmed. Whenever he arrived, Ahmed appeared with correspondence he had received in the past few days. Gulam read the letters to him and Ahmed dictated flowery replies.

Srinagar, the capital, is a city of canals. It stands on the banks of the Jhelum River, a huddle of cramped buildings, many of which appear to be tottering but none of which ever seem to fall down.

At four in the morning, from the mosque of Makhdum Sahib on the way up to the fort of Hari Parbat, you can watch dawn break over the city. To this mosque the faithful come to perform their ablutions and then to pray. Some who have been to the mosque come out onto a promontory under a massive chinar tree, where the view spreads out over the valley of misty lakes. Here they chant their prayers, facing the distant mosque of Hazrat Bal as the sky begins to glow behind the mountains (page 606).

Gradually the light strengthens to a brilliant yellow, and the chant increases until the blinding eye of the sun tops the crests, and the whole city and valley are flooded with its early warmth. The mist clears, and the gold-tipped spire of the Shah-i-Hamadan Mosque in the center of the town shines like a flame above the roofs.

Descending the long flight of steps with the faithful, you must pick your way carefully among the women. They walk in groups, some in frilled *burqas*, or cloaks, their faces completely veiled. They turn away after a quick glance, and scatter like birds if you approach. I never got used to the feeling that they were watching me with invisible eyes behind their cloth masks (page 631).

Water Taxis Serve City of Canals

There are probably more miles of water than of road in Srinagar, and, since no point is more than a few minutes walk from a canal, a shikara is the best means of transport. The city is full of mosques and Hindu temples with shining domes shaped like tulips about to open. The brick and wooden houses with grass-grown mud roofs and the graceful bridges reflect in the water. But as so often happens in the East, beauty exists in the midst of squalor.

At every gap between the houses people wash themselves and their clothes in the soupy water. As you pass a boat where a family lives, a woman will stretch out her arm and rinse a plate in the canal.

Climbing an evil-smelling stair, you find the city's best jeweler and his array of superbly set stones. Outside a shop where beautiful fabrics are sold, a legless beggar huddles in rags. And upstairs in a room with a mud floor, men with strained eyes sit embroidering delicate designs that are the same on both sides of the material (page 619).

Not long after we arrived in Kashmir came one of the important Moslem holy days. In the morning the canals bristled with boats of all kinds, many of them almost swamped with Kashmiris intent on praying at a particular shrine. Joining them, we followed a boatload of young men who sang to the accompaniment of drum, lap organ, and a stringed instrument called a *sarangi*.

Shoeless Worship Opens Festival

As the time of prayer approached, the field outside the shrine filled with orderly rows of men and a few women, all sitting cross-legged on the grass. Those who had shoes placed them behind, with the soles together, in order not to defile the holy ground.

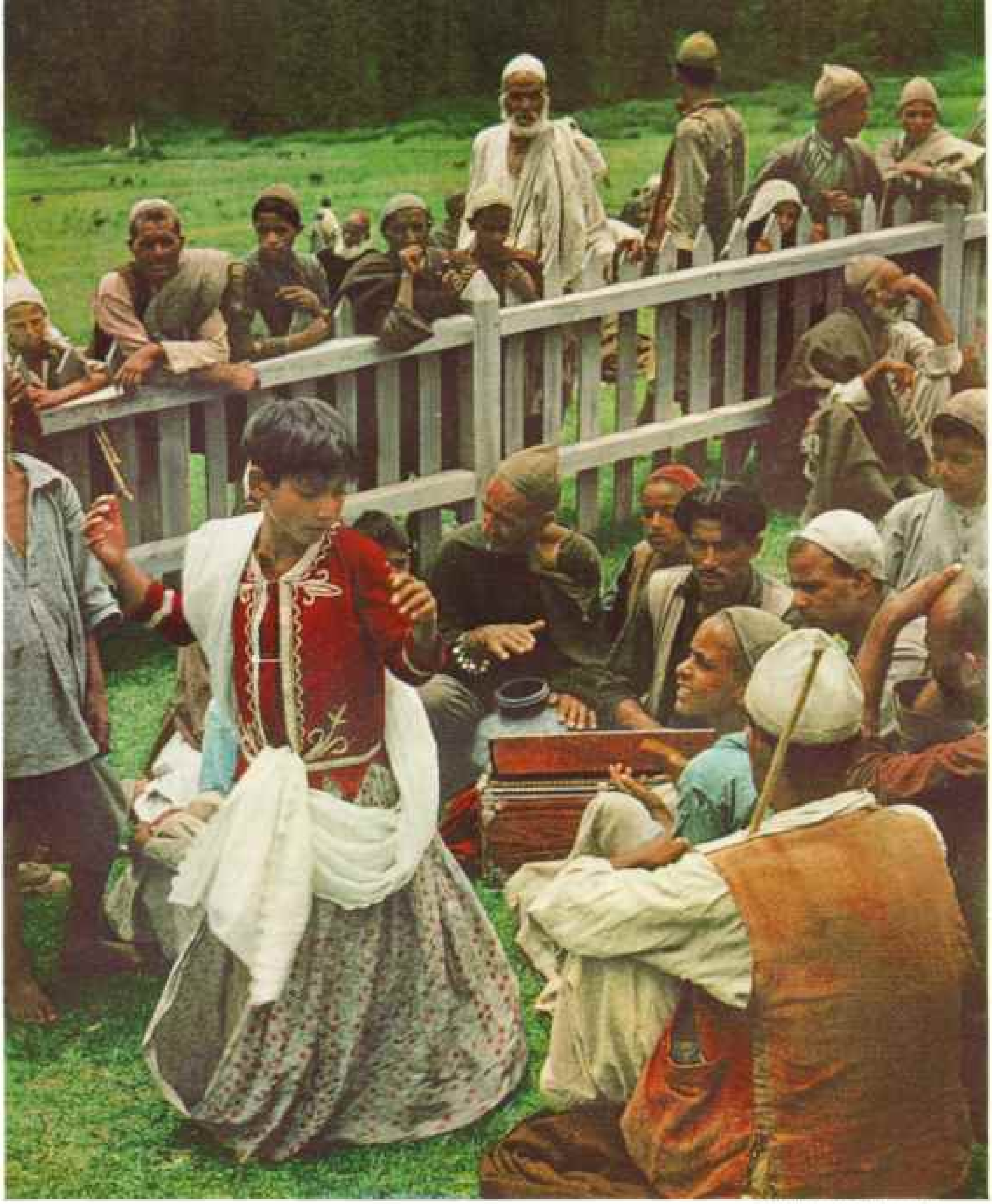
The *maulvi*, or religious teacher, an impressive figure with a brightly hennaed beard, sat on a small platform with a microphone. The loud-speaker gave out whining noises. After the brief ceremony and a final touching of all heads to the ground (page 631), the crowd streamed out to an adjoining field, where stalls held everything from candy to carpets.

For such festivals the Kashmiris put on their best clothes—new ones, if possible. In scarlets, blues, pinks, and yellows, they made a colorful sight as they wandered around, buying and haggling. Great talkers, they indulged in an inordinate amount of arguing before the simplest deal was done.

Soon the crowd thinned, however, and went home for dinner, some in tongas, like Irish jaunting cars (page 618), others on foot.

Ahmed had invited us to take the holiday meal with his family in his own houseboat. There we found his father, a courtly old man in an immaculate white turban. Ahmed's eight children ("Such a trouble to me, they are," Ahmed said affectionately), and a few others gathered to welcome us. His mother and his wife were cooking in the kitchen next door.

Mrs. Wangmo, a dark-eyed beauty, was the

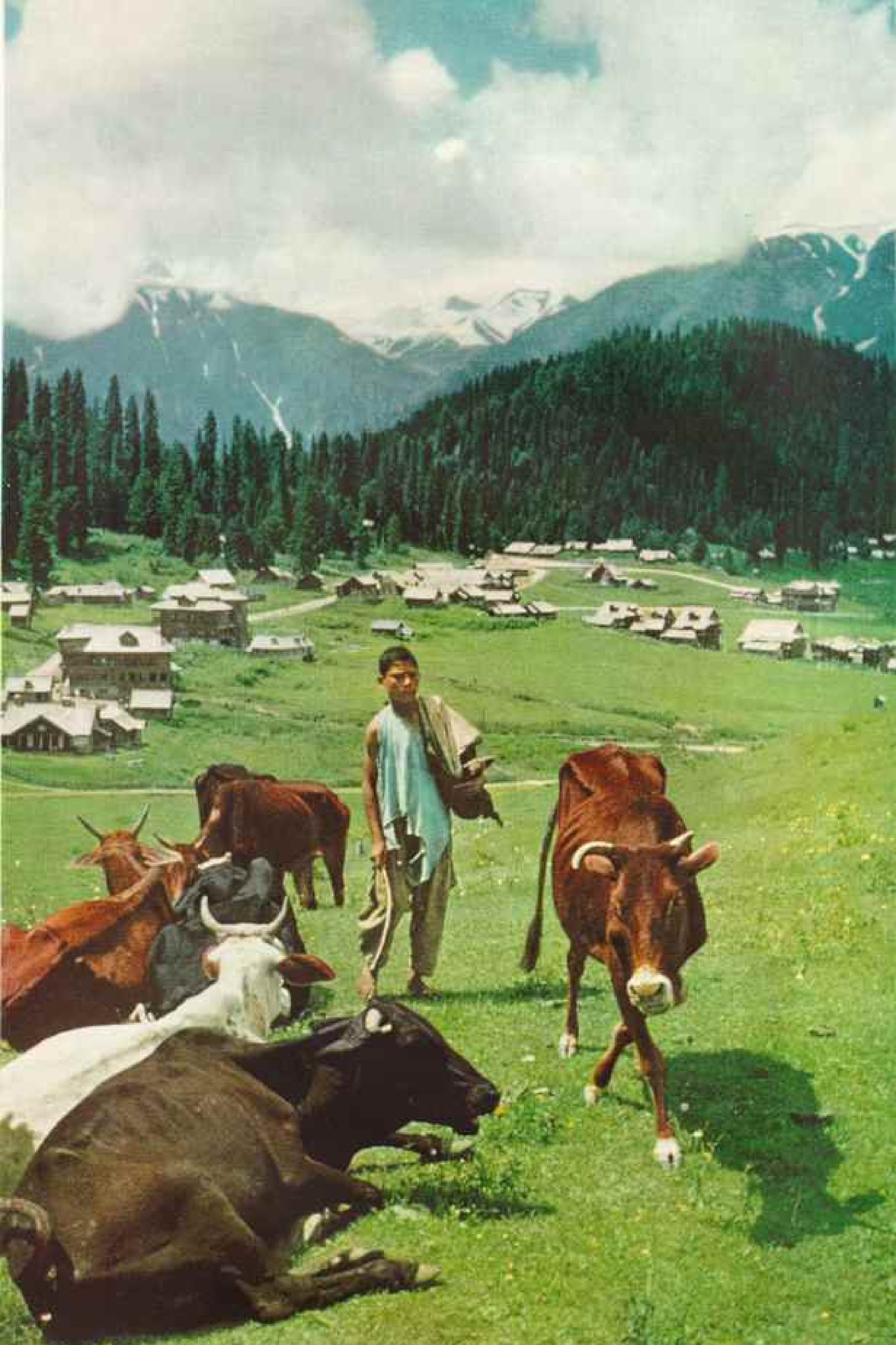


Water-jug Drum and Lap Organ Accompany a Shepherd's Dance

Gujars, hardy mountaineers, live by herding sheep, goats, buffaloes, and cattle in the Himalayan foothills (opposite). Valley dwellers once feared these tall, erect hill people, whose men kept fit by lifting dumbbells fashioned of heavy logs. Gujars, though Moslems, speak a tongue different from Kashmiri. This dancer in vest and swirling skirts entertains spectators at Yus. English missionaries contributed the organ.

Cattle in a Neglected Hill Resort Turn a Golf Course into a Pasture

Britons sweltering on the Indian plains looked to cool, lofty Gulmarg as a paradise. Their withdrawal from India converted the place into a ghostly town of vacant hotels and silent streets. This boy and his herd take over a once-crowded fairway.



first Kashmiri woman I had been able to observe at close quarters who remained unveiled. Both she and Ahmed's mother kept very much in the background. Traditionally, in Moslem countries, women do not eat with men when strangers are present.

I'm not very skilled at eating with the fingers of the right hand—a fact I discovered some time ago in Arabia—so I was far behind when our friends had finished. In Arabia it is rude to go on eating after others have finished, but fortunately here in Kashmir our hosts regarded it as a joke and merely heaped more delicacies on my plate.

Invitation to a Wedding Feast

We learned more about Kashmiri life a few days later, when we discovered that the son of our tailor was to be married. We expressed interest, and the tailor cordially invited us to attend the wedding dinner.

About seven we arrived at the tailor's house in a dark back street. The courtyard inside swarmed with people, including a dozen cooks perspiring freely over wood fires. They were preparing a meal for a hundred of the bridegroom's guests. Although the wedding and banquet take place at the bride's house, the food for the guests is cooked by the family that invites them.

The tailor showed us into the room where the bridegroom in new white clothes reclined, surrounded by his brothers and male friends. To the young man each guest presented some money, which was recorded in a book.

We sat on the floor drinking tea with the other guests. Once these groups of men had settled down, conversation—the consuming passion of all Kashmiris—began in earnest. Very little interest was taken in the object of the gathering—the bridegroom lolling at the other end of the room.

Presently his attendants helped him change into a dark topcoat and glittering tinsel necklaces, and the company went out to the street to join the procession. By now people filled the narrow lane outside the house, and ornamental torches cast a lurid light over a white jeep in which the bridegroom was to ride. The women of the house lurked in the shadow of a doorway, withdrawn and singing plaintively. Ahead strode the band, dressed in a fair imitation of Scottish regimental uniform and playing a Scottish air on bagpipes.

Rather self-consciously the bridegroom emerged, and, to a chorus of greetings and some wailing from the women, the procession moved off as best it could.

At the bride's house the enormous party assembled. The bridegroom acted shy and hung his head, as is the custom, throughout the elaborate meal. I never saw the bride, for the women remained apart even now.

The predominant color of the food was yellow from the saffron used, and several of the dishes were wrapped with thin silver foil meant to be eaten. I was told it was good for the digestion—and hoped it was true.

The feast lasted late into the night. Not until the newly married couple had departed for the bridegroom's house was the wedding officially over.

Day of the Hair of the Prophet

Thus, little by little, we gained an insight into the ways of the Kashmiris. When someone fell ill, we learned of the *hakim*, or traditional doctor, and his herbal cures. Then Ahmed's uncle returned from Mecca with his wife, and we saw at firsthand how an old man, already respected in the community, acquired the additional honor and holiness that the hadj, or pilgrimage, bestows. For days on end he received friends and delegations and told stories of the glory of Mecca (pages 638-9).

A little later we celebrated the day of the Hair of the Prophet at the mosque of Hazrat Bal. Each year the hair, said to be indestructible by fire, is brought out and shown to the faithful. It should be a solemn occasion, and in a way it is. But to expect pageantry in the Western manner is futile in Kashmir.

After the usual prayers, while the crowd sat in the courtyard of the mosque, the maulvi suddenly reached down and, raising his arm, held aloft what appeared to be a test tube. An exultant cry of "Allah! Allah!" ensued, and I realized that this was the Hair of the Prophet. Then the proceedings abruptly ended, like a film of which the final reel has been lost.

In a shikara three times larger than the

Weary Pilgrim Dozes Through a Service on Mother's Shoulder

On special holy days Kashmir Moslems gather at the mosque of Hazrat Bal for a glimpse of its great treasure, a thread of the Prophet's hair, which they regard as indestructible by fire. Too young to sit with the men, this boy attends with the women.

Smiles and Tears Greet a Pilgrim and Wife Returning from Mecca

Few Kashmiris can afford the trip to the distant shrine. This elderly couple saved for years to make their six-month journey. Already widely respected in Srinagar, the old man (below) gained religious prestige from the pilgrimage and adopted the title hadji. Townspeople raised welcome signs in his honor, and strangers sought to touch him. Women (opposite) embrace the wife. Unlike her husband, she assumed no title.

usual we made a trip to Wular Lake. It amused me to find that, to look after the two of us, a crew of five paddlers, a cook, Ahmed, and his son Ramzana appeared necessary.

A few days before starting out we had jokingly invited Satara, the masseur, to join us. To our surprise, as we set out along a canal near Srinagar, we encountered him, complete with his usual little bag containing bottles of almond oil and testimonials from ambassadors stating how he had cured their rheumatism. He hopped aboard our boat and cheerfully settled down for the trip.

Wular Lake is the largest in Kashmir, 12½ miles long by 5 miles wide. It lies downstream from Srinagar; so it was an easy day's trip floating with the current of the muddy Jhelum, the paddlers merely steering.

Because of unseasonable snows earlier in the year, river and lakes had risen far above normal, and disaster had overtaken many hundreds of farmers whose fields lay below the embankment.

For centuries the banks of the river have been built up to form this ridge, and once it is breached or topped, water pours into the farmlands. We found many such gaps; and, as we drifted downriver, we saw flocks of sheep and a few cows stranded on islands of higher ground from which they had already cropped all the grass. Farmers ferried loads of leaves to them for fodder. Whole villages stood isolated.

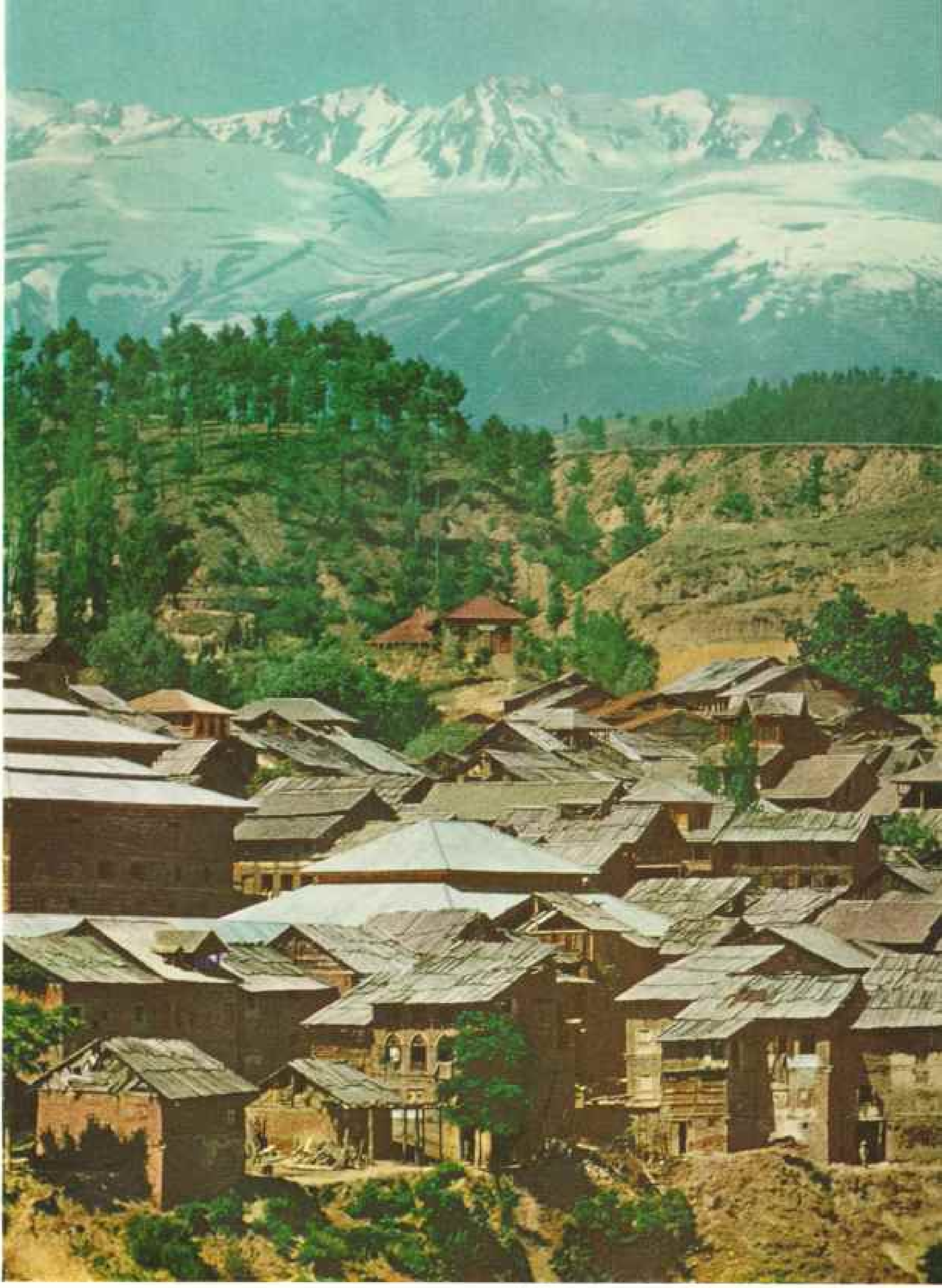
It was twilight when we reached Wular Lake, and I could hardly distinguish it from floodwater. That night I slept well in the shikara, and by the time I woke in the morning we were halfway across the lake.

In the early light the peak of Apharwat,

(*Continued on page 643*)

Like an Ice Mirage, the Pir Panjals Soar Above Tsrar Sharif, a Hill Town

An early visitor likened Kashmir's ranges to "staircases piled one on the top of another." Such



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a staircase is the Pir Panjals, the country's frosted southwestern rampart. This view shows terraced houses with shingled roofs. Green-domed mosque rises beyond the spire of a holy man's tomb.

Hindu Merchant Silently Sits Through His Moslem Customers' Prayers

Kashmiris leave political disputes at the mosque or temple door. Waiting to sell his wares, the Hindu peddler watches Moslems bow in the courtyard of Shah-i-Hamadan.

dwarfing the landscape, looked higher than its 13,592 feet. The surface of the lake was congested with water-chestnut leaves; Ahmed said the plants would produce a good harvest and compensate the farmers to some extent for the loss of their crops. The water chestnut, prized by the Kashmiris as a food, commands a good price.

This part of the lake goes by the name of the "Gulf of Corpses," since it is said that bodies of the drowned drift toward it. Our paddlers assured me that if I dived in there, I would never come up.

For three days and nights we lived in the boat, sailing on the canals past villages and fields, past Gandarbal, where men fish for wood in the icy water that gushes down from the glaciers. The wood collects in drifts and is used for fires in the winter. The men dredge it up in nets, standing neck-deep in the water, often, if the current is strong, with their sons on their shoulders to anchor them. From time to time they huddle round fires in the boats, thawing out their chilled bodies.

