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Turkey Paves the Path of Progress

BY MAYNARD OWEN WILLIAMS

Europe Looks at Asia Across the Bosporus, World Crossroads Since Jason's Voyage

AS I sat chatting with a Turkish journalist in his office in Ankara, a messenger entered with a sheaf of heavily headlined newspapers. My friend skimmed one across to me.

The black letters, in the nation's modern alphabet of Latin characters, announced that Turkey had offered to send troops to join the armed forces of the United Nations in Korea.

The Turkish Brigade, 5,190 strong, and third largest United Nations contingent in Korea, arrived in the battle zone six weeks before the Chinese Communist armies launched their offensive in November, 1950.*

By the end of that month the Turks had shown their mettle in decisive fashion. They were called on to plug a gap between retreating South Korean forces and the exposed flank of the American Eighth Army. The situation was critical.

Short of food and ammunition, the Turks stopped the Red flood with bayonets, sticks, and bare fists for two days, and protected the American flank. Their mission accomplished,

* By mid-1951, 16 members of the United Nations had sent armed forces to aid Korea in its fight against Communist invaders; three had sent medical units. The contingents:

Army units—United States, Great Britain, Turkey, France, the Netherlands, Greece, Canada, Belgium, Luxembourg, Philippines, New Zealand, Australia, Thailand, Ethiopia; Naval units—United States, Great Britain, Australia, New Zealand, Canada, the Netherlands, France, Thailand, Colombia; Air Force units—United States, Great Britain, Union of South Africa, Australia, New Zealand, Canada, Greece; medical units—Sweden, India, Denmark. The Republic of Korea had all its land, sea, and air forces in action.

142 George Pierson, Three Lions

Kemal Atatürk in Bronze Surveys Ankara, Capital of the Republic He Fathered

Turkey's first President stands in National Square, where main streets cross. A figure at the monument's base (lower left) represents one of the women ammunition carriers whose valor helped the nation win its independence after World War I. The broad avenue leads to the railroad station.

they were ordered to withdraw. Officers and men marched the 50 miles back to Pyongyang, carrying their wounded on their backs. Every tenth man had been a casualty (page 166).

The late Lt. Gen. Walton H. Walker, commander of the American Eighth Army, pinned medals on Brig. Gen. Tahsin Yazici and 15 of his gallant men (page 147). General MacArthur, visiting the Korean front in February, said, "In Tokyo they are calling the Turks the Bee-Bee Brigade—bravest of the brave."

Every day for centuries barefoot figures have formed a tiny group before the prayer niche in Istanbul's old Mosque of Suleiman the Magnificent (pages 149, 150). But after the Turks won fame in Korea, the huge rugs were crowded with Turks praying for their soldiers, far from home.

More than 32,000 enlisted men in the Turkish Army volunteered for service in Korea to replace the casualties. Six hundred, chosen by lot, were sent to join the Brigade.

The orders which sent the Turkish Brigade to Korea came from a government elected by the people. This new Turkish democracy was what my Turkish friend and I had been talking about in his office.

Nearly 8,000,000 Turks, out of a population of 20,000,000, went to the polls to elect members of the Grand National Assembly. In

141 National Geographic Photographer Maynard Owen Williams

Faithful Moslems, Heads Covered, Shoes Removed, Bow Toward Mecca from Ship Deck

About 800 such travelers, including women and children, accompanied the author on a five-day Black Sea voyage from Istanbul to Hopa (map, pages 144-5). Throughout the trip they lived in the open. Some raised tiny tents against rain and sun. Five times a day they lined up on hatch covers for prayers.

turn, the Assembly later elects one of its own members as President of Turkey. In free and orderly balloting, by both men and women, the Democratic Party voted out of power the Republican People's Party of Kemal Atatürk and İsmet İnönü, Turkish strong men who had been in office 27 years. Celal Bayar, former Prime Minister under both leaders, became the nation's first President under a two-party system.

Said my friend: "Maybe the Democrats will win again; maybe the Republicans. But the 1950 election proved that the choice lies with the people. That, as we see it, is democracy."

A new 20-kuruş (about seven cents) postage stamp pictures three young Turks in modern dress watching an aged farm woman casting her ballot on May 14, 1950. On that day, absolute monarchy, benevolent dictatorship, and one-party government came to an end.

Tsar Nicholas I called Turkey the "Sick Man of Europe." While I taught in Turkey before World War I, Italy and the Balkan lands were carving off great hunks of the Ottoman Empire, which extended from the Adriatic to the Arabian Sea. But Russia faces no "Sick Man" now. Turkey today is the most powerful nation between Italy and Pakistan, with an army of some 400,000 men.

Turkey Controls the Straits, Prize of Contending Armies Almost Since History Began

The 28-year-old Republic is a bulwark of democracy.

On recent visits to Turkey for the NATIONAL GEOGRAPHIC MAGAZINE, I had arrived by air. This time, on a journey to gather material for a sixth article describing life in Turkey, I arrived with my wife at Istanbul by ship, as beauty lovers should.

Aboard the splendid *Trabzon*, newly reconditioned by the Todd Shipyards Corporation, of San Francisco, we passed Istanbul's glamorous skyline and rounded Seraglio Point, where Bosporus meets Golden Horn.*

Here, for 2,000 years, stood the ancient acropolis of Byzantium. A. D. 330 the city was renamed New Rome, but shortly thereafter the Greek title Constantinople superseded it. Since 1930 it has been known officially as Istanbul. Here, inside the Imperial

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Turkish Republic Comes of Age," by Maynard Owen Williams, May, 1945; "Constantinople Today," by Solita Solano, June, 1922; and "Constantinople and Sancta Sophia," by Edwin Grosvenor, May, 1915.

Her Troops Face the Iron Curtain on Two Frontiers, the Bulgarian and Russian

Gate, for 470 years Turkish sultans had their pleasure palaces.

Here was the Seraglio of sultan and slave. Its customs were those of the divan. "Divan" was the name of the court, of the room in which it was held, and the couch on which the sultan sat. A divan was also the display counter for harem beauties.

We docked at Galata quay, as merchants of Venice and Genoese navigators had done, centuries ago.

Down from the northeast comes the Bosporus, which separates Europe from Asia and joins the Black Sea with the Sea of Marmara (Marmara Denizi).*

Farmers Learn to Drive Tractors

So close that one can count the buildings is the edge of Asia, with massive barracks, cypress-dark cemeteries, and the military hos-

* See, in the National Geographic Magazine: "Seeing 5,000 Years of History in Four Hours," December, 1928, and "Summer Holidays on the Bosporus," October, 1929, both by Maynard Owen Williams.

Turkish Information Office

Turkey Goes Democratic: Women Vote as Men's Equals

General elections on May 14, 1950, marked the end of one-party government. Celal Bayar, Democratic Party leader and former Premier, was chosen President. Kerchiefed grandmother and stylish matron here drop sealed ballots into a padlocked box (pages 142-3).

pital where Florence Nightingale won fame.

I had known Atatürk's Turkey, spurred to activity by the dynamic personality of a virtual dictator. I had helped celebrate its 21st birthday. Now I had come to Turkey to see farmers using tractors and combines, to see the training of airplane mechanics, to see new roads where dynamite, bulldozers, and scrapers are paving the path of progress.

While plans for my 2,000 miles of automobile travel in remote areas were being arranged, we took a steamer trip on the Black Sea. For thousands of years ships plying the Bosporus and the Dardanelles have connected the rainy, mountain-backed Black Sea coast of Asia Minor with the Mediterranean world (map, pages 144-5).*

Voyaging east toward the Russian frontier, we carried Marshall Plan machinery and manufactured goods from America, and deck passengers, homeward bound. Returning to Istanbul, 11 days later, we brought tobacco, hazelnuts, eggs, and city-bound farmers.

Compared with the Europeanized commuters on Galata Bridge (pages 152, 153), our deck passengers seemed exotic. Actually they were the true Turks.

In the days of the Ottoman Empire the Turks disliked the name "Turk," because it signified "rustics." Instead, they called themselves Osmanlis. But Atatürk made "Turk" an honored name.

In old days, I asked my models whether they were Turks, Greeks, Armenians, Kurds, Turkmen, or Yuruks. Today all are Turks, and proud of it.

Back of modern progress, growing literacy, mechanization, better roads, airfields, radios, and universities, the farmer is Turkey's strength and Turkey's problem. Illiteracy is still common. Although schools are free and coeducational, there are still only 16,000 schools in the 40,000 towns and villages.

We went as far as Hopa, 10 miles from Red Russia, to see rural Turkey and to follow the green, rainy shore of the Black Sea. As we began to buck the Bosporus current, a mile from the Galata Bridge, we passed the Dolma Bahçe Palace, which took its name from a filled-in valley. Here Turkish farmers, caught between steep hill and broad stream, once grew food for the city.

* See "Gates to the Black Sea: The Dardanelles, the Bosphorus, and the Sea of Marmora," by Harry Griswold Dwight, NATIONAL GEOGRAPHIC MAGAZINE, May, 1915.

142 Wide World

Fighting Turks, Headed for Korea, Converse with Their Commander

Armed with American weapons, the Turkish Brigade joined the United Nations battle against North Korean and Chinese Communists in October, 1950 (page 141). Soon after taking the field, Brig. Gen. Tahsin Yazici (right) and 15 of his men were decorated for gallantry by the late Lt. Gen. Walton H. Walker, of the United States Eighth Army. Here Yazici and infantrymen wait to board ship at Iskenderun.

How many, riding home, or sitting in an open-air café, think of the April night in 1453 when sweating men, horses, and oxen dragged 68 ships up the valley from the Bosporus, over the saddle, and down into the Golden Horn, thus ushering in the fall of Constantinople on May 29, 1453? This dramatic scene was recently filmed for the movies, with Turkish soldiers wearing the costumes of 500 years ago.

Beyond the glistening mosque at Ortaköy we soon saw the European Castle (Rumeli Hissar), which Mohammed built in four-and-a-half months (pages 156, 157). Framed in its medieval towers we could see a window of our son's apartment at Robert College.

Robert College Helps Turkey Think American

This famous American college is highly respected for the part its graduates have played in Turkey's progress for nearly 90 years. Many American diplomats, military advisers, agricultural experts, and Economic Cooperation Administration workers trust in these young Turks, who speak colloquial English and "think American."*

Turkey's Black Sea coast is almost without harbors. Ships anchor offshore, and passengers land from rowboats.

Overnight from Istanbul lies Zonguldak, behind whose new breakwater steamers shelter while loading coal. At near-by Çatalağa a new plant utilizes low-quality coal to generate electricity. Close to the mines, it will effect estimated savings of $1,000,000 a year.

Atatürk well knew the value of water in a thirsty land. "Let not one drop of Anatolian water waste itself in the sea," was his dramatic advice. Now the ECA is helping the Turks to erect hydroelectric plants which will give Turkey electric power at one cent a kilowatt-hour. Thus hard-working rivers will save Turkish coal.

In the first nine months of 1950, with expensive machinery coming in, Turkey imported less than she exported.

The exports represented much patient toil: cotton and tobacco, picked by hand; mohair, gathered a strand at a time; hand-picked figs and raisins; and hazelnuts, flailed from their

* See "American Alma Maters in the Near East," by Maynard Owen Williams, NATIONAL GEOGRAPHIC MAGAZINE, August, 1945.

husks by strong-armed men and sorted by old women and children (page 185).

Eggs in flat boxes resembling bicycle crates go to Istanbul and other European cities. Day after day, as we stood on deck, we saw farm products pour into our hold.

At Sinop the sun seemed to rise in the west, for the best harbor between the Bosporus and Batumi is caught in a fishhook curve. Its fleets once shared the Black Sea with those of Byzantium, and to its sheltered roadstead came caravans from the fabulous East. To its shaky pier, close to the ancient walls, I saw a heavy case of Marshall Plan machinery ride in, straddling two rowboats.

As I roamed about Sinop, several young men adopted me, showed me the sights, found the key to museum and tomb, and discussed Turkish-American friendship. As we sailed back to Istanbul, they waved farewell.

Must Learn to Keep Machines Running

In Ankara, Turkey's capital, I had interviews with highway experts with whom I was to travel, but they could not leave for three days. Within an hour of arranging our timetable, American food and agricultural specialist Hugh K. Richwine and I were off by taxi on a flying trip to Eskişehir. There next morning young Turks were to take an examination on the care and maintenance of agricultural machines.*

Few realize what it means for peasants to change from primitive tools to modern machinery. Of course the machinery proves its superiority—until it breaks down.

Richwine is teaching alert young Turks to keep expensive machinery going and to teach others, in turn.

Several of these enthusiasts dined with us and conferred on common problems. Richwine made hardly a positive statement during the entire evening, but led his students to think. He was helping them, not telling them.

On the high plateau, plowing is difficult until the infrequent rains soften the earth. But then the tractor tires, tall as a man, spin in the deep mud. To avoid this, hundreds of pounds of water are pumped into the tires, so adding to the weight that the tires get a better grip. Richwine explained this in terms of the more familiar draft animal.

"Your tractor has plenty of horsepower. By adding to its weight you increase its footpower. When full of water, rubber tires will approach the pulling power of track-type tractors."

Pointing to a bearing on a gang plow, during the next day's examination, Richwine said to the Turkish instructor, "Ask that boy how often he must lubricate here."

The instructor winked at his friend. It was not Turk against American, but knowledge against ignorance.

"About every 100 work hours," said the student.

Richwine turned to the Turkish instructor: "That right?"

"No. That bearing is permanently sealed, and there is no place to lubricate it."

Simple. Yet in many cases, unable to find a way of lubricating a bearing, Turks have bored a hole and *made* a way.

Many Turks, switching from oxen to motorized machinery, have to start from scratch, just as chauffeurs did when trucks first displaced donkeys.

With a high birthrate and increasing population, Turkey must depend on machines. On the high plateau and amid mountains the season is short. Sometimes the rains come so late that plowing is delayed. With oxen, a farmer cannot plow, plant, harvest, and thresh enough grain. Each operation, taking more time than it should, is restricted by the swift march of the seasons. Machines will get larger crops in the ground sooner and harvest them before winter sets in (page 183).

The past lays a heavy hand on the farmer, even when he has modern tools. Because threshing by sledge and ox-hoof produces chaff, farmers feel that straw for fodder *must* be chopped; so they feed threshed straw through a chopper before it is stored. At one village we saw two modern tractors hauling old-style threshing sledges, while a Case combine, which could have done a week's work in a few hours, stood idle.

"They understand the tractor. But they don't yet understand the combine."

Turkish Alfalfa Seed for U. S.

Nor are machines the only problem. Seed must be improved. Hybrid corn, brought in from America, may increase Turkey's crop by 30 percent.

Agricultural cooperation is not a one-way street. Richwine showed me the largest alfalfa seed pods he had ever seen, developed from a wild strain native to Turkey. Samples have been sent to the United States for testing. Turkish alfalfa may help us as much as American hybrid corn helps the Turks.

I photographed a thick field of *korunga*, similar to alfalfa but easier to grow. Korunga seed also has been sent from Turkey to the United States.

Better crops and good roads are long-range objectives. But for hundreds of miles Turkey touches Soviet Russia. To protect its borders,

* See, in the National Geographic Magazine: "Peasants of Anatolia," by Alfred Marchionini, July, 1948; and "East of Constantinople," by Melville Chater, May, 1923.

Gaily Painted Caïques, Istanbul's Water Taxis, Ply the Golden Horn

This strategic harbor, a 5-mile-long arm of the Bosporus, has witnessed Byzantine and Ottoman Empire glories. Now it watches the steady advance of the modern Republic of Turkey.

The sickle-shaped waterway, separating the city's old and new quarters, enjoys protected calm in all seasons. Ships bearing the world's commerce reach it from Mediterranean and Black Seas.

Across the harbor from Galata (foreground), the graceful dome and minarets of the Mosque of Suleiman the Magnificent seem to float in space (page 150). There, on December 14, 1950, thousands gathered to ask Allah's blessing on the Turkish Brigade, fighting for the United Nations in Korea.

In the newly redecorated chamber of the House of Representatives in Washington, D. C., both the Turkish Suleiman and the Byzantine emperor Justinian are shown on two of 23 marble plaques representing men who contributed to the evolution of American law.

University of Istanbul buildings crown the hilltop to the left.

Kodachrome by Robert L. Van Nice

Rotund Dome and Spearlike Minaret, Gleaming Radiantly, Break Istanbul's Skyline

Sailing craft from Greece, Italy, Syria, Egypt, and Bulgaria moor in the Golden Horn awaiting cargoes of Bosporus fish. Mosque of Suleiman the Magnificent (right) crowns one of the city's seven hills (page 149). Yeni Cami, or New Mosque (left), stands near the harbor.

Vegetables Brighten Golden Horn Markets. They Travel by Horseback to Bosporus-side Villages

Fertile farms of Anatolia, the western part of Asiatic Turkey, ship tons of garden produce to Istanbul and Bosporus-side villages. Right: A huckster parades his wares in the streets of Rumeli Hisar (page 156).

 Kodachromes by Maynard Owen Williams Kodachrome by Robert L. Van Nice

Kodachrome by Maynard Owen Williams

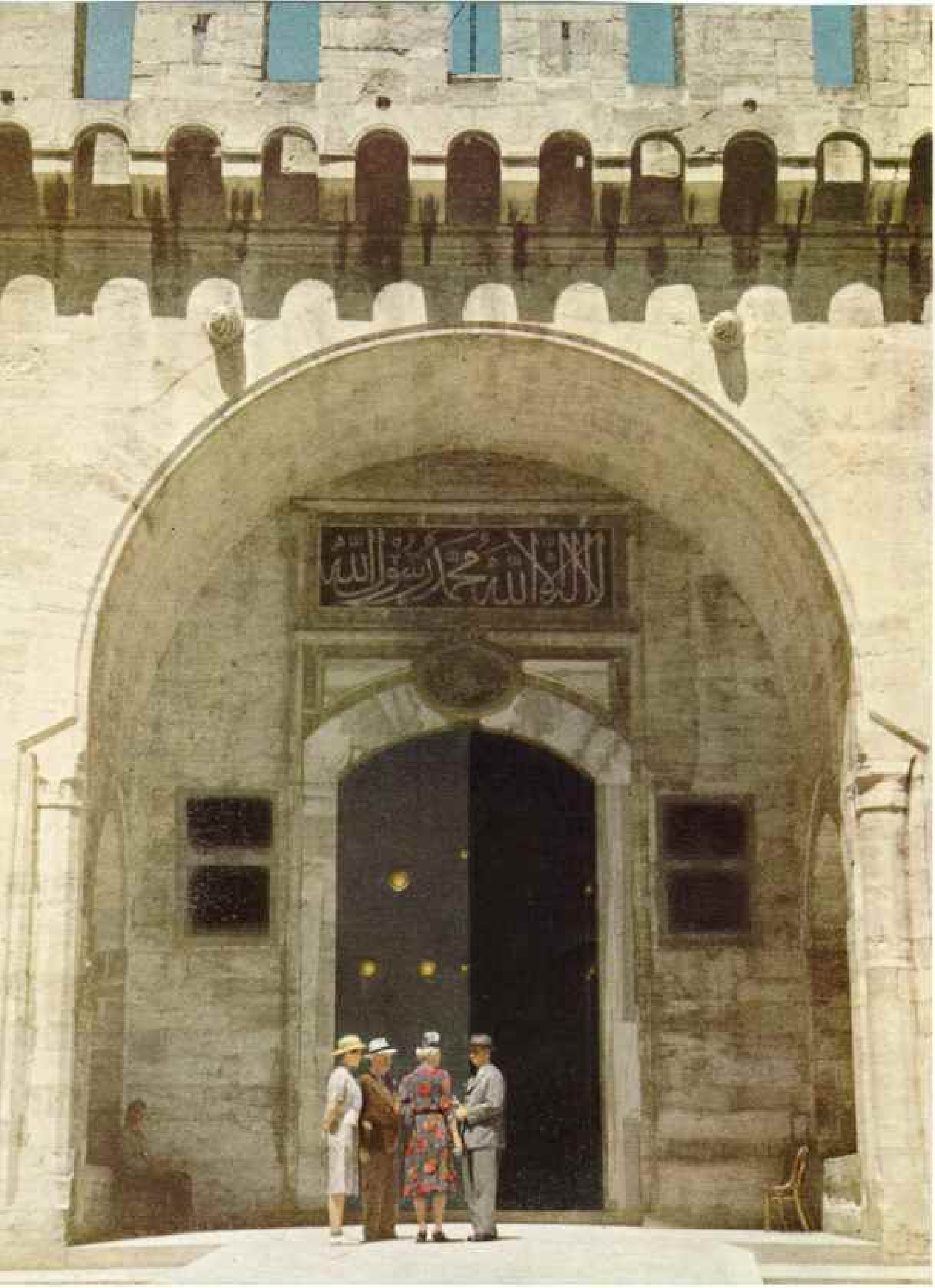
All Aboard for the Princes Islands! Steamers Carry Istanbul's Thousands to Outdoor Fun on the Sea of Marmara

Ferries at the pontooned Galata Bridge landing load picnickers, sight-seers, and summer residents (opposite and page 158).

Istanbul's "Grand Central Station" Is the Galata Bridge, Where Turks from Europe and Asia Mingle at the Rush Hour

Daily the traffic shuttling between the city and Bosporus resorts ebbs and flows. Left: Travelers jam the ferry landing (opposite page). Right: City workers relax in the saloon of a ferry.

Kodachromes by Maynard Owen Williams



Seraglio Gate Bears the Creed: "There Is But One God, and Mohammed Is His Prophet"

Behind the brass-studded portal, graceful odalisques performed for sultans of the bygone Ottoman Empire. Visitors here include Mrs. Gilbert Grosvenor (back to camera), wife of the Editor of the NATIONAL GEOGRAPHIC MAGAZINE.

St. Irene, a Byzantine Gem, Houses Turkish War Relics

Erected by Constantine the Great, the Church of St. Irene ranked second only to Sancta Sophia (page 162) among early Christian shrines. Now a military museum, it exhibits Crusaders' weapons and a section of chain once stretched across the Bosporus to bar invaders.

Hollywood Made the Film; Turkey Changed the Title

This Istanbul poster advertises "I Will Have My Revenge," originally "Johnny Angel." Names of many American movies are revised for wider understanding. Turkey's 28-letter Latin alphabet contrasts sharply with Arabic (opposite page), abandoned since 1928.

Kodachrome by Robert L. Van Nice

Blue Bosporus Flows Between the Castled Slopes of Europe (Foreground) and Asia

Rumeli Hissar, or European Castle (left), was built by Mohammed II to aid his siege of Constantinople in the 15th century. Ottoman guns commanding the strait barred help from the Black Sea for the Byzantine capital. Buildings of Robert College (right), an American educational outpost, are visible through the trees.

The Bosporus, Dividing Two Continents and Linking Two Seas, Cools Istanbul Suburbs with Its Breezes

These people, relaxing on the quay in Anadolu Hissar (Asiatic Castle), enjoy the view of Rumeli Hissar, in Europe (opposite page).

Kodachrome by Robert L. Van Nice

Marmara Breezes Caress the Verdant Princes Islands, Once the Home of Exiled Potentates, Now a Playground for Istanbul

Resort hotels and elaborate villas stud four of the archipelago's nine islands. They lie a short sail from the Golden Horn. Sunday excursionists, fleeing summer heat, flock to the rounded hills and rocky headlands. This group on Büyük Ada, the largest island, looks toward Heybeli, Burgaz, and Kınalı.

Istanbul's Grand Bazaar Offers Old and New in Fabrics

Merchants and artisans, gossiping and haggling in many tongues, ply their trades in more than 3,000 shops and workrooms lining some four miles of Istanbul's streets and alleys.

The Grand Bazaar sits under one vast roof. Shoppers find goods to fit all purses. Antique buyers from all parts of the world bargain for Oriental rugs, hammered copperware, furs, silks, shawls, and jewelry. Most shops have changed little in centuries, but some boast neon lights.

Near the cubbyholes of the bazaar are department stores and specialty shops as up-to-date as any on Main Street. They sell everything from washing machines and typewriters to bobby pins and nylon hose.

← An expert repairs a sumptuous robe of gold-embroidered silk. He sits among rugs, furs, silks, and a black-velvet jacket adorned with silver thread.

→ The poster's blue-eyed miss, free of the veil that once hid feminine charms, attracts attention to silks spun in Turkish mills.

Reduction by Maynard Owen Williams

Kodachrome by Gilbert Grosvenor

Six Minarets, Surpassed Only by the 7-spired Shrine at Mecca, Adorn Sultan Ahmet's Blue Mosque in Istanbul

Moslems Worship at the Mosque and Tomb of Eyüp Ansari, Companion and Standard-Bearer of the Prophet Mohammed

Church custom decrees that men be covered at prayer, but several bare heads appear in this gathering. The majority here wear skullcaps, or reverse the brims of caps, so that foreheads bowing toward Mecca may touch the ground. Right: A guide prays at a grille outside Eyüp's tomb.

Kodachromes by Maynard Owen Williams

Massive Sancta Sophia, Survivor of 14 Centuries of War, Fire, and Earthquake, Keeps Alive the Glories of Byzantine Art

Constantine, first Christian emperor, laid the foundations of Sancta Sophia A. D. 326. Two centuries later a far larger church was completed by 10,000 workmen carrying out a plan conceived by Justinian the Great. In 1453 conquering Turks made Sancta Sophia a mosque and plastered over priceless Christian mosaics. Today the former mosque is a museum; the mosaics are uncovered. Left: An Istanbul shop's huge glass bottles hold perfume. Right: The antique dealer displays Moslem arms.

Kodachromes by Maynard Owen Williams

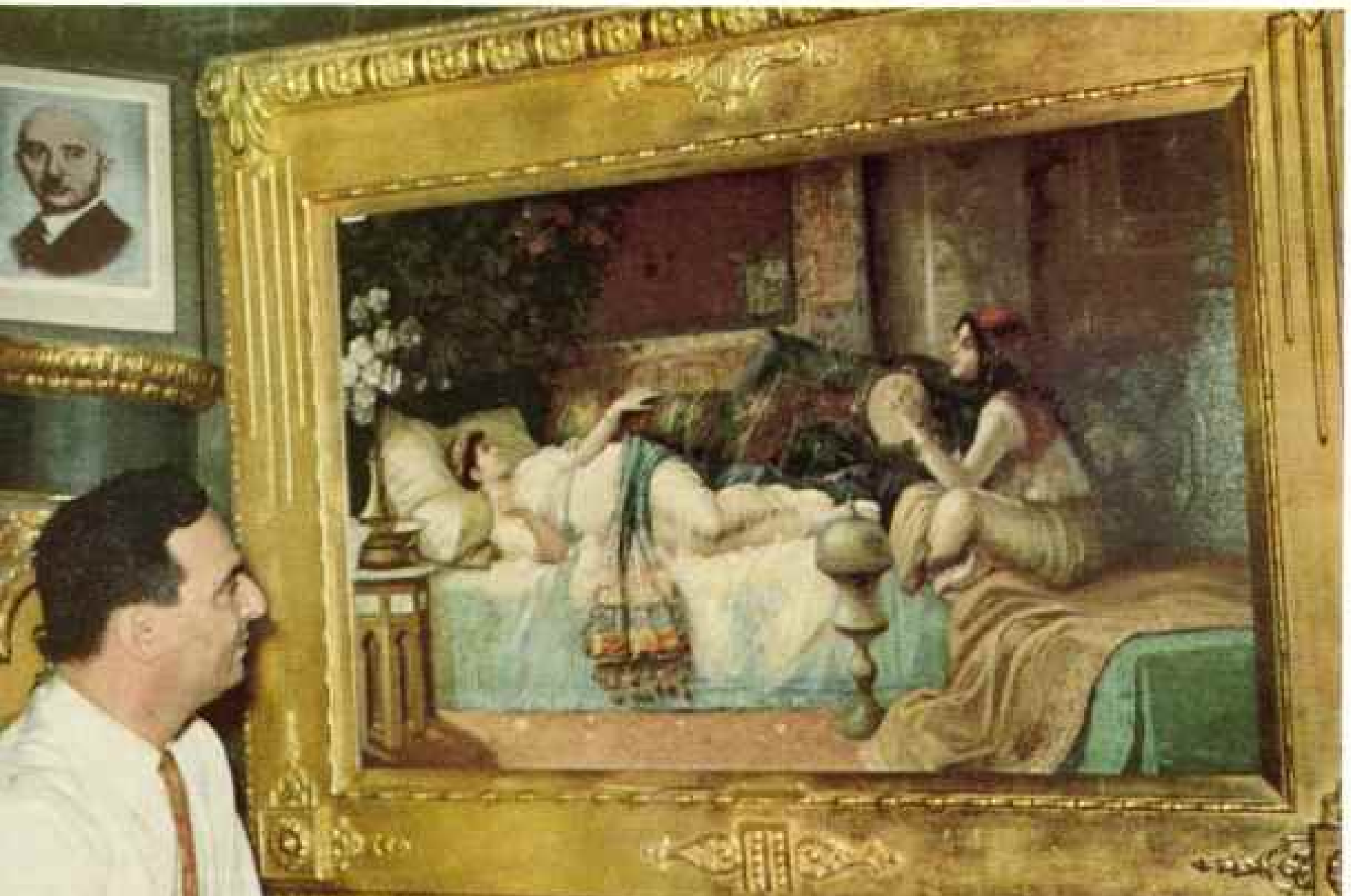
Kodachromes by Maynard Owen Williams

↑ Prayer Beads Screen Moslem Books on Sale Outside a Mosque

Rosarylike necklaces invite purchase by visitors to Istanbul's Beyazit Mosque (page 180). Most books on the shelves are printed in Turkey's new Latin alphabet. Some older worshipers prefer Arabic texts.

↑ Harem Scenes Belong to Turkey's Romantic Past

Antique dealer Davut Musazade gazes at a painting of a bored beauty and her tambourine-playing handmaiden. Ismet Inönü, second President of the Republic, looks out from the picture at left.



Turkey has had to maintain a large and brave, but not wholly modernized army (page 184).

The Joint American Military Mission for Aid to Turkey is teaching the use and care of modern military equipment and aircraft.

By the end of 1950, 25,000 Turks had completed training under American supervision, scores had finished intensive language study at Robert College, and a thousand picked men had been sent to the United States or to Germany for instruction.

One prominent Turk said: "At this time of danger and change, the Turks are pinning their faith on America. But, what is more important, they are working with, liking, and trusting Americans.

"Robert College has long taught us American ideals. Now we are trying them out while our peasants are still poor, still illiterate, still opposed to change. Against such handicaps our best weapons are American men, good books, and good roads. Each in its way opens the mind and the land."

The Director General of the Department of Highways had offered to show me what is being done to improve Turkey's roads. But before an American can appreciate Turkey's road problems, he must understand Ahmet, the carter.

Here he comes now, slowly plodding ahead of his mild-faced oxen. The disk-wheeled cart groans along. The wooden axles protest, although the load is only 500 pounds. The slow squeal of his axles is deliberate. Some say that it serves as an alarm clock, for when Ahmet is lying in his crude cart and the sound stops, he wakes, goads his not-too-trusty steeds to action, and goes back to sleep.

How Starvation Wages Can Be Exorbitant

His charge of $1.25 a day for a man and two oxen does not *seem* exorbitant. But it is. Who would pay $45 for transporting a ton of grain or vegetables from Baltimore to Washington?

An American road expert told how, in the fields near Ordu, he had found that potatoes cost about two cents a pound. They were four cents a pound at the steamer and eight cents a pound in Istanbul. He asked a farmer why.

Said he: "The carters get rich while we get poor."

The American played ignorant. "I hadn't realized that those patches on their trousers are signs of wealth and that the thin faces of the men and their animals indicate riches."

Even the slow-thinking farmer got the point. By paying a day's wages to transport 500 pounds five miles, he was enriching no one, not even the carter. The ton-mile cost of transportation must be lowered by better vehicles and roads.

In Turkey, new roads are helping reduce illiteracy, raise farm prices, feed cities, and enabling teachers and doctors not only to reach isolated areas but to endure them.

For Turkey as a whole, primitive methods are henceforth impossible. In three 3-year plans, the Turkish Directorate of Highways, with American aid, is to build or radically improve some 14,000 miles of roads.

A mile of all-weather road built by man power, at starvation wages, costs about $22,000. With modern machines the cost is about half as much (page 168).

Of the 10,000 men needed to maintain Turkey's improved highways without machines, only 4,000 are available. Road building with hand labor is seasonal employment. When the worker has crops to plant or harvest, he quits, no matter how badly he is needed.

Machine operators, with steady work on the roads at good wages, are part of the growing professional class needed to balance Turkish life. The Turkish farm population averaged a cash income of 20 cents a day in 1943. A good machine operator may earn 30 times as much.

In Turkey, some road engineers have been too proud to toil with their hands. But when 22 top Turkish engineers went to school for ten weeks of hard, dirty manual labor, they were sold on the idea.

In general, roads in Turkey today are about what United States roads were in 1912. Out of 13,500 miles of national highways, only 350 miles are asphalt and fewer than 5,000 miles are all-weather macadam.

My friends praised the new 160-mile highway from Ankara to Konya. I took a bus trip to see what it is like. I found the rough road tossing up clouds of dust while truck tires pounded down the roadbed, prior to surfacing. When our de-luxe chartered bus developed mechanical trouble, we rode in local buses whose seats, four inches too close together, would discourage any long-legged tourist.

Where St. Paul Suffered Persecution

A trip to Konya, which Bible students know as Iconium, is worth any discomfort. In the city where St. Paul suffered persecution for his strange religion, the most picturesque of Turkish museums is housed in the former mosque of the Dancing Dervishes, who were banished for theirs.

Konya is becoming so modernized that the medieval Seljuk gateways come as a surprise. As one enters the Mevlevi Museum, the centuries fall aside before a sense of the Infinite with whom the dervishes sought communion.