Ghostly Village in the Mountains

One of the pleasantest aspects of Kashmir is the mountain meadow, or *marg*. Gulmarg and Sonamarg are the best known. On these two the British, seeking the coolness of higher altitudes, established recreation centers.

An hour's drive from Srinagar took us to Tangmarg at 7,000 feet. There we mounted two bony horses and jolted up the last 1,800 feet to Gulmarg. For reasons not entirely esthetic, I was glad to dismount and admire the panorama of the valley of Kashmir.

But I sensed something strange about Gulmarg. The green meadow undulating for a mile among the mountain peaks, the neat rows of wooden houses and shops, reminiscent of medieval towns in Europe, the golf course and the club—these were all normal enough.

It was not until we came closer that I realized not a soul was in sight. As we walked along a street, shutters creaked and doors banged in the wind. Gulmarg, once a thriving tourist center, lay almost deserted. The British who loved it had gone. It was an eerie place (page 635).

All over India one finds the *sadhus*, Hindu holy men who have renounced the things of this life for meditation and prayer. During what is called the "bright fortnight," great numbers of them collect in Srinagar to join the pilgrimage to Amarnath Cave, in the mountains 87 miles distant.* The journey is timed so that the pilgrims may see the cave at dawn on a full-moon day in midsummer.

We found the pilgrims on a rainy afternoon, about to start out from the courtyard of a temple in the city. The ground was a sea of mud, and the sadhus sat as best they could on bits of board, their ash-covered skins giving them the appearance of men in a deep faint. Before them burned small wood fires, for it was chilly as well as wet.

The rain beat down as we waited for the procession to begin its long trek. But nothing happened. The crowd eddied here and there under old umbrellas and bits of cardboard. An unhappy young sadhu begged my last cigarette. He held it in his ashen fingers and blew smoke the color of his skin from blue lips.

A bright-eyed sadhu in a saffron cloak, with the ritual red and white paint on his forehead, came and spoke to me.

"I hear you are a writer," he said in perfect English. "You must be sure to tell about the glorious example of the sadhus." He smiled with large liquid eyes and held me by the biceps with thumb and forefinger. "Be sure to write about us," he repeated. I said that was what I intended. "That is good."

And he went away to join some other sadhus who stood smoking and chatting like a group at a party.

"Scottish" Band Plays for Pilgrims

Eventually I wandered outside to wait in the tonga with the driver. An interminable delay followed before the band (Scottish type again) struck up defiantly. The procession emerged looking rather damp—the officials in khaki with pink turbans, the priests from the temple at Bawan carrying a sacred emblem, and finally the sadhus with their little bundles and begging bowls.

It was an odd, dispirited straggle of people, not at all like the start of one of the greatest Hindu pilgrimages. But by this time I had learned not to expect my preconceived ideas to be right.

Several days later, by car and horseback, we caught up with the sadhus, now well on their way to Amarnath Cave. Most of them were still clad in dhoti and ashes, trudging over the pass near Shisha Lake, where it is 12,000 feet high and very cold (page 609).

* See "Himalayan Pilgrimage," by Christopher Rand, National Geographic Magazine, Oct., 1956.

Quite different from the Hindu sadhus' activities is the Tenth of Muharram, or Martyr's Day, celebrated by the Shia sect of Moslems. The occasion commemorates the death of Husain, son of Ali, the Prophet's son-in-law.

On a hot, dusty morning we watched the banners heading the parade leave the mosque; spectators jammed the narrow lane so that the horse which followed could scarcely move. This white horse, richly decorated and bearing a golden replica of the hand of Husain, is bred and kept unridden especially for this day.

Marchers Oblivious to Slashing Knives

The devotees, mostly in black shirts, sang a rhythmic song about Husain the King of Medina, and at the beat of the music thumped their chests with the flat of their right hands. They walked a few paces and stopped, forming an oval, and the singing and beating of chests doubled in volume. Then came other groups of men stripped to the waist, their bodies already bleeding from the lacerations of bunches of small knives with which they scourged themselves (page 632).

By the time they reached their destination —six hours' slow march, covering about four miles—the knife wielders were a gruesome sight. Many of them were men I recognized as traders from the markets; now their eyes were glazed, and they appeared oblivious to the pain and loss of blood.

An onlooker cautioned me. "You must not laugh or smile while they pass. This is our holy day, when we remember the martyr. We are very sad today."

He assured me that the wounds left no mark, but I hardly believed him, for I had already seen the scars of former years on the bodies of some who took part.

Contrast is the essence of the particular quality one senses in Kashmir. Even as this procession was passing, I noticed brilliant kingfishers flying up from the ditches and perching in the graceful willows. And a woman on a balcony, wearing a burqa of exquisite blue, beat her head on a beam as the knife men went by, and fell moaning. Her religious ecstasy was entirely in keeping.

Aside from these religious phenomena, however, hundreds of things in Kashmir charm even a much-traveled eye. The ruins of ancient times stand about the country, warm in the sunlight, recalling greater days.

At the spring at Vernag, reputed to be one of the sources of the Jhelum, shoals of striped fish swam in a basin of milky emerald water surrounded by an arcade of Moorish design. It remains in my mind, as do parts of Venice where one can find the same harmony of stone and water and sun.

The Hindu temple at Bawan, too, had a unique atmosphere of peace, and, at the same time, of mystery. In its twin pools the sadhus, naked but for a strip of crimson cloth, bathed in the dappled shade.

Memorable are the Mogul Gardens—Shalimar, Nishat, Chashma Shahi—where Jahangir and his son Shah Jahan made sanctuaries with water cascading amid beds of flowers and airy pavilions. Places of great beauty, they portray the nearly perfect marriage of art and nature (pages 624-5). The water drops cool and foaming over stone parapets, to run beneath the floors of the pavilions, and to fall again and again through the length of the gardens, until eventually it joins Dal Lake.

Nishat Garden was to me the most enchanting. Unlike Shalimar, which is set back from Dal Lake, Nishat borders the water. Its formal flower beds, its ancient chinar trees, its fountains, and its waterfalls lead down from the soaring mass of Mahadeo to the edge of the lake.

The beauty of the garden is extraordinary, but it is the lake, its surface glittering in the sun, fringed with poplars and willows, that completes the picture.

Kashmiris Live as Friends

Once the preserve of the Mogul emperors and their courts, today the gardens are the resort of the people of Srinagar. Hundreds of these colorfully attired folk, Moslems and Hindus alike, picnic side by side under the chinars.

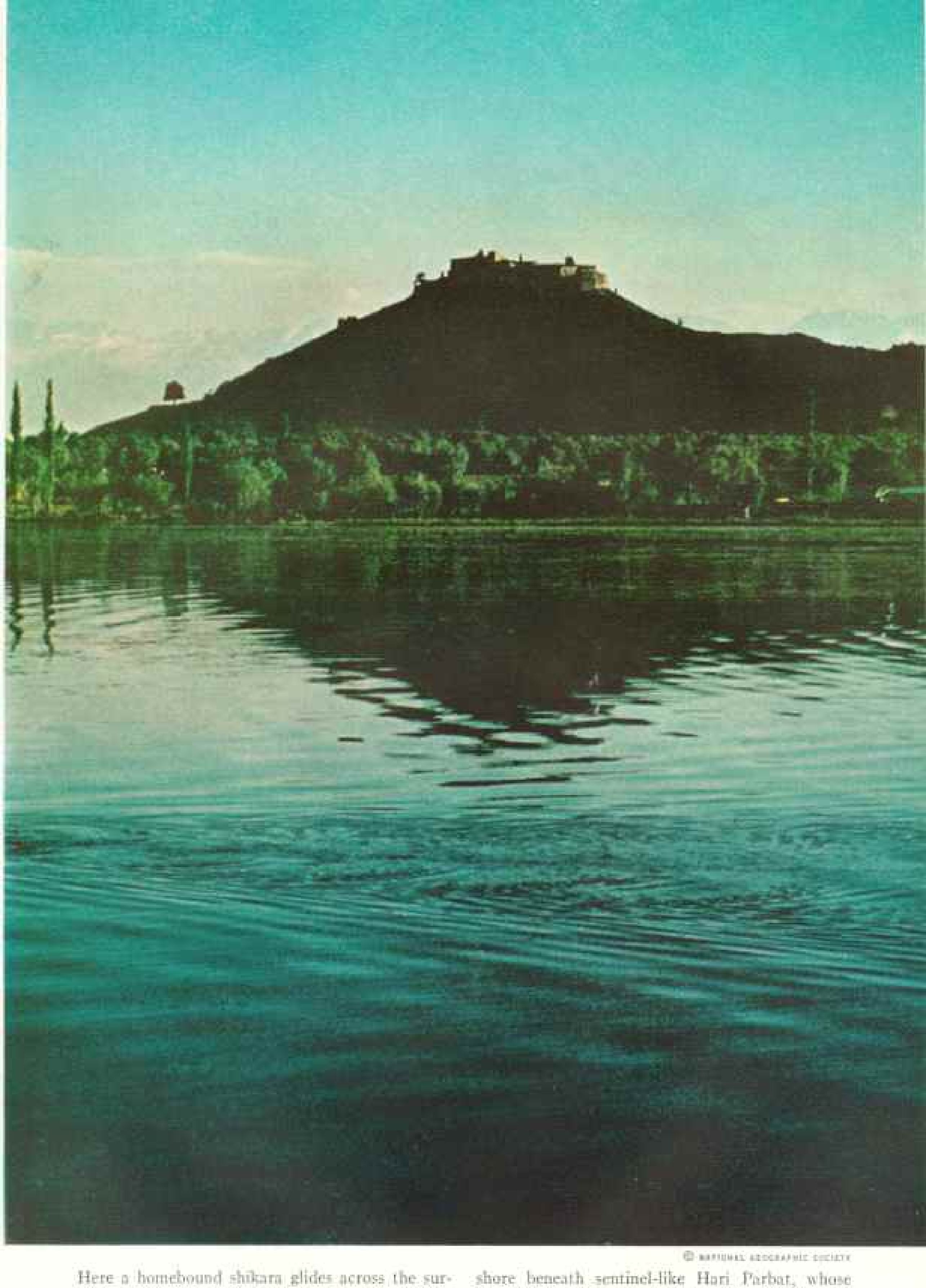
I saw not the slightest evidence of discord between Hindus and Moslems. One Hindu told me of his gratitude to Moslems who had hidden him from the armed raiders of 1947.

"They kept me safe and fed me until the danger was past." He gestured as if beyond Kashmir's borders. "In some places, they say, it is different. But in Kashmir we are friends."

Himalayan silver fir raise living spires near the "Rooftop of the World." Giant conifers, the tallest 200 feet, dwarf riders on the trail to Gulmarg (page 635).

Shikara at Dusk Ruffles the Mirror of Nagin Lake

Grandeur such as this led Mogul Emperor Jahangir, lord of many lands, to breathe a deathbed wish for just one realm, his beloved Kashmir,



Here a homebound shikara glides across the surface, seemingly supported by its own image. Slender poplars and spreading chinar trees line the shore beneath sentinel-like Hari Parbat, whose fort reflects the sun's fading rays. Remote and majestic, the Pir Panjals wear a coronet of clouds.

Atlas Map Charts the Nation's Heartland

THE geographic center of the United States shifts more than 400 miles. Giant man-made lakes swallow the mighty Missouri River and dampen a dust bowl. New towns spring up; old ones die. Recently completed turnpikes radiate from Chicago, while others slash hundreds of miles across Kansas and Oklahoma.

The face of the Nation changes, even in a decade. **North Central United States,** the National Geographic Society's new 10-color map supplement to this issue, reflects these and many more developments since 1948, when Society cartographers last charted this rich heartland. Distributed as plate No. 9 in members' National Geographic Atlas Folios, the 2,300,000 copies of this newest map bring to 14 million the number issued so far in the monumental Atlas Series.

Land Bought for 5 Cents an Acre

This, the sixth Atlas Map, encompasses nearly a million square miles, including much of the Nation's greatest river system. Most of the territory shown was acquired from France in 1803 through the Louisiana Purchase, a historic bargain that doubled the size of the young United States. Napoleon would blush with chagrin if he could see today what he sold for about five cents an acre.

Here in Kansas, Nebraska, the Dakotas, Iowa, Illinois, Wisconsin, Minnesota, and Missouri lie the country's meat market and breadbasket. A vast coal cellar underlies two-thirds of Illinois. Oklahoma's fabulous oil boom may be challenged by that of the rich Williston Basin in the Dakotas, Montana, and adjoining Canadian provinces.

Among the map's 6,756 place names (more than on any previous Atlas sheet), Dubuque, Fond du Lac, St. Louis, and dozens more recall the exploits of French explorers. Here, too, eras meshed in the making of America. At Franklin, Missouri, Boone's Lick Road ended and the Santa Fe Trail began. A century ago the marvelous telegraph hummed messages to St. Joseph; there Pony Express riders began the sprint to California, 10 to 17 days away.

The region rings with history's echoes. The soft splash of Marquette's paddles on the "Father of Waters" mingles with the hoot of Mark Twain's beloved paddle-wheelers past Hannibal, Missouri. (See "The Upper Mississippi," page 651.) The clatter of modern aircraft plants and wheat combines in Kansas cannot quite still the clank of Coronado's armor near Lindsborg—or the cross fire of Coffeyville citizens of the 1890's cutting down the notorious Dalton gang, which was trying to rob two banks at once.

The imaginative may still hear echoes of a Lincoln-Douglas debate in Freeport, Illinois . . . fiery-eyed John Brown preaching abolition in Osawatomie, Kansas . . . or Winston Churchill's "Iron Curtain" address in Fulton, Missouri.

These states are not only steeped in history; they make it. From South Dakota's Stratobowl—where the 1935 stratosphere flight sponsored by The Society and the U. S. Army Air Corps soared 13.71 miles to break existing records—and from an old mine pit near Crosby, Minnesota, manned balloons poke plastic fingers ever nearer the brink of space.

A bleak plain below Two Top Peak in western South Dakota becomes, with Alaska's admission to statehood, the Nation's new geographic center, according to U. S. Coast and Geodetic Survey calculations. A spot near Lebanon, Kansas, still marks the theoretical balance point of the 48 contiguous States; a place near Devils Lake, North Dakota, that of the entire continent. Alaska's admission also deprives Penasse, in Minnesota's isolated Northwest Angle, of its title as most northerly town in the United States.

Eight miles from Olney, Illinois, lies the population center of the United States. In all probability it will shift westward once again with the 1960 census.

Giant Dams Tame the Missouri

A broad blue vein meandering through the Dakotas mirrors a project that dwarfs Paul Bunyan's fabled exploits. Last summer engineers bottled up Oahe Reservoir with the fifth of six great dams designed to gentle and harness the fractious Missouri River.

Already that muddy giant ("too thick to drink, too thin to plow") relaxes behind massive earthworks, forming a chain of sparkling lakes. The water they will hold could submerge both the Dakotas by 9 inches; Oahe alone nearly links the State capitals of Pierre and Bismarck, 170 miles apart.

ROBERT STILLER, STAFF PHOTOGRAPHER

Combines, Taking 18-foot Bites, Level a Midwestern Wheat Field

Fair weather in 1958 gave the United States a record wheat crop of some 1.4 billion bushels. Combine operators, following the harvest north as it matured, gathered the bumper yield from Texas to the Canadian border. These machines, the largest self-propelled combines in production, shear a field of winter wheat, simultaneously cutting, threshing, and cleaning the grain and discarding the chaff and straw. Trucks, keeping pace, collect the wheat and carry it to storage elevators.

Control of devastating floods, 13 billion kilowatt-hours of new electrical power annually, irrigation of 7 million parched acres, a navigation channel up to Sioux City, invaluable recreation—all these will result from the $5,400,000,000 Missouri Valley project.

Progress asks its price: towns like North Dakota's Sanish and Van Hook stand abandoned, no longer mapped, in the path of the water that is slowly filling the reservoir behind Garrison Dam. But others—New Town, Riverdale—blossom in their stead.

New names also appear on Lake Superior's northwest shore. Silver Bay and Taconite Harbor ring with an apt metallic sound. They symbolize a fresh source—possibly a 200-year supply—of ore for a Nation built on steel. At these ports, pellets of concentrated taconite rock cascade into the holds of lake freighters. With a process for unlocking iron from this plentiful low-grade ore, Minnesota's Mesabi Range seems no longer near exhaustion—it has caught its second wind.

The rich resources and bustling commerce of the region depicted on the National Geographic's latest map amply fulfill a 155-year-old prophecy:

"We have lived long," said American Minister to Paris Robert Livingston to his colleagues on concluding the Louisiana Purchase, "but this is the noblest work of our lives."

Waders Ford the Infant Mississippi's Headwaters at Lake Itasca, Minnesota

Six inches deep and a few steps wide, the river here starts its 2,300-mile journey to the Gulf of Mexico.

Author and wife paddle past willow, alder, and pine near the river's source.

The Upper Mississippi

Between Lake Itasca and Cairo, Old Man River Grows Up

By WILLARD PRICE

HE STOOD his ground, snarling, trying to make up his mind what to do. I blocked his path. The river behind him cut off his retreat.

I took another step forward. Like a flash, the bobcat wheeled, fled to the river's edge, spanned the water in one great leap, and disappeared into the forest.

The river was the Mississippi, which thinks nothing of being a mile wide, and in flood once reached a width of 80 miles. But at the point where the bobcat vanished, the river was just 10 feet across—a babbling brook with very little to babble about, since it was only two minutes old. A hundred yards upstream it had issued from Lake Itasca, past a wooden

The Father of Waters Meanders Through Minnesota Marshes

marker designating this spot as the source of the Mississippi.

We were here, my wife Mary and I, with an aluminum canoe in which we proposed to paddle down the first 500 miles of the river. But so small is the mighty Mississippi in its upper reaches that on the first day of the journey we found ourselves carrying the canoe almost as often as it carried us.

Forest-girdled Lake Itasca lies in northern Minnesota, about 100 miles from Canada. (See "North Central United States," an Atlas Map supplement to this issue.) Its discoverer, Henry Rowe Schoolcraft, fixed upon it as the Mississippi's true source. Searching for a name that would suggest this, he considered the Latin words *veritas caput*, or "true head." That would be too long—so, with skillful surgery, he cut off the first and last syllables and came out with Itasca.

It had a pleasantly Indian sound. In fact, scholars have since tried to trace it to the Chippewa language, and one went so far as to imagine it the name of the tribal god's unhappy daughter, whose falling tears had formed the lake.

But the question was settled once and for all when a historian unearthed a letter written by Schoolcraft on July 25, 1832, 12 days after the discovery, telling how he had devised the name. Shaping names from Latin origins was quite the fashion in those days.

River's True Length Unknown

The signpost where the newborn Mississippi issues from Lake Itasca states confidently that the river's length from this point to the mouth is 2,552 miles.

Actually, no one knows the precise length of the Mississippi. The river is constantly changing. In years past it could change almost overnight. Blocked by a sand bar, the channel might go several miles out of its way around islands. Where it made a 30-mile loop, it would suddenly gather its strength and cut through the neck of the loop, reducing the river's length by almost 30 miles.

Mark Twain called this the crookedest river in the world. It is still among the most fickle. Though today the work of the river engineer tempers nature's whims, sand bars still appear and disappear and the channel changes, however slowly. Even the U. S. Army Corps of Engineers, whose business it is to control the river, cautiously uses the word "approximately" when it estimates the present length at 2,350 miles.

The timid little creek where we stood would grow to be one of the greatest rivers in North America, and—with the Missouri—one of the greatest in the world, rivaled in length only by the Nile and the Amazon. It would gather to itself thousands of tributaries, large and small. It and its affluents would provide 13,200 miles of inland navigation.

Water from 31 States, Two Provinces

The vast Mississippi water web drains 40 percent of the United States, not to mention 13,000 square miles of Canada. It draws water from 31 States, and one of the fingers of its longest arm, the Missouri, flows 170 miles through Alberta and Saskatchewan.

Its drainage area stretches to a maximum of 1,900 miles in longitude and 1,400 miles in latitude and covers 1,244,000 square miles. That, as Mark Twain observed, "is as great as the combined areas of England, Wales, Scotland, Ireland, France, Spain, Portugal, Germany, Austria, Italy, and Turkey."

The river exacts tribute from States as far east as New York and as far west as Montana. From the source of the Missouri to the Gulf of Mexico, it measures about 3,890 miles—but again this is a variable figure, because of the river's habit of stretching and contracting like a temperamental caterpillar.

The river pours into the gulf at the rate of 724 billion cubic yards of water a year. It delivers one and a half times as much as the mighty St. Lawrence, eight times as much as the majestic Rhine, and 177 times as much as the Thames.

Each year it drops half a billion tons of silt in the gulf, and over the centuries has poured out enough to build a delta the size of Maryland and Delaware combined. Parts of Missouri, Kentucky, Tennessee, Arkansas, Mississippi, and Louisiana came in this way from the vast area drained by the Missouri, Upper Mississippi, and Ohio river systems. That is a debt the South owes the North!

27-Foot Paul Bunyan Awaits the Call to Fell a Forest Singlehanded

Fabulous hero of lumberjacks, Bunyan used a trimmed pine tree for a pencil. Hoofprints of his blue ox Babe created Minnesota's 11,000 lakes. This mighty image moves eyes and arms and tells stories to awed visitors at Brainerd, Minnesota.

Paul Bunyan
Playground

WILLARD PRICE AND WALTER H. WETTSCHRECK (OPPOSITE)

The Willard Prices Park Their Trailer Beside a Minnesota Lake

Following the Mississippi from its source to its meeting with the Ohio, the author and his wife made this aluminum camp-on-wheels their mobile base between jaunts by canoe, towboat, and steamer. Veteran travelers, they embarked on the "Great River" of the United States having just traced another river road, the Thames, through the heart of England. Mr. Price described that trip in the July, 1958, National Geographic.

Black bear cubs (opposite) scramble up an aspen tree in Itasca State Park.

The Ojibway Indians gave it the name Misisipi, from *misi*, great, and *sipi*, river. An imaginative Frenchman incorrectly translated the word as "Father of Waters." Yet the phrase does suggest the importance of the Mississippi among rivers of the continent. So does the Indian's nickname "Old Big Strong" and the Negro's "Old Man River."

The Indians and Negroes did better than the early explorers, who dubbed it variously "Conception River," "Btiade River," "Colbert River," and "Rio del Espiritu Santo." Fortunately and appropriately, time has obliterated all but the Indian "Mississippi"—a noble name, though, as we spell it, unnecessarily sand-barred with s's and p's.

The Mississippi's network of tributaries serves the United States from the Rockies to the Appalachians. The agricultural Midwest and the industrial East are linked with New Orleans and, through that great export outlet, with the world.

From the Mississippi by way of the Great Lakes, canals, and the St. Lawrence Seaway, cargo may be water-borne all the way to New York or Montreal, there to be shipped across the Atlantic or around the globe.

Death and Rebirth of River Boats

During the 1840's the tonnage of boats plying the Mississippi River system accounted for more than half of all that was registered in the U. S. In 1849 there were a thousand big packets plying the river. The end came rather suddenly. After the Civil War the steamboats were eclipsed by the railroads.

The Mississippi was dead. Progress had passed it by. It was only natural to suppose that slow transport must always give way to rapid transport. Improved roads allowed trucks to compete with the railroads. The airplane made inroads on both. There could surely be no return to the plodding river boat.

But during the two World Wars the Government, to relieve transportation congestion, revived river traffic. From December, 1941, through August 15, 1948, the amount of petroleum and petroleum products transported on American inland waterways (mostly on the Mississippi network and Gulf Intracoastal Waterway) totaled seven million carloads.

Mississippi traffic did not stop when the war stopped. The lesson had been learned: heavy goods such as oil, metal, grain, building materials, salt, sulphur, ores, chemicals, and scores of other products could be carried far more economically by water than by land—and in some cases almost as rapidly, thanks to the

Twilight picnickers toast marshmallows over a driftwood fire. The trim houseboat transported this party from Dubuque, Iowa, to a mid-river island. Bluffs of Illinois loom across the river.

A Winona family moors its houseboat and takes to the river (opposite). Powered by a 70-horsepower inboard engine, the craft draws only 22 inches; roomy cabins hold five berths.

SUPER ANSCOCHROME AND KODACHROME (OPPOSITE) BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON © N. G. S.

Houseboats Crowd the Riverbank near Winona, Minnesota

Below Saint Paul the Mississippi wanders through scenic "Hiawatha Valley," where locks and dams convert the stream into a staircase of lakes dotted with islands.

Hundreds of houseboats cruise this picturesque stretch in summer. Between excursions the floating homes line Winona's marinas.

DAVID H. BOYER, NATIONAL GEOGRAPHIC STAFF

evolution of that marvel of water transport, the diesel towboat.

Since the war, tonnage has increased year by year. To take a single dramatic example, between 1947 and 1956 the Port of St. Louis saw its annual river trade grow from 2,259,894 to 7,408,279 tons.

And yet use of the river has only begun. There is plenty of room left on the great highway. We sailed it for hours without seeing another craft.

It can still be a wayward and rebellious monster. Millions of dollars and thousands of men are constantly working to tame it.

In view of the possibilities of even better control, better boats, perhaps atomic power, the Mississippi, already one of this planet's most heavily loaded rivers, may be only in the early stages of its useful career.

Lightweight Canoe Scrapes Bottom

"You'll get pretty snarled up in there."

That was a farmer's dour warning when we mentioned we planned to canoe down the Mississippi's upper reaches.

We did get pretty snarled up. In spite of the fact that we had the able help of two lusty lads, it was rough going. Fortunately our Grumman aluminum canoe drew only three inches. It was 13 feet long and weighed but 45 pounds.

Houseboaters Cruise the River Without Leaving Home

The modern houseboat, a spacious vessel that floats in a few inches of water, offers a carefree, gypsy way of life. Complete with kitchen, bathroom, and sleeping quarters, it resembles the house trailer. Some hybrid models roll on retractile wheels.

Nesello (above) passes a tow north of Alton, Illinois. Passengers relax on the foredeck while one member of the party washes dishes in the compact galley (right).

Spacious *Ma Belle* (opposite) sleeps nearly a dozen. Dining nook at rear converts into a double bed.

Glass Boats Take Shape in a Minnesota Factory

"Wooden boats are going the way of the horse and buggy, as far as we are concerned," says Paul G. Larson, president of Larson Boat Works, Inc., Little Falls. His men turn out a custom-made Fiberglas boat in three days; a wooden craft used to take two weeks.

Using a spray gun (left), builders apply glass fibers and polyester resins to a mold to produce a seamless unit without joints. As many as eight layers may be required. Colors become a permanent part of the boat.

Other workers coat the bottom. Cedar strips reinforce the hull.

light enough to carry around obstructions. But when you meet almost nothing but obstructions for 18 miles and repeatedly find yourself with a three-inch-draft boat in two inches of water, you are inclined to give this part of the river back to the mosquitoes.

The river came out into a great marsh and lazily looped back and forth. There was no sign of other human beings—no house, bridge, or road, nothing but swamp a mile wide backed by forest.

River Wanders in a Wilderness

The solitude was a lively solitude, ringing with song, for what could be a better bird paradise than this forest-bordered open swamp full of bugs and free of humans?

The red-winged blackbird's *gug-lug-gee* suggested the gurgle and ooze of the swamp. The purple grackle twanged his piano wires. When we neared the trees, we heard the peanut-roaster's whistle of the cedar waxwing and the tremulous spiral of the veery.

Muskrats and beavers swam out of our way. Deer stood at the edge of the woods. Woodland sounds were untranslatable, but we had been told by foresters that the animal population of this northern part of Minnesota is still sizable.

The big gray timber wolf still roams the northern woods. In winter he ventures out on the ice of lakes and is hunted by plane for a bounty of $35. A farmer's wife looked out the window one day in 1957 to see a big timber wolf trotting away with a lamb in its jaws. In the Wildlife Museum at Bemidji one may see a wolf that was trapped within three miles of town.

The wolves survive by preying on deer, whose number has remained fairly stable in recent years. The black bear continues to be a source of amusement and distress to campers and rangers in wilderness canoe country (page 655). Occasionally a bear may attack sheep grazing in isolated areas.

The river finally left the swamp, became less tortuous, and plunged down a chute several miles long between high banks topped by tall trees. Every few yards a fallen tree blocked our way, and we carried around it through almost impenetrable underbrush.

And all this time we were going in the wrong direction! Wrong if we wished to reach New Orleans. For 60 miles the young Mississippi flows northeast, as if determined to reach Hudson Bay. Then it turns eastward and finally, after many an indecisive loop and twist, heads south toward the gulf.

Its farthest north is Bemidji Lake, and here we spent the night in our 21-foot trailer, which we had parked there some days previously. The next day we took to the air in my son Bob's little Navion to see the stretch we had just covered so laboriously. The river twisted beneath us like a tormented boa constrictor (page 651). In every direction were blue gems in dark settings. The Minnesota waterland in its far reaches is best seen from the air. Then you are quite willing to believe that it is the "Land of Ten Thousand Lakes"—by actual count more than 11,000.*

The river as it flows out of Bemidji Lake is navigable for small craft. From here on the stream would carry Mary and me comfortably, without need for frequent portages.

We did not camp out. We had someone drive our car to the point where we planned to end our day's canoeing. From there we drove back to spend the night in our mobile home. Every few days the trailer was moved farther down-river.

It is easy to imagine oneself a French voyageur while paddling down this unspoiled river. It flows between walls of dark-green conifers, aspen, and snow-white birch. It slows in lilied swamps or speeds down narrow chutes. It embraces charming islands or swirls rudely around rocky capes. It passes through lake after lake.

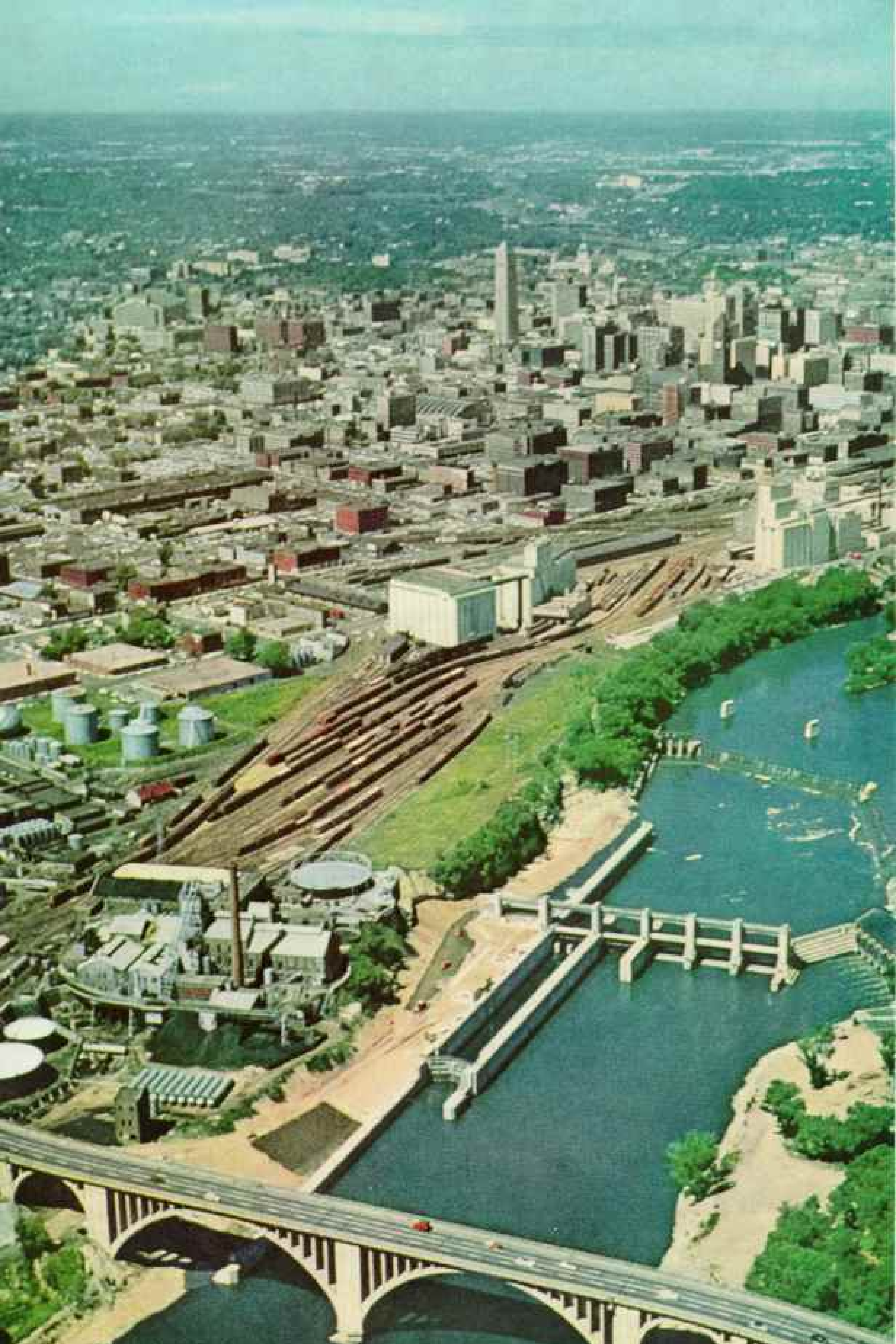
Wild Rice Grows in Shallows

In the river's quieter stretches the canoe slid through reedy shallows that reminded us of the water-soaked rice fields of Japan. Arriving in Grand Rapids, Minnesota, we inquired about what we had seen.

Yes, it was rice, but wild—a commodity in which Minnesota does an annual million-dollar business. It has long been one of the staple foods of the Indians, who still are the chief harvesters. There is money in wild rice. Some boats (two persons in each, one to harvest and the other to paddle or pole) make $40 to $80 a day (page 664).

At one of the rare waterside farms we went ashore near a small beachside cabin that was belching smoke from its chimney. It was as windowless as a fort, and the door was closed. Could this be a Finnish *sauna?*

*See "Minnesota, Mother of Lakes and Rivers," by Glanville Smith, NATIONAL GEOGRAPHIC MAGAZINE, March, 1935.



St. Anthony Falls Halts River Traffic at Minneapolis

The Upper Mississippi drops nearly 700 feet in its 500-mile run from its source to the twin cities of Minneapolis and Saint Paul. Already it has flowed farther than the Seine, two and a half times as far as the Jordan.

Flour made Minneapolis; today milling companies still grind prodigious quantities of grain. Geometric shapes of grain elevators and flour mills punctuate the riverfront skyline.

St. Anthony Falls (upper right) and the Northern States Power Company spillway (center) block upstream navigation to the city's northern industrial district. Two locks now being constructed by the U. S. Army Corps of Engineers will bypass the rapids. Completed lower lock and dam (below the spillway) will raise boats 25 feet. Upper lock, scheduled for 1962, will hoist vessels 50 feet around the falls. It will be the river's highest lift.

Cedar Avenue Bridge (lower left) and Third Avenue Bridge (upper right) link river-divided Minneapolis. Stone-arched Great Northern Railway Bridge curves between them. Concrete piers of the old Tenth Avenue span march across the river above the new lock.

Obelisklike Foshay Tower dominates downtown Minneapolis.

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

We walked on up to the farmhouse. From a radio inside came talk in a foreign language, then song, equally foreign.

Our knock brought a big, cheerful, rosy-faced man to the door. He spoke English without accent. He welcomed us in, then turned off the radio.

"Was that a Finnish program?" I asked.

"That's right. It's the Finnish Hour."

"But you weren't born in Finland."

"No, I was born right here. But my parents and grandparents spoke Finnish; so of course I picked it up. There are plenty of Finns in Minnesota, you know. And a lot of them still speak Finnish."

"And take their baths Finnish style?"

"Oh, you saw the sauna. Yes, that's one Finnish custom we won't give up. I suppose you've seen how it works."

Introduction to a Finnish Bath

We confessed that we had not. He took us down to the cubicle on the beach. A little girl, completely nude, was just coming out of the door. Her whole body seemed to radiate steam, as if she were walking in a mist. Quite undisturbed by our presence, she ran across the beach and plunged into the water.

We went inside. First there was a small dressing room. Beyond it was the steam room, fitted with a bench where bathers could sit, soap themselves, and swelter in the steam. To increase the effect, they might beat themselves with bunches of birch or cedar twigs. When they could bear no more, they would run out and dive into the river.

On top of a wood stove a huge pan filled with rocks gave off tremendous heat.

"How do you make the steam?"

"I'll show you." The farmer filled a small wooden bucket from a large tub and threw the water over the stones. It made a noise like machine-gun fire. A dense cloud of hot steam immediately filled the little room. We choked and backed out.

But our host would not be satisfied until at least one of us had tried it. With grave doubts, I disrobed in the dressing room, went into the steam room, and closed the door. The fire was burning briskly. Sitting on the bench, I found myself already dripping wet, thanks to the humidity.

After soaping myself, I flung a dipperful of water on the stones. The sudden steam made me gasp for breath. More and more water went on the stones, and more and more I progressed toward suffocation.

In 10 minutes I felt as wrung out as a rag. For five years in Japan I had taken a daily bath in water three feet deep heated to 120°, but it was nothing like this. The steam went up the nostrils and down into the lungs, and I felt baked from both the inside and the outside. My head seemed about to explode.

"Out already?" asked my host as I burst through the door and ran to plunge my stewing body into the river. Later the ceremony was completed with a mug of mulled cider in the farmhouse. Now I was feeling the afterglow. It was like sinking into a feather bed a mile deep. Every muscle, every nerve, was relaxed. A shoulder that had become paddle lame was now perfectly at ease.

"It's good for neuralgia," said the farmer's wife. "And colds."

"You take these baths in the winter, too?"

"Certainly."

"But then you can't go in the river. It must be frozen over."

"Yes. We roll in the snow instead. A drift six feet deep forms against the north wall of the sauna. We have great fun in it."

"The bathhouse is a kind of temple . . ." wrote Arthur Reade in *Finland and the Finns*, "and the bath of the nature of a ritual. The church and the bathhouse are holy places, says a Finnish proverb."

Paul Bunyan Guards His River

There's a long carry at Grand Rapids. A dam has replaced the rapids that gave the town its name, and above the dam the river is surfaced with several acres of logs waiting to be turned into paper in a local mill.

This is one of the longest of the 14 portages on the way to Minneapolis. There navigation for large craft begins, and every dam downstream is supplemented by a lock. From Minneapolis to the gulf, one need never take his craft out of the water.

We were deep in onetime lumbering country now. At Brainerd an animated figure of that mythical lumberjack giant, Paul Bunyan, with 150-inch waist and 80-inch neck, towers 27

Poling Through Minnesota Marshes, Chippewa Indians Harvest Wild Rice

In one day a team of two can reap several hundred pounds. Ferried by her husband, Mary Wadena flails the heads of waving grain into their homemade boat.

CHS. OLSON

feet, moves his arms and eyes, and tells stories to visiting children (page 653). He is surrounded by buildings and implements of logging days—a logging camp containing bunkhouse and cookshack, the high-wheeled cart used to haul out tall timber, and a sled to carry water for icing the roads so that log sleds could pass over them more easily.

We almost drowned as we paddled through a summer storm down to Little Falls. My wife in the bow was more than once lost to sight in wave and spray. A helicopter from near-by Camp Ripley returned time and again to see if we were still above water.

Glass, which is transforming modern architecture, performs another miracle at Little Falls. It makes boats (page 660).

"We were forced out of the manufacture of wooden boats," said Paul Larson, builder of glass boats, "by the labor cost. It took us two weeks to make a wooden boat. But if we get an order for a custom-made Fiberglas boat Monday morning, we can deliver it Wednesday evening. Three days against fourteen.

"Glass fibers can be molded to any shape. Color can be made a part of the material—doesn't have to be laid on, never needs to be removed. A glass boat doesn't need to be reconditioned at the start of the season."

"But isn't the stuff brittle?"

Larson picked up an eighth-inch slab of the plastic composition. He beat on it with a hammer. The blows had no visible effect.

"Wood wouldn't stand that. Do it to a metal boat, and you'd have at least a bad dent. The plastic alone wouldn't stand it. It's the glass threads that hold it together and make it strong."

NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON

CLARENCE R. SCHMIDT

A Restless Giant Winds South Through a Maze of Wooded Islands

"Crookedest river in the world," Mark Twain termed the Mississippi; in his day, before engineers tamed the waterway, its cutoffs shifted boundaries, created new islands, and blotted out old ones. Flying south of Dubuque, Iowa, National Geographic photographer Robert F. Sisson turned his camera upriver for this view. Iowa appears at left, Illinois at right.

Father Jacques Marquette and Louis Jolliet, first white men to descend the Upper Mississippi, entered the river on June 17, 1673. Guided by Indians, their party had paddled west by way of Lake Michigan, Green Bay, and the Fox and Wisconsin Rivers. This painting, by Cal N. Peters, hangs in the Museum of History, Prairie du Chien, Wisconsin.

The canoeist paddles through much of Minneapolis scarcely aware that the city exists. In the heart of Minnesota's largest city, the river passes through a canyon closed in on both sides by wooded banks hundreds of feet high.

The gorge is a quiet sanctuary for birds and probably about as it was when man first saw it. Bridges cross so high above that they hardly disturb travelers on the river. For long stretches no houses are to be seen; yet we found later when we drove along the river roads that only a screen of trees shuts off beautiful residential districts from the water.

In the Land of Hiawatha

An unimportant-looking little stream comes in from the west, but this trivial trickle is one of the best loved waters in America. It is Minnehaha Creek, immortalized by Henry Wadsworth Longfellow.

On its way through Minneapolis, City of Lakes, this woodland creek passes through Lake Hiawatha, and divides to embrace the island on which stands a bronze statue of Hiawatha about to bear his sweetheart across the rapids. Then, at Minnehaha Falls, the stream plunges over a precipice, to the daily delight of hundreds of admiring visitors.

A little farther down we paddled under old Fort Snelling, at one time the northwesternmost post of the U. S. Army. Here the Minnesota River quietly joins the Mississippi. As if this reinforcement gives it the courage to face the world, the Mississippi now flows through the busiest part of Saint Paul.

Commercial traffic of large river craft begins here at the Twin Cities. St. Anthony Falls, however, still blocks off one of the chief industrial districts of Minneapolis. To tap this area, the falls is now to be bypassed by two great locks (page 662).

The lower lock, already built, has a lift of 25 feet. The upper lock, planned for completion in 1962, will hoist boats 50 feet, the highest lift on the entire Mississippi. Above the locks an upper harbor 3.5 miles long will be constructed, to serve this metropolitan complex of 1,240,000 people.

Saint Paul's youthful mayor, Joseph E. Dillon, took us to the roof of his city's tallest office building, the First National Bank, and pointed out a large area in a bend of the Mississippi. There was little to be seen but swamp, trees, and some shacks.

"It doesn't look like much now," he said. "It's been flooded twice in recent years. Naturally, industry is afraid to build there. But we have great plans for it. We expect the Corps of Engineers to dike it so there'll be no more flooding. Then we can reclaim about 3,000 acres and bring in industries that can use the river.

"We aren't realizing at present the potential value of the Mississippi. It is America's great north-south axis. The trouble with us is that we think east-westwise, not north-south. Our great railroads run east and west. We buy and sell with New York, Chicago, San Francisco, but we ignore the great opportunities that are opening up in the southern States.

"The Mississippi offers us direct communication with the South. We should use it more than we do."

The soft sandstone upon which Saint Paul is built is easily cut away, and there are miles of tunnels under the city. One cave contains $100,000 worth of aging cheeses, and in others large white mushrooms are grown and stored awaiting shipment.

Russian rivalry in scientific achievement has made the United States painfully conscious of the need for modern laboratories. Many industries in the Twin Cities are tireless in research.*

"Research is the key to tomorrow" is the motto of the Minnesota Mining and Manufacturing Company, familiarly known as the 3M. The firm produces a surprising variety of things, from "Scotch" tape to abrasives, roofing material, and chemicals.

The company employs more than 1,400 chemists, physicists, and engineers seeking new products or better ways to make the old ones. Several of the largest 3M laboratories stand on a 150-acre tract on the city's east side. The ideas formulated there and in other company laboratories take commercial form in huge factories in Saint Paul and in 36 other cities, both in this country and abroad (pages 678-9).

River of the Floating Palaces

We now had come to the river of big boats. The Mississippi from the Twins to the gulf was once famous for its floating palaces, with great side wheels or stern wheels, with tall smokestacks topped with iron crowns, with murals and chandeliers and sumptuous cabins and good food and a deep whistle and gay music on the calliope.