The founder of the dervish order was Jalal-

106 Department of Defense

Turkish Foes of Communism Raise Their Flag

Bravery of the star-and-crescent soldiers has become legendary among UN forces in Korea. Ambushed on a mountain road by a foe outnumbering them 3 to 1, the Turks battled two days and a night before giving ground before 20,000 Chinese Reds. Overwhelmed, they rescued their weapons to fight another day. One company fought until ammunition was exhausted, then charged with bayonets.

General of the Army Douglas MacArthur, testifying before Senate committees, called the Turkish Brigade "one of the finest I have ever been associated with" (page 141).

ed-Din Mevlana, a mystic poet of the 13th century, who pictured the universe as a sea and men as the waves of God. Around his tomb is an atmosphere of peace.

During our excursion one Turkish lady was the ministering angel to all, translating for American Embassy secretaries, lending her coat to an old lady who was cold, and sharing her food during delays. This gentle Turkish woman translated for me in Konya's exquisite Mevlevi Museum. Her husband, Turkish Ambassador Mehmet Münir Ertegün, died in Washington in 1944. After the war the "Mighty *Mo*" carried his body home.

Dust can't obscure the main point about the Ankara-Konya road: that trucking rates are already one-tenth and bus fares one-half what they were. Cars average 40 miles an hour for the whole distance. On some stretches 75 miles an hour is possible.

"The road is such a success that we'll have a hard time keeping traffic off it long enough to pave it," a Turkish official told me.

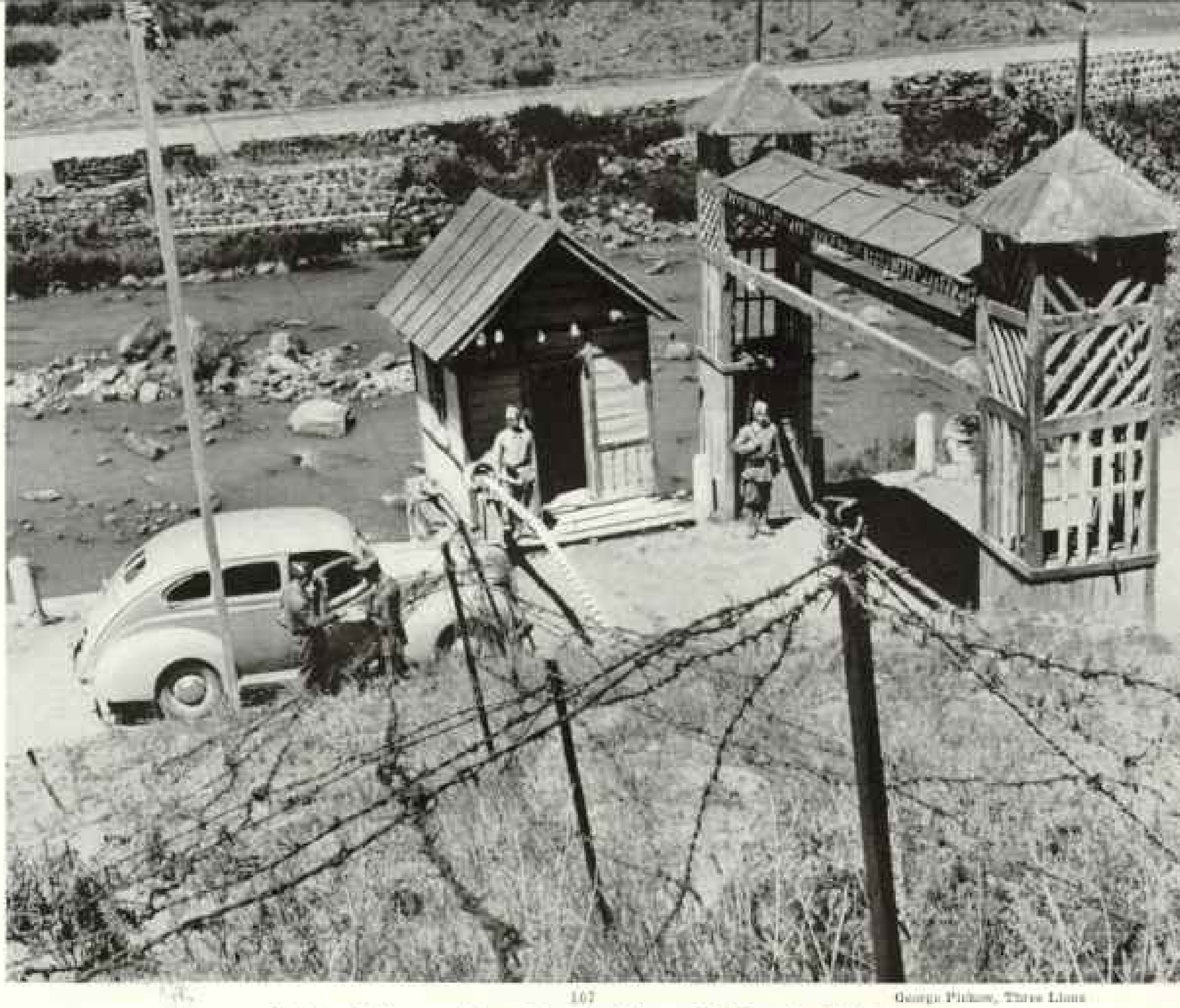
Back from Konya, I was ready to share in an inspection of 1,700 miles of old and new roads. Vecdi Diker, who studied at Robert College and the University of Missouri, is the Director General of Highways. Associated with him is his American consultant, Jesse E. Williams, Division Engineer, U. S. Bureau of Public Roads. For 11 days we traveled together.

New Road Will Be a Life Line

Low-slung passenger cars already make the 550-mile trip from steamy Iskenderun to chilly Erzurum in two days. Hundreds of men were laying new roads, chipping off mountainsides, or burrowing through tunnels to fit the road for winter travel.

At one end of this road, machinery from American factories is landed at the rapidly improving Mediterranean port. As American products come in, nearly 200,000 tons a year of much-needed chrome, from the richest deposits in Turkey, leave for America.

If war comes, the highway from Iskenderun to Erzurum will be a life line for all. But the roads east of Erzurum will not be improved until the highways to the west are good enough to serve Turkish defense.



George Pickow, Three Lions

Turkey's Troops Face Russia Along 350 Touchy Miles

Strategists see the Republic as a likely target for lightning conquest should the Reds lunge toward the Mediterranean. To guard against the threat, a full army group defends the line separating Turkey from Soviet Georgia and Armenia. The Iranian frontier is similarly guarded. A driver entering this outpost shows his pass.

In 1928 I had spent many toilsome weeks touring through Turkey for 2,500 miles in a high-slung chartered bus. Our comfortable 1950 trip was made in four-door sedans. In 1928 vermin were the order of the night. In 1950 I was not bothered once. In 1928 I carried tent and bedding. In 1950 my only safari equipment was a length of cotton cloth with which to cover the pillow in case of need. It was never unfolded. The vast difference which formerly existed between provincial travel in Europe and travel in Turkey no longer exists.

Leaving Ankara in two comfortable cars, we headed east toward some steep hills across whose shoulder our highway was a mass of mud gobs and deep ruts.

A bulldozer waddled up, turned in its tracks, and leveled a half-mile path for our low-slung cars. In the valley we forded past unfinished bridges, each equipped for self-destruction by pre-built spaces for demolition charges.

From a round-topped hill we could see the broad valley of the Kizil, longest river in Asia Minor. On the National Geographic Bible Lands map the river is also known as the Halys. In ancient times it was considered the boundary between East and West.*

We spent the first night in Amasya. Here Strabo, the widely traveled, venerable Greek geographer and historian, was born when Julius Caesar was in his prime and Cleopatra a pretty little girl. The barren cliffs above the Green River (Yeşil Irmak) are honeycombed with what Strabo, writing in Jesus' day, called tombs of the kings of Pontus.

Today, Amasya is a quiet shoestring city, with attractive houses lining both banks of the river. But when we arrived, it was packed with wrestlers and their adherents, ready for a tournament next day. In Turkey, which won first place in free-style wrestling at the

* See map of Bible Lands and the Cradle of Western Civilization, published as a supplement to the December, 1946, issue.

Dave Perkins, ECA

↑ **Camels Clumsily Plod Past Tractors Making Over Turkey's Face**

Marshall Plan dollars and machinery enable the Turks to transform miles of camel and donkey trails into all-weather roads stretching from inland farms and mines to Mediterranean, Aegean, and Black Sea ports (page 165).

These new highways will strengthen the Republic's defenses, increase exports, and hasten development of mineral resources.

ECA-trained Turks, working on an Anatolian road, move earth with American equipment.

Donkey Power at Work

← This operation proceeds according to old-time methods. The contractor, unable to raise funds for earth-moving equipment, uses donkeys to build up the bridge approach.

The new span near Tunceli, crossing the Munzur River, a tributary of the Euphrates, is an important link in a road between Erzurum, near the Russian border, and Iskenderun, on the Mediterranean (pages 166, 172).

National Geographic Photographer
Maynard Owen Williams

170 George Pickow, Three Lions

Moslem Veils Are Unknown to Glider Girls in Coveralls

Turkey's leading aviatrix, Maj. Sabiha Gökçen, adopted daughter of Kemal Atatürk, volunteered in vain for combat duty with United Nations forces in Korea. These girls, preparing to soar over rolling hills near Ankara, hitch a towing cable to their motorless craft.

London Olympics in 1948, and in 1950 won 15 out of 16 bouts with American amateurs, the groan-and-grunt racket is not wholly vocal. Every bed sagged low under a mountain of muscle.

The two Williamses slept in the police station. At dawn I was awakened by a pullet that tapped on the window, expecting to be fed. Behind her the close-packed city faded away down the narrow valley, where squeaky water wheels irrigate gardens of luscious grapes and Amasya apples, famous for perfume and flavor.

Our second night found us in Samsun, the great tobacco port. Here a statue commemorates the landing of Mustafa Kemal Pasha in 1919. Four years later, with Turkish soil freed of foreign armies, the victorious Mustafa Kemal became the first President of a rejuvenated Turkey. In 1935, when titles were abolished and surnames adopted, in accordance with a 1934 law, the Republic's founder became Kemal Atatürk, which means "Father of the Turks" (page 142).

Like shiny jewels on a necklace, Black Sea ports stretch along between the waters and the green hills. The new shore road still wets its feet at each valley mouth, but bridges will soon enable the motor traveler to ignore the age-old fords.

171 George Pinkerton, Three Lions

Turkish Bathing Suits Rival Florida's. So Do the Wolf Whistles!

Forgotten are the veils and flowing garb which hid feminine charms during the Ottoman regime. These young folk relax at a Bosporus beach resort opposite Rumeli Hissar (pages 156, 157). In 1853 the kiosk (background) was built as Sultan Abdul Medjid's seaside retreat.

We watched deep caissons emptied by pumps, concrete piles driven, cement poured, and steel strung.

Adventurous trucks already creep along the new road from town to town. In good weather, if a steamship passenger misses his boat, he can take a taxi to the next port. Now the road builders are turning fair-weather trails into all-weather roads.

Samsun ships the famous small-leaf Turkish tobacco. From Fatsa to Giresun, beach and city square are carpeted in brown rugs of drying hazelnuts. The town of Akçaabat ships large-leaf tobacco in big heavy bales to Istanbul and other European cities.

At Trabzon I photographed eager boys and girls against the almost impregnable table of rock which gave the site its ancient name of Trapezus. Today, rocks quarried from the near-by mountainside are dumped into the sea to form the breakwater for a new harbor.

Bus Service on Ancient Caravan Routes

After a side trip to Rize we set out from Trabzon on a long spectacular climb to Gümüşane, which looks more like the Caucasus than Turkey, and through picturesque old Bayburt to the highly strategic city of Erzurum.

A regular bus service, following this ancient

caravan route, now carries passengers from the Black Sea past Mount Ararat to the border of Iran.

Built of dark volcanic stone and harmed by earthquake and war, Erzurum has few luxuries. But considerable improvements have been made since my last visit. The natural water supply is better distributed, tolerable hotels have been built, and an attractive western suburb is taking shape.

Erzurum, more than a mile above sea level, means "Fortress of the Empire." For several months during World War I it played the part.

From Erzurum the fiery Enver Pasha advanced and scared the Russians so badly that they appealed to Great Britain for the ill-fated Dardanelles campaign of 1915.

In this savage, awe-inspiring country, military advance must be paid for. Even on August evenings the smartly dressed Turkish officers wear heavy uniforms, and winter's threat is felt. New roads, west of Erzurum, coupled with the valor of Anatolian soldiers, should make the fortress city, even more than in its past, a tough nut to crack.

Geography made Erzurum an east-facing fortress. Geography made Iskenderun a Mediterranean port, open to ocean-going ships, even if the Dardanelles were to be closed. But geography did much to bedevil the road builders who had to join the two.

The railway builders, linking eastern Turkey with İzmir and Istanbul, used the gorge of the Euphrates, in the earthquake-shaken area between Erzincan and Sivas. Between this railway and Elâzığ rose a great mountain barrier. For the new road builders it was a case of "up and over." Once over the shoulder of Bağırbaba Dağı, the line follows that of swift, clear rivers.

Roads Must Go Where Goats Have Trouble

Here and there roving goats have a chance to plant four skillful feet on the same level, for in the rocky gorge avalanche or erosion has built up occasional grassy plots. But for the road builder it is a case of carving away cliffs, tunneling through solid rock, and bridging powerful rivers.

On the new road from Iskenderun to Erzurum, which joins American factory to democracy's eastern ramparts (page 166), we saw road building in all its complexity. A succession of big rivers demands big bridges. Steep, narrow valleys demand corniche roads and many tunnels.

As we motored southwestward through idyllic valleys, far from public haunt, men and machines were trying to build a roadway that could serve in the dead of winter.

On two nights, at Pülümür and Karanlıkdere, we had hot showers and soft beds in the trailer homes of the road engineers. A merrier, more hospitable lot I never knew.

Day and night, "Topic A" was good roads. Should operators of expensive new machinery be trained on the job or at the base? "On the job," said the foremen. "At some base, where spare parts and expert supervision can be given," said an American expert. Turkish mechanics, like sons seeking a driving license, feel that they can handle the job on the job.

To finance its roads, Turkey imposes a tax of about 15 cents a gallon on gasoline. The humble Turkish motorist is paying his way. Out of the first hundred million dollars of American military aid, only five million were allotted to roads.

Huge Embankment Built by Hand Shovels

Near Tunceli we came to a bridge approach, 50 or 60 feet high and hundreds of feet long (page 169). Each load of dirt in that huge pile had been shoveled into a box and carried on donkey back. The bridge is an important link in a vital highway. But the contractor could not afford to buy modern equipment.

The antlike shovel-wielders at Tunceli came as a shock. The local mayor, who studied in Springfield, Massachusetts, Sacramento, California, and Washington, D. C., explained that, for this essential bridge on a key highway, Marshall Plan dollars were not available.

From Tunceli to Maraş hundreds of highly picturesque miles must be summed up in two words, "tough going."

At Elâzığ the governor asked about plans and progress. Like Turkey's Premier, Adnan Menderes, he was a former student of an American college at İzmir, since moved to Beirut. Like many another Turk, he wishes that his alma mater could again serve Turkish youth.

Southwest of Malatya we left our cars, skidded down slippery rocks, and entered a low, dark tunnel, which seemed endless.

"Long tunnel. How long do you think it is?" asked an engineer.

"About 980 feet."

"It's 1,036."

That rock tunnel near Karanlıkdere, in the heart of Turkey, is one of scores of such short cuts for military transport, agricultural produce, isolated villages, and lovers of scenic grandeur. The path of progress in Turkey is still rough.

From Maraş we crossed the Anti-Taurus on a mere cart track through some of the finest scenery in Turkey.

Turkmen and Circassian women, wearing bright gowns and coin headdresses, were too bashful to allow close-up photographs, but

The Green Mosque Looms Above Tiled Houses and Tilted Tombstones in Bursa

Yegil Cami, or Green Mosque, owes its name to the color of its brilliant interior. Its builder, Mohammed I, lies in a near-by tomb. Old headstones in the open cemetery bear Arabic inscriptions.

MARMARA OTEL
VE KIRAATHANESİ

Horse Carts Draw Food and Fuel in Ancient Bursa

Bursa dates from about 185 B. C., when it was founded as a principal city of the kingdom of Bithynia. Today it is one of the Republic's leading silk-spinning centers. Mulberry groves, thriving on the water-laden foothills, supply the mills with cocoons.

The dusty courtyard (opposite page) suggests that modern roads have not come to this part of Turkey. On the contrary, as a popular resort town Bursa is well paved.

A Turkish Government project to build or improve some 14,000 miles of roads is under way. In several areas the author saw Marshall Plan specialists teaching farmers to operate American tractors.

"By water all things find life." This quotation from the Koran might apply to the fountain in a Bosporus-side village. Water sellers, trudging beside donkeys laden with 5-gallon tins, still serve many homes. The poster proclaims that dubbed-in voices of two Turkish singers will be heard in an American movie.

Kodachrome by Gilbert Grosvenor

Truck and Oxcarts Haul Brick to Expand a Resort on the Slopes of Turkey's Mount Olympus

Uludağ offers winter skiing and summer breezes. The view from its summit includes the Dardanelles.

Ancient Nicaea (Iznik), Birthplace of a Christian Creed, Drowses Behind Crumbling Byzantine Walls

Once a wealthy metropolis, Nicaea today is a sleepy village. Here, A. D. 325, a council adopted principles still guiding much of Christendom.

Kodachrome by Gilbert Grosvenor

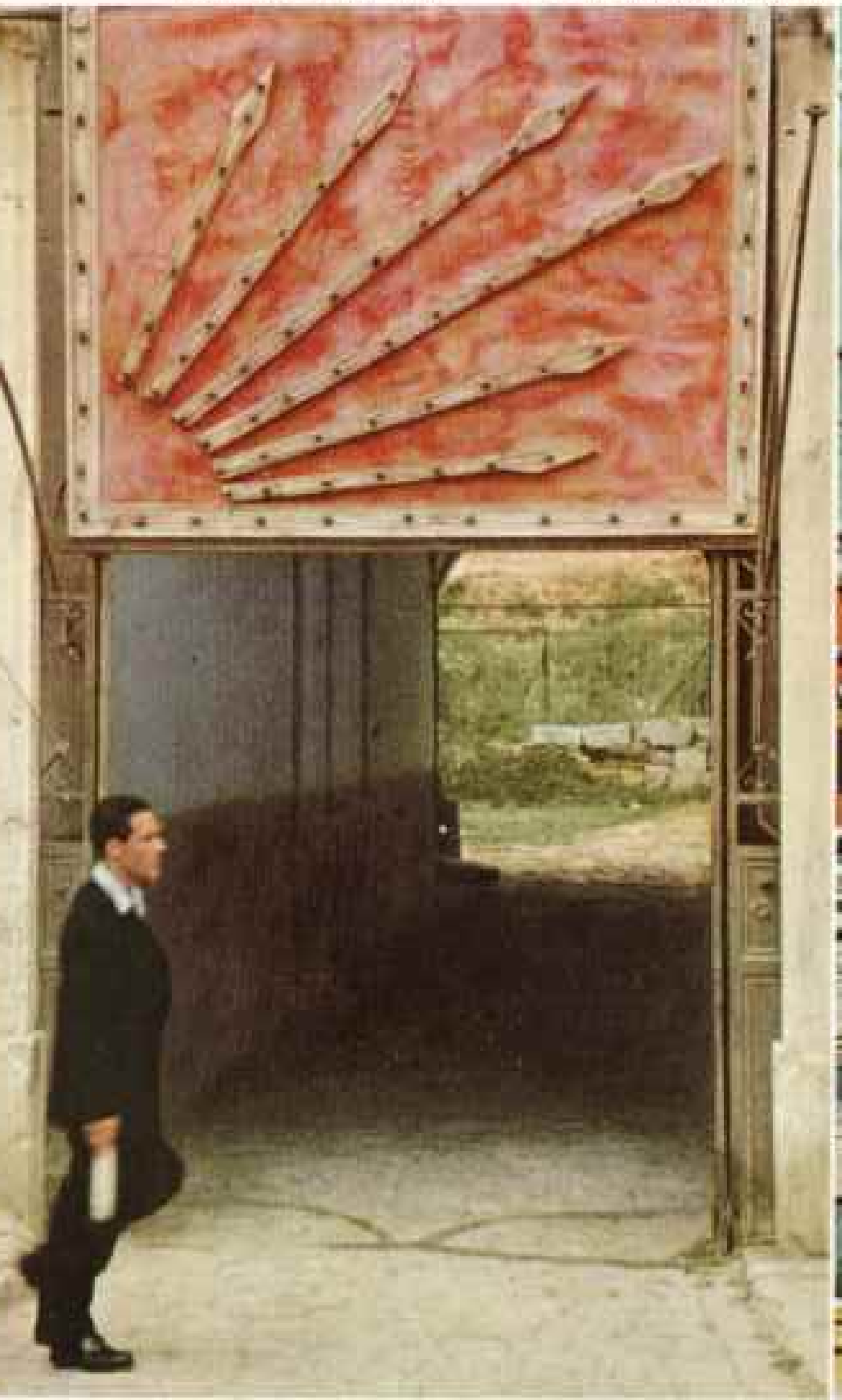
Kodachrome by Gilbert Grosvenor

Turkish Boys Take to Soccer Like Americans to Baseball. Bursa's Youngsters Play near the Slope of 8,343-foot Olympus

Six Arrows Symbolize Turkey's Republican Party . . . The Golden Horn Teems with Produce Boats

Turkey counts Democrats and Republicans as its main parties. Atatürk, Turkey's first President, and his successor, İnönü, were Republicans. Celal Bayar, elected in 1950, is a Democrat. Left: A People's House, not unlike an American community center, stands in a Bosporus-side village.

 Kodachrome by Gilbert Grosvenor Kodachrome by Maynard Owen Williams



Kodachrome by Maynard Owen Williams

"What? Thirty *Kurus* for a Kilo of Tomatoes?"

Such a price, the equivalent of 5 cents a pound, would be considered high at Istanbul's outdoor vegetable stands. This woman, shawled against the fierce sun, shops near the Beyazit Mosque, whose dome looms in the background.

they added bright touches of color to the golden threshing floors.

In the high valleys were wide meadows and fine-looking cattle. Where the tawny rocks or bright cliffs come down to green valleys, poplars rise above inconspicuous houses, their flat roofs hidden under stacks of fodder or dung for fuel. At one place, two enormous half-domes towered so close to our trail that a normal lens could not picture them.

When we arrived at Pınarbaşı, dinner was over; but there is no time clock on Turkish hospitality. We fared well.

We slept at Kayseri, in the guesthouse of the textile mills, administered by the Sümer Bank, Government boss of 30,000 more-or-less skilled industrial workers. In addition to producing 13 yards of cotton cloth per capita, Turkey exported more than 55,000 tons of raw cotton in 1950. For the first time, leaf tobacco was eclipsed by raw cotton as an export. In January, 1951, cotton made up more than half of Turkish exports.

The factory is almost hidden by trees. Bright flower beds are kept in beautiful condition. There are tennis courts and a swimming pool, with a dance floor and outdoor restaurant. The machinery is first-class, the layout efficient, and the laborers loyal.

Industry Slow to Take On Women Workers

Female mill operatives are relatively few, although almost no career is closed to women. Turkey has more than 12,000 female teachers, and nearly 36 percent of Turkey's students are girls.

Women, enfranchised in 1934 (page 146), have served in the Grand National Assembly since 1935, when 16 out of 17 female Deputies were professional women. Others sit as judges. Young Turkish girls at the American College for Girls on the Bosporus think many of the same thoughts, see the same movies, read the same books, hum some of the same tunes as those of Mount Holyoke or Vassar (pages 159, 170, 171, 175). Florya and Florida have the same beach styles. But in remote parts of Turkey the older women still veil part of their faces, and cotton-mill hands are mostly men!

The introduction of more women operatives at Kayseri might reduce expenses without deterioration of the product. But many Turks are conservative about letting women displace men in industry.

The mill director, Tarik İsmet Erdem, has organized a revolving fund for building sturdy houses with two bedrooms, living room, bath, kitchen, and storage room for the equivalent of 550 days' wages. Wages, houses, and buying power give the 35-cent Turkish lira about the same value as the American dollar.

Some of the old mosque doors of Kayseri (Caesarea Mazaca) are very fine. Rising above humble markets are walls dating from Roman days, with the ski fields on 12,848-foot Erciyaş Dağı far in the distance. But the new areas are well built, and the maintenance shops of the Highway Directorate, identical with others along our route, are spick-and-span.

Machinery borrows some features from the animals it displaces. One day, picturing modern road machinery against the mighty mass of Erciyaş Dağı, I came upon a heavy-studded roller.

"Nothing beats a sheep's foot for treading down loose earth. That is a sheep's-foot roller. It does the same work as a flock of sheep, but does it faster."

In a land of 25 million sheep and 17 million ordinary and mohair goats, the road builder uses machines. But thousands of miles of trails are still kept open by the feet of animals.

Back in Ankara, on August 30, I found scores of star-and-crescent banners decorating the capital, while crowds wildly cheered the troops destined for Korea. Scarlet headlines showed this was a red-letter day, and Mustafa Kemal was pictured on page one of Turkish newspapers as he appeared during his battle of 1922, when the Turks drove their enemies to the sea. In 1921, for an earlier victory, he had been given the title of *Gazi*, or Conqueror.

I asked a Turkish official the significance of Victory Day.

"Actually, it commemorates a victory over the Greeks. But the Greeks are our friends. We honor our army and the Gazi, but we don't like to remind our former enemies of their defeat."

Xenophon, Alexander, and St. Paul Passed This Way

My friend Haydar Sicimoğlu wanted to show me the new highway between Ankara and the Cilician Gates, where, since time began, armies, travelers, and cargo have squirmed through the Taurus (Toros Dağları).

Xenophon passed this way on his Anabasis. Alexander's men went through, without a fight. The Crusaders fingered their weapons as they approached the narrow defile. I had rattled through it in 1928, when a motor trip in Anatolia was real adventure.

Turkish hospitality lives up to the prospectus, and I might still be wandering in the footsteps of St. Paul. But my time was short, and I could not again visit St. Paul's birthplace, Tarsus, which is also the place where Cleopatra's barge "burn'd on the water" toward Antony.

George Pickow, Three Lions

American-made Taxis and Swiss Bus Pass an Ankara Bank and Department Store. A Policeman in a Canopied Barrel Directs Traffic

Pride of a Turkish Family Is a Tractor Bought with ECA Help

About three-fourths of Turkey's 20 million people live by agriculture, growing wheat, corn, cotton, tobacco, and other crops. Oxen, horses, and donkeys are still the chief sources of power, and scythes, sickles, and wooden plows the most available tools.

By 1951 the country had six times the 1,000 tractors it counted before the Marshall Plan was launched. Increase in mechanization resulted in less labor and bigger yields.

Hitherto, most machinery has gone to cotton growers. In the future, more will be shipped to wheat regions. Combines, such as those used in America's Midwest, have been introduced for more efficient harvesting. By raising more wheat, the Republic may be able to help friendly neighbors with their food problems.

Father and son here share the driver's seat on a wheat farm near Sivrihisar. Others, including a farm woman in pantaloons, admire the machine. For better traction, tires are filled with water (page 148). Mounds of chaff mark threshing floors where oxen and donkeys tramped out grain.

National Geographic Photographer
Maynard Owen Williams

134 George Pickow, Three Lions

Field Officers Map Turkey's Defense on the Hood of a Jeep

Turkey now has some 400,000 men under arms, a peacetime record, and could muster 1,500,000 more in an emergency. Uncle Sam supplies his United Nations partner in the Near East with arms, equipment, and training specialists. Jeep and truck are American-made (page 165).

We compromised on a quick trip to Aksaray, and then around Hasan Dağ to the volcanic area, "where early Christians lived in cones of rock" (page 186).* Both the mayor of Ürgüp and Ismail Hakki Eratay, the custodian at Göreme, treasure copies of the articles in the NATIONAL GEOGRAPHIC MAGAZINE, and the personal cards in the custodian's box constitute a *Who's Who* among distinguished visitors to central Turkey.

Between the Konya and Aksaray roads is Turkey's Salt Lake, the Tuz Gölü, sometimes 50 miles long, sometimes a glaring salt scab which aviators can see from many miles away. The plateau is fairly level here. Making a new road is largely a matter of dredging gravel from a river bed, crushing and screening it, and letting truck tires pound it down until a permanent surface is added.

On the Trail of the Mysterious Hittites

We made rapid progress over the unfinished road to Bor. Its main interest lies in the fact that two fragments of a stele, found here 12 years apart, showed that we were following

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "Where Early Christians Lived in Cones of Rock (Cappadocia)," by John D. Whiting, December, 1939; and "Cone-Dwellers of Asia Minor," by J. R. Sitlington Sterrett, April, 1919.

183 National Geographic Photographer Maynard Owen Williams

Men, Women, and Children Husk the Filbert Crop Near Fatsa

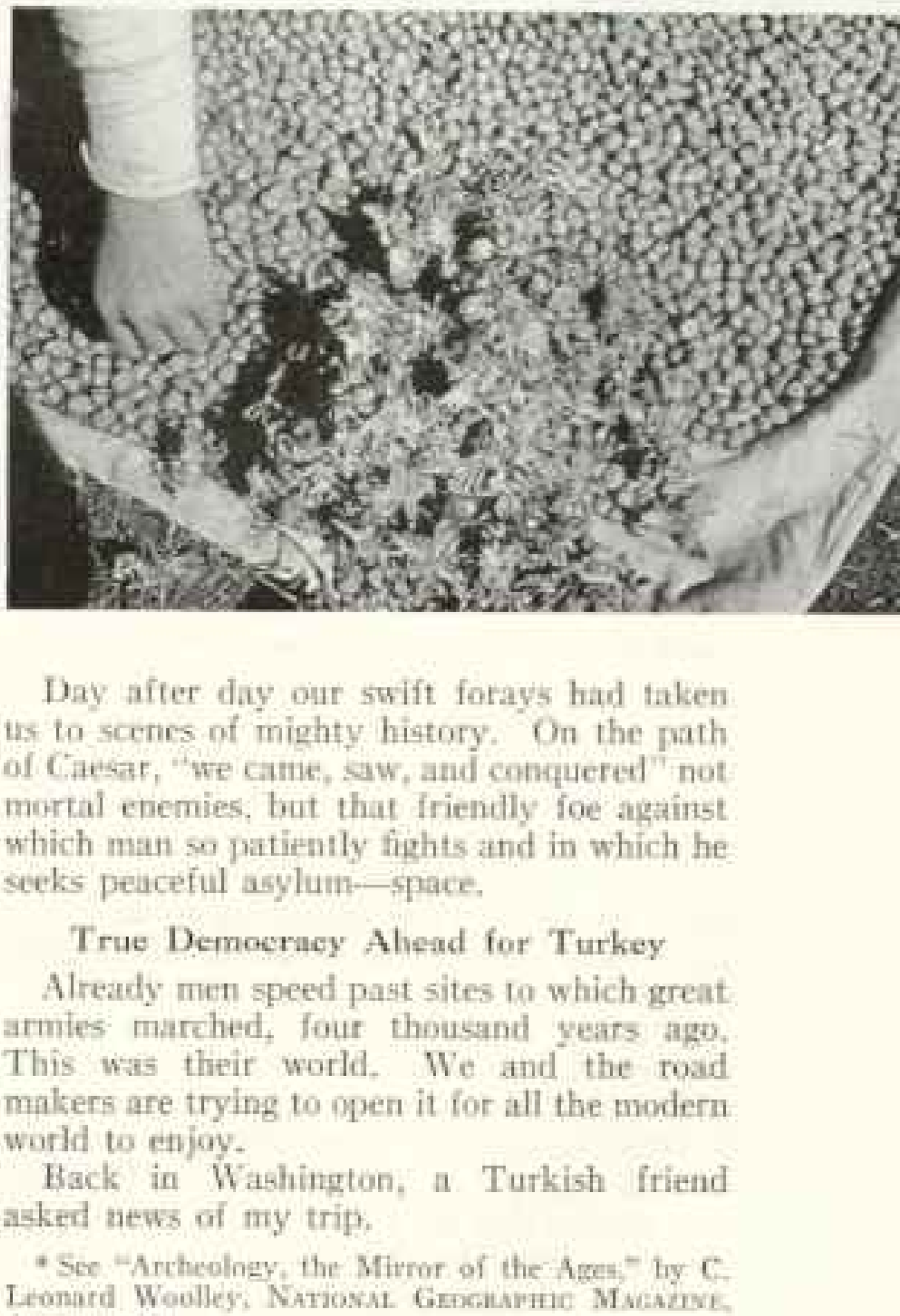
These hazelnuts may eventually find their way into Christmas stockings and to dinner tables in the United States.

To Turkey, which produces half the world supply, they are a leading export (page 147).

Thousands of pounds are eaten raw; others are used whole or chopped in confectionery and ice cream.

Filbert oil goes into soap, varnishes, and finishes for fine wood products like gunstocks and airplane propellers. Waste, rich in nitrates, feeds cattle.

Corn, an American Indian contribution to the world's breadbasket, grows in the background.



a route of the mysterious and fascinating Hittites.

Since my professional writing began with a description of the unearthing of a basalt slab at Carchemish by "Lawrence of Arabia" and NATIONAL GEOGRAPHIC contributor, C. Leonard Woolley,* I have long been interested in this people, whose civilization ranked third in importance among those of the Near East.

This block of basalt, covered with pictographic script, might have become the Rosetta Stone or Bisitun Rock of Hittite lore.† But it hasn't yet.

From Bor we rounded tawny Hasan Dağ and came to the valley of Göreme. The region, unlike anything else I know, is of outstanding interest, and the two "Cone Dweller" articles in the NATIONAL GEOGRAPHIC MAGAZINE prove it.