There are a few of the old steamboats left. We boarded one, the *Avalon*, at a Saint Paul dock for an excursion down-river. Away aloft

* See "Minnesota Makes Ideas Pay," by Frederick G. Vosburgh, National Geographic Magazine, September, 1949.

a steam calliope was playing "Cruising Down the River" (pages 674-5).

We spotted the captain, introduced ourselves, and asked permission to photograph the calliope and its player.

"Certainly—and you'd better hurry. He won't play after we start."

Calliope Music Blares Half a Mile

The high-pressure music was meant to attract customers and must surely have been effective, for it could be heard half a mile away. We climbed to the top deck. The musician proved to be 22-year-old Clark Hawley, first mate.

"How old is the instrument?"

"About sixty years."

The calliope consists of a row of steam whistles, each connected with a valve, every valve governed by a key on a keyboard like that of an organ. As each key is pressed, the corresponding whistle lets off a shrill note and a jet of steam.

Mary asked, "Is it like playing the piano?"

"Well, it's harder. You see, there is 55 pounds pressure on each valve."

It takes strong fingers and a strong back to play the calliope, and ears that will stand more violent sound waves than a hundred symphony orchestra instruments could produce.

As we pulled away from the dock, the music stopped. The giant stern wheel began churning, and in the spray that was tossed to the upper decks we could see a rainbow.

The mate took us to the pilothouse. The pilot, Capt. Roy Wethern, slim and agile,

Author Price paddles his 13-foot canoe through the new 1,200-foot-long Keokuk Lock (page 687), one of the largest in the world.

WILLARD PRICE

looked 10 or 15 years younger than his age of 75. He got his license at 21.

The *Avalon* is governed by an eight-foot steering wheel, one of the last on the Mississippi. Small levers steer modern river boats. The old-fashioned engine telegraph is still in use on the *Avalon*. On towboats the pilot does not signal orders to the engineer; he has all the engine controls under his own hands.

The pilot was particularly proud of the fine three-toned whistle. He operated it by standing on a pedal; only his full weight would make it blow. On the new-fangled boats the pilot touches a button.

Paddle-wheelers Still Ply the River

We went down to the main deck to talk with the captain. He did not go near the pilothouse. It is the pilot's job to steer the boat. The captain's job is administrative. He looks after the crew, is responsible for the safety of the passengers, oversees all moorings and landings, and has the general management of this floating pleasure house.

"It keeps me busy," he said. "The capacity of this boat is 1,370 passengers. We have a crew of 48. We do no overnight business, just excursions—one in the afternoon, one in the evening, and a third excursion on Saturday, or rather, Sunday morning, sailing at 12:30 a.m., back at 2:30. That one is called the 'Midnight Frolic.'

"On the deck above this we have a 2,000-square-foot ballroom for free dancing and an orchestra that can play anything from the 'Missouri Waltz' to rock-n-roll."

The boat lies all winter at its home port, Cincinnati. It sails from the first of April until mid-October, from town to town, spending one day each at the smaller towns, several days at some, and a week to 10 days at the larger cities like Saint Paul. In every sense, it is a going concern.

"To pay our way, we need 1,000 passengers a day; we average quite a few more than that, so as long as people like to cruise, we can make ends meet and give pleasure to a lot of folks."

The *Avalon* is not the only paddle-wheeler still plying the Mississippi, nor is it even

Marble dome of the Minnesota State Capitol in Saint Paul resembles that of St. Peter's in Rome. A gilded figure of the spirit of Minnesota, his triumphal chariot drawn by four horses, rides above the parapet below the dome. Governor, Supreme Court Judges, Senators, and Representatives have offices here.

the most important one. The *Admiral*, sailing out of St. Louis, is twice as big and carries three times as many passengers (page 685). In all, we saw 27 paddle-wheelers, four resting ashore, all the others still afloat.

However, this was in five months spent almost entirely on the river. Probably the average resident of a Mississippi River town, whose interests seldom take him to the river, does not see a paddle-wheeler from one year's end to the next.

But he does know the towboat. In that respect he is ahead of most Americans, who are aware only that the glorious days of the steamboat era have passed and may therefore visualize the Mississippi as a dead and empty thoroughfare.

The steamboat era is gone, but the Mississippi is not dead. It is more alive than at any time in its history. It now does in a day what it once did in a year. For the Mississippi's new usefulness we must thank the towboat.

Towboats Don't Tow—They Push

The towboat is misnamed. The word gives no idea of the nature of this remarkable craft. One is apt to confuse it with a tugboat—the busy little beetle that hauls barges across New York Harbor or presses its padded nose against a big ocean liner hugging up to a North River pier.

The towboat is nothing like that. It is one of the miracles of modern transportation. Instead of perhaps two decks, it has five or more. Instead of one or two engines, some have four. Instead of one rudder, it may have ten. Instead of some 4,500 horsepower, the newest will deliver up to 8,500.

Instead of nudging an ocean liner, it pushes a fleet of barges carrying the loads of two great ocean-going freighters. Instead of a crew of seven to a dozen men, it requires up to 17. Instead of $600,000 or so for a harbor tug, it may cost well over a million.

The towboat does not tow. It pushes.

In the long-distant past it did haul its barges behind it. The old name has stuck, but the method has changed.

A string of barges trailing out behind could not be controlled. It would whip about like a crocodile's tail. Crosscurrents or cross winds would throw it onto the rocks or into other boats or against bridge piers.

So the barges are put in front instead of behind. Barges, perhaps three abreast and numbering a dozen or more, are tied together so rigidly by steel cables that they become one unyielding raft. This tow, as it is still called, is in turn locked in place before the towboat so firmly that the entire fleet can be controlled by the slightest touch of the pilot upon the steering levers (pages 688-9).

Mississippi push-towing is now imitated in lands as far apart as Argentina and Germany, on the La Plata and the Rhine.

The barge, like the towboat, is too humbly named. The Mississippi barge is a floating warehouse. The average size costs $85,000 to build. It weighs 350 tons and can carry 1,500 tons in cargo, the load of three or four of the large packets of steamboat days. And one towboat may push 20 or more such barges!

Other jumbo-sized barges stretch 300 feet in length and carry 3,000 tons. One large grain barge will carry 85,000 bushels. A tank barge will take 1,000,000 gallons of oil. By comparison, the average railroad tank car holds 13,500 gallons. An integrated tow, the entire unit lashed together, may stretch 1,200 feet—longer than the largest ocean liner. Such a tow can carry as much oil as two big ocean-going tankers.

War Revived River Traffic

This fabulous development in the history of transportation began during World War I, when movement of supplies overwhelmed the railroads. The Government commandeered the few barges and towboats that could be found on the Mississippi, hastily built a fleet of new boats, and in 1918 formed what became known as the Federal Barge Lines.

Great stores of war materials began to move. Private investors saw the opportunity and formed barge lines of their own. The Government, having demonstrated what could be done, sold its shipping interests to private investors in 1953. By that time there were some 700 transportation lines on the Mississippi system and the Gulf Intracoastal Waterway. There was plenty of business for all, and it continues to grow spectacularly year by year.

Through the courtesy of the Federal Barge Lines, we were put aboard the towboat *Huck Finn*, originally steam powered but now converted to diesel.

People who confuse towboats with tugboats should see this vessel. It is only average size; yet instead of the tugboat's one or two decks, there are six levels in the *Huck Finn*—the

(*Continued on page 681*)

PHOTOGRAPHED BY DAVID S. BOYER, NATIONAL GEOGRAPHIC STAFF, AND WILLARD PRICE (BELOW) © N.G.S.

Cheddar Cheeses Mellow in Caves Under Saint Paul

To gain flavor, cheddars age on racks six to twelve months. Every 30 days Clarence Auge turns each wheel and wipes away mold. A wax coating protects each cheese.

Part of a labyrinth that tunnels 500 feet into a hillside, this cool gallery once housed a night club, whose lighting fixtures still adorn the stucco walls.

Girl at Lumbertown, on Gull Lake near Brainerd, Minnesota, wears bonnet and gown of the 1870's. Visitors step back a century in this reproduction of a typical community of logging days. Plank sidewalks and old buildings brought from former sites complete the illusion.

Steam calliope aboard the excursion boat *Avalon* shrills "Cruising Down the River." First mate Clark Hawley plays the organlike keyboard. A multitude of brassy throats, the double row of valves produces siren music amid clouds of steam.

Pilot Roy Wethern spins *Avalon*'s eight-foot steering wheel. Perched high in the pilothouse, with nothing to interfere with vision except the black smokestacks (opposite), he can spot shallows, bars, and snags better than anyone else aboard.

The Stern-wheeler *Avalon*,

PHOTOGRAPHED BY WILLARD PAGE © NATIONAL GEOGRAPHIC SOCIETY

One of the Last Reminders of Steamboating's Golden Age, Docks at Saint Paul 675

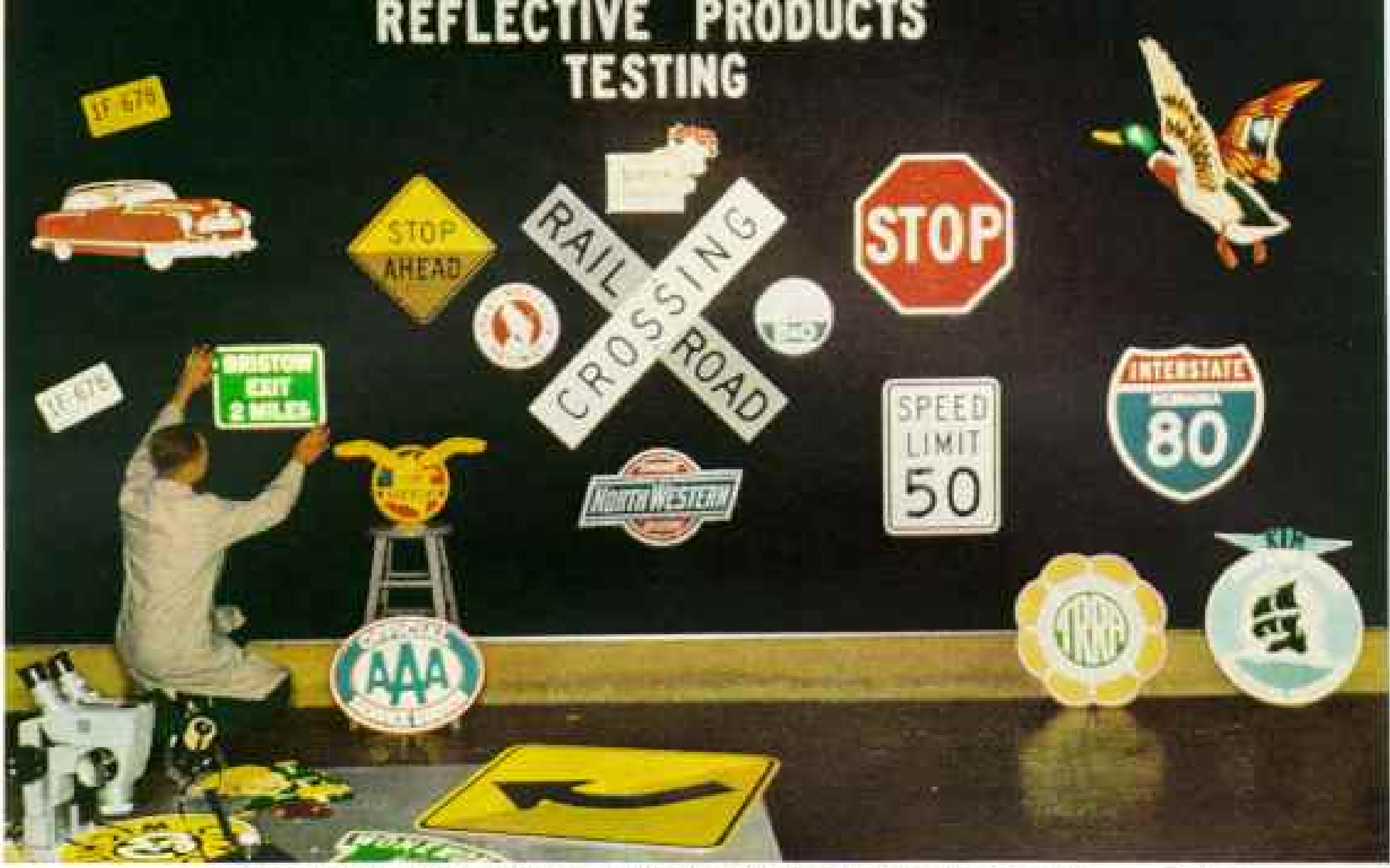
A Towboat Nudges Her Barge Fleet in the Dresbach Slough

The Upper Mississippi widens to three miles at points between Saint Paul and St. Louis. Sloughs, or backwaters, form scores of shallow lakes studded with islets. Some are dredged to by-pass winding stretches of the river.

Coursing south between marshlands and wooded hills, the river here divides Wisconsin (left) and Minnesota. U. S. Highway 61 parallels tracks of the Chicago, Milwaukee, St. Paul, and Pacific. Distant Lock and Dam No. 7 straddle the channel.

Churning upstream behind three oil barges, a diesel-powered towboat resembles an ant pushing a string of dominoes. The snub-nosed towboat is the Mississippi's version of the railroad locomotive. It can maneuver a fleet carrying 30,000 tons, the equivalent of more than 500 railway freight carloads (pages 688-9 and 694).

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



SUPER ANSCOCHROME (OPPOSITE) AAA ROUGHCHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER ROBERT F. SISSON © N. G. S.

ROUGHCHROME BY WILLARD PRICE

Road Signs Coated with "Scotchlite" Gleam in the Dark

Reflective sheeting developed by the Minnesota Mining and Manufacturing Company in Saint Paul reduces the hazards of night driving. Millions of microscopic glass beads cast a glareless reflection 55 to 220 times brighter than white paint.

Reflective markers are tested in the room above. Untreated parts of the signs "Stop Ahead" and "Railroad Crossing," as well as the arrow on table, lack luminosity.

Research scientist in protective mask and insulated gloves withdraws a batch of molten glass from an electric furnace in the company's laboratory.

Jumbo rolls of "Scotch" tape hang in the factory's "forest," which holds enough of the sticky ribbon to girdle the globe.

radar platform on top, the pilothouse level, the texas deck, the boiler deck, the main deck, and the below-water, engine-room deck.

But she has to be big and powerful to push the equivalent of a loaded freight train two miles long, and that's only a modest load for a modern tow. In the pilothouse I picked up a newspaper and saw an item concerning a tow of 24 barges, 126,000 square feet or almost three acres, being pushed on the Tennessee River by the towboat *Robin*. Three acres on the move!

I read the item aloud to the pilot. He said:

"Imagine how hard it would be to stop it." He was peering anxiously ahead; it was Sunday, and the small boats were out in force. They skipped in front of our tow.

"They have a lot of confidence in their motors," remarked the pilot. "If their power failed while they were ahead of us, nothing in the world could prevent us from running them down. We could reverse our engines, but we couldn't stop in less than a quarter of a mile."

Hapless Skier Falls in the Way

Half an hour later the pilot's fears were borne out. A water skier lost his balance and fell in the path of the oncoming barges. The pilot immediately threw the engines into reverse and blew a thundering blast on the whistle. There was nothing more he could do.

The raft of barges plowed on remorselessly toward the struggling skier. To the people in other boats, it must have looked as if we were deliberately running the man down. They blew their horns and shouted at us, the men angrily, the women hysterically, unaware that the boat's engines were doing their best, though vainly, to stop the raft.

The skier swam hard, but he would never make it; the oncoming barges were too broad. But a man in one speedboat did something besides blow his horn and shout. He roared into the path of the tow, seized the swimmer, and hauled him aboard. The boat shot across the front of the barges and into safe water.

Onlookers cheered the rescuer and jeered the towboat pilot. The floating skis disappeared beneath the raft. They would not look much like skis after a quarter-mile of pummeling under the barges and towboat.

The pilot's face was tight and white, but he said not a word. Now he flipped the engines back to full ahead and called for a cup of coffee.

He smiled. "Nearly got into trouble that time."

"Who, you? It wasn't your fault."

"The law doesn't look at it that way. The least that could happen would be a hearing. A pilot I know has been waiting trial three months for running over a motorboat. Last week he had the bad luck to run over another. I'd hate to be in his shoes when he goes to court."

Old Man River Takes a Toll

There is always the river to reckon with, and Old Man River has many moods. He builds up a sand bar; the front barges run up on it, break the huge ratchets and steel lines that bind them together, explode in all directions. A gasoline barge wraps itself around a bridge abutment and blows up.

A barge breaks loose and slips into a side bayou, and you search for it until a helicopter pilot reports its location. The steering gear goes dead as you try to make a bend, and you go into the rocks with a crash like the end of the world. A snag pokes a hole in a gasoline barge, and the river is covered with gasoline, and that's a bad time to light a cigarette.

At mealtime we sat down with the men who had just come off watch to a table groaning with great bowls of steaming food. The barge lines are like the old-time lumber camps, where men were fed well so they could work well.

The big boat trembled with power. A diesel towboat can push its enormous load upstream against a strong current at about four miles an hour and twice as fast downstream.

With the master pilot's permission, we returned to the pilothouse. Here he reigns supreme and tolerates no distractions. A high degree of concentration is necessary in piloting a big tow on this winding river.

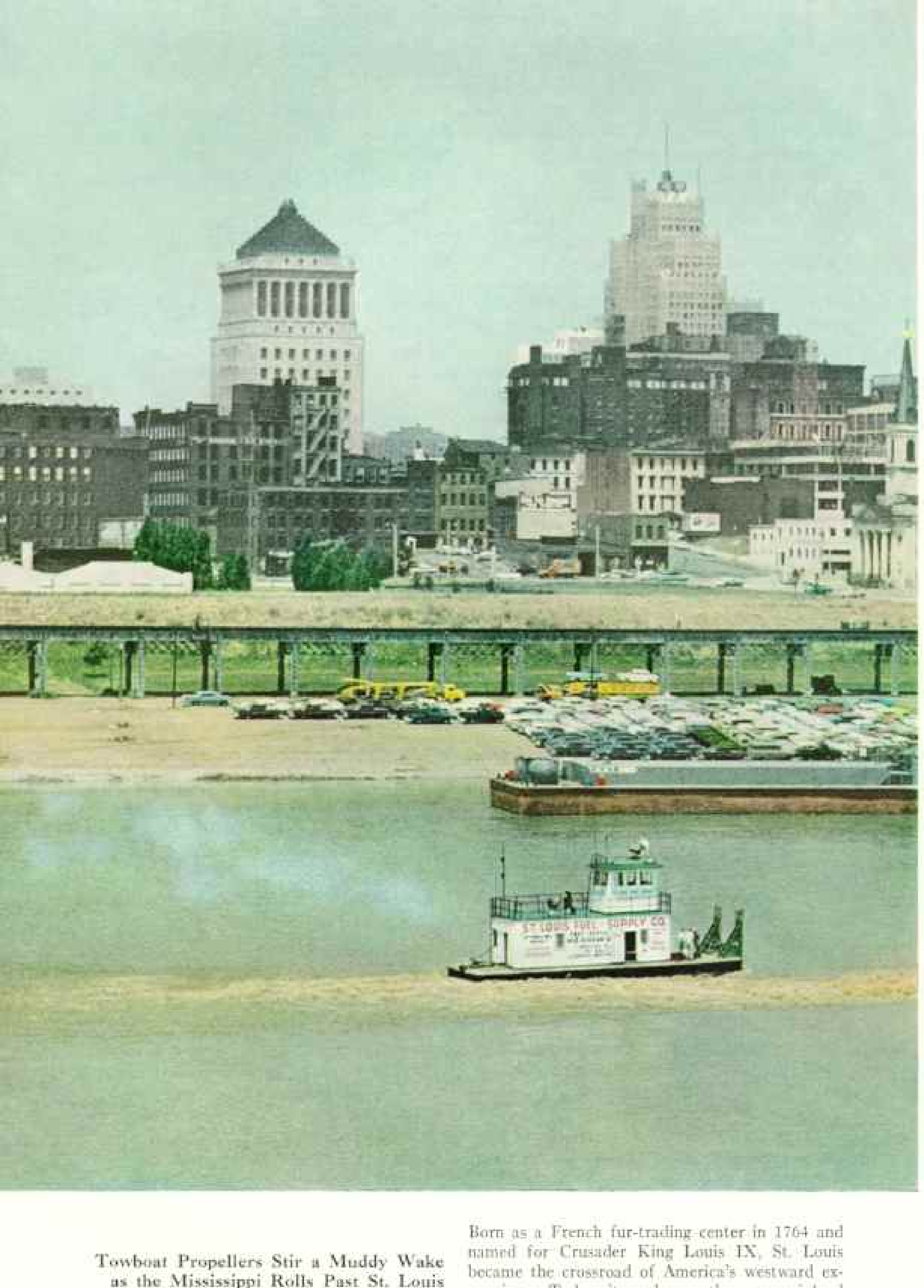
At times the tension lets up, and the master settles in his chair on the small of his back, puts his feet up on the controls, and starts a conversation with his guest.

He does not need a guest to have a conversation. Even when he is alone, he is not alone. Over his radiophone he chats with the master

Nonchalant King Boo Leaps Through Fire: Showtime in the St. Louis Zoo

Summertime visitors to the Zoological Garden in Forest Park watch chimpanzees ride bicycles and twirl on roller skates; elephants in grass skirts dance the hula.

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



Towboat Propellers Stir a Muddy Wake as the Mississippi Rolls Past St. Louis

Born as a French fur-trading center in 1764 and named for Crusader King Louis IX, St. Louis became the crossroad of America's westward expansion. Today it ranks as the queen inland port on the Mississippi. Floods wet only the

KODACHROME BY DAVID S. BOYER, NATIONAL GEOGRAPHIC STAFF © N.G.S.

city's feet; business and residential districts stand on high ground. Skyline landmarks include the pyramided Civil Courts Building, 31-story Southwestern Bell Telephone Building, and iron dome of the Old Courthouse. The wide levee, busier today than at the height of the steamboat era, holds an outbound shipment of new cars. St. Louis barge terminals handle more than 7,000,000 tons of cargo a year. Here a floating ship's store heads for shore after servicing a passing tow.

of some other vessel, perhaps miles away, perhaps just around the next bend, but still unseen. It's important that an upcoming and downcoming tow should not take each other by surprise. They compare notes.

"I'm close to the right bank, but the current is swinging me out."

"Okay. I'll hug the sand bar and give you a wide berth."

But the talk is not limited to official matters.

"How's that bad tooth of yours? Did you get to a dentist?"

"How could I get to a dentist? No, I just tied it to a door and slammed the door."

Radar Fingers Grope Through Fog

In a dense fog the tow keeps on going. The radar screen shows the river and its shores. When another boat appears on the screen, the master picks up his telephone. He cannot see the boat, he cannot even see out to the front end of his tow, but there is the boat on the screen, and here is the master's voice coming over the phone. They talk things over, decide what to do, where to pass.

The master uses another phone if he wishes to talk to the engine room, still another for the barges to the front of the tow. This is called the teletalk, or more commonly the "tattletale."

Time was when the captain had to shout through a megaphone to the men on the barges. The second mate would megaphone back. Every word had to be clearly pronounced and sung, not spoken. With the tattletale there is no need to sing or shout.

Below Red Wing, Minnesota, the Mississippi expands to form Lake Pepin, some twenty miles long and two wide, bordered by a 1,000-foot escarpment weather-beaten on the Wisconsin side into fantastic shapes. One of its picturesque bluffs is Maiden Rock, from which a Sioux Indian is supposed to have leaped to her death rather than marry the warrior selected by her parents.

Many more have gone to their death in Lake Pepin, which used to be known as the "steamboat graveyard." It was purported by old-timers to be the "storm kettle of America," the place where all the storms of the country were brewed.

Here in 1890 the excursion steamboat *Sea Wing* capsized, drowning 98 persons. Here when the river broke in spring flood, the current carried large ice floes that poured downstream with a roar like thunder, tearing out bridge piers and pilings and smashing steamboats, boathouses, and houseboats.

Onslaughts of ice are less savage now that locks and dams have tamed the river, but a storm on Lake Pepin is still to be avoided by smaller craft.

From Red Wing past Lake Pepin and for many miles beyond, through what is reminiscently known as the "Hiawatha Valley," U. S. Highway 61 hugs the Mississippi. It affords motorists a dramatic view of the upper river.

By boat the vista is even finer. Between Saint Paul and St. Louis there are more than 600 islands large enough to have names or numbers, and thousands of islets. The river broadens at times to three miles. Its locks and dams have converted it into a staircase of scenic lakes full of islands, and these lakes make pleasant cruising grounds for hundreds of houseboats (pages 656-9).

We sailed with the *Huck Finn* past Winona, but later returned by car and took a cruise on a "Whit-Craft," designed by a houseboat builder named Richard D. Whittaker.

The Whit-Craft is a cleverly devised floating house consisting of forward deck, roomy cabin, galley, head (toilet), closet, aft cabin with four bunks, rear deck, and open deck above. All this in 34 feet of length and 11-foot beam. The boat draws only 22 inches and is powered by a 100- to 150-horsepower inboard motor. It will do 16 miles an hour upstream. Each boat is custom made to the buyer's specifications.

New Harbors Shelter Small Craft

A spanking new marina at Winona is being enlarged to accommodate 150 forty-foot cruisers and houseboats. Still another marina is being completed among the islands. In fact, nowhere over the entire length of the Mississippi did we see such houseboat activity as at Winona. The two new marinas will give the town five good harbors for its hundreds of small craft.

Through a valley six miles wide, *Huck Finn's* passage took us next into a region where the Mississippi seems to consist of more land than water, so many are its islands (page 676). Dam No. 7 near Dresbach, Minnesota, loomed up like a huge wall.

The lock was not big enough to take our whole tow at one bite. Like most of the Mississippi locks, it is 600 feet long and 110 feet wide. We had to resort to double-locking—that is, put half the barges through the

REDRAWN BY RALPH GRAY, NATIONAL GEOGRAPHIC STAFF © N. G. S.

Silver-bright, the Excursion Steamer *Admiral* Leaves St. Louis

Oil-fired, air-conditioned, and soundproofed, the sleek craft ranks as the Nation's largest all-steel inland river boat. Five decks accommodate 4,000 passengers.

Admiral's Spacious Ballroom Attracts Dancers Aged Seven to Seventy

As long as a city block, the liner ranks as one of St. Louis's leading summer attractions. Its power plant generates enough electricity to supply a

lock, tie them up beyond, then come back for the rest. This takes an hour or more, whereas single-locking takes 15 minutes.

"When this canal system was planned some 30 years ago," said the lockmaster, "a future of about 9,000,000 tons a year was expected. Now twice that much moves through some of the locks. They should be at least double their present size. But who could have imagined that Mississippi traffic would make such a comeback?"

In addition to commercial traffic, the number of small craft using the locks has increased amazingly. Every lockmaster would like to have a supplementary small lock to pass small boats. Opening a 600-foot lock for a rowboat or a motorboat causes expensive shipping delays and uses water that in dry periods is very precious—but it must be done.

French Grandeur in the Wilderness

Through island reaches that called back memories of Japan's Inland Sea,* we journeyed along the edge of Wisconsin, past thriving La Crosse to historic Prairie du Chien, where girls in costume of a century ago show guests the treasures of Villa Louis. This remarkably civilized home was built on the

* See "Cruising Japan's Inland Sea," by Willard Price, NATIONAL GEOGRAPHIC MAGAZINE, Nov., 1953.

BRUCE S. KOYER, NATIONAL GEOGRAPHIC STAFF

town of 4,000. Two decks high, its ballroom affords room for a thousand couples. An amusement arcade occupies another deck.

savage frontier by Col. Hercules Dousman, fur-trader agent for John Jacob Astor.*

Night and day the towboat plowed on. It might pause at a town to put off a barge or take one on, and it had to halt at the locks. But ordinarily it slid along with no sound but that of the engines. There was no bustle on the decks and little talk except in the pilothouse. At any given time half the men were asleep. Sometimes we had a weird feeling that this was a ghost ship traversing a no man's land.

Large cities were becoming more numerous:

* See "Wisconsin, Land of the Good Life," by Beverley M. Bowie, NATIONAL GEOGRAPHIC MAGAZINE, February, 1957.

Dubuque, Moline, Davenport, Rock Island, Burlington, Quincy.

Deep in its Mormon memories lies Nauvoo, named by Joseph Smith, who claimed it meant "beautiful plantation" in Hebrew. And so it seemed to the Mormons when they settled there in 1839. They made it a city of 20,000 people, bigger than Chicago or any other Illinois city at that time.

But troubles that had driven the Mormons to Illinois multiplied, especially after the practice of plural marriage was known. Smith was arrested with three associates and met death at the hands of a mob. The Mormons were forced to move on, and Brigham Young led them on the arduous trek to Utah.

Through the Huge New Keokuk Lock

Now we came to a recently completed marvel, the new Keokuk Lock, one of the world's largest in water volume—1,200 feet long, 110 wide, and 38.2 deep when full.

To get a true impression of its size, one should enter it in a small canoe, as I did later, and look up at its towering walls (page 669). It was a striking contrast—one of the smallest of boats in one of the largest of locks. This immense concrete tank, with as much water capacity as a small lake, fills to the level of the upper pool in about ten minutes.

We transferred to the towboat *Missouri* for the continued trip downstream. One of the newer boats, she could not be replaced for a million dollars. Even at that she is not the most expensive or powerful on the river: for example, the *A. D. Haynes II*, also a newer boat, cost far more to build, and the *United States*, scheduled for launching in October, 1958, will have 8,500 horsepower!

Strangely, these great craft are not called ships, for the word is taboo on the river. Here it is as much a sin to call a boat a ship as to call a ship a boat at sea.

We were taken up to our quarters. Here was towboat luxury indeed. Our cabin was without exception the largest and most luxurious we have ever had on any boat or ship anywhere in the world in some 40 years of travel.

Thirty-two feet long and 16 wide, its big windows looked out to the right shore and to the left and full ahead; its walls were wood paneled, and its ceiling and floor parqueted. Two air-conditioning units gave it any climate desired, there seemed enough furniture to equip a hotel lobby, and its private bath alone was as large as an average tourist cabin on a big ocean liner.

(*Continued on page 693*)

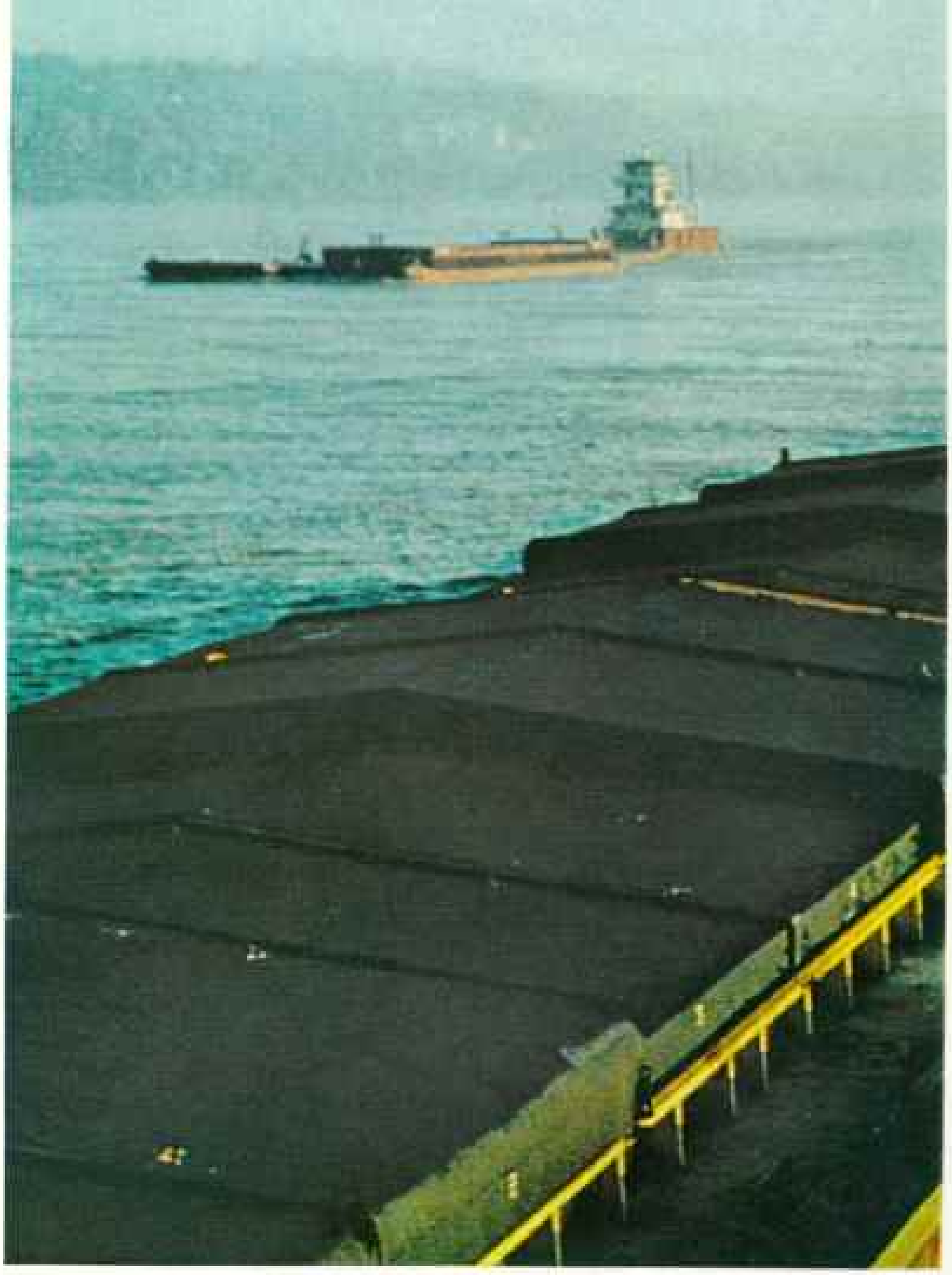
Dawn's Eerie Light Reveals Tow Fleets Passing in the Mist

Towboats on the middle Mississippi transport 10 times more tonnage than steamboats in their heyday. But the new queen of the river is misnamed; she pushes, not pulls, her string of barges.

Sulphur on an open barge here rides ahead of the towboat.

Captain's teletalk box at his right connects him with deck hands on the barges.

Mark Twain, once a river pilot, later wrote about the men who maneuvered paddle-wheelers around tight bends, through eddies and narrow channels. The towboat pilot is no less skillful. But steering levers with finger-tip controls have replaced the old pilot wheel with its hand-turned spokes.



RECENT PHOTOGRAPHS BY WILLARD PRICE
(RIGHT) AND NATIONAL
GEOGRAPHIC PHOTOGRAPHER
ROBERT F. SISSON © N. G. S.

Chafed Line Smokes as a Tow Is Checked

Deck hands, the sailors of the tows, apply the same science of knots and lashings as that used on ocean-going vessels. Each knot does a specific job, and a man must tie it firm and fast. Guiding a 105-foot-wide barge train through a 110-foot lock demands perfect performance from pilot and crew.

Here a tow enters Lock No. 15, Rock Island, Illinois. Hitching the hawser around a kevel, or cleat, a deck hand brakes the leading barge.

Hannibal's Worst Flood in 100 Years Turns Tom Sawyer's Town into a Watery Venice

Since pioneer days residents along the Mississippi have faced a major problem: how to tame the swollen river. Inevitably, when melting snows and heavy spring rains magnify its tributaries, the Mississippi threatens to burst its banks.

Years ago the rampaging river swept away thousands of lives and billions of dollars in buildings and topsoil. Today an elaborate and costly system of dams, levees, and channel dredging restricts floods to comparatively small areas along the riverbanks.

Only a few major inundations have occurred within recent decades. One of the most severe at Hannibal, Missouri, occurred in June, 1947. But the hills on which the city is built limited damage to the narrow waterfront section. Ninety-six percent of the community's area remained high and dry, and towering levees protected farmlands close by.

This air view shows the muddy waters inching ever closer to Main Street (lined with automobiles). A Wabash freight chugging past the river front leaves a churning wake.

Swirling water all but covers the circular fountain in tree-ringed Nipper Park in upper left and the speedboat docks at lower left. *Poplar*, the U. S. Coast Guard cutter between them, served as a base for small boats repairing levees.

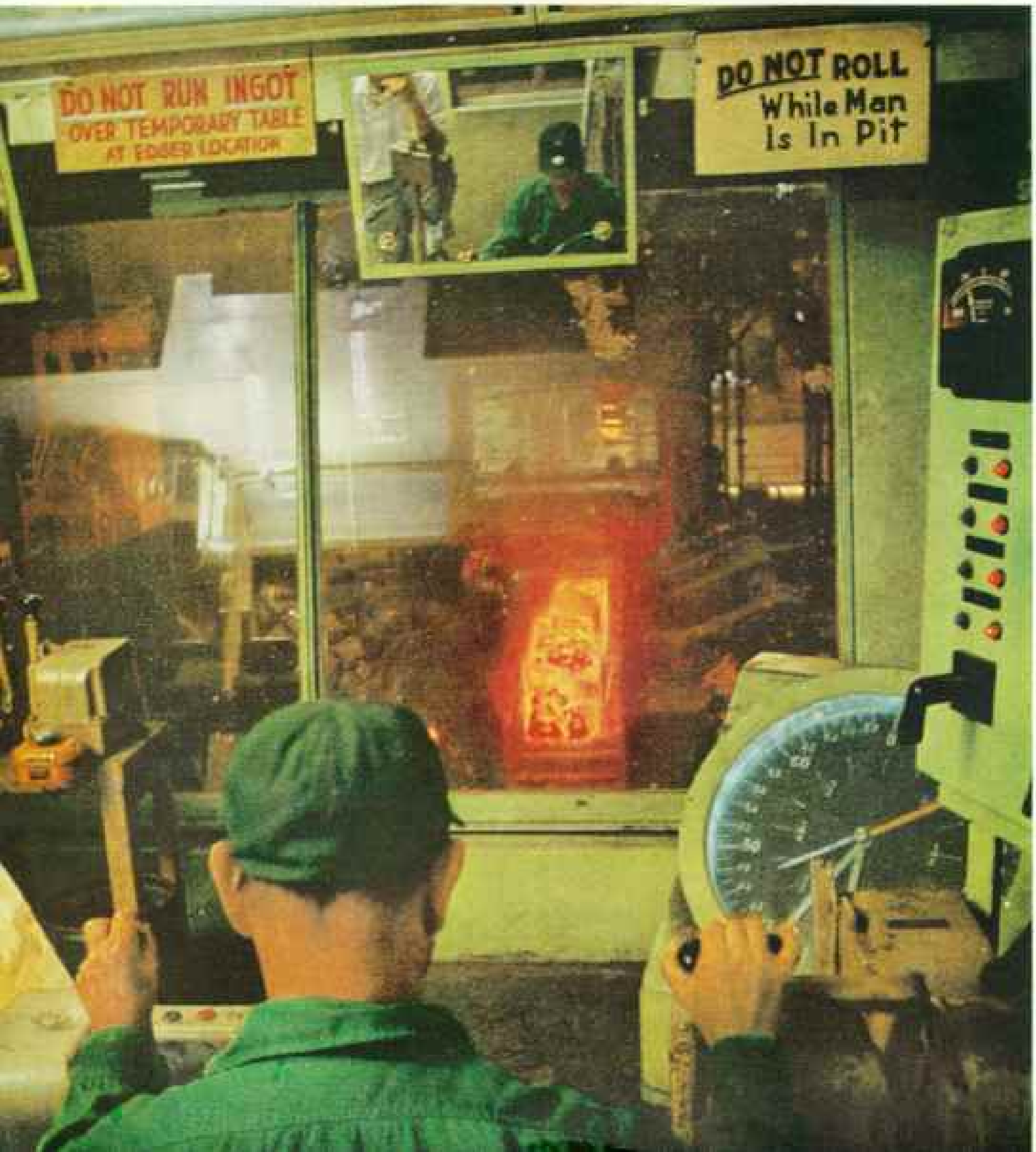
Giant Tongs Lift a Fiery Ingot in an Illinois Steel Mill

Seven open-hearth furnaces turn out some 1,500,000 tons of steel ingots a year in the Granite City Steel Company's sprawling plant across the river from St. Louis.

Lifted from the 2,400° F. temperature of the soaking pits, the 40,000-pound ingot moves into the blooming mill (below), where heavy rolls squeeze it into a thinner, semifinished slab of steel.

Operator in the pulpit, an air-conditioned enclosure, guides the ingot through the rolls.

ANSCOCHROME (LEFT) AND SUPER ANSCOCHROME BY NATIONAL GEOGRAPHIC PHOTOGRAPHER J. BAYLOR ROBERTS © N. G. S.



It is customary to provide a room of this sort on many modern towboats for the convenience of traveling officials of the company. If the room does not happen to be so occupied, it may be available to outsiders who have some special interest in the river.

We were called to the pilothouse to meet Capt. Jesse B. Marks. As he talked, he nonchalantly glanced at the river now and then, flipped levers, and punched buttons.

Directly under his control were the boat's four engines, four propellers, ten rudders (four steering, six for backing or flanking), two searchlights, Fathometer, radarscope, RCA radiotelephone, Bell System mobile phone by which any number in the world can be called, phone to the engine room, phone to the tow, gyrocompass which can be set to hold the course without manual control, radio receiver, ice-water dispenser, and a crewman to keep the coffee coming.

We sailed past Hannibal, Missouri, Mark Twain's boyhood home and scene of the exploits of Tom and Huck (page 696).*

"A month ago," said the captain as we lay in the lock at Clarksville, "a man was killed here. An empty gasoline barge exploded. They think the spark that set it off must have been caused by the friction of a bumper against the lock wall."

"But how could a gasoline barge explode if it was empty?"

"An empty one is more dangerous than a full one. The liquid is comparatively stable, but after it has been taken out, the tank fills up with vapor. If the right mixture of vapor and air occurs, all you need is a spark to have an explosion."

Enter the Missouri—with Mud

Sixty miles farther on we passed Portage Des Sioux, which has its own romantic story. In the flood of 1951 the village was threatened by the rising river. The people prayed that their town be spared. At the last minute the waters subsided. In gratitude, a tall white statue of the Madonna was erected. It is called Our Lady of the Rivers and is probably unique among Madonnas, since it is made of reinforced Fiberglas. It towers 26 feet above a 17-foot pedestal and is illuminated at night as a guide for river traffic.

Fifteen miles above St. Louis, the great Missouri River ends its long journey from Alberta, Saskatchewan, Montana, and Wyoming, through North Dakota, South Dakota, Nebraska, Iowa, Kansas, and Missouri. It pays tribute to the "Father of Waters" in the form of 100 million tons a year of the Midwest's most fertile soil.†

The Mississippi at first refuses to accept the gift, and the two tides, one black and one brown, flow side by side with little intermingling. Gradually, infiltration takes place, and the Mississippi is never itself again.

Amusement Park Sails from St. Louis

We left the *Missouri* at St. Louis, which used to see a hundred steamboats lined up along her levee at one time, and which now knows an amount of river traffic never dreamed of in steamboat days.

But there is one remarkable and thriving reminder of the old days, the steamboat *Admiral*. We went aboard her for an afternoon excursion (pages 685 and 686).

The *Admiral* is a truly fabulous boat, the biggest inland river excursion steamer in the Nation, 375 feet long, five decks high, 60 feet from the water to the top of the pilothouse.

One of its main features is an enormous ballroom extending almost the full length of the boat and accommodating 2,000 dancers at one time. A 12-piece orchestra provides the music. Looking down on the dance floor is a spectators' gallery, also full boat-length.

The main deck is unbelievable. It is a floating carnival, a water-borne Coney Island, with every sort of bright and gaudy machine to play games on, painted horses for the kiddies, rifle ranges where grizzly bears taunt sharpshooters, fortunetelling machines, ice cream, and hot dogs. Even the two huge connecting rods that turn the great side wheels are decorated in bright colors and named Wimpy and Popeye. This amusement park afloat is as long as a city block.

Three of the decks are restaurant decks, and the amount of food sold must be stupendous. The fare for the all-afternoon ride is one dollar for adults. Dancing on the great floor is free.

The capacity of the boat is 4,000, and on the day of our excursion it was virtually sold out. Never have I seen such activity on any boat, such fun-making and food-stowing, so many camera bulbs flashing, such chattering of women and screeching of happy youngsters,

* See "Tom Sawyer's Town," by Jerry Allen, NATIONAL GEOGRAPHIC MAGAZINE, July, 1956.

† See "Taming the Outlaw Missouri River," by Frederick Simpich, NATIONAL GEOGRAPHIC MAGAZINE, November, 1945.