Day after day our swift forays had taken us to scenes of mighty history. On the path of Caesar, "we came, saw, and conquered" not mortal enemies, but that friendly foe against which man so patiently fights and in which he seeks peaceful asylum—space.

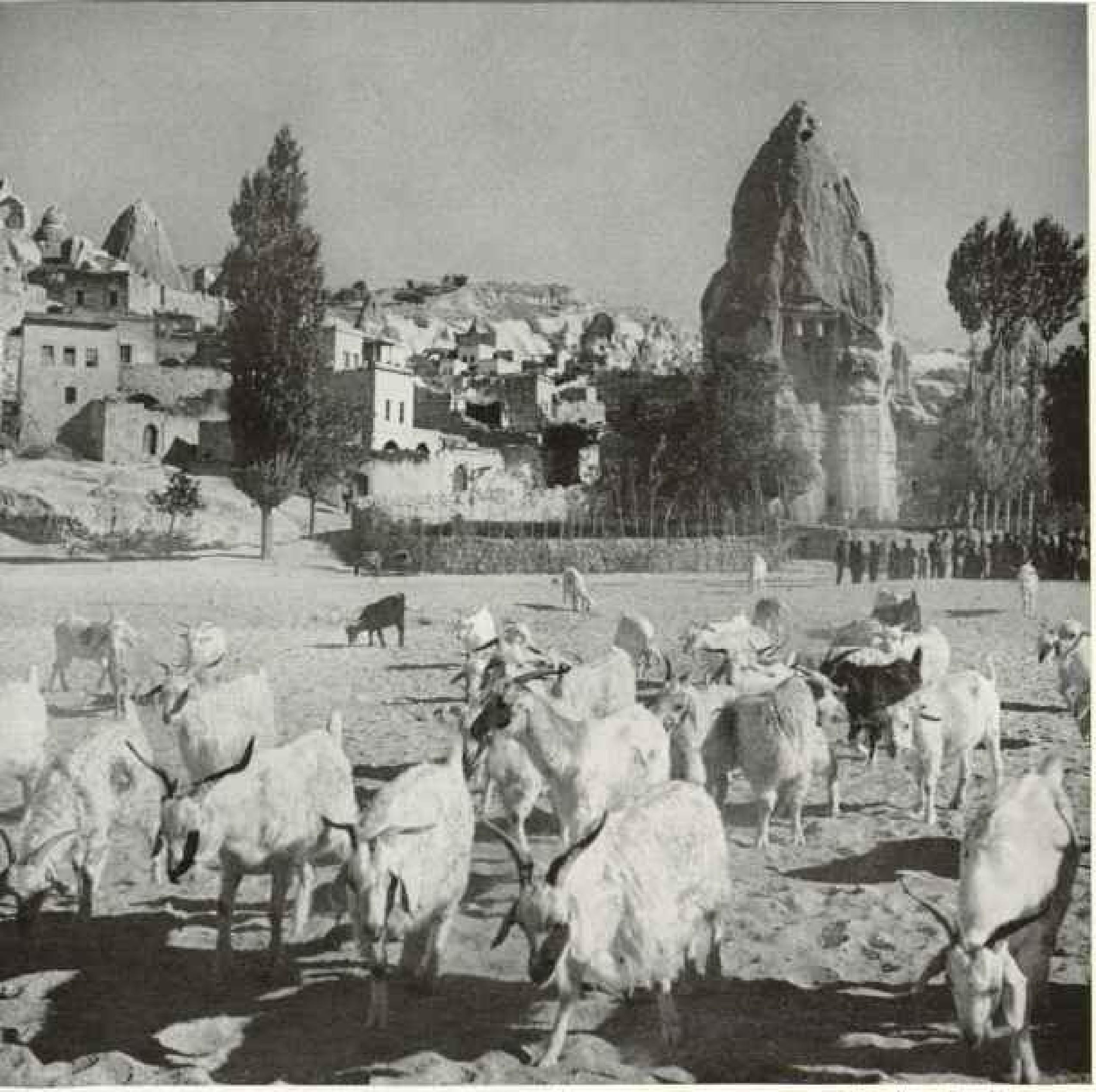
True Democracy Ahead for Turkey

Already men speed past sites to which great armies marched, four thousand years ago. This was their world. We and the road makers are trying to open it for all the modern world to enjoy.

Back in Washington, a Turkish friend asked news of my trip.

* See "Archeology, the Mirror of the Ages," by C. Leonard Woolley, NATIONAL GEOGRAPHIC MAGAZINE, August, 1928.

† See "Darius Carved History on Ageless Rock," by George G. Cameron, NATIONAL GEOGRAPHIC MAGAZINE, December, 1950.



185 George Pickow, Three Lions

Cappadocia's Sugarloaf Cones, Once Homes and Monasteries, Now Serve as Pigeon Roosts

Volcanic towers near Ürgüp were hollowed out by early Christians. Some had as many as 10 floor levels. Thousands of doves nest in the chambers. Their guano, collected once a year, fertilizes fields.

Commenting at length on what a wonderful year 1950 had been for Turkey, this friend said: "As long as we were a one-party government, we had a lot of explaining to do. But we have no apologies to make for the election of 1950!

"Turkey is like a tennis player, to whom Atatürk taught many of the tricks of the game. But the people, studying democracy in other lands, knew that they were not yet first-class players. The May 14, 1950, election showed that we are at last on the way to becoming first-class democrats."

Even under the sultans there was a tolerance, family loyalty, and democratic conduct among the Turks. The 1950 elections, far from violating the people's natural tendencies, gave them political expression.

For a young republic, built on the decayed ruins of many centuries of absolute monarchy, that achievement is a source of hope that government "of the people, by the people, for the people, shall not perish from the earth."

When Lincoln spoke at Gettysburg, and the weak, extravagant Sultan Abdul Aziz was bankrupting the Ottoman Empire, even the Great Emancipator could not foresee the day when his democratic principles would be supported by Turkish bayonets, Turkish ballots, and American bulldozers as they clear the path for progress in Turkey.*

* For additional articles on old and new Turkey, see "National Geographic Magazine Cumulative Index, 1899–1950."

Colorado's Friendly Topland

By Robert M. Ormes

TIMES have changed in the Colorado Rockies.

In 1806 Zebulon Pike gazed across the "Grand Peak" later named for him and wrote in his diary, "No human being could have ascended to its pinical."

Now, most visitors to the 14,110-foot summit don't even bother to climb it (page 203). They ride in Diesel-powered trains, drive their cars, or ride up the bridle path.

On top they have their choice of two summit houses. From one they can telegraph home. In both they can eat doughnuts which, because of the altitude, are raised with a fraction of the normal amount of leavening; drink coffee that boils at a temperature scarcely hot to the finger; and buy the souvenir donkeys called Rocky Mountain canaries.

Of those who climb, one man counts a thousand ascents. Others have put on their shorts and run up from the prairie in half an afternoon. On the cog road right of way I have seen women walking toward the mountain in high heels.

Even the white ribbons of winter do not tie off the summit. Members of the Pikes Peak AdAmAn Club climb up through wind and snow to celebrate New Year's midnight with a fireworks display (page 214).

Roaming the Roof of Colorado

For off-the-highway explorers, all Colorado's upland has the same friendliness.

The age of ice is over. The glaciers have receded, leaving only their tracks. These are the sunny cliffs that give grandeur to the scene, the meadow-floored valleys, the cirques that cradle small, vivid lakes.

Storms are brief. Even in a wet summer they do not drive the visitor under his tent for long.

Most of the high country lies in 11 national forests and one national park (map, page 188). In the 15,000,000 acres of forestland, clear streams and seasoned firewood invite the camper to stop anywhere and make himself at home. Above the tree line rises a wanderer's paradise—a vast open land with long vistas between the mountains.*

The era of mining and tree cutting left byroads through the forest, but they too are subjects for the explorer. They have been forgotten, and man-high spruces grow between the ruts.

My mountaineering began in boyhood, when I could look out the schoolroom window to Pikes Peak. There were trips with my father, who loved the outdoors.

I remember beef-and-bacon squares impaled on a long spit and roasted over the open fire. I remember a night in the Bottomless Pit cirque when we woke to see bighorn springing noiselessly up the headwall.

I remember the first Pikes Peak climb. As we came over the shoulder, we saw other peaks—the Sangre de Cristos, the Mosquitoes, and the Collegiate group—gleaming in rows in the west.

These mountains, and more beyond them, have opened out like a vast attic hide-out in which every exploration calls for another.

50 "Fourteeners" Challenge Climbers

The Colorado Mountain Club impartially lists Pikes Peak among some 50 that top 14,000 feet. An agile father-and-son team once made all these summits in a single month.

My visits, like those of most clubbers, were spaced out over several seasons. More recent ones have fitted into a collective aim of the State's mountaineers. We voted to pool our knowledge to help others find their way around. The job sent us out to recheck distances and heights, verify new routes, note shelters and pack-in facilities, and learn the personalities of the mountain giants.

Chief among the many mountains that still hold the glamour of gold is the Mosquito Range, one jump back from the prairies. The treasure hunt began here after the fifty-niners started the State's first gold rush, and still the veins have not dried up. In its time, the industry has used every means from the ledge-walking donkey to the great land-cruising placer dredge to keep them flowing.

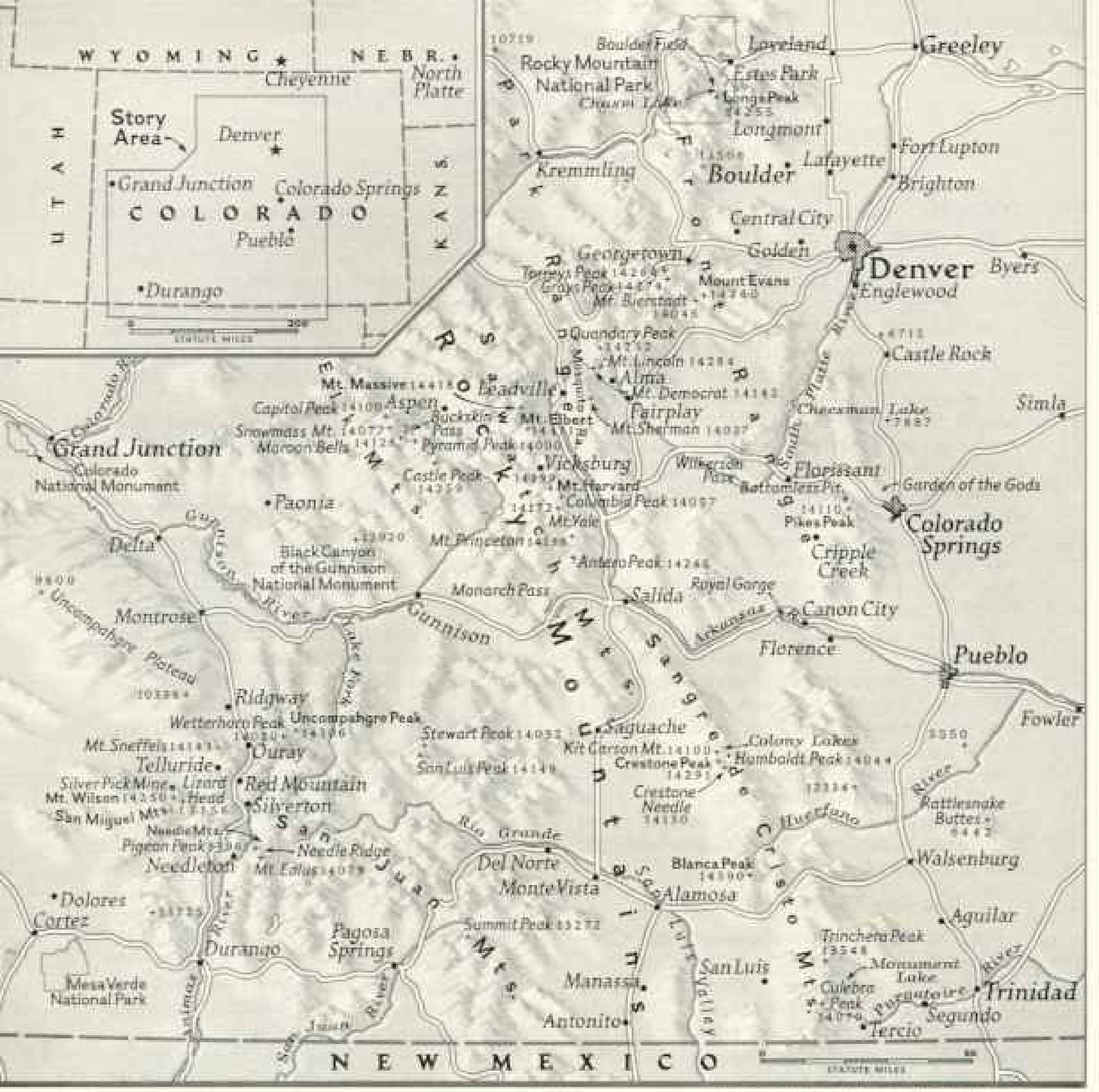
To drive to the Mosquito Range, we circled northward around Pikes Peak, passed the fossil beds and petrified forests of Florissant, and climbed to Wilkerson Pass. Before us lay treeless South Park (page 211). We picked out our peaks on the far rim, then coasted into the tawny dip where calves teetered and lambs gamboled.

A roadside ditch showed Colorado's dependence on water.† On the uphill side were gray mounds of sage. On the downside stretched lush hayfields.

As the flats narrowed toward a point, we began to read mingled chapters in the story of metal. First came a million-dollar placer dredge. Crane-shaped, it floated in a pond that moved with it and ate up yards of earth to get spoonfuls of gold.

* See "High Country of Colorado," by Alfred M. Bailey, National Geographic Magazine, July, 1946.

† See "Colorado, a Barrier That Became a Goal," by McFall Kerbey, National Geographic Magazine, July, 1932.



153 Drawn by Harry S. Oliver and Irvin E. Alleman

Even at Its Lowest, Colorado Is High Country

Lowest spot in the area covered by this map is 4,300 feet above sea level; lowest in Colorado is 3,350 feet, higher than the highest points in 18 of the 48 States. Mount Elbert, lofty vertebra in the Continental Divide spine, reaches 14,431 feet—highest elevation in Colorado and second in the United States, yielding to California's Mount Whitney by a scant 64 feet. Of the Nation's 10 tallest peaks, seven are in Colorado. About 50 mountains in that State top 14,000 feet. The author and companions climbed dozens of rocky skyscrapers.

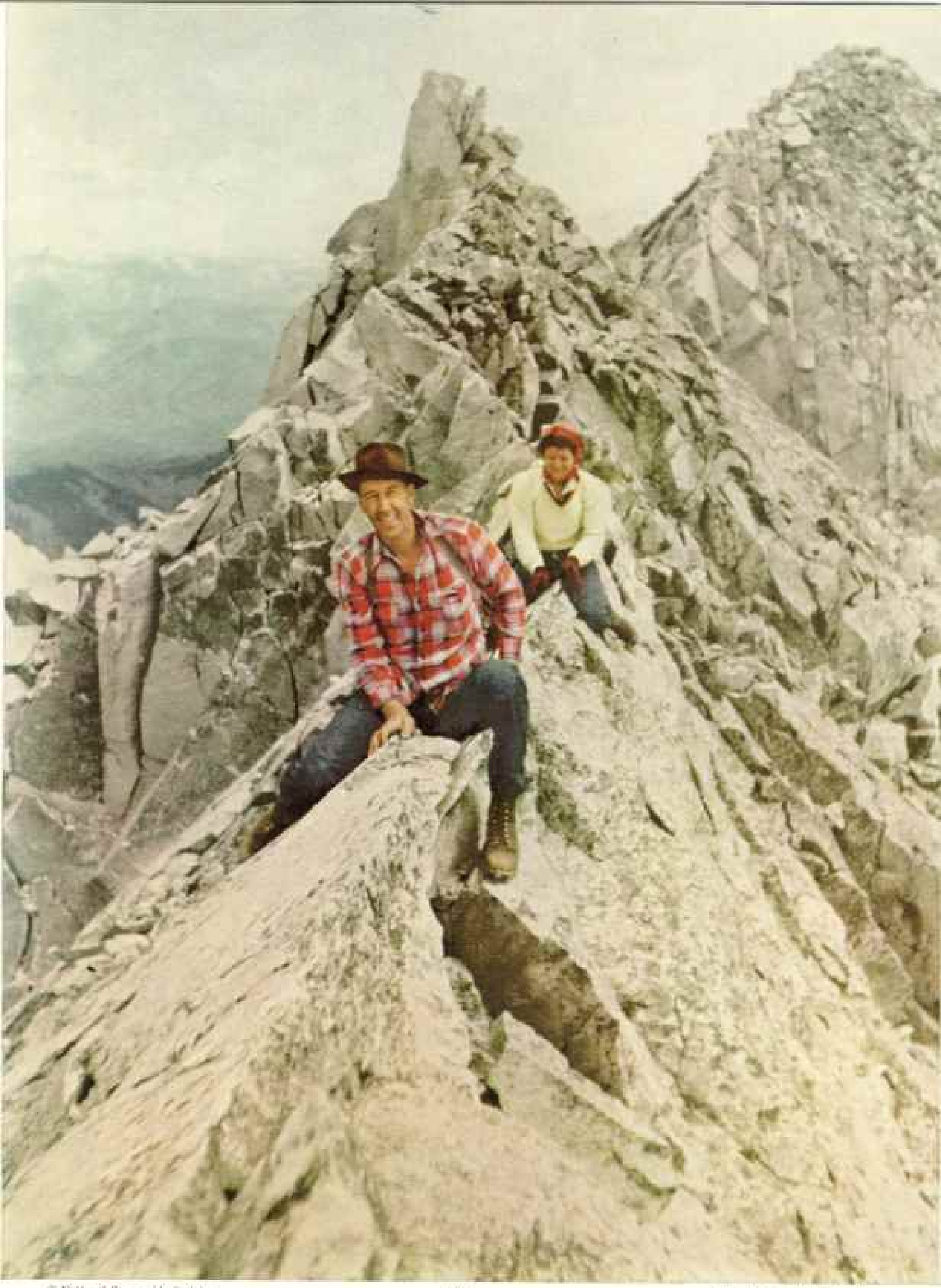
At Fairplay, farther along, were older placer workings. Pressure hoses had washed down the riverbank and left it a rocky badland. The town, though, was not living on reminiscences. Its buildings had paint, its lawns had grass, and its store counters showed items for fly fishers and ranchers.

Alma, between park barrens and forest, crept toward ghosthood long ago, then stopped for a comfortable, tattered old age. People live there cozily, with geraniums in their windows. Two gasoline pumps shriek garishly on Main Street, sole bright spots in the clutter of paintless board walls.

Two or three miles along, a sign, "The Arrastres," Spanish for drag mill, told us we had reached a Chapter I illustration in the gold story. In the stream that splashed by were smooth, doughnut-shaped pools carved from the bedrock.

Using horsepower on a winch, the miners of the early sixties had dragged a millstone around and around the ring to crush their ore for roasting.

Farther upstream was the more familiar grinding mill, a big building with the roof coming down in giant stairsteps. It had long been idle, but the cable, still hung with ore



Annan Collet for Carl Blaurock

Alpinists Climb Sitting Down as They Inch Along the Knifelike Ridge of 14,100-foot Capitol Peak

Some 50 peaks rise to 14,000 feet or more near this aerie in Colorado's Elk Mountains. These ridge straddlers look down into deep basins on either side.

Kodachrome by Glenn L. Gebhardt

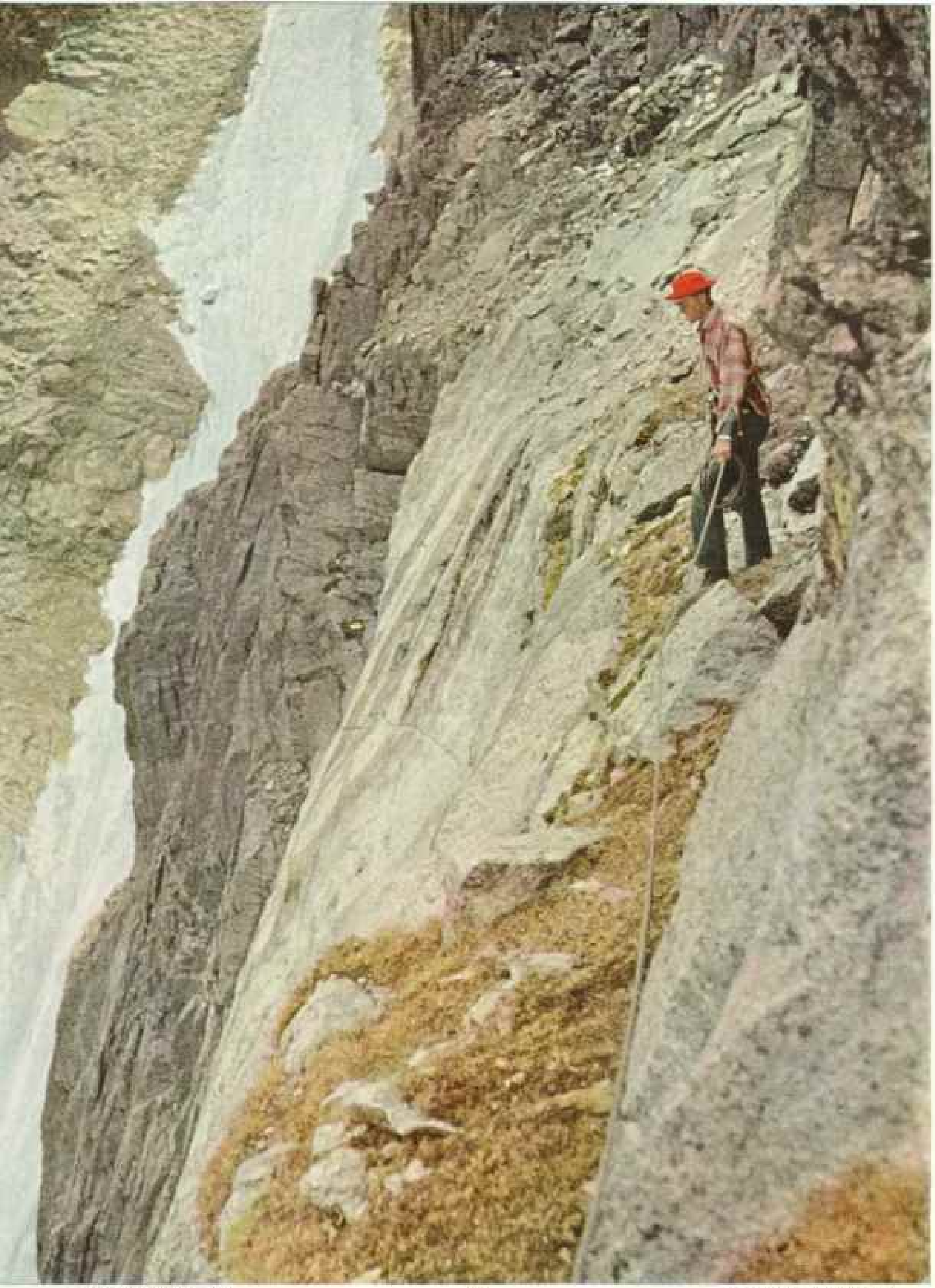
A Head-in-clouds Visitor on Mount Evans Watches a Storm Swirling over Arapaho National Forest

Like Pikes Peak, this mountain boasts a motor road to the top. Physicists study cosmic rays on the 14,260-foot summit. Artist Albert Bierstadt in 1863 called the pinnacle Mount Rosalie, for his sweetheart. Seven years later the peak was named in honor of Colorado's second territorial governor, John Evans.

Drifting Clouds, Screening the Sun, Give Elk Mountains' 14,000-foot Maroon Bells an Ever-changing Look

To those who climb afoot or by pack horse, this unspoiled preserve in White River National Forest offers campsites beside trout-filled lakes in snow-flecked alpine meadows. Motor highways, summer homes, and resorts are barred.

Kodachrome by Carl Blaurock



Ansco Color by Stanley Bonches

"East Face Is for Experts Only," Rangers Warn Climbers on Longs Peak

The photograph was made from ledged Broadway, the only horizontal stretch between the 14,255-foot summit and Chasm Lake, 2,000 feet below. This leader waits for his roped companions.

Kodachromes by H. L. Standley

Footsore Hikers Welcome a Splash in an Upland Stream

These mountaineers wade Lake Fork of the Gunnison River. Home of fighting trout, the Gunnison drops from mountains to sage hills, cuts through Black Canyon, the State's deepest gorge, and meanders through a former desert to the Colorado River.

Not All a Climber's Hazards Lie on Mountainsides

One false step could mean a tumble into cold, rushing water for this pack-laden hiker. Cautiously, she inches across a sapling footbridge, using another felled tree as handrail. Anglers find superb sport in Colorado's snow-fed streams.

Kodachromes by Allen B. Rawson

© National Geographic Society

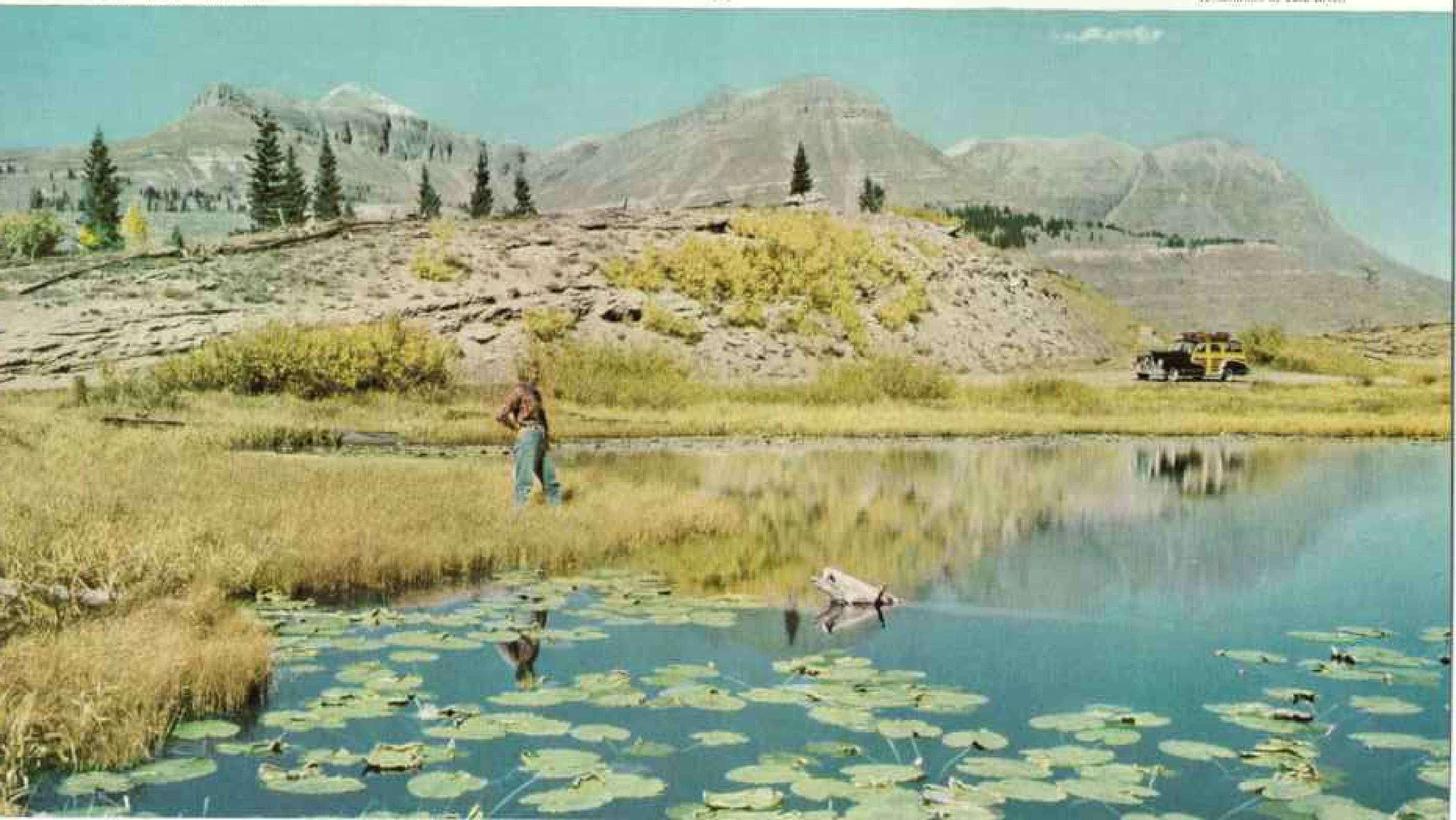
Kodachromes by Jack Breed

↑ Colorado's Topland Glows in All the Spectrum's Colors. It Throws In a Rainbow for Good Measure

San Miguel range's Mount Wilson, Gladstone Peak, and Wilson Peak raise snow-covered heads behind the angler casting in a spruce-fringed lake. The rainbow arches above the photographer's station wagon near Durango. The road is called the Million Dollar Highway because originally it was surfaced with gold-bearing gravel.

Below: A nameless alpine tarn near Silverton mirrors the 13,400-foot Twin Sisters. In early summer, each water lily sports its own delicate blossom.

Kodachrome by Jack Breed



A Free-wheeling Gate Swings Shut on a Colorado Ranch

Travelers in southwestern Colorado's grazing areas find many such openings in ranch fences. An old wagon wheel attached to the gate's open end permits easy handling and relieves strain on hinges. Distant San Juan peaks overhang the mining town of Telluride.

A Sheepherder's Best Friend Is His Intelligent Little Dog

Ben Maestas's helper takes part in the lonely job of tending 700 ewes and 500 lambs grazing the San Juans. In winter, Maestas moves his herd southward to New Mexico. There he rejoins his wife, ten children, and six grandchildren.

Kodachrome by Jack Breed

buckets, swept upward from the top-story window to the canyon wall in a 1,000-foot parabola. At its high end and all along the rimrock we spotted tiny holes where men had gone up with their donkeys or in the ore buckets to do a day's work.

Our schedule called for two nights of camping with a three-peak climb between. We chose a miner's cabin for shelter in case of storm, but clear weather let us sleep outside.

The name of the range had forewarned of mosquitoes. Large flights hovered around, but they gave us little bother. Their bite hadn't the potency to raise a welt, and after we were settled a breeze fanned them off.

The road took us through timber line to a small lake. With nothing in the way but altitude, we climbed Democrat's remaining 2,100 feet in the standard ascending time, 1,000 feet an hour.

On these mountains gold came high. Exploring between the teeth of a rotten, precarious ridge, we found a mine shaft scarcely a stone's throw from Democrat's 14,142-foot top. After lunch a bombardment of snow pellets drove us off the summit.

A try at fire building with slivers from an old mine shack made us wonder how men had found the oxygen to cook with. We were still without a blaze when the storm passed and let us move on in sunshine.

Mount Lincoln gave us a scare. It too had its lonely mine shack, bleached to silver by high storms, and apparently abandoned. Just as we passed, there came from it the long, wild scream of an industrial whistle. It had signaled a change in shifts.

To gather in Quandary, next of our objectives, we drove over the Continental Divide into Pacific drainage. Almost from the crest of the Divide we found more water and verdure on the western slope.

Mount Elbert State's Highest

From Alma our car was sent by driver around a 75-mile U-bend, while we cut directly over the range to take Mount Sherman. Much of our altitude was made on an abandoned wagon pass with sky-petaled columbine growing in the ruts.

Sitting with our backs to the summit cairn on Mount Sherman, we could look across the Arkansas Valley to the Sawatch Mountains and a 40-mile string of fourteeners that hugs the Continental Divide. Nearest were Mount Massive, which the early Hayden Survey called the State's highest, and its rival Mount Elbert. The latter, by recent calculations, is securely in first place with 14,431 feet.

Diversity of ores has made 10,000-foot-high Leadville one of the most tenacious of mining camps. Now a housing shortage occurs in winter when Army mountain troopers camp near by for ski training.

South of the big two—Elbert and Massive—are La Plata and Grizzly Peaks, then the Collegiate group—Yale, Harvard, Princeton, and Columbia—and three noncollegiates at the end.

From the population belt just east of the Rockies, these mountains make good week-end runs. Long canyons, U-shaped from the glacial epoch, finger between them. Glistening water spills down their side walls from each hanging valley. Fish hide in the pools; deer make trails in the forest.

Solitary Old-timers Haunt Ghost Towns

Rebuilt mine roads keep the back country open. To explore two fourteeners and a little-known group of thirteeners, we drove up a roaring creek to the ghost town of Vicksburg. Grass carpeted the street from one row of doorsteps across to the other.

The lone inhabitant was a genial cliff comber who trapped in winter and panned gold in the summer. "Makes me a living," he told us, "just where I like to be."

Near Mount Princeton on a trip years ago, we stopped to chat with an old woman who had stepped out to her mailbox. She led us back across the stream on a footbridge, then plunged through a mat of aspens. In the clearing beyond was a surprise village that she proudly called "my town."

Five or six heavily built log houses stood in a semicircle. Grandma had kept them all in repair against the time when mining should come back.

We were shown each one in turn, and at the end of the tour she handed us the key to the largest. It was immaculate, and furnished as if for guests.

Our volunteer hostess drew a county pension, the postman told us. She said she was 93 years old, but she would not leave her ghost town until snow blocked the little railroad that supplied her with food.

From here we climbed two peaks in three tries. Mount Princeton yielded easily, but on the first try at Antero, on the opposite side of the valley, we hauled ourselves up into the wrong hanging valley and climbed the wrong peak.

From the Sawatch Mountains our next venture was to Mount Evans, west of Denver (page 190). Like Pikes Peak, it has a road to the top and faces the peak collector with a moral issue: How far up can he drive and still tell himself he has climbed? A washout and a roadblock loomed in the head lamps to decide the matter for us.

It was raining and we were on a steep, timbered hillside with no place to pitch a tent.

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Bronze Cayuses Buck and Bridle in Salute to Colorado's Mile-high Capitol

Denver's seat of State government looks down on the Civic Center. A. Phimister Proctor's equestrian statues, *Bronco Buster* and *On the War Trail*, symbolize the old-time "wild West." From the capitol dome, on a clear day, a majestic backdrop of 150 miles of Rocky Mountains is visible. Outdoors-loving Denverites enjoy about 30,000 acres of municipal parks in near-by mountains.

We hauled our sleeping bags into the ends of a steel culvert not yet installed. It gave an eerie ring to bedtime stories; but sleep soon overtook us, and we settled into its corrugations like ditchwater.

Physicists were using the Evans summit house for cosmic ray study. We talked with them briefly, then headed off for Mount Bierstadt, a mile and a half southwest. Evans and Bierstadt are linked by a fin of jagged rock. It looked as if we would have to dip far into the valley to avoid it, but we happened upon a little ledge high up where we could cat-walk across. We put up cairns that would guide others to the same starting point.

Heading for Grays and Torreys Peaks, also west of Denver, we gave up camping to spend a night at silver-wealthy Georgetown's famous Hotel de Paris. The cashier's cage of massive mahogany filled one side of the high-ceilinged lobby. The dining hall and our rooms upstairs had Victorian furniture of the same solid elegance.

The canyon that runs from the town up to its mines was too steep for a railroad grade. To gain the needed altitude, engineers put in a full circle of track called the Georgetown Loop. It climbed all the way around and finally overpassed itself on a high trestle. In the booming late sixties and seventies ore trains spiraled metallic wealth down into the town's coffers. Now a thinner but reviving trickle of wealth comes up from the hot prairies in the pockets of atmosphere-hunting tourists and fishermen.

High in the hills near by is Central City. In its summer season visitors can stop at Teller House; have their tintypes made; and square-dance in the streets with Lloyd Shaw, nationally known expert on folk dancing.

North of Denver, roads run from the middle-sized towns of one of Colorado's rich agricultural areas to the Rocky Mountain National Park.* Private inns and government trails have opened its treasureland of lakelets, streams, and ice-eaten mountains.

Clouds Make Longs Peak Sizzle

Many plainsmen are introduced to the mountains here and make rugged Longs Peak their first high conquest. We found even its tourist routes were "big mountain." The old Enos Mills trail circled to the cliff-surrounded

* See "Photographing the Marvels of the West in Colors," by Fred Payne Clatworthy, National Geographic Magazine, June, 1928.

summit on narrow ledges; the short cut down used a handrail of fixed cable.

While we were aloft, cloud puffs coasted across the top. Our hair stood on end, our boot nails crackled, and the rocks buzzed with static discharge.

After lunch a higher, not so harmless cloud came in. Baby lightning replaced the sizzle and drove us to cover under projecting rocks.

While the storm kept us there, we talked to the alpinist ranger, the professional of Colorado's mountaineering, and learned oddments about his job.

He takes care of three above-timber-line shelter huts. In June this means cutting the roof-high pack of snow and ice into cubes and spading them out. On our July trip it meant a curious assortment of repairs. He mended the glass-footed stool he stands on to telephone down the hill during thunderstorms. He wired together a tile chimney in the lightning-battered Boulder Field hut. He replaced a window sash at Chasm Lake.

The ranger carried a long ice ax on the trail and cut fresh steps wherever thawing snow exposed the ice sheet under drifts. He did no guiding, but kept a close eye on weak parties. On the descent ours was a large group that had collected around him during the storm.

Crossing a steep snowbank, a girl made a careless step. She slipped, cried out in fright, and began to shoot downward like a sled. The ranger flung himself upon her. With his ice ax point spraying snow, they rode to a quick stop.

Next day two of us returned for a wall climb on the sheered-off east face (page 192). The ranger came up with us to Chasm Lake, and while we lay on a meadow of buttercups he pointed out the long, steep routes. We picked out one that gave us several hours of wrestling with nose-close geography problems.

When we reached Broadway, the cross-ledge halfway up, the ranger megaphoned some time-saving advice to us from a side ridge. We met him again on top.

Spanish Place Names Dot Southern Colorado

Colorado's south line is a parallel of latitude. Inside this straight boundary is a wavy one that marks the edge of Spanish-speaking penetration. On the piedmont traffic artery and in the big towns it appears only in names.

Trinidad, Durango, and steel-making Pueblo are like any other American business centers. But on the byways the traveler turns a corner and finds himself suddenly in a lane between adobe houses.

On the hunt for Culebra, the southernmost fourteener, I stopped to ask which peak of the long snowy range it was. Whether I spoke in Spanish or English, the answer was the same "No," delivered in friendly, rising inflection. These sun-happy people cared little more for the mountains that loomed above them than for the seams of black coal beneath.

The names in these parts are mostly Spanish. There are Trinchera Peak, Huerfano River, and the coal camps of Segundo and Tercio, where the miners seem to be of every background but Spanish-American.

One name has a curious history—the Purgatoire River. Spaniards called it *Las Animas Perdidas en Purgatorio;* this has been corrupted to Purgatoire. Cowboys added to the confusion by mispronouncing it Picket-wire. Today all three names may be heard.

The Culebra ascent from the east side took three tries. On the first attempt I climbed some nameless peak miles too far north.

Topland Trout Fishing

On the second try I was waylaid by the trout water of Monument Lake near by. The fish, notoriously picky over their food, were at that moment breaking the surface like a hailstorm. I whipped out a fly rod and in 15 minutes had four beauties. Then I spent the rest of the week end trying everything from cream to caviar, without another strike.

On the third trip I back-packed a sleeping bag into the high country and found the summit of Culebra, identifying it by the rock cairn and the registry cylinder which Colorado Mountain Club members have placed on all major peaks.

Among the Spanish-speaking, Sangre de Cristo (Blood of Christ) is a broad term, perhaps synonymous with the Rockies. Coloradans have tied the name to one range, a long, backhand exclamation point that parallels the potato-growing San Luis Valley (page 196).

Our drive to Blanca Peak, the dot in the exclamation point, led us through strange contrasts. The dry inland valley floor bubbled with artesian water. Its road, straight as a gun barrel and far flatter than any highway east of the mountains, runs 50 miles without a dip or curve. Outlined against the dark-timbered mountainside were sand dunes 1,500 feet high and white as snow in the sun glare.

Blanca was a high one (page 205). The way began in the cottonwood grove of a dude ranch and climbed through belts of piñon, yellow pine, fir, and spruce to sky-domed heights beyond the trees.

To reach the staff peaks of the exclamation point, we decided on a week's high camp and wrote to Otto, a rancher-packer recommended by the Colorado Mountain Club.

A long straight lane up the valley, between

300 Standley Photographers

Unwise Climbers Make Work for Firemen

Sandstone pinnacles in the Garden of the Gods often lure would-be alpinists into dangerous escapades. The Colorado Springs Fire Department stands ready to save them. Here a rescuer carries a marooned daredevil down a ladder.

timothy fields and flower-studded pastures, led us to Otto's green door-yard. He had answered no letters, but the horses were tethered and he came out of the shed with a blanket in one hand and a pack saddle in the other.

While we were unloading the car, Mrs. Otto called "Dinner's ready," from a white porch bright with sweet peas. Her dinner was for us—creamed onions, garden lettuce, a platter of fried chicken, homemade currant jelly, and her own bread to spread it on. We gave thanks we had not lunched on the way.

After cherry pie and a last cup of coffee, we ambled up through the timber, enjoying the pack-free walk. Otto's irrigation ditch, flowing with clear, soft water, guided us around into the creek from which it flowed. An old copper mine road took us upstream toward the Colony Lakes. The bridges were gone, but we found a felled log near all the crossings.

Otto, who passed us on the trail, chose a dry knoll for our camp. He threw off our freight where the gnarled scrub pines of timber line would give us a windbreak without cutting off our view. Crestone Needle, towering yet intimate, seemed all the steeper for the flat mirror of water at its base.

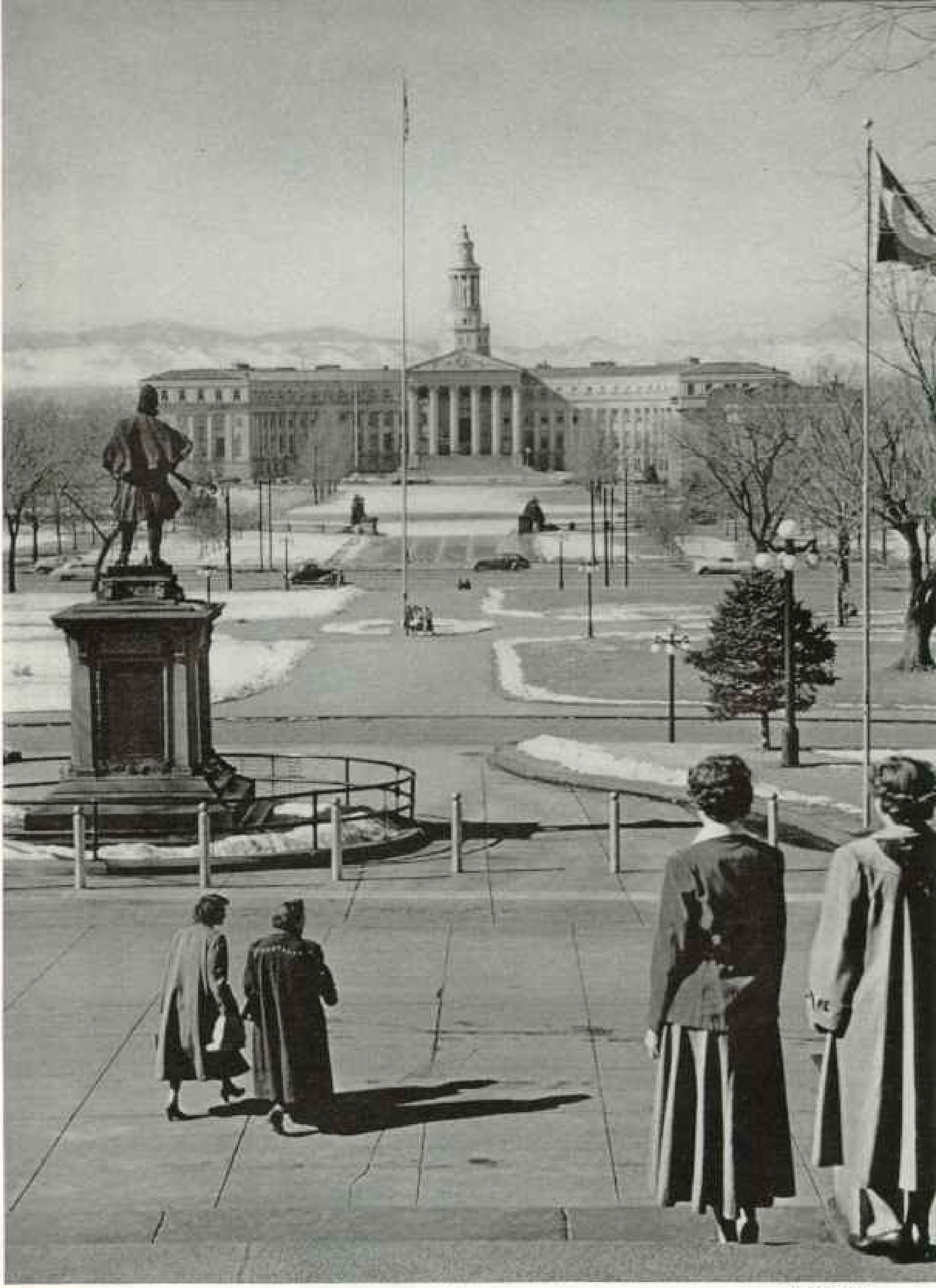
Lofty Playground for Bear and Cubs

Climbing out of the Colony Lakes bowl on a trip to Kit Carson, north along the range, we heard a guttural woof-woofing that warned us to move quietly. For the next half-hour we watched a big bear with two cubs. There was no food hunting, or other practical activity. They seemed to have come up to the 13,000-foot tableland to play.*

Humboldt, our second peak, was a magnified anthill of rock. From the drudgery of climb we looked across to Colorado's handsomest ridge, the jagged connecting spine between Crestone Needle and Crestone Peak.

The conglomerate of these mountains gave us good entertainment. It is a green cementing rock set with varicolored stones. Sheared off, it looks like panchromatic salami.

* See "Lords of the Rockies," by Wendell and Lucie Chapman, National Geographic Magazine, July, 1939.



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Crested "Waves" of Rocky Mountains Lap at Denver's Western Fringes

Snowy foothills loom above striking City and County Building, joint design of 55 architects. Soldiers Monument (left), a bronze figure of a Union soldier, stands at the western entrance to the State Capitol (page 198).

Jack Breed

From Sculptured Cliffs Near Grand Junction, Youthful Hikers Survey a Promised Land of Fertile Colorado River Flatlands

Rimrock Drive circles through Colorado National Monument, rich in petrified wood and prehistoric animal remains. Irrigation makes the valley verdant.

Colorado Springs Aimed Its "Main Drag" Straight at Pikes Peak. The Name? Pikes Peak Avenue, of Course!

Snow dusts the 14,110-foot summit, named for early explorer Zebulon Pike. Cog railway and automobile road ascend it. Holiday banners partly screen the Antlers Hotel.

Stewart's Commercial Photographers & Finishers

In most places, however, it has the rough surface of broken nut bread. Knobs jut out conveniently wherever the hands and feet require them, and we found we could swarm over impossible-looking walls at will. In a series of vertical field days, we climbed Needle and Peak and all but one of the cloud-scratcher pinnacles between.

On rest days we fished and prowled about mine properties. Below camp we waded through monkshood, mertensia, and a meadow of chest-high larkspur.*

One of the Colony Lakes gave us baked trout dinners. Every fish we took weighed about a pound and measured 14 inches. Our packer explained their uniformity: the trout had all ridden in three years ago on horseback, two canfuls to a horse. Their fine growth answered the question, "Can fish live through the winter in this high lake?"

West of the Sawatch Mountains shoots a crane arm of rougher, wilder peaks, the Elk Mountains. The old-timers who named them did so with eyes of appreciation. They called one Snowmass for the year-round bank of white that hangs like a sheet from its summit ridge. Two others they named the Maroon Bells for their deep red rock and flaring sides (page 191). They called the turreted one Castle, the one with straight-edge ridges Pyramid, and the rock dome Capitol.

The Elks saw Colorado's first sport mountaineering, early in the century, when the late Percy Hagerman packed in and found his way to their tops.

Aspen, the gateway town of the Elks, has recently touched up its gingerbread façades and installed 14,000 feet of elevator service, making it one of the world's ace ski spots.

From our ghost-town camp at Ashcroft, near Aspen, we climbed through drizzle to the weird escarpments of Castle Peak. Just under the top we emerged into sunlight. We stood on an island with a sea of whitecaps heaving around and wished for a cloud-going boat.

Our second camp was by Maroon Lake. From it we watched beaver wakes glistening under the moonlight. At first the swimmers slapped the water and ducked when they came past. When they grew used to us, we could see them drag their aspen poles down skidways to the water.

From this camp we climbed the Maroon Bells and walked to the saddle of Buckskin Pass. Percy Hagerman had told us of naming it for his troublesome horse. The animal had twice rolled off and scattered the pack over 1,000 feet of mountain.

In southwest Colorado there is a Mount Eolus, named for the Greek god of the winds, but for us the windy peak was Pyramid. Wind thrashed us across a moraine, tripped us in the fallen timber, and shoved us off balance on the rocks. We crawled to the top, signed the register, and scuttled off again.

Back in camp we found the wind had knocked down our tent and streamlined it behind one peg. My air mattress had sailed across the lake and a visitor had nabbed it going over the hill at the far bank.

The remaining peaks of the Elks had upright lines instead of horizontals. Narrow ridges swept down from their tops like cloth-draped wires from a center pole. For a stretch on Capitol we had to climb sitting down. We hunched straddlewise along the knife edge with each leg overhanging a mile-wide basin far below (page 189).

Skiless Skiing down a Mountain

Colorado's mountains divide into three parts. First, there are the front peaks, those that look off toward the prairie. Then there are the middle ranges, the Sawatch, Mosquito, and Elk, and the Sangre de Cristo, which trails off southward. Third come the twisted ranges of the southwest corner. These last are more remote, and their tops took us deeper into the isolation of mountain country.

From the placid Gunnison Valley we made excursions southward. First came Stewart* and San Luis Peaks, northeastern outposts of the broad San Juan Mountains. To get within walking distance, we hired saddle horses at a ranch and rode them far up the canyon.

The ups and downs between peaks kept us busy until sunset, and we thought we should be inching down Stewart after dark. But from the top almost to our tethered horses ran an arrow of snow. We pushed experimental toes into its edge. A sun-softened layer on a firm underbed made it just right for glissading. Turning, twisting, checking on the edges of our boots, we scooted down for a nonstop drop of 3,000 feet in 20 minutes.

Driving toward our first two peaks of the main San Juan group, we aimed our car up a side road that had no width on which to turn or pass. It grew steeper and sketchier, and finally led us creeping across a tilted face of bald stone.

The inside rut was a little ledge that someone had chipped from the rock. The outside wheels ran on a strip of dirt held in place mainly by aspen poles. The poles were wired to iron pegs in the rock, but some were rotted and swung downward from a single mooring.

On the worst patch we heard a throb like that of an approaching car. It was only the stream that tumbled over a waterfall far down, but it almost gave us heart failure.

* See "Wild Flowers of the West," by Edith S. Clements, NATIONAL GEOGRAPHIC MAGAZINE, May, 1927.

A Human Fly Clinging to Blanca Peak's Sheer Face Goes Up Smiling

Acrophobia (fear of high places) means nothing to this member of the Colorado College Mountain Club as he nears the 14,390-foot summit. His leader already has anchored the rope with pitons.

Kodachromes by Jack Breed

"Galloping Goose," Half Train, Half Bus, Delights Vacationists

On summer week ends Rio Grande Southern's wheeled hybrid carries picnickers and sight-seers between Ridgway and Lizard Head. Once it operated daily. Driver Jim Cooper, here handing over a sack of bullion, carries rifle and shovel to deal with wild animals and rock slides.

Red Mountain, Once a Boom Town, Slips Quietly into Decay

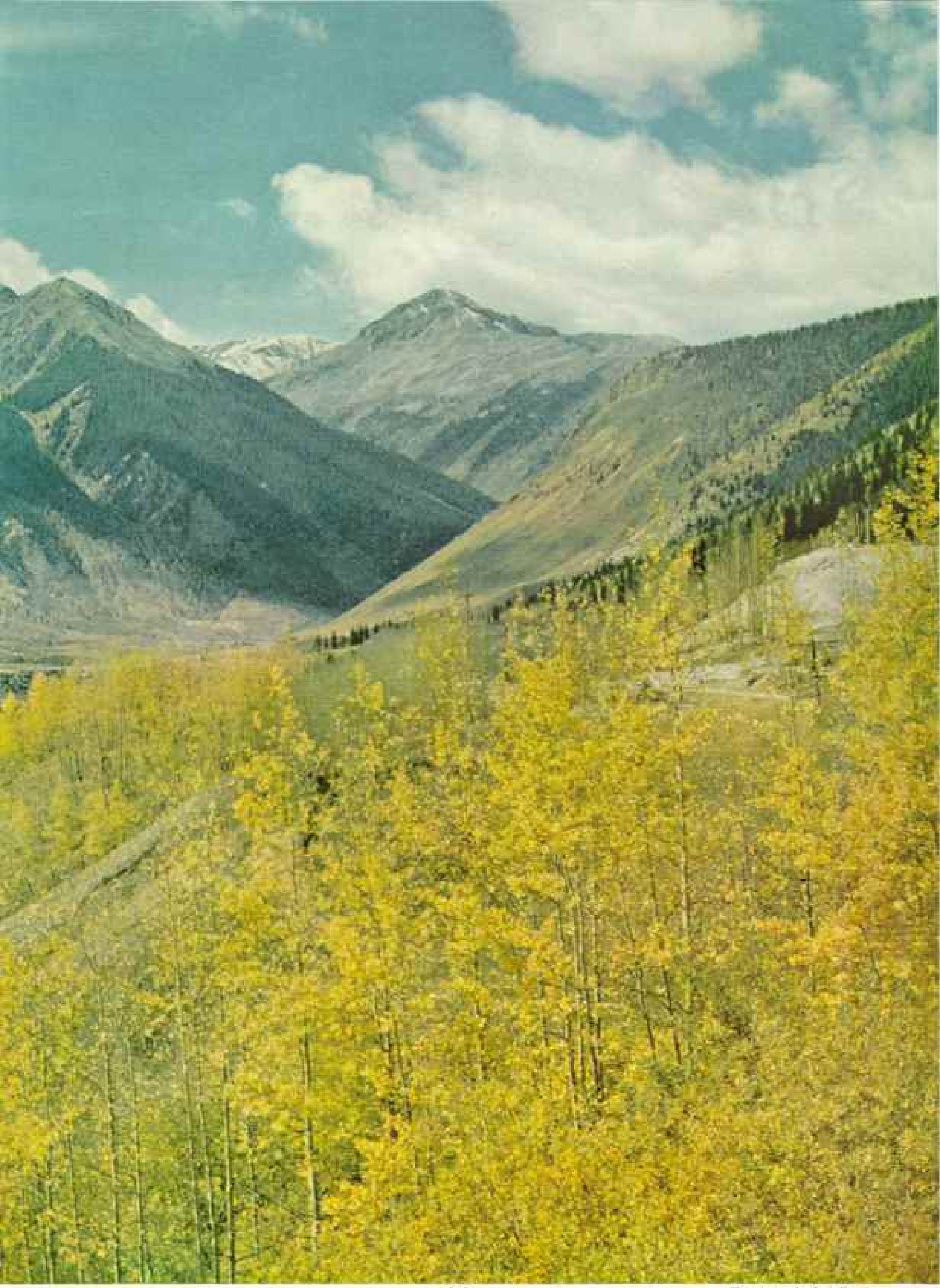
Each year's storms and rock slides take their toll of abandoned cabins and mine shaft buildings (background) in this ghost town high in the San Juan Mountains. Red Mountain in the late 1800's boasted hotel, railroad, newspapers, and countless bars.

Movie Makers Built This Wooden Locomotive as the Stand-in for a Real Iron Monster

For most scenes of *A Ticket to Tomahawk,* Twentieth Century-Fox used the *Emma Sweeney,* a venerable narrow-gauge engine now chugging between Durango and Silverton. When the plot called for mules to haul Emma over a trackless stretch, the animals could not budge her. Studio craftsmen then constructed this antlered replica, shown at Durango's airport, where an Indian attack was staged.

Mountain-ringed Silverton, a Mining Center, Outlives a Hundred Ghost Towns

Nestled in a valley at the base of 13,336-foot Sultan Mountain (center), Silverton often is snowbound for weeks. The town, formerly called Baker's Park, was rechristened when a miner boasted: "We have silver by the ton."



209 Ektachrome by Jack Breed

Colorado's Sky-reaching San Juans Look Down upon Shimmering Carpets of Aspen

Spanish explorers named the range. Trappers and prospectors succeeded them. Today deserted mines and empty prospect holes honeycomb Animas River district, which in 36 years produced metals worth $62,000,000.

^ High-country Forest Flames with Fall's Golden Aspens

Colorado boasts more than 40 varieties of evergreen and broadleaf trees.

Aspens, members of the poplar family, are valuable as cover growth in burned areas, growing quickly to hide the scarred earth. They also provide shelter for slow-maturing trees.

Each yellow leaf does a shimmering dance in the breeze; hence the name "quaking" aspen. A few turn red. These brilliant trees mingle with dark evergreens, which clothe the distant slopes.

➤ In the fall thousands of sheep migrate from high ranges to three raised intermountain plains, vast expanses of sage and wild grass.

Colorado sheepherding, mainly on the western slope of the Rockies, began in the 1880's, when some 1,175,000 head grazed on the plains. Cattlemen, objecting because they believed sheep cropped grass so close they left no feed for cattle, feuded violently with the herders. Today the grazing lands are regulated, sheep and cattle sharing equally. Colorado's sheep population for 1950 was more than 2,000,000. This count included stock imported from Utah and Wyoming for summer feeding.

Kodachrome by B. L. Standley

Kodachrome by Wayne Arye

Crags and Spires of America's Roof Fill the Vision of Climbers on Rugged Mount Sneffels

Sneffels's name comes from its resemblance to the fanciful peak of that name described in Jules Verne's *Journey to the Centre of the Earth*. San Juans, Needles, and San Miguels stretch away to the horizon.

After that ordeal, the steep-sided peaks of Wetterhorn and Uncompahgre seemed like a mere stroll. But looking northward from the cairn on Uncompahgre we had a sudden gone feeling. The mountain was only half there! We stared down a breath-taking wall that dropped almost straight to timber line.

The town of Gunnison caters to fishermen. Round about are many angling resorts; stores sell bright flies and other tackle; at the normal school students can earn college credits in the art of fly tying and casting.

Gunnison often has the State's lowest temperatures, but the air must stay clear; for years the old La Veta Hotel served free dinner on any day the sun did not shine.

Driving west to the Black Canyon of the Gunnison National Monument, we looked down on the State's deepest mountain-in-reverse, a shivering 2,000-foot chasm with almost parallel walls and the Gunnison River in the bottom.

On a back-door route to Mount Sneffels, we drove up the road to Tom Walsh's Camp Bird Mine, where Evalyn Walsh McLean's *Father Struck It Rich*, as recorded in her book of that name. The canyon was so dark and deep that in the slit of sky above we could see stars at midday.

Sneffels proved a range to itself. Serrated ridges plunge from its summit to rise again into lower summits. Between them gulleys streak earthward from the heights (page 212).

Slide Covers Road with Tons of Snow

Climbing out of Ouray on the Million Dollar Highway (page 194), we stopped where Bear Creek slips from the canyon side to fan and fall and wet the moss 500 feet below. We looked across the canyon to incredible mine holes and wondered how men reached them before the days of helicopters.

In spring this main north-south highway is sometimes closed to traffic. Any warm day the Mother Cline Slide may let go its moorings, and, with no more warning than a soft hiss, bury the road under tons of snow.

On the high point of the road we swapped lunch tidbits with a pair of streamlined prospectors whose donkey was a jeep and whose pick a portable geiger counter. They were hopeful of finding uranium.

Taking time out to explore a byway, we drove east from Silverton toward Stony Pass. We had been told at home that the road was in fine shape, but a sheep rancher informed us that only one car had ever come over it—the first automobile in Silverton (pages 208-9). To make the trip, it had had to be taken apart and loaded into wagons.

Down the same road had come San Juan County's first girl baby. Born on the Pass in a snowstorm, she had been sheltered with her mother in a hastily built lean-to of boughs.

We waited the next day with Silverton residents for the biweekly noon train. When slides block its rails and the road passes blow full of snow too fast for the plows, no food comes into town for weeks at a time.

A casual attitude toward food prevailed when we were there, however. The hotel proprietor, sauntering into the dining room in the morning to take our order, said, "Breakfast is a dollar. What'll you have, steak or Shredded Wheat?"

Our train cliff-hugged its way down the winding Animas canyon and stopped at Needleton. We crossed the river and, with the help of a sheep man and his pack outfit, moved our camp up Needle Creek to a lonely, peak-encircled valley head which some wag had named Chicago Basin.

The first day we climbed easy rocks to Mount Eolus. Despite its windy name, not a breath disturbed its summit while we swigged fruit juice, munched sandwiches, and looked into the deeps of the Needle Mountains.

T. M. Griffiths, a San Juan explorer who had joined us at Ouray, picked out for us Arrow and Vestal, the Trinity Peaks, and Jagged Mountain, its ridge arched up like the horny spine of a tyrannosaur. These mountains were not for this trip, but they started us planning for others.

Sunlight and Windom, climbed the next day, finished the fourteeners of the group. They were not roped climbs, but we were glad for the rope coming down. Dashes of rain and snow coated the rocks with slick treachery.

The schedule called for a rest day. We breakfasted late on ham and eggs garnished with Chicago Basin watercress. Some loafed, some bathed or rinsed clothes in the cascades that sprayed over a rounded rock ledge.

After lunch a pair of us tackled Needle Ridge, roughest sector of the cirque's perimeter, and, to our knowledge, previously unclimbed. From its short half-mile length five teeth sawed at the sky. As we climbed a slim blade edge to the first, clouds drifted by on both sides. The valleys filled in under us. We moved on, seeing little even of the pinnacles we were on.

The next dawn we set out for Pigeon Peak, which proved tougher than any fourteener we had met. Still harder was the way down and out. In the dusk we could find no trail and fought our way down a watercourse.

We broke all the rules, sit-sliding on muddy slabrock, slithering down tree trunks. Gooseberry bushes arched tough branches over our boot toes to trip us. By the time we fell into the Needle Creek trail we were bruised, torn, and criss-crossed with scratches. This master-

214 Standley Photographers

Wind and Snow Lash Hikers Bound on a Frigid Annual Pilgrimage

In a late December gale, stalwarts of the AdAmAn Club (each year one new member is admitted) plod along the cog railway up Pikes Peak. At midnight on New Year's Eve, the climbers shower the summit with a fireworks display visible over miles of surrounding plains and mountains.

piece of inaccessibility and wildness below Pigeon Peak goes by the name of New York Basin!

A week after the trip in, we swung our food-depleted baggage from Silverton's train platform to our cars and headed south. Durango and the cliff dwellings at Mesa Verde National Park gave us a low-country interlude.*

Our take-off point for the westernmost mountains was Ouray's sister town of Telluride. Telluride's Smuggler Union Mine and Ouray's Camp Bird are only three miles apart. But the shortest road between them makes a 60-mile circle around Mount Sneffels and its satellites.

From Telluride we drove to the Silver Pick Mine, headquarters for the San Miguel Mountains climbs, over a sidehill road that had not seen attention for 40 years. The chiprock of which it was built drained too well to wash away.

To reach Mount Wilson (page 194), we climbed over a 13,000-foot ridge and then, like ants in a bowlful of gravel, dipped across Navajo Basin. One false summit after another lured us on before we came to the top.

An Outlaw Mountain of Rotten Rock

From the Wilson group we could look across at the rock tower of Lizard Head, treacherous exception that proves the rule of safety among Colorado's peaks. Albert Ellingwood and Barton Hoag climbed it in 1920. They left their precious rope dangling from it in order to get down alive.

Others of us, wondering why veteran climbers spoke of such a conquest with no enthusiasm, have scaled its walls to find out. The peak does not merely call forth the climber's utmost skills and nerves; its rock is rotten, and the challenge is danger. It is the outlaw mountain that hides deadly peril under the guise of sport.

From the Silver Pick we headed homeward, better friends with our car and our boots, now many jolts older than when we had started. We were friends, too, with the mountains. Their ore roads had given us trails, their forests and streams had provided camps, and their summits fine exploring.

We had run all over them, sometimes at night, sometimes when we were very tired, and suffered no kind of injury. The evening after I reached home from the San Miguels, I had occasion to go down the basement stairway. I was empty-handed and the light was on, but I managed to fall from the bottom step and sprain an ankle. The mountains, I decided, were pretty safe country.

* See "Ancient Cliff Dwellers of Mesa Verde," by Don Watson, NATIONAL GEOGRAPHIC MAGAZINE, September, 1948.

Dragonflies—Rainbows on the Wing

By James G. Needham

MY FIRST contact with dragonflies was down on the old farm in Illinois. I was a small boy, wading down the branch at a time of low water, making tracks in the clay beds of the pools with my bare feet. The layer of soft yellow clay that overlay a harder bottom printed beautifully. I liked the feel of it, too, as the clay oozed up between my toes.

While I was engaged in making cleaner and better toe impressions, I felt something move beside my foot and saw it wriggle about in the soft ooze that covered the clay. That was the first dragonfly infant I ever saw, but I didn't know what it was. Then I saw, lying at the water's edge, several empty shells of precisely the same form; and I realized that something must have hatched out of them and left them there. This led me to take the living one home and give it a chance to hatch out something.

In my bedroom at home was a washstand, a small cabinet of the then conventional sort, with a rail around three sides. On the top a tall, pot-bellied pitcher full of rain water stood in a big white bowl. Without consulting my mother, I put water from the pitcher into the bowl to make a pool for my crawler and arranged a wash cloth on the sloping side of the bowl to provide a bank it might crawl up to shed its shell.

Nymph Transformed Overnight

Fortunately, this enterprise was not discovered that evening. Next morning when I awoke, there, on top of the rim beside its cast-off nymphal skin, stood a fine big dragonfly with fully expanded wings. Its body was striped, its tail was ringed with green and brown, and its broad shiny wings trembled and scintillated with light.

Without waiting to dress, I ran for my mother, fully assured in my own conscience that the end attained would justify the means employed.

Together we watched the tremor of the dragonfly's eager wings and, at my mother's suggestion, we took it to the door, gave it its liberty, and saw it fly lightly away. I do not know its scientific name. The only record kept was the photographic image of it on my brain, but that tells me it was some species of *Gomphus*. I can still see with my mind's eye the striped pattern of green and brown on its body and its sprawling, outspread feet.

Of course I knew something of adult dragonflies. I had seen them hawking for mosquitoes in the twilight, or soaring through the air above the orchard in tireless flight, or sitting on the clothesline in the back yard of our home. They even had perched on the top of the cork float of my fishing line while I held the pole.

Everybody knew dragonflies, knew so much about them that wasn't so! What tales I had been told about how they could sting, that they could sew up your ears with their long needle; that they were snake doctors, or snake feeders, or mule killers. The less most people knew in fact, the more positive they were in opinion about such vagaries. I knew from handling dragonflies that they did not sew or sting, and I was aware that they were both beautiful and very agile.