Towboat on the Ways Seems to Be Sailing Through Space

With the advent of the railroad, river shipping languished for half a century. Two world wars brought about a flourishing revival. Today the craft of more than 900 companies ply the Mississippi system and the Gulf Intracoastal Waterway.

Headed gulfward, tows push coal from West Virginia, Pennsylvania, and Kentucky, grain from the corn belt, and steel from Pittsburgh and Gary. New Orleans transships many cargoes to foreign ports.

Upstream, the barges tote South American coffee, nitrates, and bauxite, Cuban sugar, Manila hemp, Pakistani jute, and Pacific coast canned goods.

With a 5,000-horsepower engine and a crew of 15 to 17, the streamlined tow can push a string of barges carrying the load of two ocean-going freighters. Lashed together with steel cables and chain, the fleet may stretch 1,200 feet, longer than the largest liner afloat.

Ready for launching, this 153-foot goliath sits atop a steel-and-concrete foundation at Cape Girardeau, Missouri. All four decks wear a coat of yellow primer; white paint will be applied later. Welder in foreground joins steel plates.

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

Freight Train Rides a Steamer Across the River

Missouri-Illinois Railroad, a subsidiary of the Missouri Pacific, crosses the Mississippi two miles above Ste. Genevieve. Since no bridge spans this stretch, trains must travel by boat.

One of the Mississippi's oldest side-wheelers, the *Ste. Genevieve* ferries 18 freight cars at a time. A diesel locomotive pushes them on board in three rows.

Smoke belching from one of its twin stacks, the venerable steamer here begins firing up.

Ste. Genevieve, settled around 1735, ranks as Missouri's oldest town.

PHOTOGRAPHS BY GERALD H. MASSIE

Tom Sawyer whitewashing contest, held yearly at Hannibal, attracts youngsters from Iowa, Illinois, and Missouri. Boys line up, then dash to the fence at a signal. Speed, accuracy, and costume determine the winner.

Hannibal boys still swim and fish in the Mississippi and play pirates and Indians, as did Mark Twain's Tom and Huck.

such running about, such prancing to lively music. Passengers on the open upper deck paid some attention to the view. On all other decks everybody was looking in, not out.

The Mississippi has been largely given over to cargo traffic. The success of the *Admiral* and the *Avalon* is dramatic proof that there is still a place for at least a few of the great pleasure boats that once adorned the river.

Moored to the St. Louis levee near the *Admiral* was the *Golden Rod*, one of the last of the showboats. She still stages a melodrama every night at 8:30. The bill is changed once every two weeks. Capt. J. W. Menke, a sweet and salty old soul with a most infectious grin, has taken her up and down many a navigable river of the Mississippi system. The boat is half a century old.

We went early to have time to talk to the captain before the show began. The theater, he said, seats 500 on the main deck, 480 in the balcony. He showed us on the walls of his office pictures of former actors on the *Golden Rod* stage, including Red Skelton, and photographs of visitors, among them Will Rogers, Helen Morgan, Fredric March, and Tallulah Bankhead.

Edna Ferber, before she wrote *Showboat*, wired for a list of his stops. He didn't know who Edna Ferber was and didn't bother to reply. The telegram lay in an accumulation of papers. But when *Showboat* was brought to his attention, he fished out the telegram and framed it.

The play we saw was *Legal Prisoner*. The beautiful maiden was, of course, pursued by two men, one a hero and the other a villain. There was an old colonel too. He forgot his lines, and after a moment of gasping struggle to remember them, he clutched his neck and said, "Something wrong with my throat." That sent both him and the hero into a fit of the titters, so that they had to leave the stage.

The best seats were 75 cents. For those who wish to see a genuine old showboat still in action, here it is.

We sailed on to Cairo, Illinois. Returning to Saint Paul by air, we recovered our car and

Mississippi (left) and Ohio Rivers Converge at Cairo, Hub of the American "Egypt."

trailer and spent many days driving slowly through river towns back to Cairo.

There is something faintly tropical about Cairo, with its ginkgo trees, magnolias, canebrakes, cotton patches, and catfish—and fine old mansions, one of which, the Rendleman House, will be converted into a museum of steamboat relics and folklore.

Cairo, like Manhattan, is long and narrow and wedged in between two rivers—far greater rivers than those that pass New York. High levees hold back the Mississippi River on the one side and the Ohio on the other (above).

We drove down to the point where the two rivers meet. Walking out to the tip of the land, we had the dark translucent Ohio within ten feet of us on the left, the brown, opaque Mississippi equally close on our right. Stretching out ahead of us was a smooth, ripple-free band caused by the boiling of the meeting currents.

In the middle is point zero. For here is where the Upper Mississippi ends and the Lower Mississippi begins. Mileage is counted from this point upstream. Where we stand a marker indicates that we are at 0.8 upriver.

According to our Army Engineers map, that same point in midstream which is zero for the upper river is 964 for the lower river. This lower mileage is calculated from Head of Passes, where the river divides into a number of streams which carry its waters out

HENRY MORGAN

Motorists Touch Three States Within Minutes: Missouri (left), Illinois, and Kentucky

across Louisiana's swamps to the gulf. The longest of these is 20-mile Southwest Pass. Thus the extreme length of the Lower Mississippi is 984 miles.

The Mississippi's delta, geologically speaking, begins at Cairo. Ages ago an arm of the Gulf of Mexico penetrated to this point. The mighty river gradually filled it with silt and now winds nearly a thousand miles through land of its own making.

The Ohio, though shorter than the Missouri, contributes a far greater volume of water than either the Missouri or the Upper Mississippi.

The consequence is that from here on we have a quite different Mississippi River. It is no longer a sweet river; it is grand. It is no longer pretty; it is majestic. It has lost some of its friendliness; now it is to be feared as well as loved.

Despite the great dams, the dredging, and the many miles of levees, the Lower Mississippi is still not completely tamed. It still becomes at times a raging, power-crazy giant. It can carry enormous commerce to man's benefit, but it can also be guilty of occasional flooding, strange eccentricities, sinkings, and numerous drownings.

It is no longer a small-boat river. Except for two or three hazardous experiments, we do not use our little aluminum eggshell again until we reach the quiet bayous of the South.

But that is another story.

Daredevils on skittering planks dramatize the thrill of flight at the end of a rope

THE BOOMING SPORT OF Water Skiing

Story and photographs by WILBUR E. GARRETT
National Geographic Magazine Staff

AWKWARDLY I thrashed about in the lake until both skis pointed in the right direction at the same time, the tips just showing above water.

"Hit it!"

My shout to the driver sounded more questioning than commanding, but the boat's engine roared in response. The towrope, which had floated idly before me, now snapped taut in my hands, and the ski tips wiggled rapidly; water gurgled past as I strained against the pull of the rope.

Instantly and unbelievably the wiggling and gurgling stopped. I was out of the water, skimming along the surface.

Just as I was gaining enough confidence to stand erect and look around, the boat swung in a wide arc, and my skis slid astraddle the boiling edge of the wake. I lurched forward, jerked backward, the skis shot ahead, lake and sky spun together, spray exploded around me. I was back in the water.

Claims 3,000,000 U. S. Enthusiasts

Thus, this past summer, I made my first try at perhaps the fastest growing sport in the world—and found that he who water skis gets dunked.

I had come to Cypress Gardens, near Winter Haven in central Florida, to photograph experts in this booming pastime. But that first morning the temptation proved too strong. I wanted to find out firsthand what it was all about.

The lake was cool, clean, and inviting. Flying across its surface at the end of an insistent towrope had been an exhilarating feeling. I wanted more of it.

I was only one of some 3,000,000 people who now water ski in the United States alone. The American Water Ski Association reports that so far this year 70 tournaments have been held. Several colleges have added the sport to their athletic programs. In one semester more than 400 students joined the ski club at the University of Miami, Florida.

Popular Around the World

In Europe water skiing has spread from the French Riviera around the Mediterranean, through the lakes of Switzerland and Austria, and on to the cool, foggy Thames River in England. It is popular in Singapore, Sarawak, Sweden, South Africa, Australia, and South America. Enthusiasts have skied past crocodiles on the Zambezi River above Victoria Falls in Africa and in the locks of the Panama Canal. In Alaska members of the Arctic Aqua Club have introduced water skiing to the Eskimos.

Perhaps the biggest single boost to water skiing was the starring role Cypress Gardens played in the first Cinerama production in 1952. On the curved screen millions of people saw beautiful girls flashing beneath moss-hung cypress trees, and athletic young men hurtling through thin air on skis.

Curiously, the same man who invented the Cinerama photographic process, the late Fred Waller, 28 years earlier built and patented the first pair of water skis.

(*Continued on page 709*)

Kite-borne Water Skier Soars 40 Feet Above Cypress Gardens, Florida

Water skiers adapted man-carrying kites to their sport in 1950. Towed behind speedboats, they break free of the surface at 20 to 35 miles an hour and soar as high as 120 feet. Here Jon Holcomb swings from the bar, his arms flexed to absorb the shock of sudden gusts. A plastic rope connects his aluminum-and-canvas sail to the towboat. Spectators line the shore of Lake Eloise.

Suspended on Canvas Wings, Kite Man Gets a Gull's-eye View

Supported entirely by muscle, skiers are seldom able to prolong flights beyond a minute. To gain altitude, they rely on wind, boat speed, and

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manipulation of the kite. Crosscurrents and air pockets multiply the dangers. Eighty feet above water, Jack Wiley appears to brush the coconut palms with his skis. Triggering a switch taped to the bar, he fires a camera on the kite frame to take his own portrait.

Electronic Flash Freezes a Night Jump in Sequence

This remarkable photograph shows Nancie Rideout, holder of the women's jump record of 89 feet, soaring from the floating ramp.

To take the multiple exposure, the photographer strapped a light to Miss Rideout's head and stationed along her route four boatmen with high-speed flash guns. During the four-second exposure, each man fired his flash precisely as she passed. The third flash highlights spray from the towboat's wake below the skis.

At left Miss Rideout crouches for the approach to the ramp; on the take-off she snaps upright to gain lift; then leans forward, tilting skis against the impact; landing, she goes knee-deep in spray. The streak from her head lamp traces her trajectory.

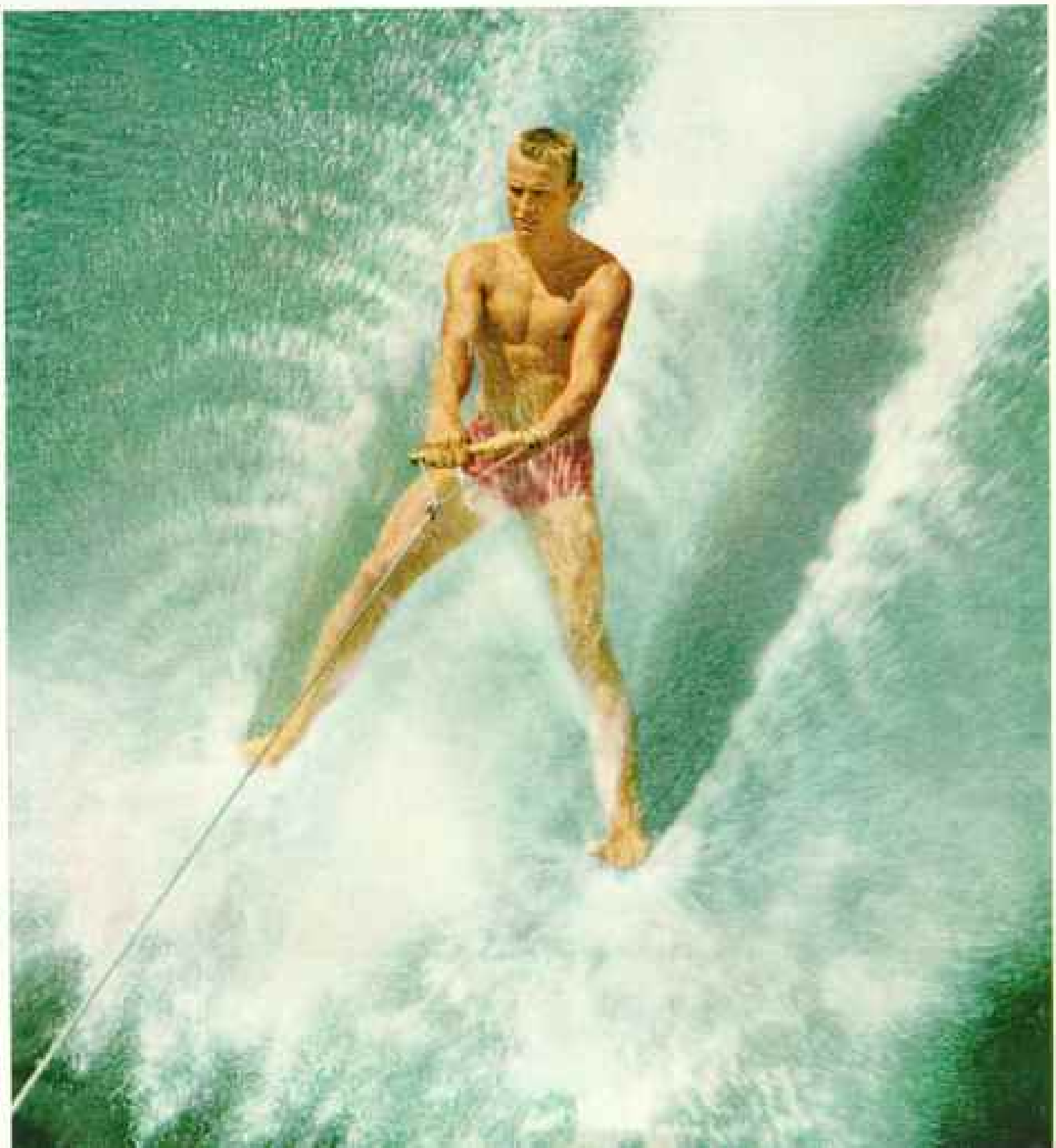
Ribbony Light Records a Graceful Slalom

Zigzagging on the single slalom ski past staggered buoys at speeds averaging 60 miles an hour, champion Simon Khoury traces sweeping arcs with his head lamp. Lit by flash guns, walls of water mark the turns. The red line at left records the towboat's direct 34-mile-an-hour course between buoys. Boat's wake shows above Khoury's head in the last flash exposure. The light's trail ripples in spots where he crossed the wake.

Hybrid of Air and Sea, the Heliboat Cruises on Whirling Rotors

Air currents spin the rotor blades as the boat gains speed, lifting the craft from the water like an autogiro. Igor Bensen, inventor of the heliboat,

looks down on skiers and their outboard tow 50 feet below. His altitude is limited only by the length of the towrope. Pontoons on the outriggers stabilize landings. A switch taped to the control stick operates a remote-control camera mounted on an extension of the outrigger boom.



The man responsible for Cypress Gardens, their landscaped beauty and spectacular water shows, is a lively, likable impresario named Dick Pope, Sr. Pope, who introduced the jump to water skiing as a youth in the late 1920's, was the one who lured me onto the end of a towrope with the enthusiastic claim, "Anyone who can swim can water ski."

I asked Dick, "What about this big boom in water skiing? How come?"

"Outboard motors, for one thing," he answered. "Skiing has been around for a long time, but it used to be the polo of water sports. Only a few could afford the big cruisers needed to pull skiers."

Now water skiing is figuratively spreading in the wake of the outboard boating boom. Since 1941 outboard motor sales have more than tripled. In the last few years, the number of people who give water skiing as the main reason for buying outboards has nearly quadrupled.

Professionals Don't Even Need Skis

"Another reason," Dick added with a smile, "is the professional show such as ours. The amateur led the way for the professional in most sports, but the opposite is true of water skiing. Champion performers here and in other shows around the country have inspired spectators to try."

Watching the precise grace of Dick's professional skiers, I understood what he meant. It looked so easy, so effortless. To spectacular leaps of 100 feet or more, acrobats on skis added a 360-degree pivot in mid-air. Others kicked off their skis and planed across the water on bare feet (opposite).

But even these difficult tricks did not prepare me for the last and most spectacular stunt in the show. As I watched, a muscular young man was towed away from the dock carrying over his head a huge canvas kite. Heading into the wind, he gained speed, crouched suddenly, sprang into the air and soared high over our heads, still wearing his skis. Hanging only by his hands, he climbed higher and higher (page 701).

I wondered how it would feel to be up there, swaying pendulumlike 100 feet above the lake, balancing the oversize kite against cross winds and sudden downdrafts.

Dick told me in direct words. "It's no place for you, Garrett. Out in Washington State last year a performer was killed doing that stunt, even though he was a veteran."

One skier, who plunged into the water from 50 feet when his temperamental kite took a dive, claimed that in the short time he was falling he heard voices telling him not to fly again. He hasn't.

However, I found I could do the next best thing—send my camera up on the kite.

Such a thing had never been tried before. There was a possibility it might throw the kite out of balance. Certainly it would add another factor to an already tricky stunt.

Despite the added risk, Simon Khoury and Jack Wiley made several flights with a remote-control camera riding above them on the kite's aluminum-tubing framework. Reaching over with his right thumb while high in the air, Jack touched the camera switch to make the photograph on pages 702-3.

Using much the same method, we photographed the even newer sport of heliboating. A rotor blade instead of a kite provides lift. The flier sits in the relative comfort of an incongruous flying rowboat (page 706).

Lights Trace Performers at Night

I then turned to another project—photographing the two main events in water-ski tournaments, jumping and slaloming. To show the difficult movements and perfect form both require, we decided to strap a light on skiers at night and trace their movements with a time exposure, using high-speed electronic flash to freeze the action.

Make better action pictures by waiting until after dark? I don't think either Nancie Rideout, who was jumping, or Simon Khoury, who was to slalom, had much faith in the project at first.

While waiting for darkness, I asked Simon, a native of Beirut, Lebanon, and a champion

Backward Swan and Barefoot Skiing Make Spectators Doubt Their Eyes

Joyce Kincaid, former junior girls' jumping champion, clings by a foot to the tow bar after pivoting from a forward stance. The ski binding turns on a swivel.

Buster MacCalla planes across the lake in a stunt that calls for superb balance and a powerful tow. Relatively few skiers have mastered the trick; they usually achieve it by stepping from a fast-moving ski one foot at a time. One daredevil taught himself by running along a beach, towline in hand, and skidding from sand to water. Spectators watching MacCalla for the first time feel sure he wears skis.

Jumper Whirls Like a Top in the 360-degree Helicopter Spin

Few sports rival water skiing in its variety of seemingly impossible stunts. Professional troupes thrill spectators with such acrobatics as the backward jump, double jump, and swan toehold (page 708). Tournaments award points in three cate-

at both snow and water skiing, to explain the difference between the two.

"The difference?" he replied. "Let me put it this way. The pull of the rope on the water takes the place of the pull of gravity on the slopes. The basic technique is the same. Both require coordination, plus balance, plus skill, plus judgment."

"But the snow skier has much more freedom of movement," I ventured.

"When you learn to water ski better, you will see the difference is less than you think.

"As I run the slalom course out here," Simon went on to explain, "I travel almost twice as fast as the boat. It goes in a straight line between the two rows of staggered buoys at 34 miles an hour. But I swing back and forth, back and forth"—swishing movements of his hands emphasized his point—"crossing the wake to pass outside each buoy."

Earlier in the afternoon we had anchored boats in which to mount the flash units along the jump path and slalom course. Skiers from the show had volunteered to fire the lights. It would take perfect timing to trip the switches just as Nancie and Simon shot by in the dark, only 25 feet from the boats.

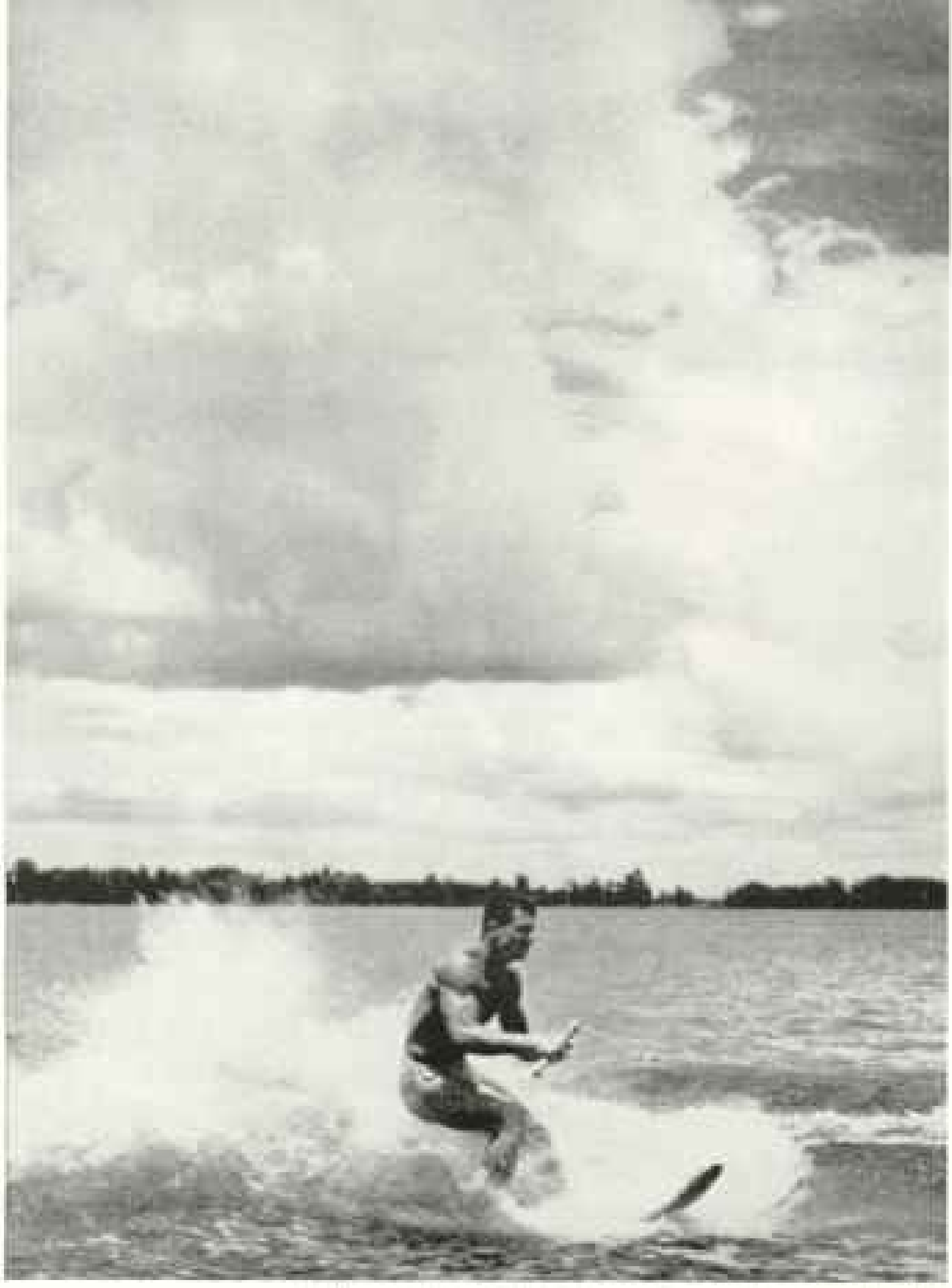
The moon rose and cast a soft, helpful light over the whole operation. So clear was the night that about 10:00 we could see the exhaust flame of a rocket from Cape Canaveral, 80 miles away, shoot into the heavens.

Four Flashes Catch Perfect Jump

Nancie strapped on the light, jammed her feet into the rubber ski bindings, and was towed away from the dock, her light bouncing along behind the boat.

Since she had never jumped at night, the crew was tense as she swung around in the darkness and sped toward the 12-foot-wide floating ramp. I opened my shutter.

The light shot into my view finder, and one flash isolated Nancie in the darkness.



ALL PHOTOGRAPHS BY WILBUR E. GARRETT, NATIONAL GEOGRAPHIC STAFF

gories: jump, slalom, and tricks. Mike Osborn demonstrates the helicopter spin, a jump involving a complete revolution of the skier's body in mid-air. While making his approach he grasps the bare line to gain slack and passes the tow bar behind his back. Leaving the ramp (left), he releases the slack, and the rope snaps his body into the spin. Completing the turn, he lifts one arm for balance while tension in the line brakes his spin. Landing, he resumes a two-handed grip.

Up the ramp hurtled the pin point of light; another flash fired as she cleared the edge; a split second later a third; and finally a fourth flash showed Nancie had completed the jump successfully (pages 704-5).

"Beautiful! Perfect timing!" I shouted.

To be safe, we shot it several more times. On the last jump Nancie fell as she landed. Momentarily the light shone from underwater, then popped to the surface and bobbed around on Nancie's blond head like some kind of channel marker. Just before the pick-up boat arrived, the light went out.

"Attracted bugs," Nancie sputtered.

Satisfied that we had the jump picture, we moved to the slalom run. Simon took the light from Nancie. The cameras were readied.

The hefty towboat roared down the course with the firefly-like light skittering in its wake. The crew, now experienced, worked with precision, flashing Simon just as he rounded the buoys.

Watching a perfect slalom is exciting enough, but dramatized by the darkness and flashing lights, it became a real spectacle.

Anxious to see the results, we had a midnight snack while the color film was being developed. About 3 a.m. the report signaled success and the completion of my work.

Later, at the National Championships at Ida Cason Gardens near Columbus, Georgia, Nancie became the new women's champion, taking first place in every event and setting a new jump record of 89 feet. Among the men, Simon won the slalom and placed second overall.

On my own first attempt I swam more than I skied. But the second time out, I crossed in and out of the wake with some confidence.

I realized it doesn't require perfect coordination, timing, balance, and judgment to enjoy water skiing. Even for the beginner, the sport is thrilling, it is fun—and who wants to fly a kite anyway?

Oil riches, land poverty, ambitious leaders,

and emotional peoples create tensions in

The Arab World

FINGERING his prayer beads to soothe his emotions, this simple Syrian countryman symbolizes the ambitions, doubts, and fears of present-day Araby. Wearing his desert kaffiyeh with black cord, he mingles with city youths in modern dress to hear a fervent orator preach the doctrine of Arab nationalism during the campaign to unite Syria with Egypt. The politician's thundering words and compelling gestures rekindle a sense of destiny that faded with the collapse of an Arab empire that once carried Islam into medieval Europe.

Patient Arabs, accustomed for centuries to accept their lot with a shrug and the fatalistic words, "It is the will of Allah," now dream of casting off the dead weight of the past and rallying all their fellows under one banner. Some 80 million people in the Arab world owe allegiance to more than a dozen kingdoms, republics, and other states from the Persian Gulf to northwest Africa.

As it makes its way into the 20th century, the Arab world possesses three assets and one enormous liability:

First, its countries share a common religion, language, and culture. Islam retains a dynamic vigor, and ranks as one of the world's great faiths.

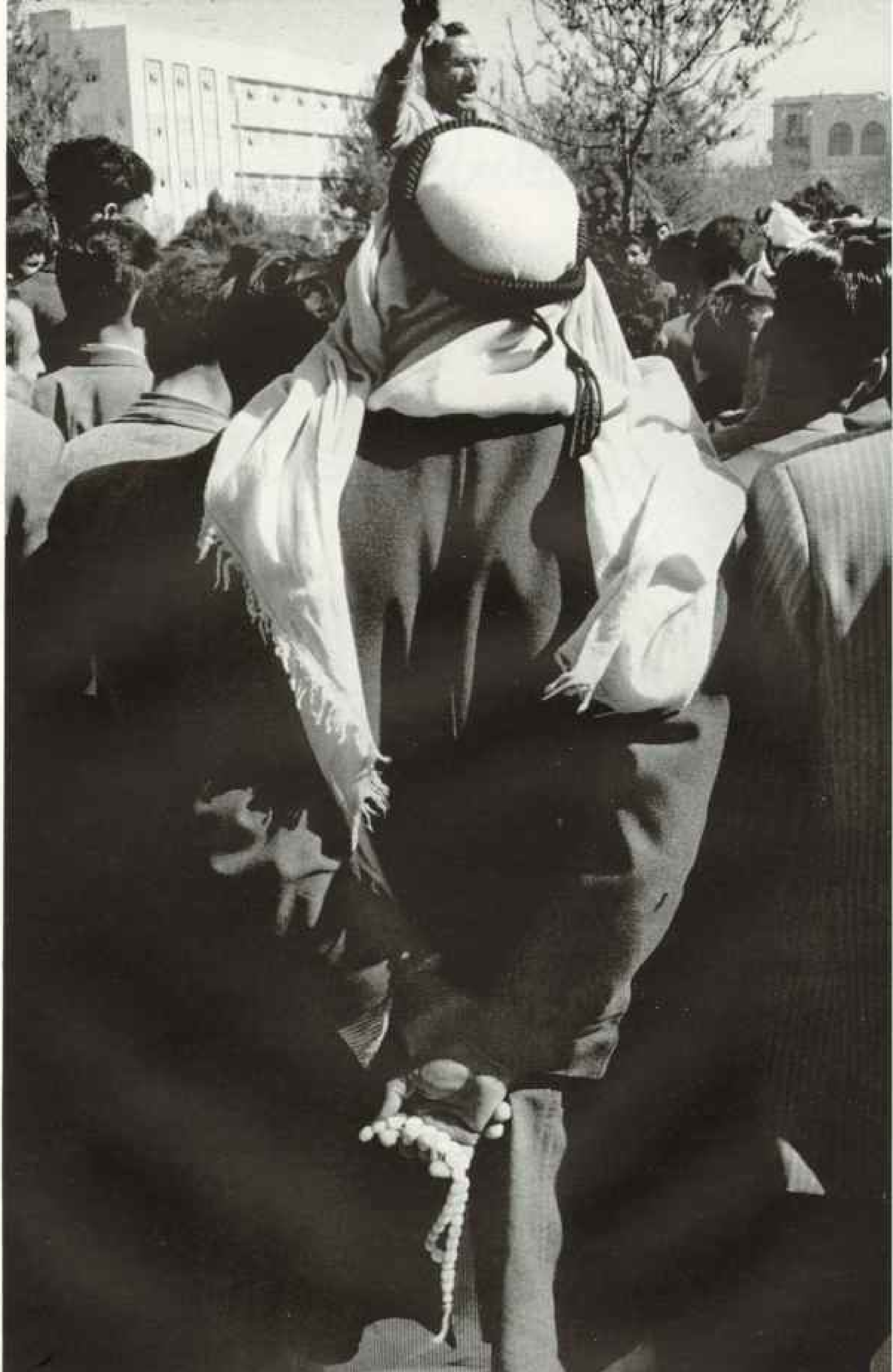
A second asset is the Arabs' strategic position astride the crossroads of the world, the thoroughfare between Europe and Asia. From the ancient spice caravans, from the Crusaders, and from the modern oil industry, the Arabs have exacted tribute in wealth or ideas.

Oil, the third asset, flows from Near Eastern fields to the corners of the earth, pumping lifeblood into Western industry. Without it Europe's wheels might grind to a halt. More than half the world's proved crude reserves lies beneath deserts on which Bedouin have pitched their goat-hair tents for millenniums.

The tremendous liability that counters these advantages is the poverty and illiteracy of the vast majority. Lands that bloomed in Biblical times no longer produce enough to feed their own people. Irrigation and advanced agricultural methods provide the only answer.

Physically, much of the Arab world resembles the deserts of the southwestern United States. Scant rains mean small yields. Where irrigation or above-average rainfall exists, Arabs cultivate their lands intensively. Where vegetation consists mainly of coarse scrub grass, nomads drive their flocks in search of forage, moving on when pastures fail.

Nationalists early this year told Syrians and Egyptians that the joining of their countries would accomplish a giant stride toward the rebirth of the Arab world. Soon after the Damascus orator shown here finished speaking and his listener turned from his beads to the ballot box, the two peoples voted to merge. That event encouraged Arabs everywhere to work toward the recapture of their former glory (see map on following pages).



The Arab World

Present-day Arab World.

Greatest Arab penetration occurred in the 100 years following Mohammed's death, A.D. 632.

Builders of the Arab Empire, A.D. 632-732.

Arabs who migrated to the Tigris-Euphrates valley, Palestine, and Syria 3500 to 1200 B.C.

Oil Fields

Ireland
Great Britain
London
Nether-lands
Belgium
Paris
France
Switzerland
Austria
Hungary
Romania
Yugoslavia
Bulgaria
Albania
Greece
Istanbul
Marseilles
Italy
Rome
Madrid
Portugal
Lisbon
Spain
Granada
Atlantic Ocean
Mediterranean Sea
Gibraltar (U.K.)
Algiers
Tunis
Tunisia
Rabat
Casablanca
Morocco
Tripoli
Benghazi
Algeria
(France)
Libya
Ifni
(Spain)
Spanish Sahara
Athens
Alexandri
U. A
Egyptian
Sud

ARAB DOMAINS

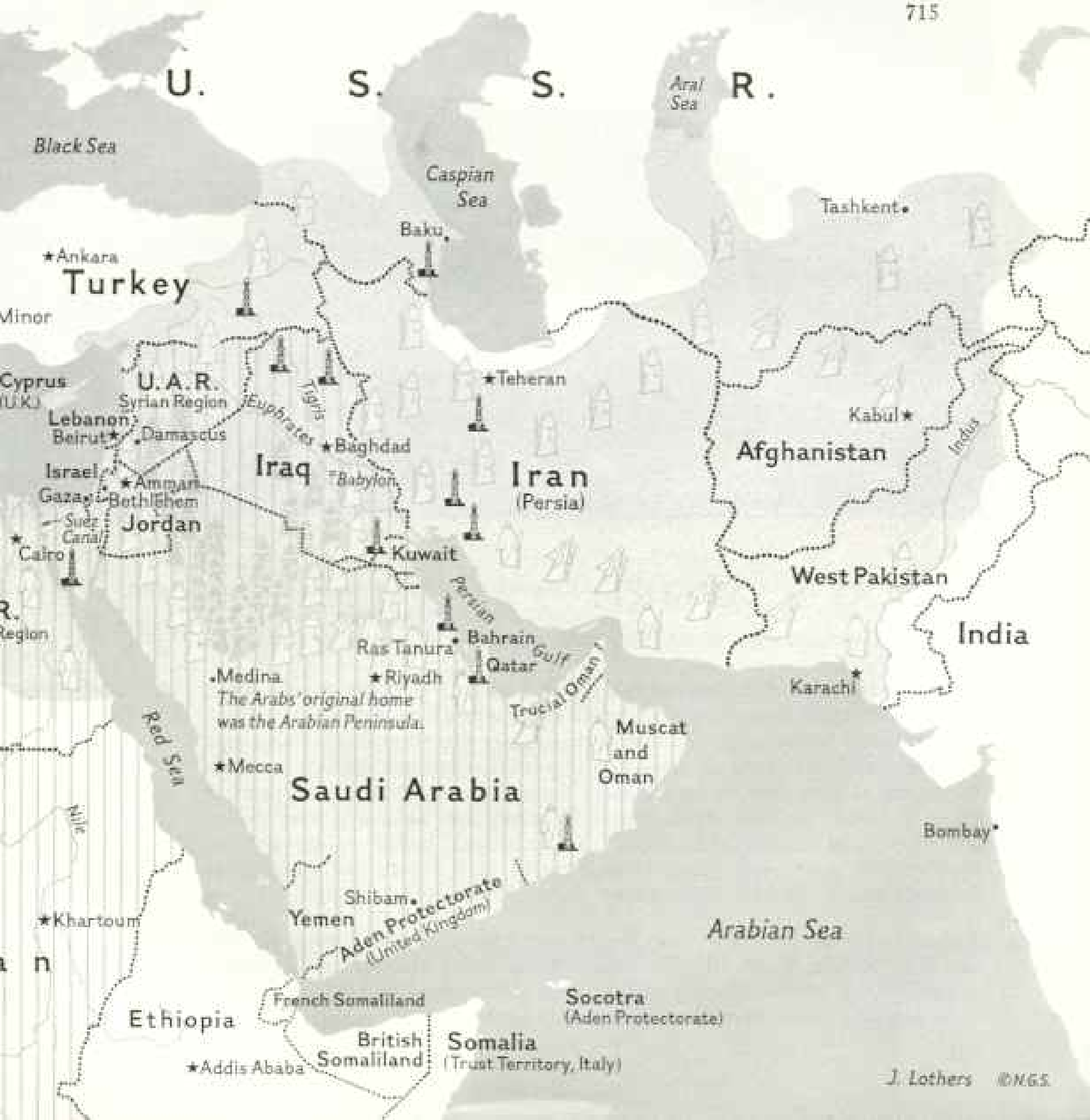
Today's Arab world, as defined by the Arabs, extends south from Turkey to the Arabian Sea, east to Iran and the Persian Gulf, and west across northern Africa to the Atlantic. In central Africa, Sudan's boundary drops almost to the Equator. The United Arab Republic, Libya, Saudi Arabia, Yemen, Jordan, Iraq, Sudan, Lebanon, Morocco, and Tunisia belong to the Arab League. Egypt and Syria form the United Arab Republic.

SWIFT CONQUEST

The Arab empire that inspires today's nationalists was born when their zealous, warlike ancestors burst out of Arabia in the 7th century. Simple tribesmen swept aside armies and entire nations and escaped the poverty of their barren peninsula.

The main campaigns followed Mohammed's death A.D. 632. To north and east, Arabs defeated Syrians and Persians and pushed on to the Indus River. In the west, they drove across northern Africa to the Atlantic. Within a century Arabs and their converts, the Moors, were the lords of Spain, with a foothold in France. In the Dark Ages Islam's scholars inspired Europe to a new love of learning, especially in mathematics, chemistry, navigation, and medicine. Moorish architecture influences Spanish America and the United States to this day.

By 1492, when Ferdinand and Isabella defeated the Moslems at Granada and united Spain, the Arab career in the west had run its course. From masters, the Arabs ultimately became subjects; most of their lands were ruled by the Ottoman Turks from the 16th century to the early years of the 20th.



[HENRY BRYON (ABOVE) AND DEREN, BLACK STAR]

ARABY'S SWORD

Brandishing rifles as they charge across an Algerian plain in the 1920's, these fierce horsemen descended from Arab warriors whose conquests forged an empire.

Wise in the ways of the inhospitable desert, zealous in their devotion to Islam, loyal to their chiefs, the tribesmen survived for centuries as raiders and herdsmen.

Historically the force that molded Arab destinies, the tribesmen are no longer a decisive influence. Strafing planes and armored cars can seek out their remotest camps and outpace their swiftest horses. Desert nomads wrote one of their last pages in history in 1918, when, with British help and leadership, they routed the Turks and captured Damascus. Jordan's Arab Legion enlists Bedouin warriors but gives them jeeps to supplement their horses and camels. It demands loyalty to king and country above that to desert sheik.

Commander of Jordan's Arab Legion until his dismissal by King Hussein in 1956, Sir John Bagot Glubb is one of the last of a colorful line of British desert soldiers. Called Glubb Pasha, he lived and fought with his men, adopted their customs, and treated Arab leaders as brothers.

SUEZ: WORLD CROSSROADS

Bullet-scarred windows in a Port Said lighthouse—mementos of aerial strafing—look out on a tanker steaming out of the northern end of the Suez Canal after the fighting in 1956. Battle damage, ship, and canal exemplify the strategic importance of this waterway, which links the Mediterranean and Red Seas and carries more than two and a half times as much tonnage as the Panama Canal.

Upon the canal rests Egypt's power among nations; administering it increases her leadership in the Arab world. Her control dates from July, 1956, when she expropriated the canal from the corporation that dug and operated it. To protect the canal, Great Britain and France intervened during the struggle between Egypt and Israel, but called off their expeditionary forces in deference to world pressures. Today the canal's lucrative tolls go to Egypt.

Cairo, the Arab world's largest city, succeeded Baghdad as the center of Arabic culture. Cairo's newspapers, magazines, and motion pictures circulate among Arabs everywhere, and its powerful radio stations bombard the Arab world with music and news often laced with nationalist propaganda. Moslem theologians have lectured at Cairo's Al-Azhar University since 972, but Egypt's first secular university, Cairo University, was founded as recently as 1908.

Bales of cotton awaiting shipment on the piers of Alexandria come from the Nile's fertile valley and delta. This narrow strip, less than 4 percent of Egypt's area, produces two-fifths of the world's long-staple cotton, the nation's only substantial export. Beyond the valley, Egypt presents barren desert, save at a few oases green with grass and date palms. The country's 17 million farmers, called fellahin, endure an exceptionally low standard of living.

BLACK STAR (EXPOSITE) AND NATIONAL GEOGRAPHIC PHOTOGRAPHER J. BAYLOR ROBERTS

RIVER OF OIL

A pipeline carries a silent, invisible stream of crude oil across the Saudi Arabian desert to tankers at Ras Tanura, a port on the Persian Gulf. Arab fields along the Persian Gulf and in northern Iraq pump nearly three and a half million barrels of crude a day, about a fifth of the world's production. Foreign companies operating under concessions discover the pools and develop the oil. Arab governments receive royalties of at least $800,000,000 a year. Some Arabs contend their countries deserve better than the usual fifty-fifty split.

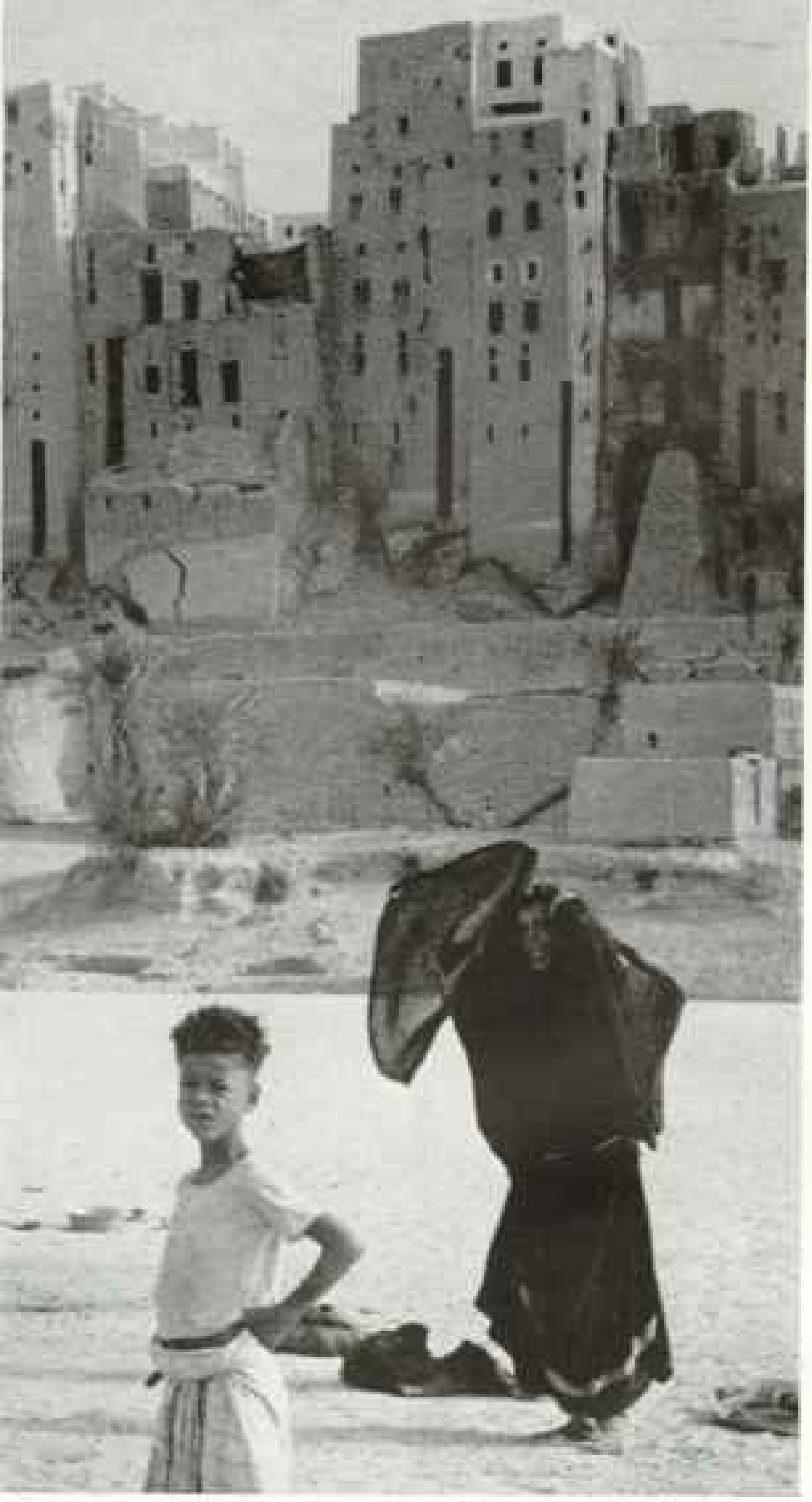
MICHAEL LEE, ARAMCO

BENEFICIARIES

Young Saudis studying at an oil company's training school at Dhahran owe their technical education to Saudi Arabia's oil prosperity.