Dragonflies Prey on Mosquitoes

People generally knew one good thing about them and revealed it in a name they called them, "mosquito hawks." They are indeed one of Nature's principal agencies for keeping down the numbers of mosquitoes, eating them as adults in the air, and eating still more of them as wrigglers in the water. The young (nymphs) of dragonflies all are aquatic.

The biggest dragonfly with which I have ever made personal acquaintance in the field is the one I call the Sky Pilot (*Coryphaeschna ingens*). It is a subtropical species very common in Florida, and found along the Atlantic coast as far as North Carolina.

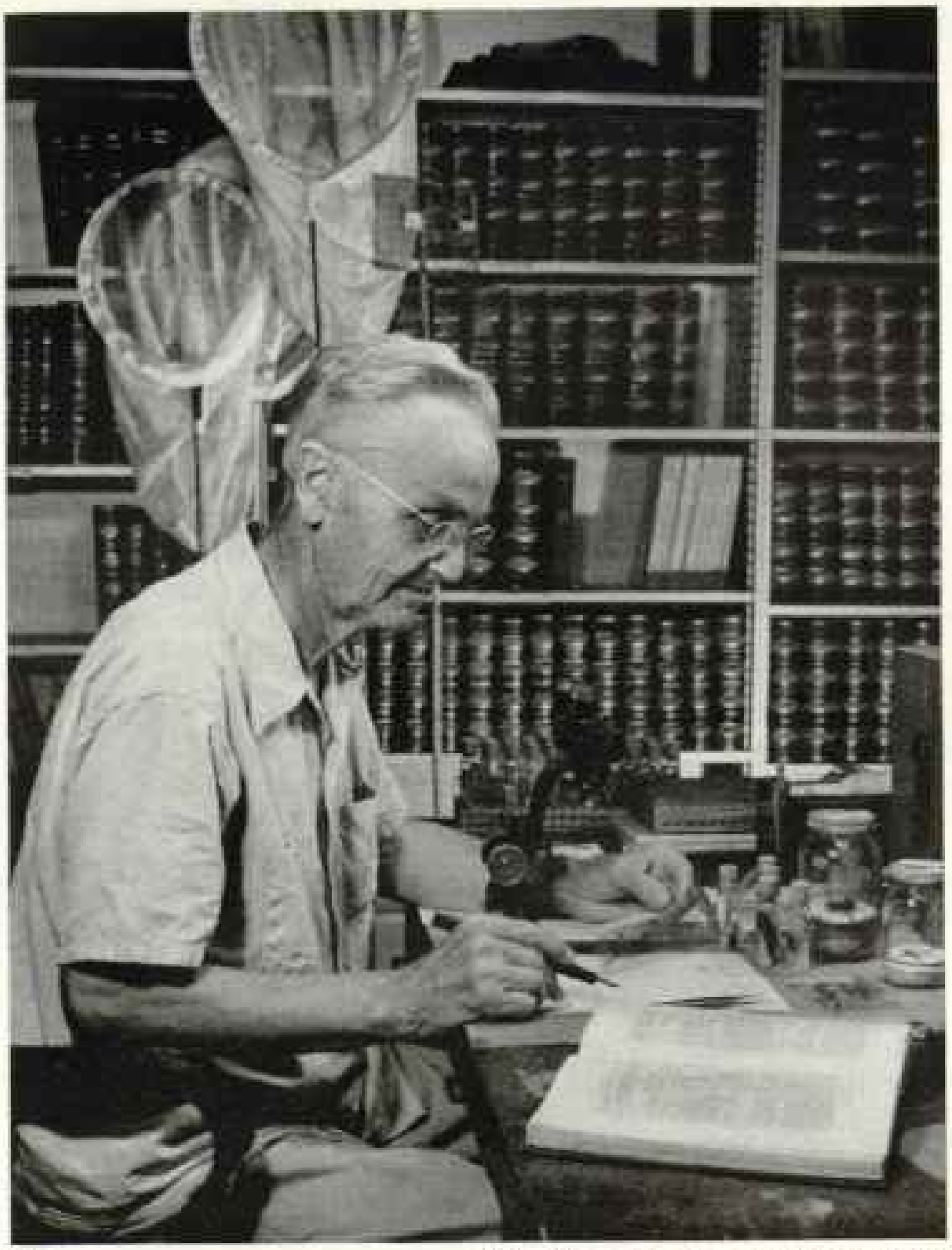
This strikingly handsome insect is a predator in every line of its shapely body; streamlined like a hawk; strong-winged; armored and braced for aggressive action. Its lustrous eyes are so large that they overspread most of the head; they meet above in a long eyeseam on the middle line (page 226).

Its brown body, broadly striped with green on the thorax and narrowly ringed with yellowish-green on the slowly tapering abdomen, ends in a pair of very long flat tails.

Any traveler on Florida highways has only to look up to see these Pilots in the sky. High overhead, steadily soaring on outspread wings, they look like miniature biplanes. They fly as if in play, two or three together, or sometimes in small companies, back and forth in long straight lines, often for hours on end.

Their flight seems effortless. They may be searching the air for food, for small insects that drift upward on rising air currents. But they seem to be flying for sport, enjoying their freedom and mastery of the upper air and filled with the joy of being alive.

Doubtless the foraging is better nearer the earth, where most of the insects stay. When the high-flying Pilots come down, they scatter



218 National Geographic Photographer Willard R. Culver

A Boyhood Discovery Started the Author on a Lifetime Study

As an Illinois farm lad, Dr. Needham found his first dragonfly nymph in a brook and brought it home to hatch into a full-fledged adult (page 215). At 85, he is still picking them out of the mud and rearing them! Here he makes notes on some of the 73 species collected in the vicinity of the Archbold Biological Laboratory near Lake Placid, Florida.

and forage singly. One may be seen touring the borders of the garden, especially on the lee side of massed trees and shrubbery; or coursing the lake shore; or patrolling a lane through the woods. Betimes, it takes a brief rest on a twig on some moss-covered bough of a tree, generally under a canopy of foliage. There the Pilot hangs up by its feet, motionless and quite undiscoverable unless the observer's eye has followed the flight to the very spot where it stops.

If the observer approach very slowly and quietly, he may come near enough for a satisfactory view of a truly elegant insect, alive, alert, and quick-starting almost beyond belief.

The best time to see Sky Pilots in action is at sunset, when they descend to forage near the ground. Leaving the woods, they sometimes gather in great numbers to fly over adjoining open fields to gather mosquitoes, midges, and other insects of the night shift that are coming out in flight.

Mayflies a Preferred Delicacy

And when the occasional mayfly swarms issue from the waters of a lake, the Pilots are sure to be found among them at the shore, gorging themselves. A single Pilot sometimes may be seen flying in the swarm with more than one pair of mayfly tails hanging out of his mouth. He has so stuffed himself that he has been unable to swallow completely the last ones captured.

Unfortunately for their reputation as useful insects, Sky Pilots also eat bees. They are wont to converge upon an apiary just after sundown, when the worker bees are returning to the hives with their day's last load of nectar. The Pilots catch some of them for an evening meal. Among beekeepers the Pilots have no friends.

The Sky Pilot is a "darner" (family Aeschnidae); its common name is derived from the old ear-sewing superstition. Another member of this group is the big Green Darner, *Anax junius* (page 227), found in all parts of North America and common generally northward. It is similar to the Pilot in habits, but it is of slightly smaller dimensions, stouter in form of body, and less given to soaring in the sky. Its thorax is bright green. On its brow is a round black spot encircled with a ring of yellow, the yellow ring in turn encircled by an outer ring of blue. A narrow line of yellow borders the rear of the head; others border the front margin of each wing. The abdomen is bright porcelain blue on its tapering base, darkens to purplish beyond, and is overspread with black toward the end.

The Green Darner is an elephant of the in-

sect world and perhaps is more widely known than any other American dragonfly.

In the clear, sand-bedded lakes of peninsular Florida lives a large dragonfly called *Didymops* (derived from the Greek for "double eye"). Its nymph is a flat-bodied, long-legged sprawler upon the lake bottom. Outspread upon the sand, the nymph is quite undiscoverable, for it sits immobile and its camouflage is perfect. Its head bears a pyramidal, upcurving horn in front; and on each forecorner an eye whose tip, rising high above the general level, sticks up like a periscope through the thin ooze.

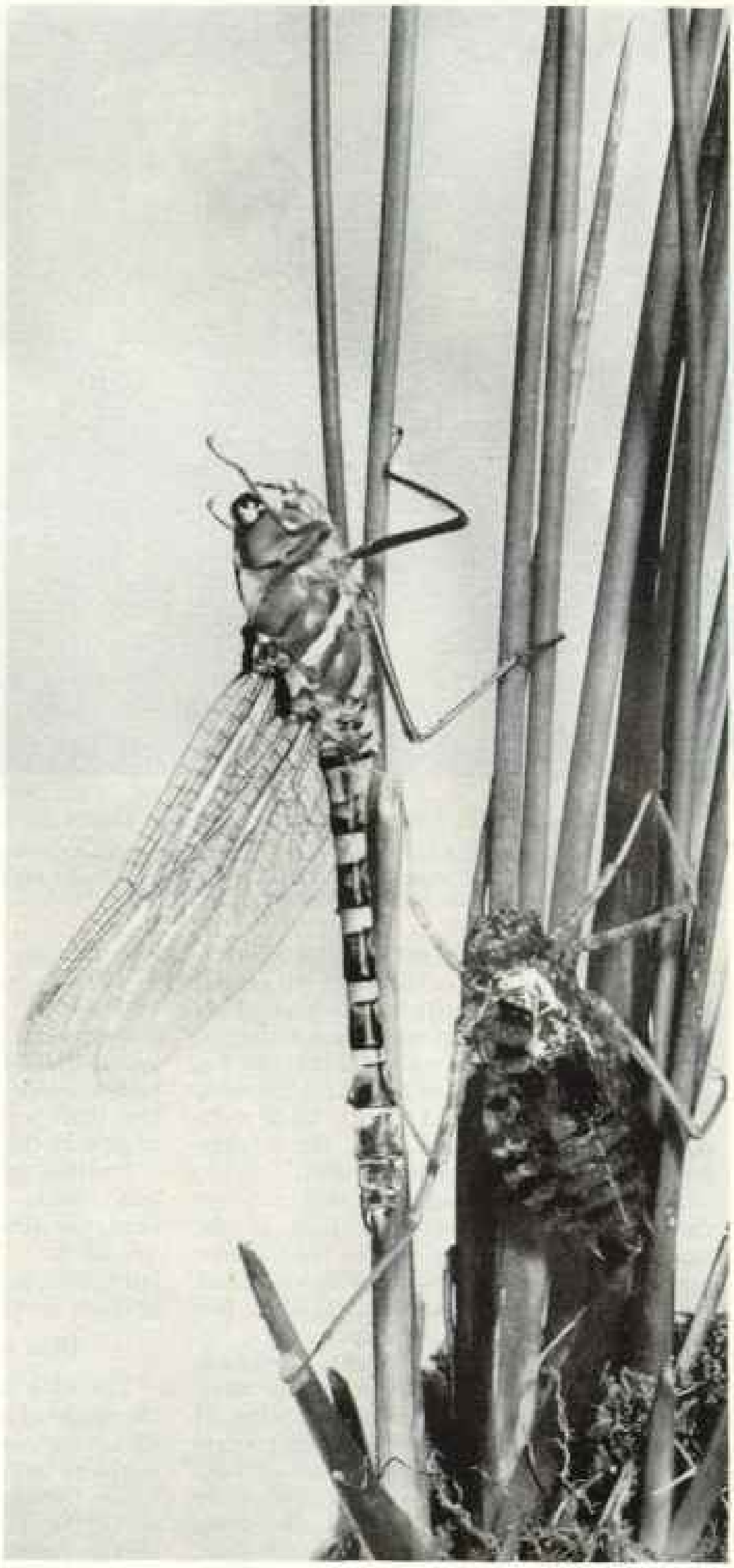
The nymph does not chase its prey. It sits and waits for whatever providence may bestow, its huge grasping "mask" held in readiness for seizure of the food.

In early spring the nymph becomes mature and moves slowly toward the shore, seeking something on which to climb up out of the water for transformation. Often in the lakes of the Florida scrub the stems of maiden cane stand at the forefront of shore vegetation, but these will not do for the *Didymops* nymph; its body is so broad and the legs so far apart at base that it cannot climb single slender stems.

Nymph Changes Directly to Adult

It bypasses the cane and moves on to the tussocks of sedge that rise from the water nearer shore line. There the stems stand close and the nymph can encompass several with its feet. Drawing them together, it climbs up the tussock to find a place, a foot or more above the water, where it can attach the long, strong claws of its six feet.

There it sheds its last nymphal skin and comes out a dragonfly. At first it is limp and pale, with stubby, crumpled wings; but it is ready for remodelling into a new elegance of form. For



217 Richard Archbold

Didymops Sheds Its Swim Suit for Brave New Wings

During the night, when bird enemies were absent, the dragonfly emerged from its nymphal covering, which hangs like a discarded garment on the sedge stalks. Striped in brown and yellow, the matured insect pauses briefly before making its first flight at dawn. Middle and hind legs support the body. Forelegs, held over the head like horns, handle food and brush clean the bulging green eyes.

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Happy Ending of a Dragonfly Hunt: the Net Holds an Unexpected Tropical Species

With his cyanide killing bottle held ready, the author retrieves the first specimen of *Erythrodiplax umbrata* found in upland Florida. Ordinarily it ranges from the West Indies to Argentina. This catch was made near Lake Stearns (page 224) by Richard Archbold (right).

Didymops exchanges its old freckled skin for a new one brightly patterned in stripes of brown and yellow; shifts to the rear of its head the little nipple-shaped nymphal eyes, and sets in their place at the front two big green eyes shaped more or less like doorknobs. This marvelous change of form is made without any intervening pupal stage; the development is direct from nymph to adult.

Anyone walking along the beach may see the empty skins clinging to tops of the tussocks in the morning, before the daytime breeze has risen to blow them down. Later he may find them battered in the drift line at the farthest reach of the waves.

Transformation occurs at night, when most enemies are not abroad. By sunup the adult *Didymops* will have flown to the shelter of the woods. How long it is before they begin foraging, I do not know, but sooner or later they may be seen flying back and forth along the narrow roads through the scrub. They fly with foraging Sky Pilots and *Anax*, but more slowly, at a generally lower level and with longer resting periods between flights.

Didymops's face is yellow, crossed by three broad bars of black; the body is dark brown, ringed with yellow; wings are clear, with yellow front margin; the long hair at both ends of the thorax is white.

A familiar little dragonfly found all over the United States, and often abundant southward, I call the Blue Back (*Pachydiplax longipennis*). It has a wingspread of about two and a half inches. Parallel stripings of yellow adorn its slender blackish body, and two short streaks of brown flash on a field of gold in the base of each hind wing.

Prettiest in the early days of its life as an adult, while its yellow stripes are bright and clear, the Blue Back gets hoary with age, as we all do. The color pattern of the back later disappears under a powdery coat of uniform dusty blue.

Blue Back Shows Friendliness

The Blue Back perches low; flies mostly at the height of shrubbery; and selects prominent bare twigs on which to sit and watch the world go by. Like a kitten, it seems to want to be friendly. It may be observed at the short range of bifocal spectacles, if approached slowly enough and with very cautious advances. I have often watched a Blue Back thus for several minutes, while it sat stock-still or merely tilted its eyes to pick up the news of the neighborhood.

Blue Backs make short flights with long intervening pauses and are rather easily taken with an insect collecting net.

Leonard M. Chace

Caught in a Web, the Dragonfly Will Fight Hard for Life, but the Spider Will Win

A golden spider surveys the prospect of a meal from a *Libellula pulchella* entangled in its snare. When a dragonfly is trapped, the spider allows the larger, stronger victim to tire itself out, meanwhile enmeshing it in freshly spun silken bonds. Not until the dragonfly is exhausted does the spider move in for the kill.

When several male Blue Backs are in the garden border, each one seems to have its favorite twig, with a claim staked and enough territory for elbowroom round about it. If another male trespasses, the claim holder flies at him to drive him away, and a bloodless fight is on. The two meet facing in mid-air, heads almost touching. They spin swiftly around each other, still facing and at the same level; then they reverse and spin the other way a few times; finally they spiral upward, still facing and flying sidewise.

The skirmish ends in this high skyward sweep through the air, which always takes them beyond the range of my vision. I have never been able to see the details of the finish. It all happens with such swift action that it is ended almost before the observer is aware that a fight is on.

This is sham fighting, but it seems to serve the common purpose of all fighting—determining supremacy. The winner, quickly swooping back, establishes himself as proprietor of the contested home base.

Over the water of a pond or pool, where the males go to find the more retiring females, they perch on the tips of aquatic plants that rise above the level of the water lilies.

An equally common, slightly larger dragonfly, generally found in association with the Blue Back, is appropriately called the Green Jacket (*Erythemis simplicicollis*). Its body is bright green in youth, with narrow edgings of black. Three middle rings of the slender abdomen are about half green and half black. The following three rings are wholly black, and the pale tip bears a pair of stubby whitish tails. With age the whole body becomes powdery blue, like the Blue Back, only more so; face and stubby tails remain pale (page 227).

Green Jacket Prefers Big Game

The Green Jacket is inclined to sprawl on broad leaf surfaces, on fallen logs, or on the ground. It is often come upon as it rests on the dirt of a well-trodden path. Flushed from the ground, it flies a little way along the path, settling several times, at successively higher levels, before sweeping around to rearward of the invader and going to the ground again. Boards lying flat, weathered logs, and other light-colored surfaces seem to attract it. Its black hind legs are armed with a double row of stout sharp spines, a characteristic it shares with some other dragonflies of similar squatting habits.

The Green Jacket is voracious. It eats other insects of many kinds, seeming to prefer big

game. It eats dragonflies of other species, some nearly as large as itself. Several times I have seen one sitting on a flat leaf eating the head of a freshly captured Blue Back.

A few species of dragonflies shun broad daylight and fly only at dusk. I call them Hoolets (*Neurocordulia virginiensis*). That was the name which my Scottish grandmother called the little owls that nested in the hollow oak behind the barn. These Hoolets fly on silent wings which have a spread of slightly more than two inches. They are khaki-brown in color, with faint touches of green and yellow on their bodies, and with little clouds of bright saffron yellow on some of the basal cross views of their otherwise clear wings.

Hoolets Erratic in Flight

Their soft tints blend with the deepening shadows of twilight; their flight is so erratic that they are hard to see and still harder to capture. Few people have ever seen one alive, though they are by no means rare.

Their short-legged, warty-backed nymphs grow up in the black muck that settles in the beds and borders of slow woodland streams.

One of the most beautiful of Florida dragonflies is called Golden Wings (*Libellula auripennis*, page 227). Its wings, with a three-and-a-half-inch spread, shine like burnished gold. Brightest toward the front margin, they are marked near the tip by a deep red stigma between black bordering veins. The face is red, darkening with age; the prominence above it becomes metallic purple at full maturity.

The body is almost patternless, aging to purplish on the front, and shading off to the usual paleness of the underparts, with a full-length band of black extending down the back of the long, smoothly tapering abdomen. It might have been of this agile species that Amy Lowell wrote:

> Across the newly-plastered wall,
> The darting of red dragonflies
> Is like the shooting
> Of blood-tipped arrows.

This species, as well as any, shows the wonderful fitness of many dragonflies for perching in a more or less horizontal position on the side of vertical stems. A glance at the side plates of the body armor will show that they are strongly aslant. The wings are thrown far backward above. The legs are graded in length, increasing from front to rear, with all feet reaching so far forward that the head is held clear of the stem to which they cling.

Middle and hind legs do most of the holding; the front ones are more or less free, as human hands are free, to be the more immediate servants of the brain. They may handle the mosquitoes and other insects that are captured for food, or they may be used to clean the eyes. Each front leg has next to its foot a special eyebrush composed of microscopic scales which match in breadth the diameter of the single facets of the compound eyes—huge eyes, on which so much of the dragonfly's activity depends (page 226). *

A quietly resting Golden Wings may sometimes be seen (with the aid of an opera glass, or even without it, if close enough) sweeping these brushes across the surface of the eyes, tilting the head to reach all parts—motions very like those of a man brushing his hair.

The nymphs of Golden Wings lead sedentary lives, buried up to the eye tips in the soft black muck and ooze of ditches and pools.

The adults love the open sunny places near the waterside and perch on the side of tall, bare, moderately rigid stems.

The females prefer narrow strips of open water in which to lay their eggs. They carry extruded eggs at the tip of the abdomen and wash them off into the water by descending and touching the surface at the middle of a long, swift, sweeping flight.

Another large dragonfly closely related to Golden Wings, but of very different color and habits, I call the Damson, a name suggested by the dark purple color, like a damson plum, which embellishes mature specimens. Its Latin name is *Libellula incesta*.

One fine May morning I was privileged to visit what seemed to be its headquarters—the Cypress Swamp in Florida's Highlands Hammock State Park. Along the high plank walk that crosses the swamp on posts set in the ground, adults were common and more easy to approach than I have found them elsewhere. They flitted among the lacy green sprays of the cypress; they perched on twigs within easy reach from the walk.

Restraining my impulse to collect specimens, and instead watching their activities for a little while, I saw that each male had his own range and stood ever-ready to drive out intruders. Twice I caught two embattled males at one stroke of the net, when they became more intent on fighting each other than on eluding me.

Damson a Black Sheep

The Damson is the black sheep of the beautiful genus *Libellula*—named by Linnaeus when scientific naming of animals began. It has stripings of yellow when first it emerges from its nymphal shell, but soon darkens, becoming almost entirely black, with purple reflections. At a little distance it looks wholly black, but there remain some small white areas on its face.

* See "Monsters of Our Back Yards," by David Fairchild, National Geographic Magazine, May, 1913.

Kodachrome by Willard R. Culver

Dr. James Needham Tends Dragonfly Pets in His Aquatic Nursery, Set in a Ditch

Although the adult dragonfly is a denizen of the air, it spends the first part of its life in water. When full grown, the nymph climbs from the water; its skin splits, and wings unfold. Then the fledgling takes to the air, darting in and out, skimming over ponds, hawking for pesky mosquitoes, gnats, and flies.

Here the author inspects a partitioned pen in which he raises nymphs to the winged stage. Wire screening separates the nymphs, which have been collected elsewhere, and lets the water, full of prey, flow through.

Kodachrome by Leonard J. Brass

▲ Through Eponina's Glassy Wings Shines the Fern It Rests upon

Butterflylike, the dragonfly speeds here, dallies there, beside ponds and over grassy fields throughout eastern United States. When the wind is high, Eponina may be seen clinging to the tip of a slender reed and swaying like a pennant in the breeze.

▼ Sky Pilot Nymph Thrusts Out Lower Lip with Its Hooks, Grabs Aquatic Prey

The doubly-hinged lip folds up compactly underneath the head, but unsheathes with lightning speed to seize victims. Hooks pass food along to powerful teeth. Parallel lines on eyes, like rings in the wood of trees, mark increments of growth, one added at each molt.

Kodachrome by Willard R. Culver

Kodachrome by Willard R. Culver

Petite Mr. and Mrs. Perithemis Seminole Live Where Once the Seminole Indians Ranged

Sun-loving Seminoles make short flights on shimmering wings from one perch to another. This is one of the few dragonflies in which the female (below) is more beautiful in wing pattern than the male. (Enlarged 3 times.)

Kodachrome by Willard R. Culver

Dr. Needham and a Friend Hand Dredge a Florida Lake's Sandy Bottom for Dragonfly Nymphs

This bed of pickerel weed at Lake Stearns's outlet gave up the two species shown opposite. Ponds, streams, and marshes where nymphs lie submerged until fully grown yield best catches. Adult dragonflies may fly far, but return to water to lay their eggs.

Dragonfly Nymphs Breathe in Water; They Move by Jet Propulsion

From the time a nymph hatches until it becomes a winged dragonfly, it spends its life below water. The nymph swims by a sort of jet propulsion. It sucks in water from the rear, and, contracting, expels the water, causing a forward sprint.

In due course the nymph crawls up a reed or onto a low beach. Its loosened skin splits along the back. Laboriously the insect arches and pulls itself out, discarding its "baby clothes." Soft, pale wings, tightly packed like a parachute, unfold and pulsate. Frail and feeble at this stage, the new dragonfly is vulnerable to foraging birds. After a few hours in the sun, it takes off on its first flight.

← Thrown up on the bare sand, the *Progomphus alachuensis* nymph feigns death for a moment, then plunges forward and buries itself like a mole.

→ Its lower lip folded beneath its head, ready to strike (page 222), the Sky Pilot nymph perches upside down on a submerged stalk waiting for prey. Voraciously it feeds on a host of lesser insects—water fleas, mosquito wrigglers, sometimes even small fish or tadpoles. In turn it may be food for fish, or peddled as bait.

Kodachromes by Willard R. Culver

Photograph by Willard R. Culver

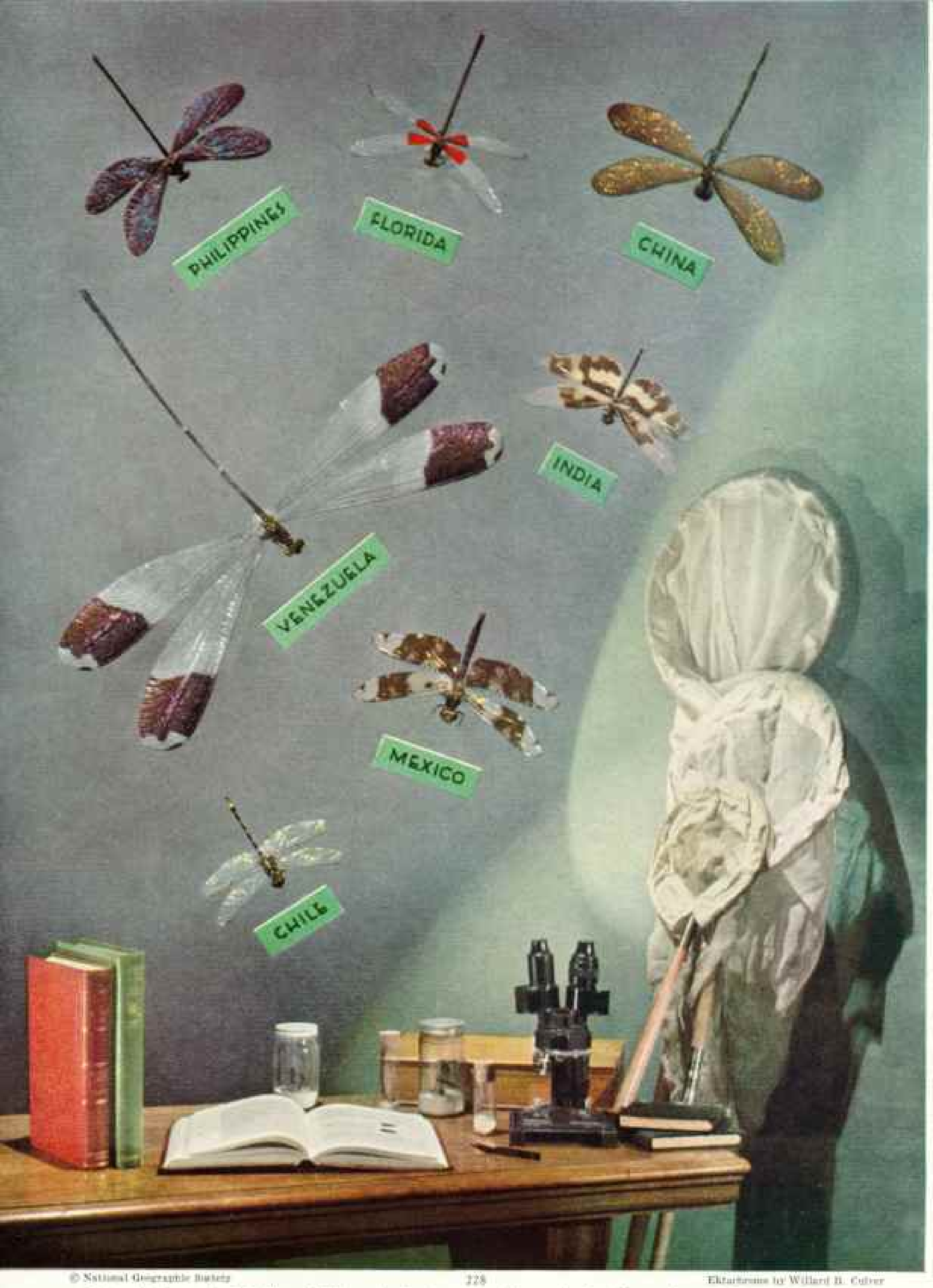
Close-up of Sky Pilot Reveals Thousands of Tiny Eye Lenses and the Swivel Neck That Enable It to See Above and Below at All Angles

Welcome to human aviators would be such a wide field of vision as *Coryphaeschna ingens* possesses! The bulbous eyes, covered with 10,000 six-sided facets, meet midway in an eyeseam. In front of them lie three ocelli, or simple eyes, and two bristly antennae. Spiny front legs, more like arms, handle captured food and cram it into the mouth. Strong wings power this large, aggressive dragonfly. Sky Pilots are best seen at sunset when they come down in search of the insect world's night shift.

Gossamer Dragonflies Tarry on a Creamy Yucca Blossom and Bare Twigs

An intricate network of veins reinforces a dragonfly's wings; brown spots near tips add strength. Six legs, placed well forward, serve as landing gear rather than as walking aids.

Widespread *Anax junius* (above) is popularly dubbed Green Darner. Countryfolk call it Devil's Darning Needle, pretend it sews up the ears of bad boys. Bands and rings of black decorate the body of the Green Jacket, *Erythemis simplicicollis* (lower left), in its youth, but this one has become dusty blue with age. The other is a young Golden Wings, *Libellula auripennis*, which will become more reddish with age. All are slightly enlarged.



Ektachrome by Willard R. Culver

Nets Against the Wall, a Collector's Laboratory Reveals the Trappings of Dragonfly Study

Cyanide jars to contain captured insects, tweezers to handle them, and microscope and books to identify them equip this desk. The author has gathered specimens around the world.

Nymphs of the Damson live in the black muck of the swamp bed. They often climb the posts of the plank walk to transform and leave their mud-encrusted empty cast-off skins sticking to the posts a few inches above the surface of the water.

The *Axillena* dragonfly *(Libellula axillena)* also is a near relative of Golden Wings, but of slightly larger size and of even more elegant proportions. It ranges from Pennsylvania to Florida and Louisiana. Generally it haunts the edges of openings in wooded swamps, or roadsides through hardwood forests not far from water.

The adult *Axillena* is a study in black and white—black-faced and black-legged, but creamy-white on the sides. The elegant black abdomen has a line of conspicuous yellow dashes along each side. The wings are very clear, except for two narrow streaks of black at the base and another beyond the middle. This last black streak is a good recognition character for *Axillena*, distinguishing it from all the other species of this large genus.

The *Eponina* dragonfly is a member of a small group of colorful species found only in the eastern United States. An inch and a half long, it has a wingspread of nearly three inches. The wings are conspicuously banded and spotted with brown and veined with yellow on a field of gold (page 222). It inhabits marshy places, but drifts with the wind far away over grassy fields and roadsides, foraging.

When returning to the water for mating and egg laying, many may be seen flying in couples. They alight on the tips of the tallest and slenderest stems and hang there, swaying on them like pennants in the breeze.

The male seems to select the egg-laying places, small openings where the surface of the water may be reached only by a vertical descent. Finding one, the pair hovers momentarily, all wings swinging, then drops directly downward for a single tap of the surface of the water by the tip of the pendant abdomen of the female.

At the touch of the water a clutch of eggs is liberated. The eggs scatter as they fall to their place of incubation in the silt of the bottom. The pair rises instantly to fly again at a safer level, and to find other sheltered openings for their brood.

These are but a few of the many species that were available for me to study in early spring in south Florida. But every part of our country has its own species, some local in distribution, some wide ranging.

One species that ranges across the continent and that everyone may have seen is Saddlebags *(Tramea lacerata)*. A close-up view of this dragonfly may often be had in village streets and parks and playgrounds where, in its long, sustained flights, it drifts down to head height of passers-by. It comes slowly floating down on broadly outspread wings, as if for closer inspection, then speeds up and is gone aloft again.

It is easily recognized by a pair of spots that in flight seem to lie across the back like saddlebags, covering the bases of the hind wings; and by its large spots, dark red-brown in color and sharply defined. Its hind wings are very broad at the base and narrowed toward the tip, much like those of hummingbirds.

It is extremely fast, but, because of its frequent dallying, it is one of the few dragonflies that may be captured with a net more easily in flight than from a perch.

The flight of Saddlebags is exceedingly varied, scarcely ever on a regular beat. Wheeling and circling, alternately speeding and drifting, it perches betimes on bare, head-high stems of grass and weeds, or on the topmost twigs of convenient shrubbery.

On windy days it is to be found in open areas on the lee side of massed trees and buildings. Generally it is found in small companies that begin to scatter after the first swing of the collector's net.

Adult Saddlebags fly far and wide, often many miles from the place of their nativity. Their clean and neatly patterned nymphs live in ponds and reedy shoals, where they clamber among the tangled water plants.

Nymph's Lower Lip Long as Its Front Legs

The nymphs of dragonflies are curious creatures. They are quite as varied in form and habit as are the adults (page 225). Perhaps the most curious thing about them, and surely the most distinctive, is the enormous lower lip with which they capture their prey (page 222). About as long as the nymph's front legs, it is hinged underneath the mouth, doubled upon itself when at rest, and folded back between the bases of the front legs by a middle hinge. It bears strong grasping hooks at its tip. No other creature on earth has such a lip.

When, at the age of 10 or thereabouts, I picked my first *Gomphus* nymph out of the yellow clay, I little thought that at 83 I would still be picking dragonflies out of the mud and rearing them (page 221). But so it has come to pass.

Few things in the whole range of animal creation are homelier than these nymphs, or less promising of the thrills of mental stimulation. Yet I have found them full of interest, ever yielding new delights of discovery.*

* See "Exploring the Wonders of the Insect World," by William Joseph Showalter, National Geographic Magazine, July, 1929.

Wide World

Siena's Horse Race Honors the Virgin. Each Entry Goes to Church To Be Blessed

Twice each summer the Italian city turns out for the *Corsa del Palio,* a breakneck race around the cobbled public square (page 233). Entries represent Siena's rival wards.

The Palio of Siena

By Major General Edgar Erskine Hume

Formerly Chief of Allied Military Government in Italy (Fifth Army) *

SIENA, loveliest of Tuscany's hill towns and ancient seat of culture, is today as nearly perfect a medieval city as has come down to us through the centuries.

Even though the Italian campaign of World War II swirled about it, Siena's art treasures escaped damage. Inspiring at any time, it is most so on those two summer days when there is unfolded a colorful pageantry that has survived since the Middle Ages.

I have seen Siena's celebrated horse race, the *Corsa del Palio* (Race for the Palio), several times and have been more impressed each time.

Pageantry Outshines Actual Race

Although the Sienese become frantic over the race, it is the brilliant spectacle that attracts visitors. As a Kentuckian who knows a little of race horses and horse races, I cannot make great claims for Siena's Palio as a sporting event. But as a colorful display of age-old costumes and customs it is enthralling.

When Palio day rolls around, countryfolk from the whole Province come in to join the burghers in a burst of cheerful festivity. Back from their villas in the mountains or by the lakes or sea, flock the nobility, and their grand, old, dusky palaces come to life. It is all in the best Tuscan manner.

During a Palio I have been a guest in a Sienese palace and can bear witness to its charm. These formidable piles, some nearly 700 years old, were built not for beauty but as stout centers of military resistance.

All over the city the banner of Siena is displayed—black and white, embroidered with the Siena wolf. This symbol depicts the suckling of Romulus and Remus, for Siena, though it had been the site of early Etruscan settlements, was founded by the Romans as Saena Julia.

In ancient times other Italian cities also had their *palii*. Dante mentions one run in Verona. Particularly famous was the palio of Ferrara in honor of St. George.

The Siena Palio is little changed from the days when it was seen by the Medici and their contemporaries. Twice a year it is held—on July 2, the feast of the Visitation, and also of the Madonna of Provenzano, the armless patroness of the Palio; and again in August, during the feast of the Assumption.

The scene is Siena's huge public square, the Piazza del Campo, or Campo. This beautiful natural amphitheater is set among the three hills on which Siena is built.

It would be hard to find a place less suitable for a race. Shell-shaped and built on a slope, it is paved with small irregular stones. Although the stones are covered with a thin layer of earth on the day of the race, it still is a most difficult course (page 235).

Dominating this site stands the Public Palace, lovely example of Sienese style, a happy adaptation of Gothic and Italian spirit (p. 238). So well proportioned is the Campo that when I was told 11 streets lead into it, I would not believe it until I counted them.

Palio races are mild survivals of the blood contests in which the city wards formerly struggled for victory. Of old there were tourneys, jousts, and sham battles. Later these were abandoned in favor of bullfights and buffalo races in which blood often was shed. So many were the accidents that about 1650 bulls and buffaloes were prohibited, and only the race upon horseback was permitted.

But I have seen blows exchanged and heard such high words that it took no great exercise of my imagination to picture the "good old days" when homicide and mayhem were common during the Palio.

Contests among sections of the city began in the 13th century. Their spirit has survived in the Palio, the first of which in its present form is believed to have been run on October 20, 1632, in the presence of Ferdinand II, Grand Duke of Tuscany (a Medici). In 1721 a decree limited entries in the race to ten horses, because of the restricted space.

Birds and Beasts Symbols of Contrade

The occasion has always been under communal authority. In immediate charge is the *Ufficio di Biccherna*, a magistracy which originated in the Middle Ages and is charged with the organization of festivals.

Siena is divided into *Terzi*, or Thirds, and these in turn into *contrade*, or wards, of which there are now 17.

The Palio is a contest among representatives of these contrade. Each has its own laws and officials, its own treasury, its own church. Each contrada bears the name of the figure depicted on its banner—Dragon, Eagle, Forest, Giraffe, Goose, Hedgehog, Owl, Panther, Ram, Shell, Snail, Tortoise, Tower, Unicorn, Wave, Worm, and Wolf.

* Allied Military Government under General Hume in World War II arrested the typhus epidemic in Naples in 1943-44. At present General Hume is Medical Director General of the United Nations Forces in Korea, where he is in charge of protecting our fighting forces against typhus and other epidemic diseases.

232 Wide World

The Race Is Not Run for Gold but for an Ox-drawn Banner, the Palio

Centuries ago the city celebrated by watching armored rivals battling in tournaments. Later festivals saw buffalo races and bullfights (page 231). Today competition is limited to the horse race, but spectators crowd balconies and windows to as great a degree as ever.

The prize for the winner of the race also is called a Palio (from the Latin *pallium*, or mantle, especially one awarded for prowess). It is a large silken banner fringed with black and gold and often with pieces of fine tapestry (above and page 243). The winning contrada keeps the prize in its headquarters.

On the morning of race day, the Palio is blessed at religious services held in one of the churches, each taking its turn.

A complicated and rigid ritual is followed in determining by lot which 10 of the 17 contrade shall participate. As an honorary Sienese, I have been accorded a special place during these preliminary ceremonies.

Each contrada is assigned a horse *(barbero)* and selects its own rider *(fantino)*. Much depends on the agility of the barbero. An equine veteran of past palii usually has learned the peculiarities of the course, such as the slippery spot near the Archives, or a certain place where the ground rises sharply.

Siena's Palio is a proud and living thing, no mere musty survival of ancient ceremonial or resurrection of some medieval ghost. The Sienese who take part never forget that, though it honors their remote ancestors, it also demonstrates the spirit of local pride and present duty. The race is run for rivalry and not for gain.

World War II Interrupted Palii

I have observed the Palio from several points, varying from a seat in a public tribune to a place on the terrace of the fine old Union Club *(Circolo degli Uniti)* opposite the Public Palace. The Allied Military Government gave full support to the Palio soon after the enemy had been expelled from Tuscany.

I recall pleasantly our successful efforts to aid Siena in arranging these races, important factors in restoring public confidence and morale. AMG realized the place that pageantry occupies in Tuscan hearts and was guided accordingly.

I arrived for the Palio of July, 1946, in company with our Army commander, Gen. Mark Clark, and his family. We found that the Union Club had lost none of its ability to serve viands, liquid as well as solid, of Italy's best.*

* See "Italy Smiles Again," by Brig. Gen. Edgar Erskine Hume, NATIONAL GEOGRAPHIC MAGAZINE, June, 1949.

233 Bastian Holmes, Roving Galloway

Entries Risk Life and Limb Circling the Pavement-hard Race Course

Spills are frequent on Piazza del Campo, Siena's hub. For better footing, cobblestones are covered with earth. A sharp corner is banked with mattresses. At one steep incline, contenders often hurtle off the track and down the Via San Martino. That is why anyone lost in Siena is said to have "gone to San Martino."

After three days of thrilling anticipation, marked by appropriate ceremonies, the great day arrives. Early in the afternoon all the world troops through the city's narrow, winding streets (still one-way, thanks to a remaining rule of AMG) and assembles in the Campo.

Brass bands of indifferent artistic merit but unrivaled enthusiasm entertain the crowd there. Tension mounts. The city fathers begin to gather at their raised seats on the platform built over Costarella Lane, not far from the Public Palace.

Municipal police and carabinieri keep the crowds in order. For once the carabinieri, Italy's colorful national police, are overshadowed by the general finery of the day.

When it seems that the spectators, and I speak from experience, simply cannot stand the suspense another moment, the procession enters with great dignity. A mighty "Ah-h-h" goes up from thousands of eager throats.

The order of precedence at a palio is inflexibly fixed by custom and rule. Each group knows just where it must fit into the polychrome mosaic picture.

The procession advances in four cadres. Brilliant medieval costumes of every hue of the rainbow flash in the sunlight (page 240). The play of colors before the magnificent Gothic background is, to me, a source of never-ending delight.

Mace-bearers Men of Dignity

First come the mace-bearers with heavy silver maces, those massive badges of authority used from time immemorial. These macers are somewhat older men, for theirs is no mean responsibility. Clad in silks and satins of 13th-century style, they step forward sedately.

Other groups in medieval costume follow. Then comes the Captain of the People, the leader of the citizens, attended by pages and grooms, together with archers, halberdiers, lancers, pikeman, and other warriors (page 234). As this cavalcade passes, a brief pause marks the end of part one of the procession.

During this slight interruption, guests on the terraces of palaces overlooking the scene, also those at the club, are refreshed with beakers of *Asti spumante* or *limonata* and offered delicious sandwiches of sun-cured Italian ham.

234 International News

Roman Armor Clanks Past the Cathedral on Palio Day

The warrior wears a legionary's 1st-century breastplate (a reproduction) and a gladiator-style helmet. His page carries a 16th-century halberd. Black-and-white layers of marble alternate in the bell tower.

Part two begins with men in dazzling costume representing the 10 contrade with entries in the race. A drummer and two *alfieri*, or ensign-bearers, accompany each (page 241).

The men who manipulate the flags are the delight of the crowd and the despair of visitors. They skillfully and rapidly twirl the banners around their bodies, over their shoulders, under their arms, and between their legs, all with a grace and skill born of long practice (page 237).

Flagmen Highlight Processional

Individual performance of an alfiero ends when the folds of his flag are, in some skillful manner, gathered into the hand and the staff cast high in the air. Instead of falling clumsily, the flag swings open and, exposing to the full all its brilliant colors, floats down to be cleverly caught by the staff. At times two flag-bearers toss their flags in such wise that each catches the banner of the other (opposite). The crowds cheer, handkerchiefs wave, colors flap in the breeze, and the procession moves on.

The flags thus cast about so freely are the ensigns of the contrade. The men are known as *giuocatori di bandiera*, and are by far the favorite performers with all save the true lovers of racing.

These skilled flagmen are followed by the captain, or *duce*, a title less popular nowadays than before Mussolini gave it such a sinister significance. One duce, with typical Tuscan humor, explained to me with mock seriousness that he was not named Benito!

This worthy is accompanied by a couple of men-at-arms and as many pages. Finally appears a horseman on a charger, the central figure himself, who will defend his ward's honor. Horse and rider have been blessed in the church of their contrada (page 230).

There is another slight pause, punctuated with more food and drink, before the third part comes into view. This one is led by 12 communal pages, all gay with garlands of laurel. Next come the representatives of the seven wards who, at the drawing of lots, failed to win a place in this year's show. These, however, are not represented by horse and rider.

Eight standard-bearers come next, carrying the banners of the principal corporations of Siena, the guilds of artisans which were formed in the Middle Ages. They have played an important part in Siena's long history and in the development of Italian city-states in general.

Finally, refreshments intervening, the fourth and last part of the parade is led

235 S. Prosser, from Black Star

Thousands Mass in Cathedral Square To Watch Flag-Bearers Juggle Their Banners

Thrown overhead, the standards swing open, flashing brilliant colors, and float down to waiting hands. Sometimes they fly over shoulders or pass between legs. Sienese never tire of the spectacle (page 237).

by the Captain of Justice, a civic official of importance, accompanied by his grooms. He may be called upon to make major decisions with respect to the race.

And now, finally, comes the ox-drawn triumphal cart, from the top of which is borne aloft the Palio banner (pages 232 and 244). From the sides hang the Palio tapestries.

Jockeys Wield Ox-tendon Whips

Trooping behind are more trumpeters and bands of the armed gentry of the commune. A splendid cavalcade, indeed, and one worthy of its history and spirit. I was presented with a lovely parchment, attesting honorary citizenship, whereon is painted this brilliant parade.

The great procession winds around the Campo. Each group is greeted by wild cheering.

Each jockey is presented at the last moment with his badge of office, one might say his weapon—the *nerbo*—a stout piece of ox tendon which serves as a whip. In days gone by fantini carried long flexible thongs with which they had a pleasant way of dragging each other from their mounts, for all seems as fair in a palio as in war or love.

The riders impressed me as being chosen for fearlessness and hardihood. Even now they are not above belaboring the mounts of their opponents, if need be.

Most of the steeds are, be it confessed, only work animals which labor at humdrum daily duties until the day of days arrives. Then, like Cinderella, they are transformed and thrust into a gorgeous riot of color and excitement.

No one cares for their collar marks, raw bones, or ewe necks. They are no longer servitors of the plow or cart. They are privileged to appear in Siena's apotheosis.

Only at the very last moment do the racers learn their places in the line-up, for these have been determined by the mayor and council under cover of deepest secrecy.

In these predetermined positions the riders fall into line with all the tension that always accompanies races. They stand nervously before a taut rope.

The moment of starting comes; the stretched rope falls, and the chargers are off! Round and round the riders go, bareback, amid ever-increasing excitement and shouting (page 233). Thrice clockwise about the Campo constitutes the course.

As the horses pass their partisans on each lap, they are encouraged by something akin to the cheering heard at American football games. But the contest is more like a charge of lancers than a mere horse race.

The running of the Palio is an affair of but a few hectic minutes, as the ancient clock on the lofty Mangia tower of the Palazzo Pubblico attests (page 238); but no thrill-packed race on earth could arouse more enthusiasm, and the time seems endless.

So much time is usually consumed in the preliminaries that the light has faded by the time the race is run, as many a disappointed photographer knows. But sunset tints the scene with lovely tones.

If the race is close, and all that I have seen were, the excitement rises to fever pitch.

When finally the race is won, a great sigh of relief wells up from the parched throats of all and sundry. The palio itself, the banner of victory, is handed over to the winning contrada.

The gallant horseman is greeted by his cheering friends, smothered with kisses, and borne off on the shoulders of those who are able to get at him first. His horse is fondled and petted like a baby. Horse and rider, and as many others as can crowd inside, rush to the church of their ward to give thanks to the Virgin.

Riders and Horses Share Acclaim

I have found it hard to decide whether man or horse has the greater share of the loving demonstrations of the women and children of the district. It is as if the costumed actors in *Romeo and Juliet* or *The Taming of the Shrew* had come from the theater into a world clothed in the 20th-century manner. Oddly, there seems nothing incongruous in Siena in the mingling of the dress of today with Raphaelesque costumes with slashings and feathered caps and velvet doublets.

Each Palio affords opportunity for visitors to look at the great works of art in Siena's galleries; to see where St. Catherine of Siena lived; and to admire the gorgeous Cathedral built of black and white marble, thus recalling Siena's coat of arms.

On Palio day the lovely marble mosaics of the Cathedral floor are uncovered. These are the *sgraffiti*, black outlines on white marble.

The only new feature of the Cathedral is the bronze door presented in 1946 by public-spirited Count Guido Chigi Saraceni. His gift was in gratitude for divine protection of Siena in 1944, when it was liberated by Gen. Alphonse Juin's French Expeditionary Corps of Gen. Mark Clark's Fifth Army.

Victory Banquet Ends Festivities

The aftermath of the Palio is interesting, too. The winning contrada sets a banquet of sorts for its members and the amateur patrons who have contributed to the expenses of the feast. Singing and orchestral music enliven the celebration.

Healths are pledged in Chianti, and in the stronger *vin santo* or even fiery *grappa*. Speeches are delivered in the soft Tuscan dialect. Italians think that their language is at its best when Tuscan is spoken by a Roman —*lingua toscana in bocca romana*.

So the Palio ends, and the visitors slowly disperse. Shadows fall in the Lizza, Siena's charming public park, as the sun sinks beyond the gray-green, olive-clad hills, while old folk tell of how much better were the Palii of yore; and youth, ever scornful, is sure that none could have equaled this year's.

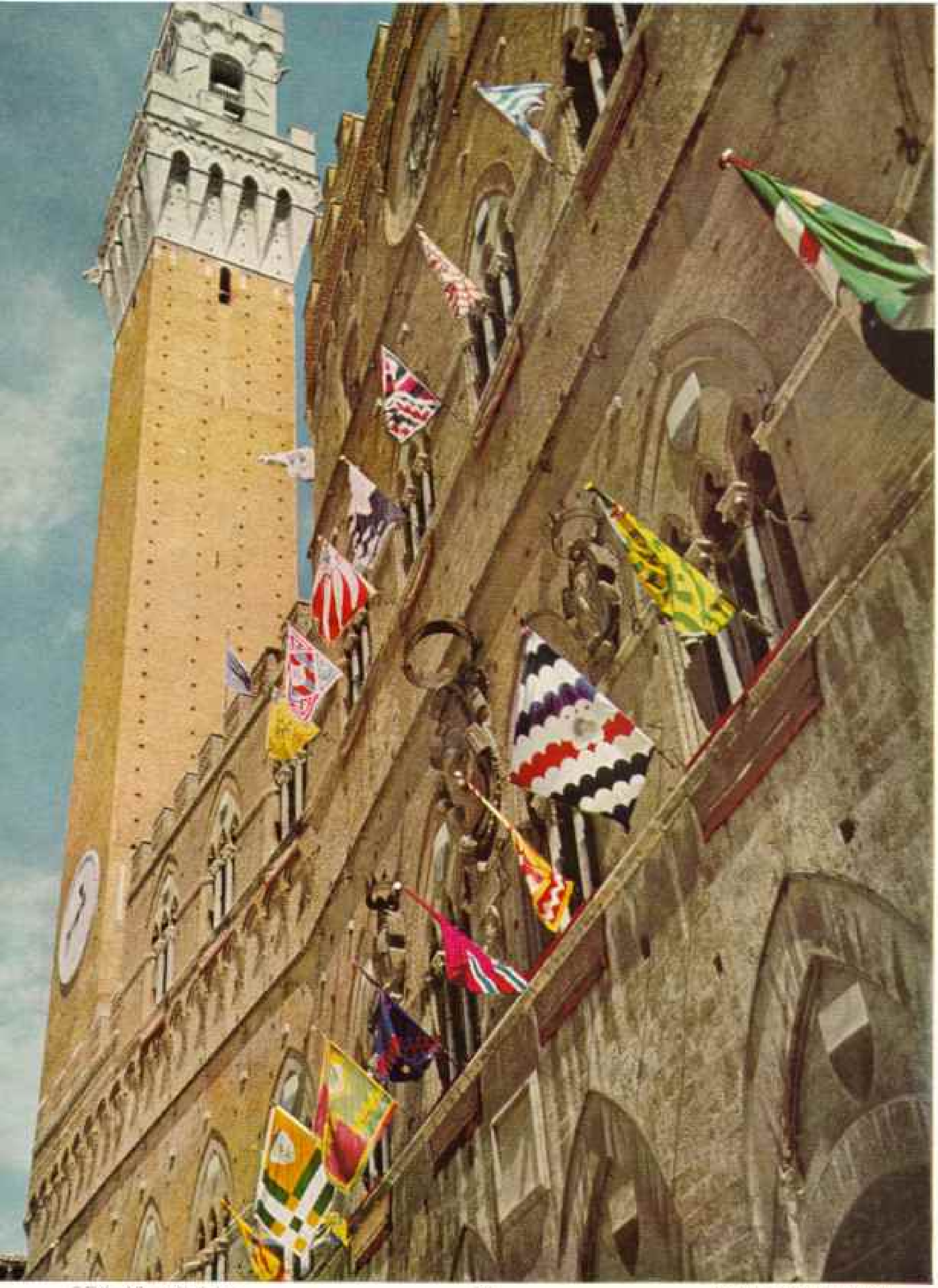
Visitors who have come by motorcar return via war-shattered Poggibonsi to Florence, go westward to Pisa or Leghorn, or, with a little more time, reach Rome itself. Leaving the city by the Porta Camollia, built in 1604 to commemorate the visit of Ferdinand I, Grand Duke of Tuscany, I read the old Latin inscription, *Cor magis tibi Sena pandit*. I knew that it remains ever true, for Siena "opens her heart," no less than her gates, to the traveler.*

* See "Siena's Palio, an Italian Inheritance from the Middle Ages," by Marie Louise Handley, National Geographic Magazine, August, 1926.

Kodachrome by Charles L. Bolden

Flag-Bearers, Siena's Drum Majors, Exchange Billowing Standards Tossed High in the Air

Costumed, crowd-pleasing *giuocatori di bandiera* (flag players) represent their wards in the pageant. Amazingly dexterous, they are trained from childhood to twirl their heavy banners like batons.



Kodachrome by Charles J. Belden

Town Hall, Facing the Race Course, Flies a Brilliant Heraldic Display

Standards of Siena, its wards, and guilds emblazon the 13th-century Palazzo Pubblico. Its slender Torre del Mangia is one of Italy's most beautiful towers.

Kodachrome by Charles J. Belden

Blessed by Priests, Flags of the Wolf Ward Leave Siena's Marble Cathedral

Ward members, their colors, and even horses are blessed in neighborhood churches before the race. Dragon, eagle, giraffe, goose, worm, panther, shell, snail, and other emblems adorn contestants' banners.

Kodachrome by Charles J. Belden

Marchers Massed in the Reviewing Stand Display the Bright Silks and Satins of Medieval Men and Boys

Legend says Siena was founded by Senius, son of Remus, who, with his brother Romulus, established Rome. A Siena emblem (lower center) honors the wolf that suckled the mythical twins. The city's black-and-white shield appears in the arches. A policeman's uniform (right) strikes the only modern note.

Mournful Attendants Carry the Hoof of a Dead Horse

Cobblestones make Siena's public square a treacherous course. When the Shell Ward's entry was killed in a practice heat, its backers marched with a severed hoof. Their flags were furled and bound in black.

A Drummer Leads Wolf Ward Marchers in the Pageant

Siena believes its cathedral (background) occupies the site of an ancient temple to Minerva. Alternate strips of black and white marble suggest the city's coat of arms.

Kodachromes by Charles J. Belden

Kodachrome by Charles J. Belden

A Trial Heat Tests Horses and Riders on a Dangerous, Slippery Course. Excited Spectators Crowd Balconies and Rails

Preliminary trials select 10 well-matched horses. Bareback riders lash one another with ox-tendon whips. Jealousies are so fierce that the winner sometimes requires protection. To photographers' dismay, the Piazza del Campo's main race is run at twilight.

Kodachromes by Charles J. Belden

Snail's Entry, Slow in Name but Fast on Foot, Is the Winner

Other Italian cities, notably Ferrara, hold similar races, but none matches Siena's Palio in pageantry and thrills. The event is run on July 2 and again on August 16.

So narrow is the race course that the entry field is limited to 10. Siena's 17 wards draw lots for the honor of competing. Six additional wards, abolished nearly three c[illegible]s ago for insulting the judges, lead a ghostly existence. Costumed knights represent them [illegible]e pageant but not in the race.

Bumping and crowding are fair tactics. Jockeys must be guarded against bribery and their mounts against tampering. Betting, however, is not part of the game.

▲ Snail Ward's mount is led in triumph through the streets. The sheep, a stablemate, tags along for company. In earlier times a display of the winner might have provoked a bloody battle.

◂ The Palio banner, bearing a picture of the Virgin, will be hung in the Snail Ward's church. Like the race itself, the standard is known as the Palio (from the Latin *pallium*, or mantle).

Snow-white Oxen Draw the Palio Banner on a Chariot of Triumph

An hour-long parade ends when the flag-decked chariot completes its circuit of the Piazza del Campo. Just before the race, each jockey receives his whip as a sign that he has qualified. By then the enthusiasm of some 40,000 spectators has risen to fever heat.

The winning rider, usually a professional jockey, becomes a hero. He is bombarded with kisses. Backers wine and dine him; sentimental fans write sonnets in his honor.

Freezing the Flight of Hummingbirds

By Harold E. Edgerton, R. J. Niedrach, and Walker Van Riper

With Illustrations from Photographs by the Authors

If hummingbirds were human, they might well have wondered why lightning was flashing all around them last summer on days of cloudless sky and brilliant desert sun.

Flashes several hundred times brighter than Arizona sunlight blinked among the darting birds but disturbed them not a bit. Each of these man-made flashes lasted only 1/5000 of a second. They came from our high-speed flash equipment, developed for what might have been called "Operation Hummingbird."

This project had a dual purpose: first, construction and testing of new lightweight equipment especially designed for motion-stopping natural-history color photography in the field; second, recording on film the flight of species of hummingbirds new to our cameras.

Wings whirring 55 times a second wear a cloak of invisibility. All one can see is a tiny darting ghost in a blur of wings. Hummingbirds are literally as quick as a flash—but not as quick as a modern high-speed flash.* Used with today's color film, it can penetrate the mystery that hides the incredibly rapid movement of hummingbird wings from human eyes. Thus we were able to "freeze" the flight of several species of American hummingbirds in color for National Geographic Magazine readers.

Hummers Cooperate with Science

These Kodachrome and Ektachrome photographs are examples of a special kind of photography requiring elaborate apparatus, much hard and patient work, thousands of miles of travel, and the cooperative antics of one of the most interesting and beautiful of birds.

Dr. Edgerton had pioneered in this work. He took the first high-speed flash pictures of hummingbirds in black and white in 1928. Picturing the Ruby-throated, only North American variety found east of the Mississippi, the photographs proved the hummingbird a most obliging as well as absorbing subject.

So courageous that it sometimes tackles hawks, the little creature is so unafraid of man that it can easily be enticed within close-up range of camera and lights.

Later, with more powerful lights, Dr. Edgerton made the first flight photographs of hummingbirds in color and presented the remarkable results in the National Geographic.†

To picture additional species, Dr. Alexander Wetmore, Secretary of the Smithsonian Institution and Vice-chairman of the National Geographic Society's Research Committee, suggested that we travel west and photograph the dozen or so species commonly found in the Rocky Mountain and other western regions of the United States.

Such a task called for a mobile form of high-speed flash photography, sometimes called the "strobe" (for stroboscopic). This brief but amazingly brilliant flash, synchronized with a camera shutter, had found many important uses. It "stopped" whirling wheels in industrial plants as effectively as it froze hummingbird flight. In World War II, night-reconnaissance planes carried extremely powerful sets, weighing more than a ton, for taking photographs behind enemy lines.

For natural-history field work, however, the device had to be light in weight and independent of electric power lines.

"Suitcase Set" Makes Flash Mobile

Working with a grant from the National Geographic Society, Dr. Edgerton and his associates designed a battery-operated, remote-control flash unit that packed into a 50-pound suitcase. With this "suitcase set," Dr. Edgerton photographed four species of hummingbirds in the West in 1947.

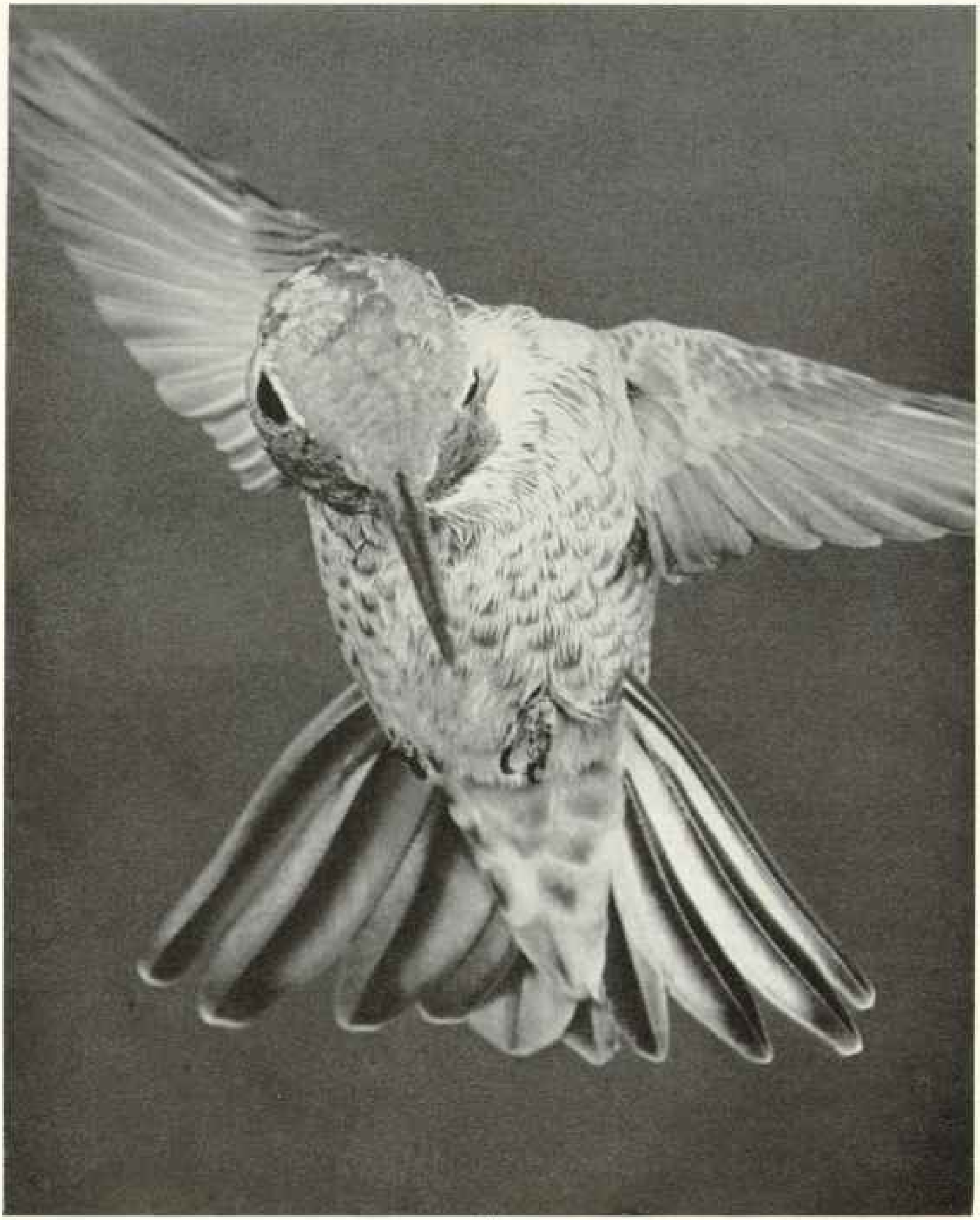
In late May and June of 1950, four of us spent three weeks in the field in Arizona under the joint sponsorship of the National Geographic Society and the Denver Museum of Natural History: Dr. Edgerton, professor of electrical measurements at Massachusetts Institute of Technology; Robert J. Niedrach, Curator of Ornithology, and Walker Van Riper, Curator of Spiders, both of the Denver Museum; and O. A. Knorr, student ornithologist.

By that time we had even lighter equipment. The flash units for each of our three cameras had been engineered down to seven pounds.

Expert advisers who contributed to both our projects included Dr. Gilbert Grosvenor; Dr. Alexander Wetmore; Dr. Arthur A. Allen of Cornell University; Henry B. Kane of Massachusetts Institute of Technology; Gjon Mili, noted photographer; and the eminent ornithologists Herbert Brandt and Roger Tory Peterson.

* See "A New Light Dawns on Bird Photography," by Arthur A. Allen, National Geographic Magazine, June, 1948.

† See "Hummingbirds in Action," by Harold E. Edgerton, National Geographic Magazine, August, 1947.



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A Hummingbird, All Motion Stopped by the Camera, Seems Big and Fierce as a Hawk

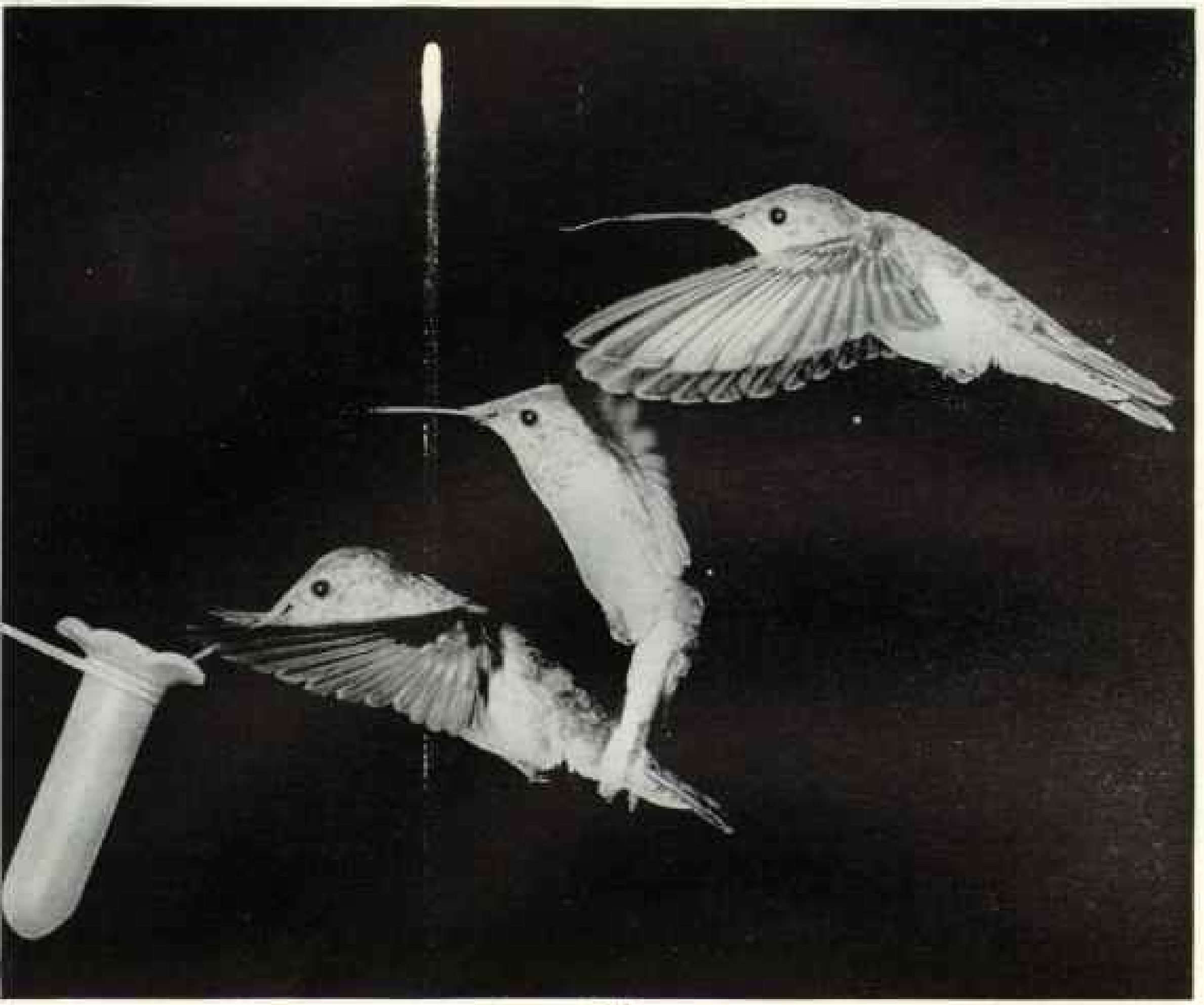
Hundreds of times brighter than sunlight, a stroboscopic flash lasting 1/5000 of a second reveals intimate details of this Anna's Hummingbird fluttering close to the camera lens (page 250). His wings whir 53 times a second.