King Saud (seated) represents another beneficiary, the Saudi Arabian Kingdom. Saud's father, Ibn Saud, forged warring tribes together to form his desert realm and struck a bargain with the Arabian American Oil Company to bring in the wells. Board chairman F. A. Davies (right) represents ARAMCO.

Another oil-rich state, the tiny sheikdom of Kuwait, has more proved reserves than the entire Western Hemisphere.



PROGRESS

Women of Shibam, a skyscraper city in the Aden Protectorate, gather at a well to fill their goatskins. They still cover their heads when strangers approach.

Shibam's 500 towering buildings, their architecture reminiscent of ancient Babylon, rise as high as eight stories. No steel or concrete reinforces their adobe brick façades. City walls are intended to repel desert marauders.

The people of Shibam once prospered as the world's leading dealers in frankincense. During the past hundred years many migrated to the Middle and Far East as traders, returning home after amassing fortunes.

In Riyadh, political capital of Saudi Arabia, other Arabs live in apartment houses hundreds of years and miles removed from Shibam's skyscrapers.

Saudi Arabia's oil millions enable its new middle class to live in easier circumstances than their tribal cousins. Modern houses, highways, and shade trees, all but unknown in the desert until oil revenues put them there, demonstrate that some Saudis have broken with their past to live in the 20th century.

WOMAN'S PLACE

Vivacious proof that modern Arabs no longer isolate women and insist they wear a veil, Rawia Attia—here receiving an Indonesian visitor—won a seat in Egypt's National Assembly in the 1957 elections. With their new status, Arab women find opportunity in business, public life, and education. Their traditional submissiveness stemmed from customs imported from Asia Minor; no precept of Mohammed requires it.

Tunisian students (above) march in celebration of their country's independence day; a generation ago no Arab girl would have done so.

That concealing mask, the veil, once prevalent among Arab women, can now be conspicuous by its presence. Few faces hide in this Tunisian crowd.

KEVIN SALORIS (OPPOSITE) AND GEORGE ROGERS, MAGNUM

U.N. AID Squatting like a tailor out of *The Arabian Nights*, a refugee girl at a United Nations handicraft training center embroiders piecework to be sold in a bazaar. The center, in the Gaza Strip on the Egyptian-Israeli border, teaches a handful of refugees to become self-supporting but lacks funds to complete the program.

H. R. JORDAN (ABOVE), UNITED NATIONS (LEFT), AND THOMAS J. ABERCROMBIE, NATIONAL GEOGRAPHIC STAFF

REFUGEES

This Arab family huddled in a Biblical tableau in a cave near Bethlehem, Jordan, owns camel, ragged clothes, and earthenware pots but has little hope for the future. Almost a million like them left their homes in 1948 following the partition of Palestine and creation of Israel.

Henry Labouisse, former head of the United Nations Relief and Works Agency that cares for the refugees, warns that their existence as unsettled minorities in host countries is "bound to cause tension." But Israel, the Arab nations, and the refugees cannot agree on resettlement, or any other solution.

Dreary camps, seething with idleness, frustration, and resentment, huddle in Jordan, Lebanon, Syria, and Egypt's Gaza Strip. Only Jordan has given citizenship to its refugees —about half a million of them, more than a third of the country's population.

UNRWA begs funds from U.N. members, but only a few respond. The agency gives each refugee about $28 worth of food, shelter, and medical care a year. Its remaining funds are spent for education and rehabilitation.

Makeshift camps like this shanty town in Lebanon hold swarms of displaced persons who, according to Mr. Labouisse, "bitterly oppose" resettlement and demand return to their old homes or reparation.

"We are not dealing solely with an agency, a technical organization," says Mr. Labouisse, "but with the human problems of many people. They and their future are what is at stake. And on them—the homeless refugees —rests, in large measure, the ultimate stability and peace of the Near East."

ABU BAKR (RIGHT), AND HIS SON BURRI, MARROW

"Allah," say the giant characters on the whitewashed wall of a mosque.

The Koran, holy book of the Moslems, states the creed of Islam in the simple, measured cadences of classical Arabic: "Say ye: 'We believe in God, and the revelation given to us, and to Abraham, Ismail, Isaac, Jacob, and the Tribes, and that given to Moses and Jesus, and that given to (all) Prophets from their Lord: we make no difference between one and another of them: and we bow to God (in Islam).'"

BOWING TO MECCA

A reverent Moslem kneels, then touches his head to the carpet in Cairo's ancient Amr-ibn-el-Aas Mosque. His prayers, spoken five times each day and pointed toward Mecca, Islam's holiest city, signify his submission to the will of God.

Mohammed, Islam's Prophet, traveled among the idol-worshiping Arabs of the 7th century preaching God's universality. He told them that all men, regardless of color or station, were equal in God's eyes. Moslems revere him as a teacher but not as a divinity. Islam, the body of Moslem belief, finds expression in the Koran, which contains what Moslems regard as God's revelations to Mohammed, and the Hadith, a collection of Mohammed's teachings assembled after his death.

Like Christians, Moslems divide into differing groups, but all hold implicitly to five basic tenets laid down by the Prophet. Besides praying five times each day and acknowledging God and Mohammed as His Prophet, the faithful must help the poor, fast during the days of Ramadan, and, if able, make at least one pilgrimage to Mecca.

THE NEW ORDER

Celebrating Syrians, some jubilant, some thoughtful, push through a Damascus square on February 21, 1958, the day their country voted to join Egypt and form the United Arab Republic. Conspicuous beside a lamp-

RENE BURRI, MAGNUM

post, a raised standard shows the face of Egypt's Gamal Abdel Nasser, who heads the new republic. Nasser came to the presidency of Egypt in 1956, four years after he had helped to oust Farouk, the country's last reigning king. His fervid followers work within Arab nations to maneuver them into the nationalist camp.

THE FUTURE

Nationalism, with its strong emotional appeal, promises primarily a political solution to the Arab's difficulties. But his most pressing problems—illiteracy, disease, and low living standards—cannot be solved with slogans or votes.

Arabs have found they can literally buy water with oil. But while desert soil lies barren and unproductive, awaiting expensive leveling and irrigation, only Saudi Arabia, Iraq, Bahrain, Egypt, Kuwait, and Qatar have developed rich oil fields. Many Arabs advocate an economic federation that would channel more of the petroleum revenues, not into the hands of spendthrift sheiks, but into projects beneficial to the people.

Using Arab refugee manpower and U.N. contributions, the United Nations Relief and Works Agency has launched a promising reclamation project in the Gaza Strip. By planting thousands of quick-growing trees, such as acacia (below), the agency has stabilized shifting sands and raised green thickets receptive to pasture grasses. But UNRWA's efforts, and those of others, appear small when compared to the empire's onetime splendor. Realistic Arabs know the road ahead has many pitfalls and offers not only a challenge to the spirit but a call to hard labor.

Gaza refugee plants a seedling deep to tap desert moisture

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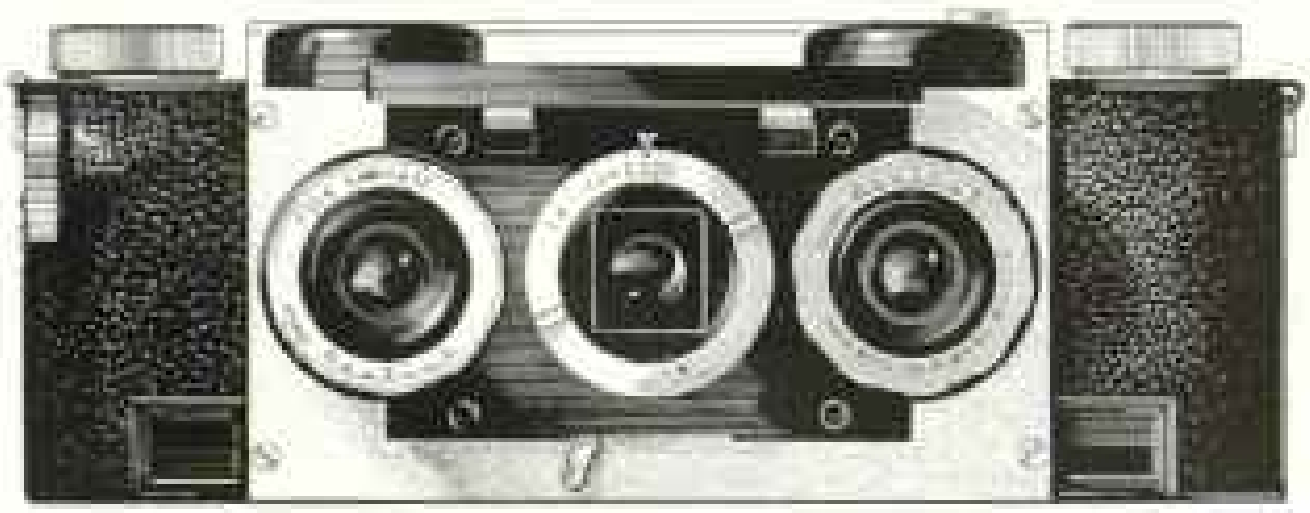

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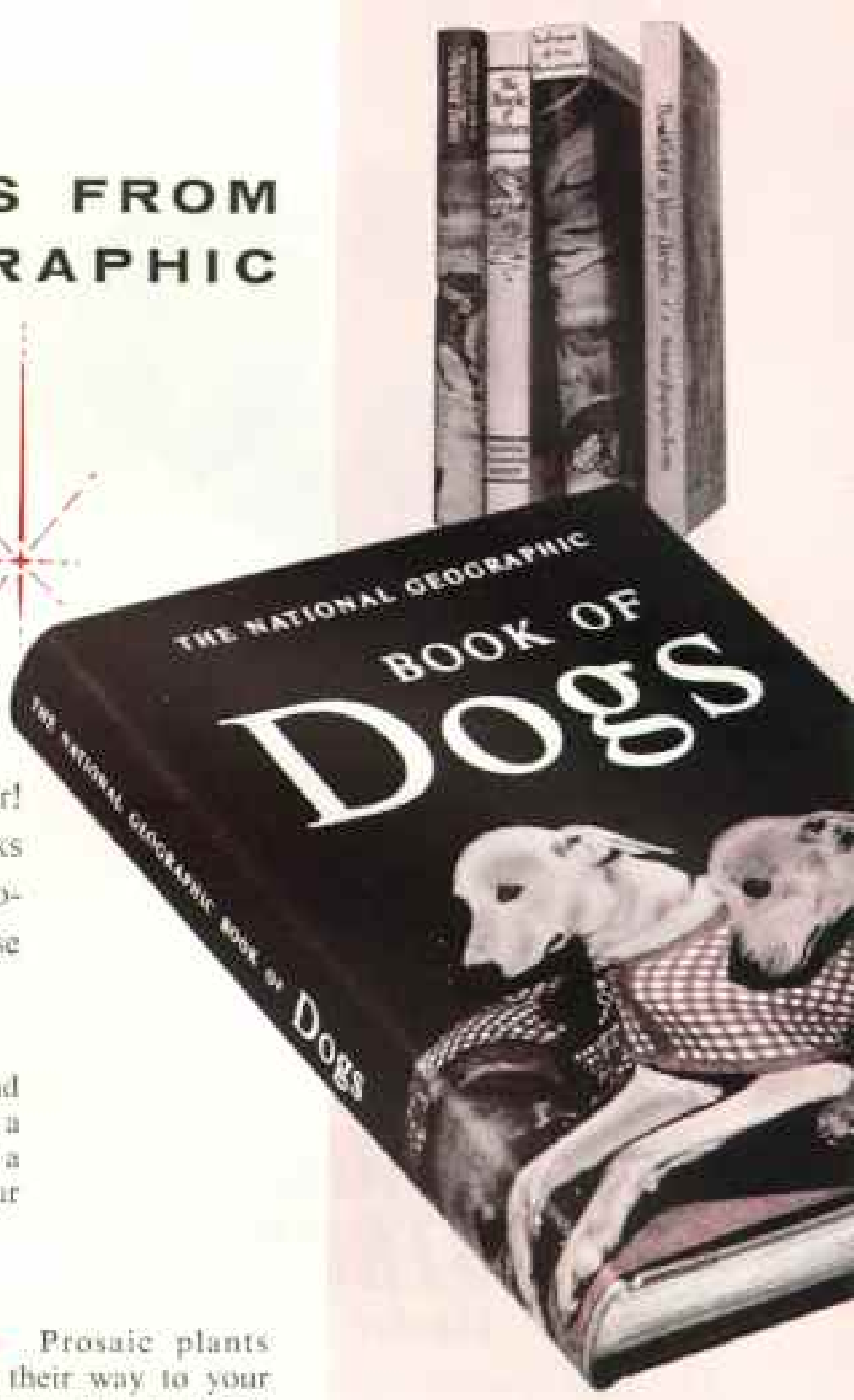

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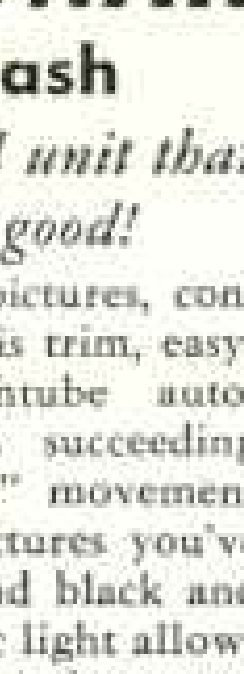

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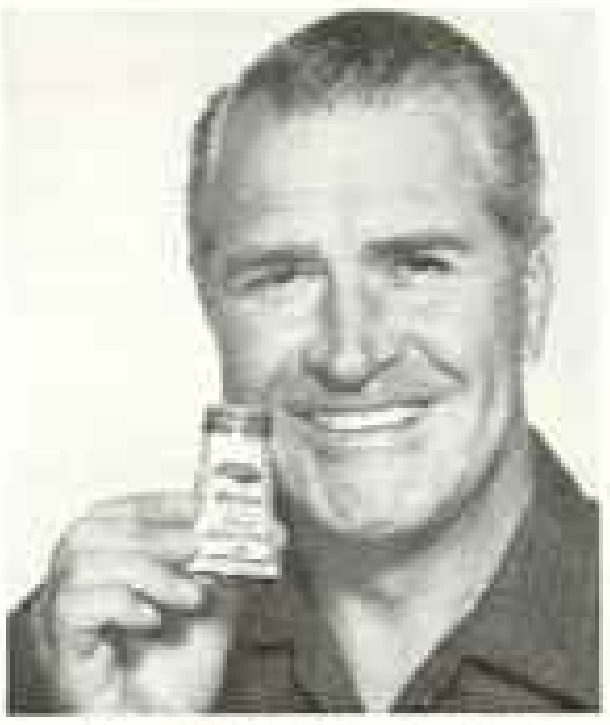

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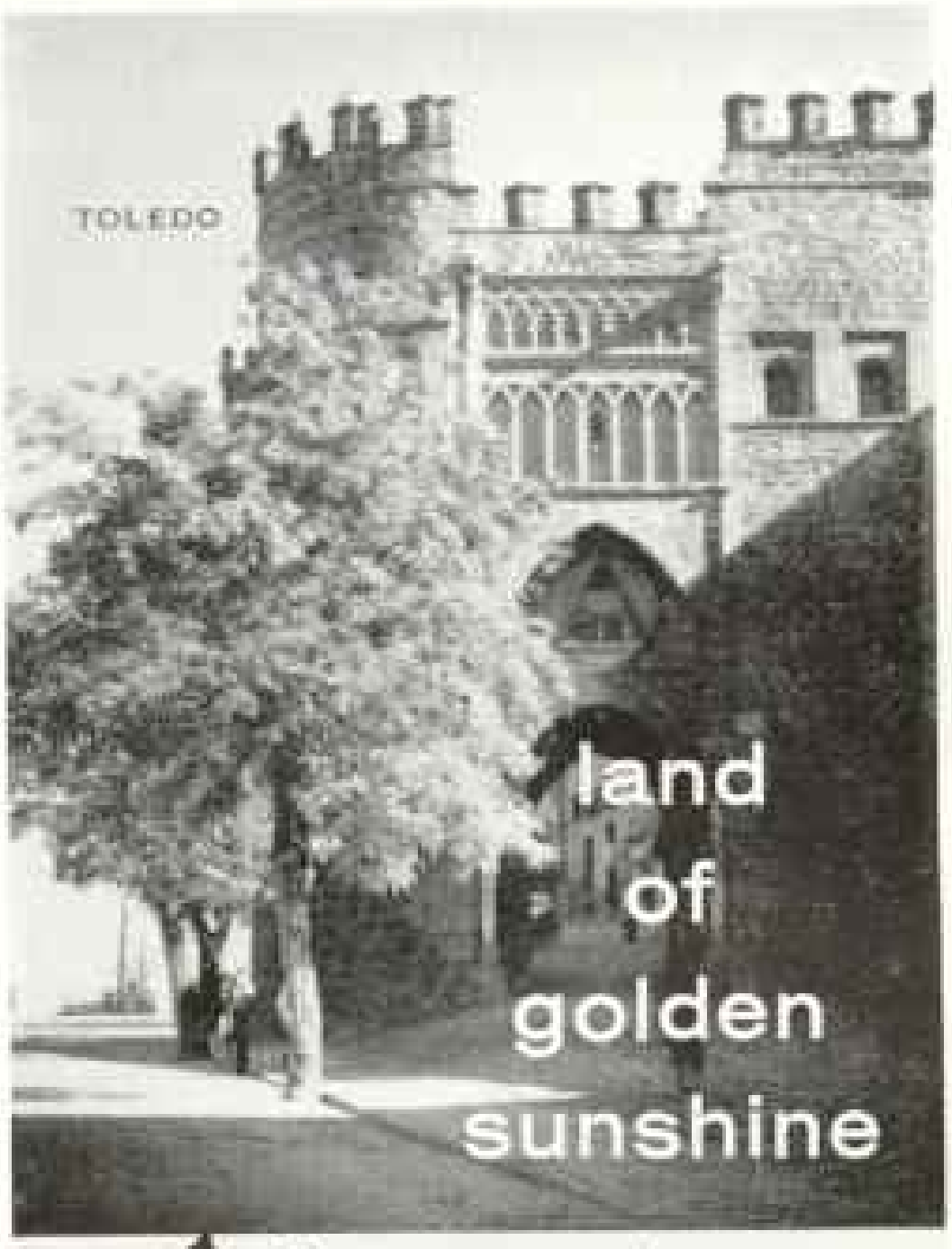

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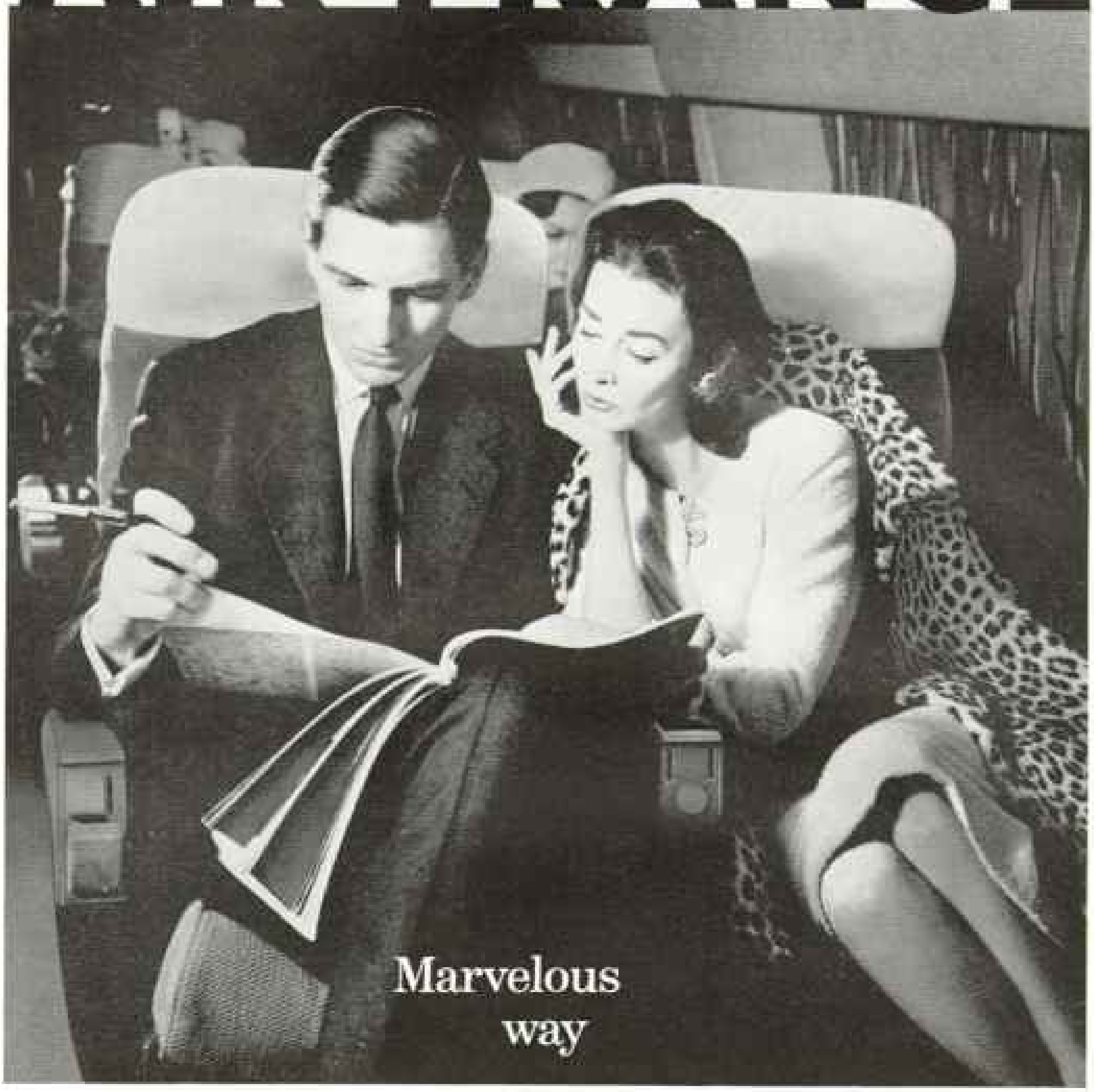

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