A hummer flying at top speed is too fast for even the speed flash's brief, brilliant imitation of a lightning bolt. When wings beat 200 times a second, they appear slightly blurred on film.

Working with a National Geographic Society grant, the authors in 1950 developed new electronic flash equipment to record habits of several hummingbird species in Arizona.

On a similar expedition in 1947, Dr. Edgerton and his associates used a 50-pound flash unit packed in a suitcase. For the later studies, lighter and more convenient equipment was developed in Dr. Edgerton's laboratory at the Massachusetts Institute of Technology.

Ornithologists and scientists took part in the new project. Denver Museum of Natural History was a co-sponsor.



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Impossible to Fly Backward? The Camera Shows How It's Done

Reverse flight once was dismissed as an optical illusion. Here a multiple exposure by stroboscopic light catches a female Broad-tailed Hummingbird backing away from a feeder (page 249).

When Harold Edgerton started west on his 1947 trip, his first objective was the Broad-tailed Hummingbird *(Selasphorus platycercus)*, abundant in the Rocky Mountain region from southern Idaho to Mexico.

The male's red gorget (page 254) resembles that of the Ruby-throat. His jewellike throat patch flashes its brightest when seen head on, with light at the right angle; otherwise it appears dark red to black. Some pictures indicate that the gorget flash may depend in part on erection of the throat feathers.

Broad-tail Gently Pushed from Nest

On the Evans Ranch in Colorado, Mr. Niedrach and Mr. Van Riper showed Dr. Edgerton his first Broad-tail nest.

"May I go closer without disturbing her?" he asked from a distance of 20 feet, looking doubtfully at the brooding female.

He was assured that he might go as close as he wished.

Shortly we had three cameras, as well as a collection of lights, aimed at the nest from a foot away. Even then, to get the mother bird to leave the nest, we actually had to *push* her off! Not until completely dislodged did she "rev up" for the take-off (page 248). Then she circled the tree once, but came back immediately and resumed her duty of keeping the two miniature eggs warm (page 251).

The male Broad-tail has one characteristic that distinguishes him from other North American hummers: his flight is accompanied by a strange trilling or vibrating sound. He is nearly always heard before he is seen.

The sound has been variously described as "a shrill trilling," "a shrill screeching noise something like that produced by a rapidly revolving circular saw when rubbed by a splinter," or "a curious, loud, metallic, rattling noise."

Close observation reveals that the intensity of the sound correlates with the vibration rate of the wings. When the bird hovers before a flower, his wings beating about 55 times

Lights! Action! Camera! Pushed from Nest, a Feathered Star Performs Reluctantly

Inquisitive humans and their gear failed to disturb this nesting Broad-tailed Hummingbird. Poked gently by R. J. Niedrach, she took off on a short flight (page 247). Walker Van Riper operated the camera.

a second, there is little or no sound. The chatter becomes distinctly audible in level flight when the beat rises to 75 or higher, and is loudest in the "dive-bombing" courtship display, when the wings reach a rate of 200.

Our pictures of male and female Broad-tail wings in actual flight reveal the source of the sound for the first time. When flying, the female makes only the usual buzzing, or humming, sound. The photograph of her spread wing shows that all the primary feathers are normally shaped (page 247). Not so with the male: his first two, or outermost, primaries are uniquely modified, narrowing at the tips to produce the slots shown in the picture (page 251). Air fluttering through these slots produces the rattling whistle.

In migration male Broad-tails usually precede the females, arriving in Denver about the middle of May. This species (and apparently a number of others) is highly matriarchal. The late Frank Bené's observations indicate that the female Black-chinned Hummingbird selects her nesting area and begins to build the nest before searching for a mate. When she finds him, she completes the nest, lays the two white eggs, incubates them herself, and cares for the young until they are ready to fly and feed themselves.

Our observations of the Broad-tail, while limited, seem to show that it follows the same schedule.

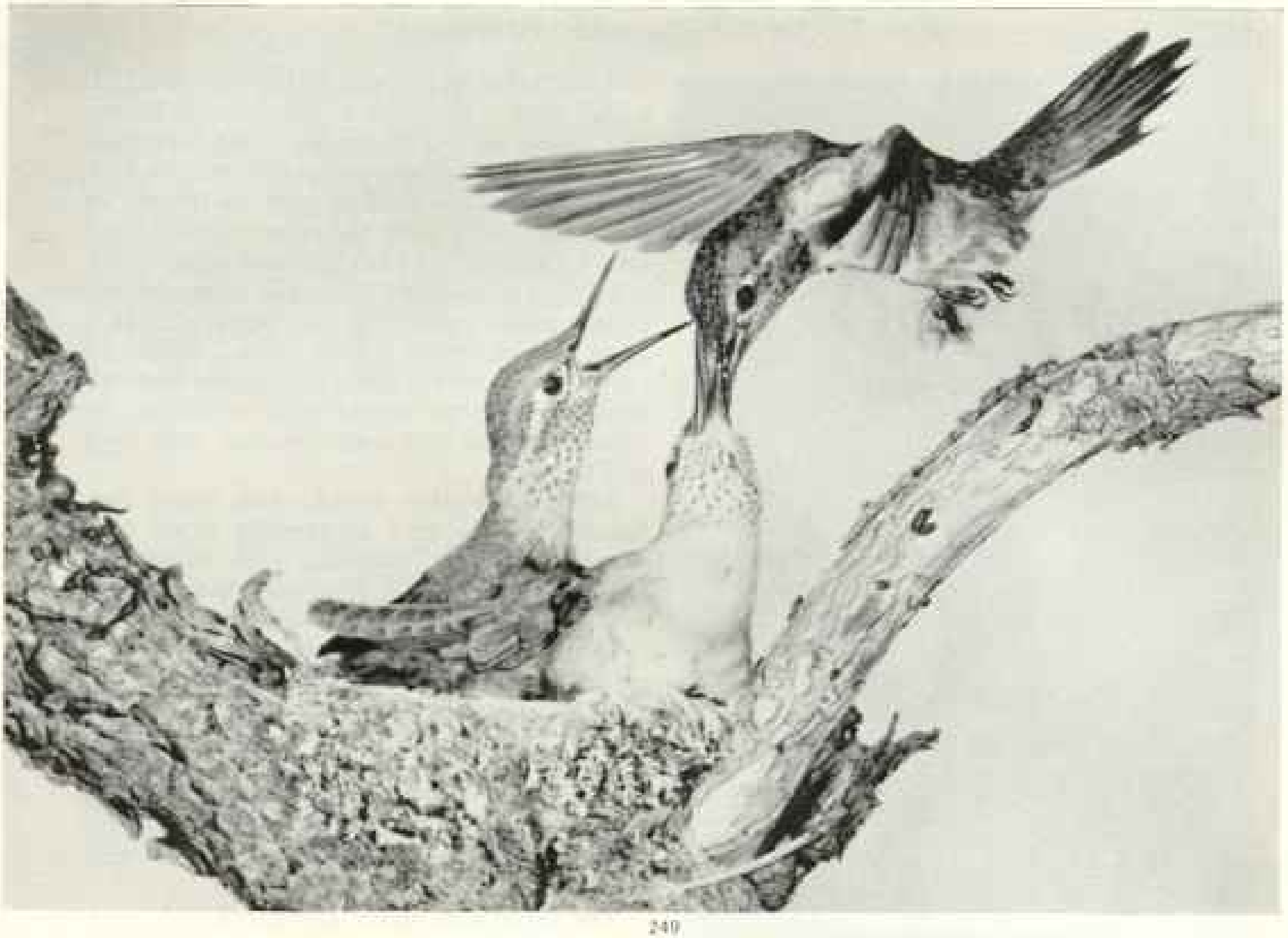
Nests of the Broad-tail average a little over 1½ inches in outside diameter and somewhat less in height. The inner cup, about an inch in depth and diameter, is lined with soft plant down, often from willow and cottonwood seeds; feathers are rarely used. Lichens, dry leaves, and fibers, bound together with spider webs, form the outer shell. Always the outer layers of the nest are camouflaged in color and texture to match the supporting limb (page 256).

This hummer nests not only in the mountains up to 10,000 feet but—conveniently for picture takers—also in the cities.

Hummingbirds Have Twins

Hummingbirds lay only two eggs. Those of the Broad-tail hatch in about 14 days. The young, born helpless, naked, black, and blind, are about the size of honeybees. They are fed by regurgitation, the mother thrusting her bill down the baby's gullet with a convulsive spasm (opposite and page 256).

Besides nectar, the food consists of small spiders and insects gleaned from flowers or caught in the air.



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Dinner Is Served! Few Other Birds Feed Their Young While Hovering, Like Hummers

Wings beating rapidly, the Broad-tail thrusts her long, sharp bill deep into the youngster's gullet (page 256). Feeding by regurgitation, she supplies a diet of nectar, spiders, and insects.

In about three weeks, the expanding bodies of the young have pressed the little nest out of all shape. They are now as large as the parents and wear a full covering of feathers. For a time they exercise their wings at the nest, then take off in flight. Though they still are fed by the mother for a few days, they soon have mastered the art of hummingbird flight—up, down, forward, sideways, and even backwards.

Backward Flight Is No Illusion

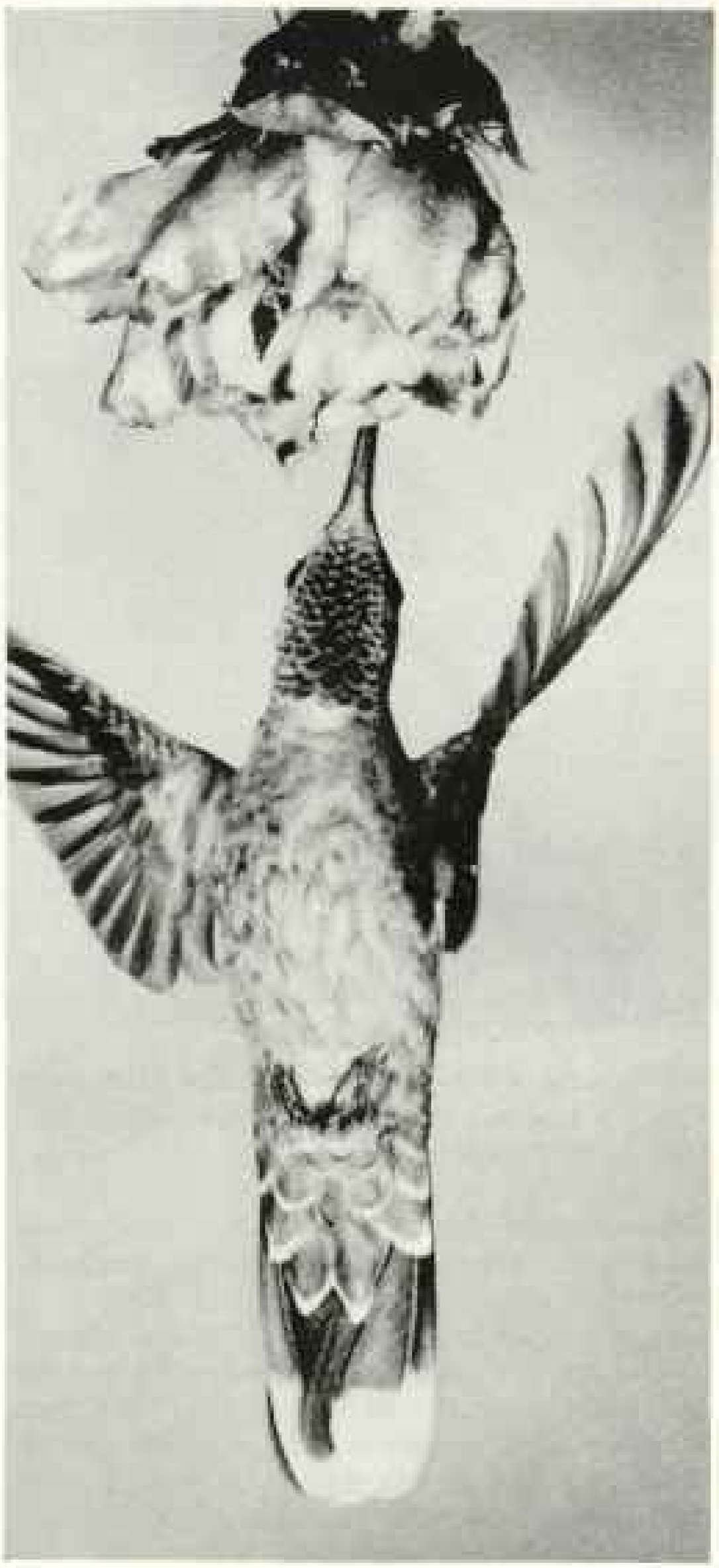
In 1867 the Duke of Argyll, in his *The Reign of Law*, stated that no bird could fly backwards. He conceded that the hummingbird might appear to do so as it left a flower, but held that this was an optical illusion; that the bird really fell away, turned, and flew ahead. Undoubtedly the noble author never watched a hummer fly, because it is easy to see that the bird *does* fly backwards.

To demonstrate the performance photographically, we contrived a switch to set off three flashes in extremely rapid succession, so that the hummingbird would appear in three positions on the same film. The first flash showed the bird's bill leaving the feeding bottle; the second and third proved actual backward flight (page 247).

This photograph shows graphically another hummingbird feature, the long, protruding tongue, the organ that distinguishes the hummingbird sharply from other bird groups. A sort of double-barreled tube, split and fringed at the tip, the tongue can be extended beyond the bill tip nearly as far as the bill's own length. This remarkable implement acts as a sucking tube to extract nectar from flowers and also as a probe or sticky brush for collecting small insects found there.

Since our pictures were made at varying distances from the subject, it was not possible to make the reproductions to scale. To give some idea of relative size, here are significant dimensions of the Broad-tail: length from tip of bill to tip of tail, 4½ inches; length of bill, ¾ inch; over-all diameter of nest, 1⅝ inches.

In mid-July we returned to the Evans Ranch in Colorado to look for the Rufous Hummingbird (*Selasphorus rufus*). During a lull in the rain, Van Riper and Niedrach went to the meadow behind camp to look for birds. Suddenly Van Riper shouted to his companion, "Come quick, the Rufous are here!" Three adult males, with fiery throats and copper-colored backs, darted about, sipping nectar from the common mountain flower, the pentstemon.



Acrobatic Junior Taps a Juicy Cactus Blossom

Up, down, forward, sideways, backwards—all forms of flight are easy for hummingbirds. This young Blue-throat seems to hang by his bill as his long, tubular tongue draws nectar. A Cooper's hawk attacking a guinea hen gave up the chase when pugnacious Junior dive-bombed him (page 252).

One male took possession of a pentstemon patch by perching on a tall weed from which he could see and attack all intruders. From his high perch the Rufous power-dived on interlopers, chased them away, then returned to the weed with the boss hummer's peeping cry of possession. Periodically he went over his patch to collect the nectar and insects that had accumulated in the flower cups.

On the rim of the Grand Canyon we studied and photographed a boss Rufous for two-and-a-half days. He liked to perch on a branch just above six thistle bushes. We were successful with close-up photography of this bird, probably because he was used to throngs of Canyon-viewers, and therefore tolerated our lights, cameras, and background (page 259).

Early one morning Edgerton observed two young males contesting the ownership of a large and desirable thistle bush. Whenever one of the evenly matched contenders attempted to glean nectar from a flower, the other attacked him from the rear with beak and claws.

After many rear attacks and aerial dogfights, the two tiny adversaries faced each other in mid-air, hovering with beaks belligerently thrust out like miniature fencing foils and with tails spread in fury.

Together the birds rose vertically in the air, only five inches apart. When 30 feet up, they came together with a shock, then dropped to the ground, where they remained quiet except for an occasional flutter. The hummers did not appear to use their beaks while on the ground; instead, one grasped the other by the back with his claws and held on with bulldog tenacity.

The aerial maneuvers alternated with wrestling matches on the ground for more than an hour. Eventually one bird gave up and flew away. By now the victor was so tired that he did not give chase in the characteristic Rufous manner. He did manage to fly to his perch and announce to the world that he was the owner and would defend his holdings.

Rufous Hummingbird lives as far north as Alaska, migrating to Mexico for the winter. This brilliant bird is seen over the entire western region during the southward migration in summer. His polished gold gorget glistens like metal.

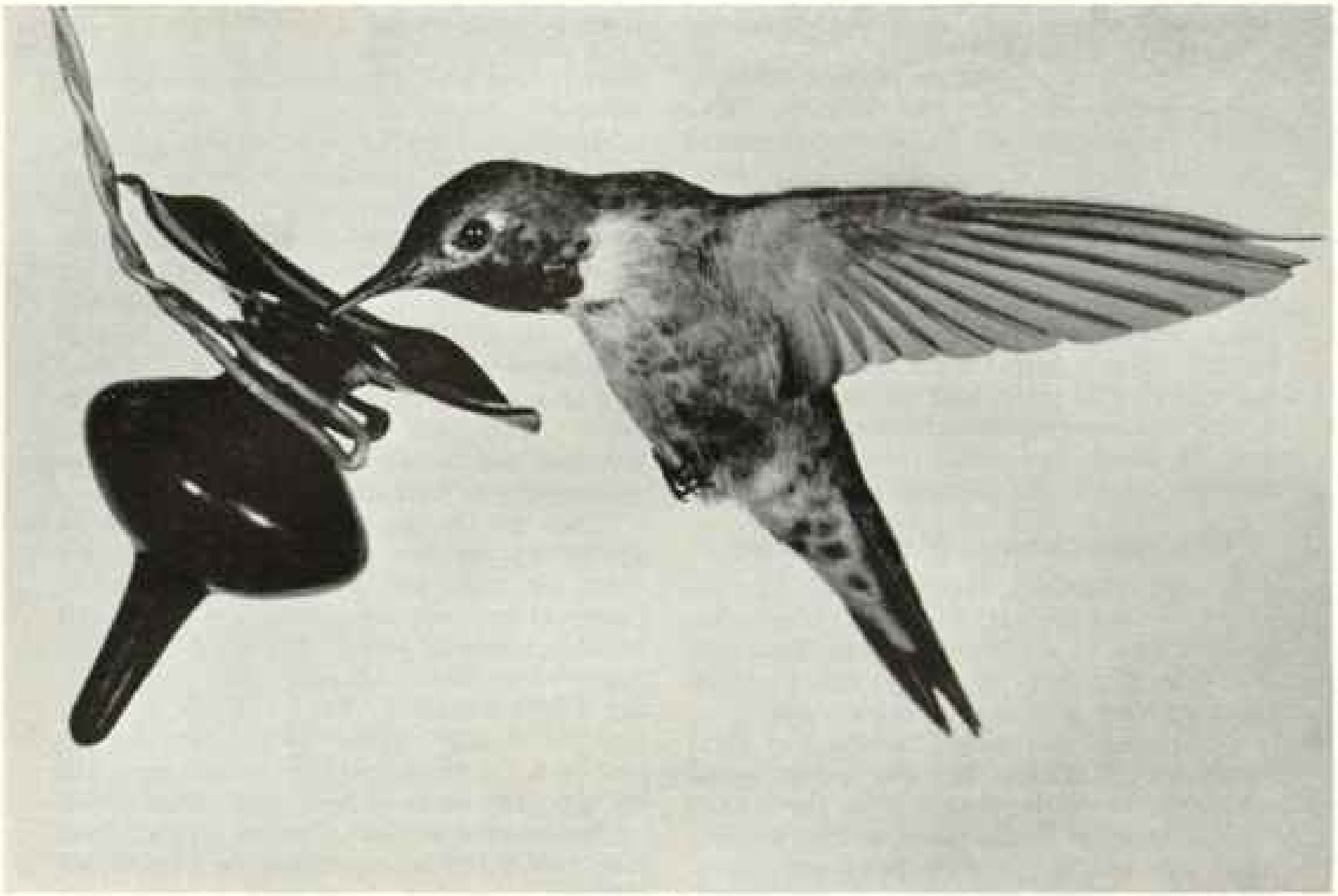
Anna's Is a Handsome Redhead

Our next quarry was Anna's Hummingbird (*Calypte anna*), California's most typical member of the Trochilidae. Californians know him well because he frequents populated places. Incidentally, he is the only hummer that spends the entire winter mainly in the United States.

To those who know only the Ruby-throat of the East, the adult male Anna's is impressive, his entire head a sheath of rose-red metallic feathers. We wanted to find an adult male that would show his gorgeous head by posing 15 inches from our lens (page 246).

A letter from Mr. Benjamin F. Tucker, of Long Beach, California, decided us. "There is no better place," he wrote, "than Santiago Canyon."

In memory of his wife, Mr. Tucker had

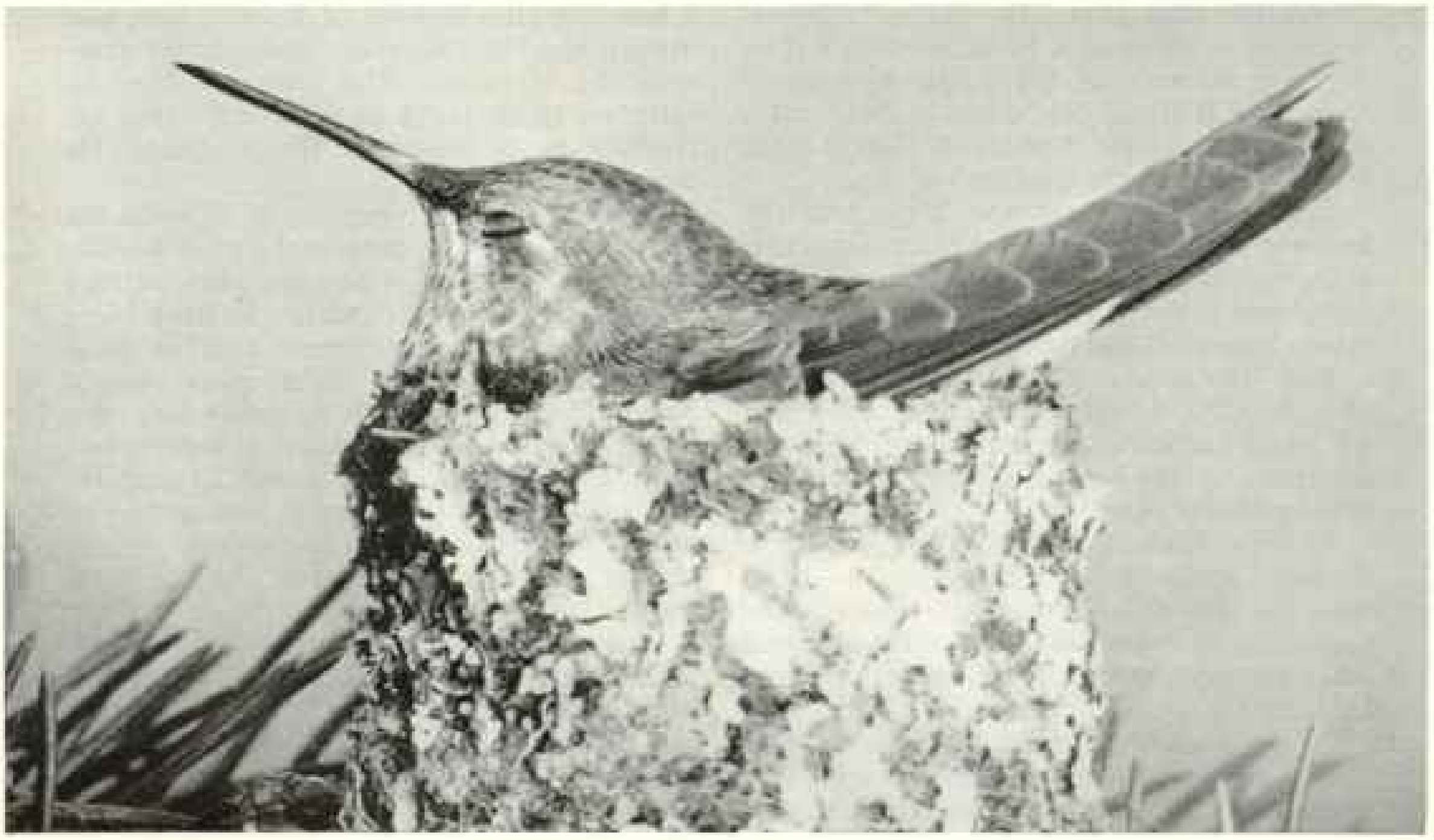


Frozen Flight Reveals the Source of a Hummer's Sound

Primary feathers of this male Broad-tail's wings taper at the tips, producing slots. Air fluttering through the openings results in a distinctive rattling whistle. Female Broad-tails, with normally shaped feathers, fly with a buzzing sound like other hummingbirds (page 248).

Mom's on Her Nest; All's Right with the World

From defiantly cocked bill to rakishly tilted tail, this Broad-tail presented a picture of maternal devotion. Cameras and lights a foot away failed to disturb her slumber. Pushed from her nest, she flew briefly, then returned to warming tiny eggs (pages 247 and 248).



donated a site in the canyon to the California Audubon Society. At the Dorothy May Tucker Sanctuary we found many Anna's and Black-chinned Hummingbirds (page 257).

Here visitors sit comfortably on a screened porch to watch hummingbirds going and coming along a row of feeders. These are glass containers of sweet liquid, enormous compared with feeders elsewhere, each with six feeding holes. Mr. Tucker had devised an ingenious metal plate, half an inch above the liquid, to prevent bees from feeding. Hummingbirds, however, can thrust their long tongues through holes in the plate to sip (page 258).

Huachucas Home to Many Hummers

In the Huachuca Mountains of Arizona, where we worked in 1950, we established headquarters at the Carr Canyon Ranch of Maj. and Mrs. John H. Healy, who provided every comfort and expert field assistance.

The profuse and varied animal and plant life of the Huachucas includes species found only here, or rarely elsewhere in the United States. At lower levels, yucca, cactus, century plant, and ocotillo grow on the warm slopes. All of these bloom and attract hummingbirds in season.

On our list were six species of hummingbirds—Rivoli's, Blue-throated, Black-chinned, Broad-billed, White-eared, and Broad-tailed. We hoped to see Costa's and counted Allen's and Anna's as remote possibilities. We probably could not find as many kinds in a small area anywhere else in the country.

The dominant hummingbird in the Huachucas is the Blue-throated (*Lampornis clemenciae*, page 253). Its specific name was bestowed in honor of a Frenchwoman, but by a happy coincidence the Latin meaning of *clemenciae* is "tame" or "domesticated." It is an apt name, for the Blue-throat likes to make its home close to the dwellings of man.

Early records report the Blue-throat as building its nest in ferns and other low plants along canyon streams, but of late years nearly every nest found is under a bridge or a water tower, beneath house eaves, or in outbuildings.

Blue-throats use the same nest over and over, building it higher each time. One nest we found had evidently been used five times, doubtless by the same bird and probably in two successive years.

In Mrs. Wallace G. Haverty's garden in Ramsey Canyon, Arizona, three species—Blue-throated, Rivoli's, and Black-chinned—fed constantly on masses of yellow columbine and other blossoms and at sirup bottles provided by their hostess.

In the Haverty garden the top sergeant was Pappy, a male Blue-throat who first appeared in 1939 as a mature bird and was, therefore, at least 12 years old. Though this statement cannot be verified in any manner satisfactory to science, it is entirely possible.

Pappy had his own lookout perch, his way of flying at other birds, and other idiosyncrasies by which Mrs. Haverty could confidently identify him. From his perch Pappy lorded it over Blue-throat, Rivoli's, and Black-chin alike. He watched both feeding stations at opposite sides of the garden. When a rival flew to a feeder, Pappy dived and drove him away. This left the other station unguarded, and another bird would seize the opportunity to feed for a moment in peace.

When we thought to vary the routine by setting up another feeder out of Pappy's sight, the move brought on a mild disaster. Pappy at once discovered the new feeder and began to guard all three. The additional work appeared to excite and upset him, and he hit one Rivoli's male so hard that he actually knocked it out. Under Mrs. Haverty's expert care, the victim eventually recovered, but we tampered no more with established order.

One evening at Carr Canyon ranch Albert Knorr sat watching a young male Blue-throat through binoculars. Suddenly a commotion broke out in the farmyard. Through the glasses Knorr saw a young Cooper's hawk attacking a guinea hen.

A Feathered David Routs Goliath

Junior, the young Blue-throat (page 250), saw the hawk too and valiantly dive-bombed to the attack, hitting the raider from above and behind. Finally the hawk gave up.

Junior streaked back up the hill, came to a hovering stop in front of Knorr's face, and uttered the high, squeaky "peep, peep" characteristic of excited Blue-throats. Then he returned to his perch to ruffle and preen his feathers as he surveyed the landscape for new victims.

In addition to the "peep," male Blue-throats sing a low, gurgling, contented sort of warble, feeble but sustained, a pleasing song for ears close enough to hear it (within 50 feet).

Hummingbirds have been said to have every avian gift—fast flight, extraordinary homing faculty, strength to cover long distances, ability to fly up, down, sideways, forward, and backwards, and incredibly magnificent color—every gift, that is, except that of song. As a matter of fact, several species besides the Blue-throat have pleasing little songs.

Writers have questioned whether hummingbirds may not produce songs that cannot be heard by human ears. Sir D'Arcy Thompson has pointed out that there might be some relation between the size of animal vocal cords and the pitch of the sounds produced. He

This Male Hummingbird Liked to Sip Orange Juice

Nectar-loving hummers readily accept a feeding station's sugar water. **Blue-throated Hummingbird** likes a handout with a dash of orange juice. Contrary to common belief, some hummers do sing. Certain notes may be pitched too high for human ears.

Blue-throat, Tiny but Tough, Warns Rivals off His Flowery Domain

Males often monopolize tasty blossoms, driving off competitors. Dive-bombing, they may chase hawks a hundred times their size. Columbine and Mexican campion conceal this Arizona bird's sirup feeder. High-speed photography freezes wingbeats too rapid for the eye.

Broad-tailed Male Flashes Rose-red Throat Feathers (Left). From a Different Angle, His Bib Appears Dark Maroon

Broad-tailed Hummingbird, whose notched wing tips make a clattering sound, is generally heard before he is seen. Only certain light angles bring out his flashy colors. As he dances about, he alternately glistens and grows dull.

Elegant Male and Mousy Female: Both Are Rivoli's Hummers, Five-inch Giants Among Their Fellows

Most **Rivoli's Hummingbirds** live in Middle America, but this pair prefer Arizona. Wingbeats, mere blurs in other species, are slow enough for the eye to catch. At times the birds glide on rigid wings. These two insect catchers did not disdain nectar from flowers and sirup bottles.

Kodachromes by Robert J. Niedrach and Walter Van Riper

Kodachromes by Walter Van Riper

Broad-tailed Twins, Grown Too Big for Nest, Clamor for Food

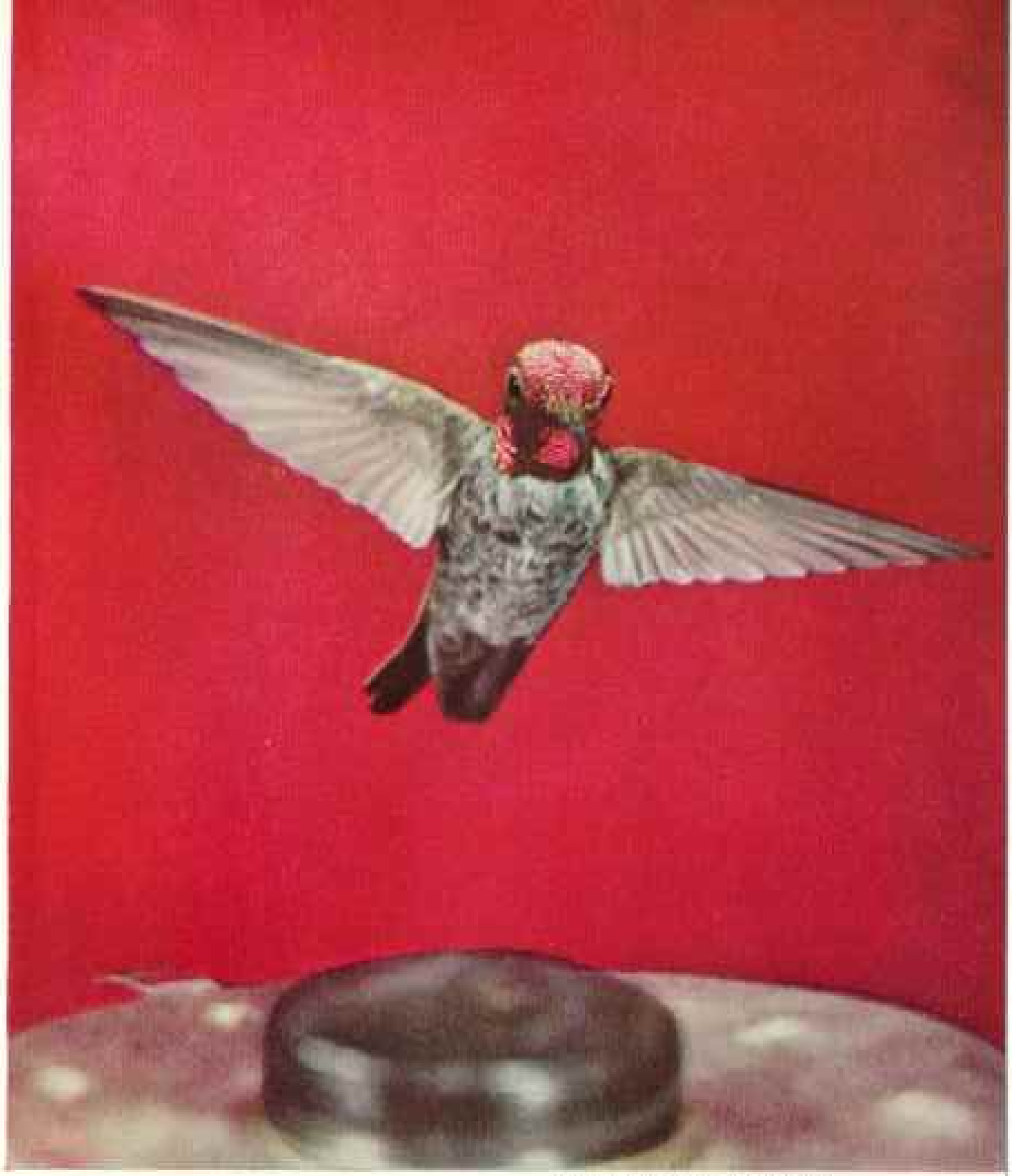
Broad-tailed Hummingbird's eggs hatch in two weeks. The young emerge black, blind, naked, and as small as honeybees. They attain full size and feathers in three weeks. Before attempting flight, they exercise wings several days. Twins are normal among hummers.

Baby Sword Swallowers Take Food from Mother's Bill

With a series of deep, convulsive thrusts, the **Broad-tailed** pumps regurgitated food. Usually she feeds each youngster in turn, but sometimes the stronger shoves his bestmate aside and grabs a second helping. Nests are made of plant down, moss, and lichens.

Timid Black-chinned Hummer Shares His Banquet Table with a Bumblebee

In flight the little **Black-chinned Hummingbird** hums like the nectar-sipping bee (center). He is found in semiarid terrain from Texas to British Columbia. Glancing light occasionally reveals a violet throat band.



Kodachromes by Harold E. Edgerton

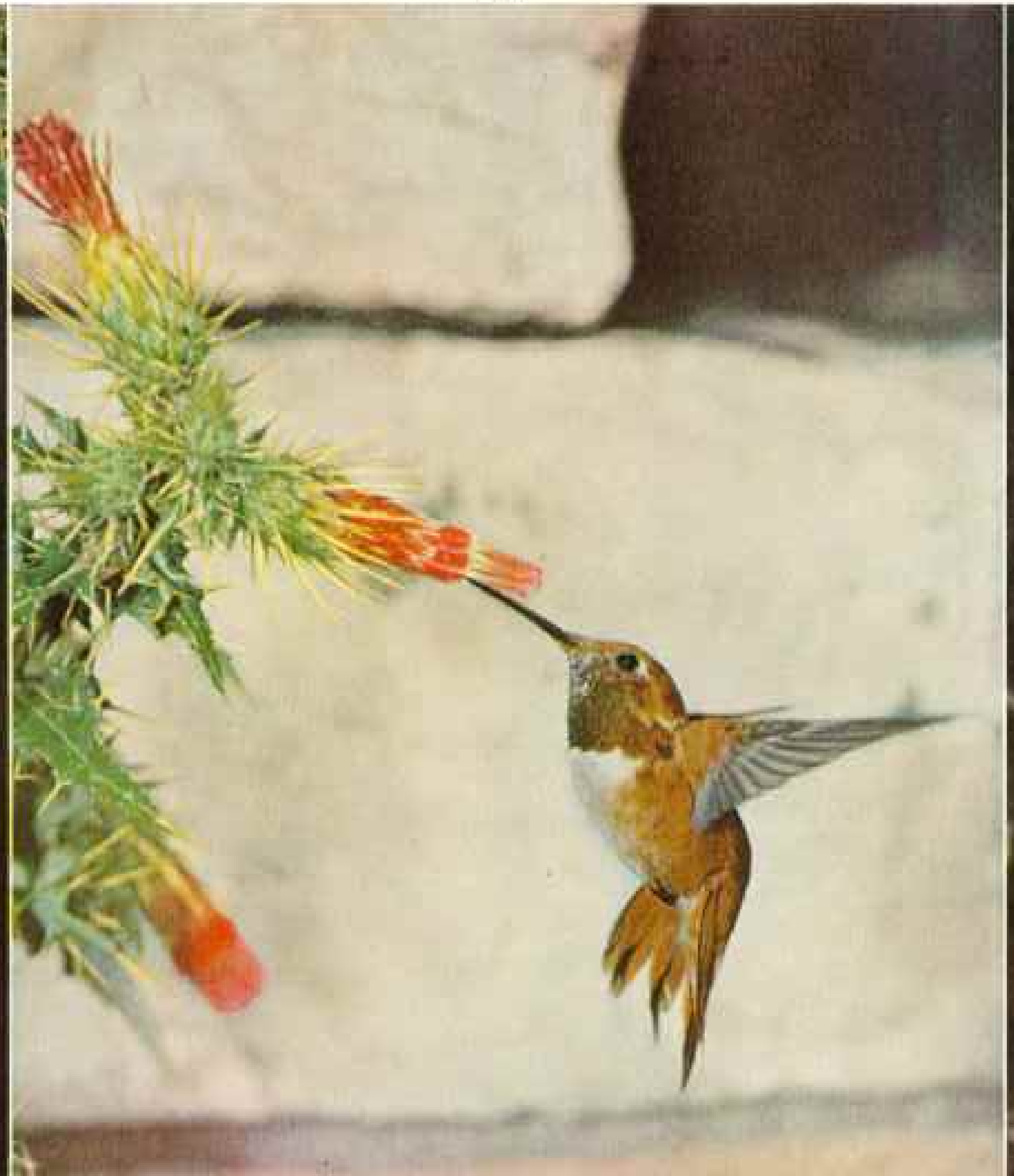
Anna's Hummingbirds Hover Above a Sanctuary's Glass Feeders for a Banquet of Sugar Water. Both Are Males

Like helicopters, hummingbirds can hang in mid-air, fly forward, backward, or straight up. Ardent males, diving from 100-foot heights or swinging in arcs, perform nuptial dances before fascinated females. Other Western species migrate south of the border, but **Anna's Hummingbird,** a loyal Californian, stays at home. These bottles, each with six holes in its metal cap, permit hummers to thrust in long tongues. The liquid level is kept too deep for bees.

Brilliant Rufous, Pugnacious Toward Other Hummingbirds, Pays No Attention to the Cameraman

Dog-in-the-manger males, jealous of food supplies, may clash head on in mid-air and, dropping, continue combat on the ground until the loser, exhausted, flies away. These three migrating **Rufous Hummingbirds** stopped on the rim of Arizona's Grand Canyon for a thistle-blossom lunch. They nest from Montana to Alaska. Darting males (center and right) sometimes sparkle like live coals; the female (left) is plainer.

Kodachromes by Harold E. Edgerton



Broad-billed Hummer Extends Landing Gear and Clutches a Twig

The hummingbird family (Trochilidae) is strictly American; none of its members is native to the Old World. More than 600 species, subspecies, and varieties make up one of the largest avian families in numbers. No other segment of the bird kingdom contains such small individuals.

The Giant Hummingbird of the high Andes attains the size of a bluebird. Smallest species, a Cuban, weighs less than a dime; it stretches 2¼ inches from bill to tail. This male **Broad-billed Hummingbird** is about 3¼ inches long.

As many as 17 species have been observed in the United States, but only one, the Ruby-throat, occurs regularly east of Nebraska.

Hummingbirds in flight have been clocked at 55 miles an hour. Hovering wings beat 55 strokes a second, on the average. In courtship dives the count may rise to 200.

Light's diffraction accounts for the brilliant colors. Rays striking the dark grating formed by feather fibers break up into glittering spectral hues.

Some hummers feed on nectar; others gobble insects and spiders; many eat both. The birds are attracted by bright colors, especially red. Individuals have mistaken women's gaudy hats for delicacies.

Fashionable British and French women a century ago wore stuffed hummingbirds on hats or perched them on artificial flowers. The fad became so widespread that Central and South America shipped bird skins in 100,000-unit lots. Brazilian curio shops still sell brooches made of hummingbirds' iridescent heads mounted in metal.

Kodachromes by Robert J. Niedrach

concluded that hummers might well sing at a level too highly pitched for human ears.

With this in mind, we watched singing Blue-throats carefully through binoculars. Movements of the throat coincided with the singing, but now and then the sounds ceased while the throat continued to vibrate, seeming to indicate that some of the passages were pitched too high for our hearing. It would not be difficult to record this song and to analyze its characteristics in the laboratory.

Dr. Alexander Wetmore once wrote in the NATIONAL GEOGRAPHIC of Rivoli's Hummingbird:*

"The first sight of this species is not likely to be forgotten, as among its small fellows it appears a veritable giant, with handsome coloring enhanced by its size. It is one of the most attractive birds of a region noted for interesting species."

Rivoli's Hummingbird *(Eugenes fulgens,* meaning the "shining one") is mainly a Central American species, ranging as far south as Nicaragua and northward through the highlands of Guatemala and Mexico. It barely crosses our southern border into the mountains of New Mexico and Arizona (page 255).

In slow flight the actual wingbeats of the Rivoli's become distinguishable, not a blur, as in smaller hummingbirds. The sound of the slower wings is softer. When photographing the three species—Rivoli's, Blue-throated, and Black-chinned—in the same location, we quickly learned to identify each by the wing sounds.

Black-chin Buzzes Like a Bee

The little Black-chinned Hummingbird *(Archilocus alexandri),* though 3¾ inches long as against 5 inches, looked to be half the size of the other hummers (page 257). By actual weight, he should be much less. The buzzing of the Black-chin's wings sounded like a bumblebee.

When the Blue-throats appeared, the little Black-chinned became timid and hard to photograph. The smallish gorget, a purple patch between the black chin and white collar, flashes only when the light is right.

The Black-chinned covers an unusually wide breeding range, from southern British Columbia and western Montana to northern Mexico and western Texas, Colorado, and New Mexico. In the Huachucas at the time of our visit, the Black-chin males fed mostly on pink thistles at the canyon mouths; while females built their second nest or fed youngsters. We found many nests along stream beds and low in the sycamore trees just out of the mountains.

Casualty rates for nests seemed high. For example, we found three nests within a stretch of 50 yards in lower Ramsey Canyon. We marked them down for night observation, as we wished to find out whether the male took his turn at night incubation. We never learned, for within a week we found the nests all destroyed, possibly by other hummers in search of nest-building material.

Though unable to observe other Black-chin nests, we made night checks of the Blue-throat twice. Both times she, not he, sat on the nest.

We regretted not having the opportunity to become better acquainted with *Cynanthus latirostris,* the Broad-billed Hummingbird. Though this charming bird undoubtedly visits the Huachucas and probably breeds there, we saw none during our stay. We found it only at Arizona's Madera Canyon, where we obtained a few pictures of the male (page 260).

The Broad-bill is a little bird, about 3¼ inches from tip to tip. A broad, bright-pink bill distinguishes the male. He wears bluish green on his gorget, green on the upper parts of the breast, head, and back, and has white posterior underparts and a glossy blue-black tail. In the United States the rare Broad-bill lives only along the border in Texas, New Mexico, and Arizona.

We had hoped to photograph Costa's Hummingbird in Arizona. Records indicated that it was not likely to occur in the Huachucas. So we spent a day in the San Pedro Valley and another in Tombstone searching for the bird, but without success. Eventually Dr. Edgerton found and photographed a fine male—in New York City! This specimen, at the Bronx Zoo, was taken in Death Valley National Monument and had lived for five years in captivity in perfect health—a record.

Costa's *(Calypte costae)* belongs to the same genus as Anna's. The males of the two species are somewhat similar, both having colored foreheads and throats. On the Costa's the color is purple or amethyst; on the Anna's, rose red.

We have now recorded all but four of the 13 hummingbird species that come regularly to this country to breed: Ruby-throated, Black-chinned, Broad-tailed, Costa's, Anna's, Allen's, Rufous, Calliope, Rivoli's, Blue-throated, Buff-bellied, White-eared, and Broad-billed.

Still missing are Allen's, Calliope, Buff-bellied, and White-eared. These four, as well as the hundreds of kinds in Mexico, Central America, and South America, leave us plenty of scope for future operations.

* See "Seeking the Smallest Feathered Creatures," by Alexander Wetmore, NATIONAL GEOGRAPHIC MAGAZINE, July, 1932.

See also "Holidays with Humming Birds," by Margaret I. Bodine, NATIONAL GEOGRAPHIC MAGAZINE, June, 1928.

Hunting Musical Game in West Africa

By Arthur S. Alberts

With Illustrations from Photographs by the Author

SINCE the war, men have made many changes in equatorial Africa, Nature very few.* From the outside looking in, the face of the low-lying Guinea coastline still seems the same to the approaching traveler.

I had flown in and out of West Africa a number of times. Now, coming in by sea with my wife, I could point out the familiar distant column of cumulus clouds marking the still invisible land surface below, then a thin line of brownish gray, and, closer, matchstick palm trees wavering in the heat haze. It was a typical introduction to Africa, changing and changeless.

A single visit to Africa is seldom enough. In the Gold Coast, early in the war, I had obtained several recordings of tribal music for the Library of Congress; when I left for Algiers in 1943, I decided to return after the war for full recordings of West African music. I wanted to show that so-called Darkest Africa has more to offer than the tom-toms and jungle chants usually associated with it by the Western World.

By bringing the first tape-recording equipment to the Guinea Coast and using a jeep as our roving source of power, my wife and I planned to record West African tribal music on the spot, in its own setting. We would travel generally north from the coast to the Niger Valley, and return to the sea at Monrovia, capital of Liberia (map, page 266).

When we arrived off Takoradi, modern port of the Gold Coast, the steel deck of our cargo ship was like a roasting pan under the February sun. As we eased in toward the breakwater, a scattered fleet of Fanti fishing canoes, outward bound, swept past our stern. Beyond the port, hilltop palms rippled lazily in the offshore breeze.

On deck was our jeep, ready to go, packed tight with sound-recording equipment and all the paraphernalia for our music hunt across West Africa.

Jeep Nearly Meets Its End

At dockside Gold Coast stevedores took over, and winches began their noisy work. The jeep climbed high over the deck, dangling in its cradle like a bug on a thread. Pausing in mid-air, it awaited the signal to swing over and down to the wharf below.

Stevedores stopped to stare. Africans will goggle at anything American, and this was no ordinary jeep. Converted for African travel to the ultimate in square-cut utility, it bulged with steel boxes, an outboard gas tank, and a self-contained electrical system (page 272). We surveyed it with pride from the captain's bridge.

Slowly the jeep swung over the wharf, then faster—too fast. Without warning, its left front wheel jumped the cradle. It lurched sharply forward. Rocking on three wheels, it inched toward disaster below.

Here was the beginning, and the end, of our expedition. I shut my eyes. When I looked again, the jeep was gently coming to rest on the wharf. My eyes met my wife's. This was a fitting introduction to West Africa, where almost everything that starts out badly has a way of righting itself in the end.

Takoradi a Busy Port

Since 1942 the port and city of Takoradi had changed but little. The great antisubmarine boom was gone, and the harbor was packed with ships of many nations.

In the town, handsome, carefree people in colorful printed cottons crowded the walks and streets.

The hard red earth would be bone dry until the next rains; deep open culverts waited to carry off the floodwaters that would then wash the city. Neat white- and black-painted mud houses made a model West African community.

In the outskirts the fields were dotted with towering mounds, built by the "bug-a-bugs." Beyond lay the airless jungle, with its cocoa and bush farms, and along the coast, ancient castles and noisy villages.

A blind man can "see" Africa through its variety of sound. The ever-crowing rooster; the shrill calls of children and the swift padding of bare feet on hard earth; the laughter of women and the deep voices of men in excited palaver; the heavy feathering of village vultures; drumbeats and singing in the distance—these are some of the notes in the age-old song of tropical Africa.†

Most Africans have a keen sense of right and wrong. Their way of handling evildoers was shown to us our first night ashore, after a visit with friends at near-by Sekondi. As we returned to Takoradi at midnight, our lights suddenly picked out a group of Africans

* See "Britain Tackles the East African Bush," by W. Robert Moore, National Geographic Magazine, March, 1950.

† See "Timbuktu and Beyond," by Laura C. Boulton, National Geographic Magazine, May, 1941.

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Laden Boats Crash the Gold Coast Surf Head-on; Trident Paddles Beat the Frothy Sea

Because the port of Accra lacks a deep-water harbor, waiting freighters must stand a mile or more offshore. Cargo is carried out to them by 24-foot surfboats manned by paddlers (page 271). Of the 80,000 people in Accra, the surfboat men appear the happiest; they love their dangerous job. Usually soaked, they dispense with clothing. Crews perch on the thwarts to allow space for cargo. The near boat jockeys for position. Crewmen will leap aboard just before the breaker strikes.

milling about a roadblock. All were armed with bows and arrows or spears; the headman sported a World War I trench helmet.

"Take it easy," I said to my wife, who might have been visualizing us in a cannibal's stewpot. "It's probably just a committee of welcome." And so it was, but not for us.

"What this thing?" I called to the headman. "What you do here?" He looked into the jeep, and rested his spear on the ground. "All right, Massa, you go. We wait. T'ief man come 'long; we catchum, we killum."

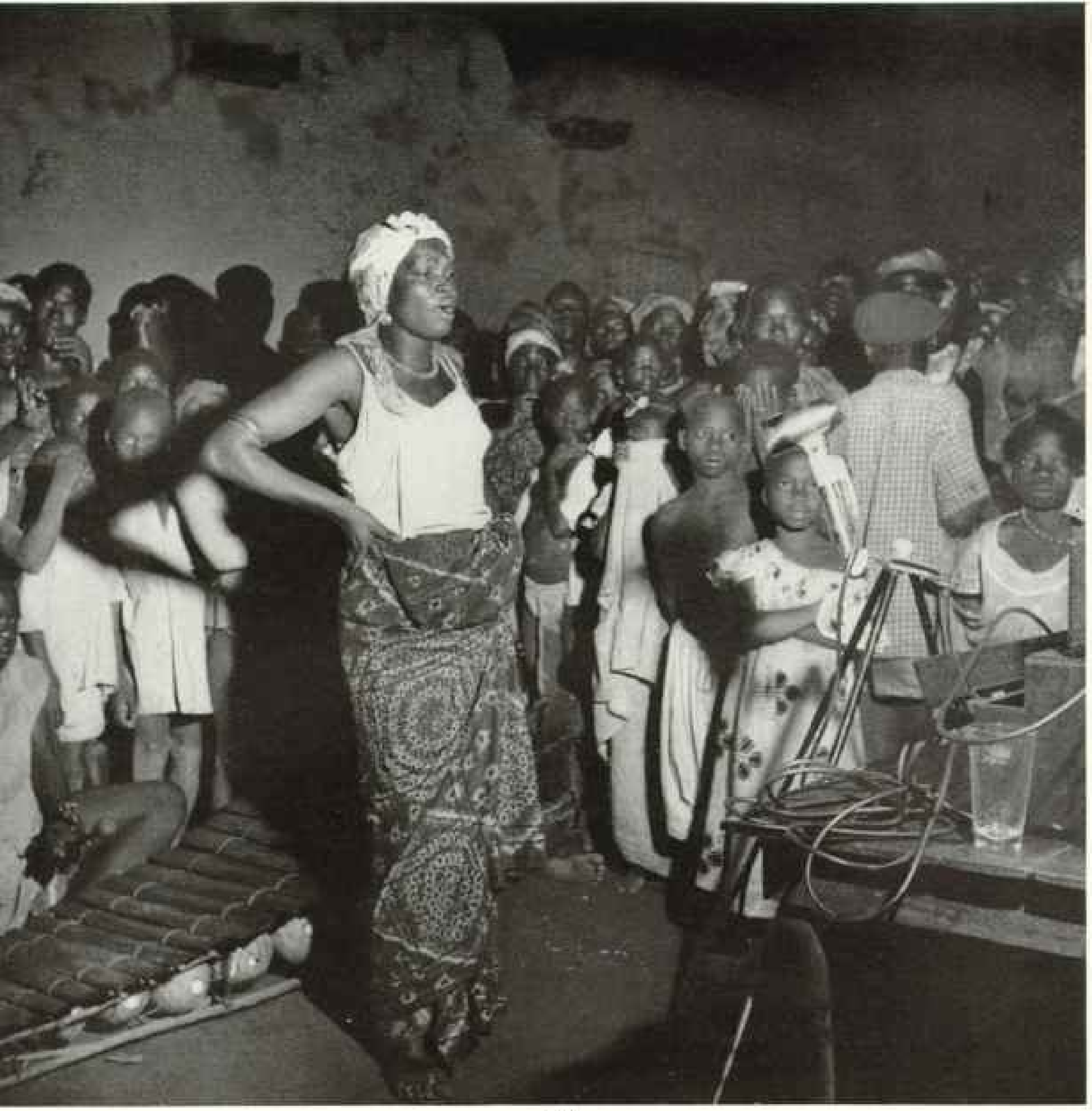
Race Relations Good in Gold Coast

Next day we learned that groups like this are common in the Gold Coast as a result of a postwar wave of housebreaking and robbery. Organized as vigilantes-without-firearms and given semiofficial sanction, their job is to catch "t'ief men" in the act or with the goods. When they "catchum," they "killum," usually by the rather drastic means of driving nails into the culprits' skulls.

Relations between black men and white are generally friendly, despite new nationalist tensions. A special liking is reserved for Americans, as I learned one day on the hot, tar-paved road to the Takoradi customs.

I had stopped to pick up two uniformed men. One, with bare feet, wore a fez, blue wool shirt, red sash and shorts, and spiral leggings; the other a peaked cap, blue policeman's uniform, and shoes.

"What's the difference?" I asked, indicating their uniforms. The man in blue answered, "We are both Gold Coast police," he said, "but this one is an illiterate policeman. That means that he cannot read or write. But I," he said with pride, "am literate. I can read and write, and I wear the blue uniform."



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Lizahbet', Recovering from Mike Fright, Confidently Sings for the Tape Recorder

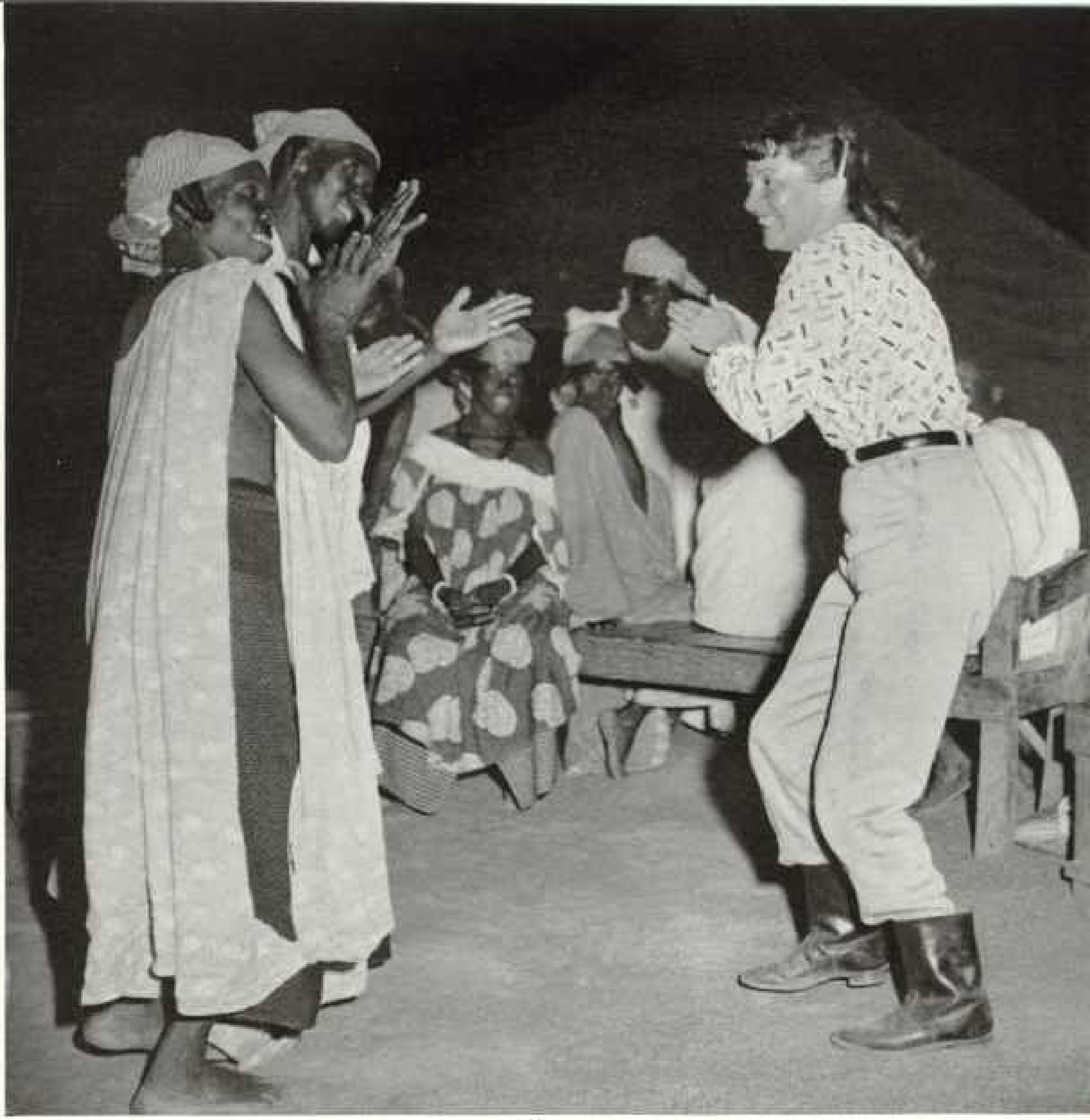
First sight of the microphone unnerved the singer, a resident of Bobo Dioulasso, Upper Volta. She faltered and giggled until the author's wife led her in a few dance steps. Composed, Lizahbet' demanded an American cigarette, and swaggered about in her rayon lingerie (page 281). Tinkling balaphons, the African gourd xylophones (left), accompanied her. Heard in the distance, they sounded like off-key mechanical pianos. At close range, their music seemed melodic, intense, and compelling.

The barefoot policeman spoke up later, to thank me for the ride. "You be American?" he asked. "Yes," I answered. "Oh," he said, "Americans be the finest Europeans we know."

From Takoradi the road to Elmina Castle and Accra parallels the shore line as far as Saltpond, where it goes off north and east to avoid the coastal marshes. Potholes left by huge GI trailer trucks dot the roadway, which imposes its own speed limit. But it was a fair road, a paved road, with a quarter-inch of tar over the red laterite. Weeks later, forcing our way across the bush roads and trails of the Ashanti country and the Ivory Coast, we looked back in fond memory to the "express" highway along the sea.

Relic of Slave-trade Days

More important, this road led us back through history to the era when African slaves were the major export of the Gold Coast. Across this country prisoners by the thousands were herded by their captors toward the slave pens of Sekondi, Axim, Cape Coast, Christiansborg, and, by no means least, Elmina. Here, in crowded dungeons, they waited for the auction block and the white traders from Europe and America.



The Author's Wife Joins a Nightlong Jam Session in Sidi Djelli, French Guinea

Xylophones' off-beat rhythms, singers' shouts, and spectators' handclaps reminded Lois Alberts of American Negro jazz. She saw African babies sleeping calmly on the bouncing backs of dancing mothers. With rare exceptions, men play the West African music—drums, harps, flutes, banjos, violins, guitars, and some instruments with no Western counterpart. Woman's role is confined to singing and dancing.

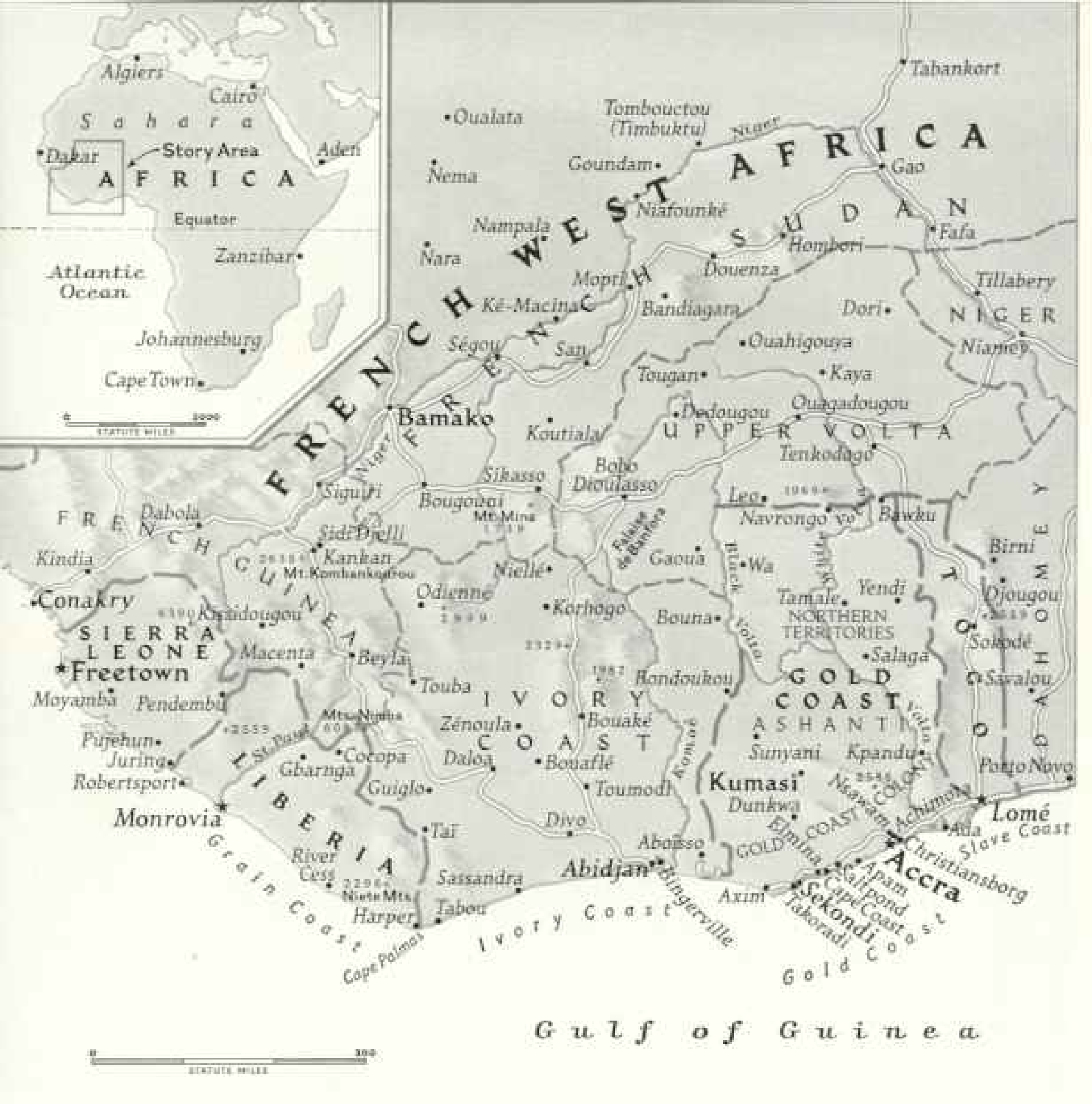
The medieval bulk of Elmina Castle dominates the coastline for miles. Seen from the west, it is framed on the left by rows of native fish nets drying in the sun along the lagoon, and on the right by a shoreside parade ground leading up to drawbridge and ramparts.

A guard in the uniform of the military police snapped to attention as our well-burdened jeep heaved its way up to the drawbridge over the fort's dry moat. Inside, past a 20-foot tunnel through solid walls, the auction house was empty and silent under the crenelated ramparts. Arched doorways led to dungeons on one side, to barracks on the other.

At the commandant's ready invitation to stay, we accepted on the spot and set up camp in a large room on the rampart level.

These had been the quarters of the Portuguese commander of the fortress in a more brutal day. A trap door opened to a private stairway leading to the cells of the female slaves below. Opposite were cells and dungeons for the males, giving Elmina a onetime capacity of 3,000 prisoners.

Elmina Castle was built in 1482 by the Portuguese, who lost it to the Netherlands in 1637 when the Dutch, by the simple expedient of taking a smaller but higher fort on a hill behind the castle, commanded Elmina and its



266 Drawn by Harry R. Oliver and Irvin E. Alleman

Grain, Ivory, Gold, and Slave Coasts Suggest the Riches Plundered from Africa Long Ago

Grains of paradise, a kind of pepper, named the Grain Coast, Liberia. The old ivory trade languishes. Slave running, which helped populate the Americas, was outlawed a century and a half ago. Gold is still mined. Man's progress in fighting the malaria mosquito and tsetse fly now expands sources of wealth—rubber, cocoa, palm oil, timber, industrial diamonds, manganese, and high-grade iron ore. The author hunted none of these treasures; he captured West Africa's native music.

approaches. Today the smaller fort houses a British leprosy research laboratory.

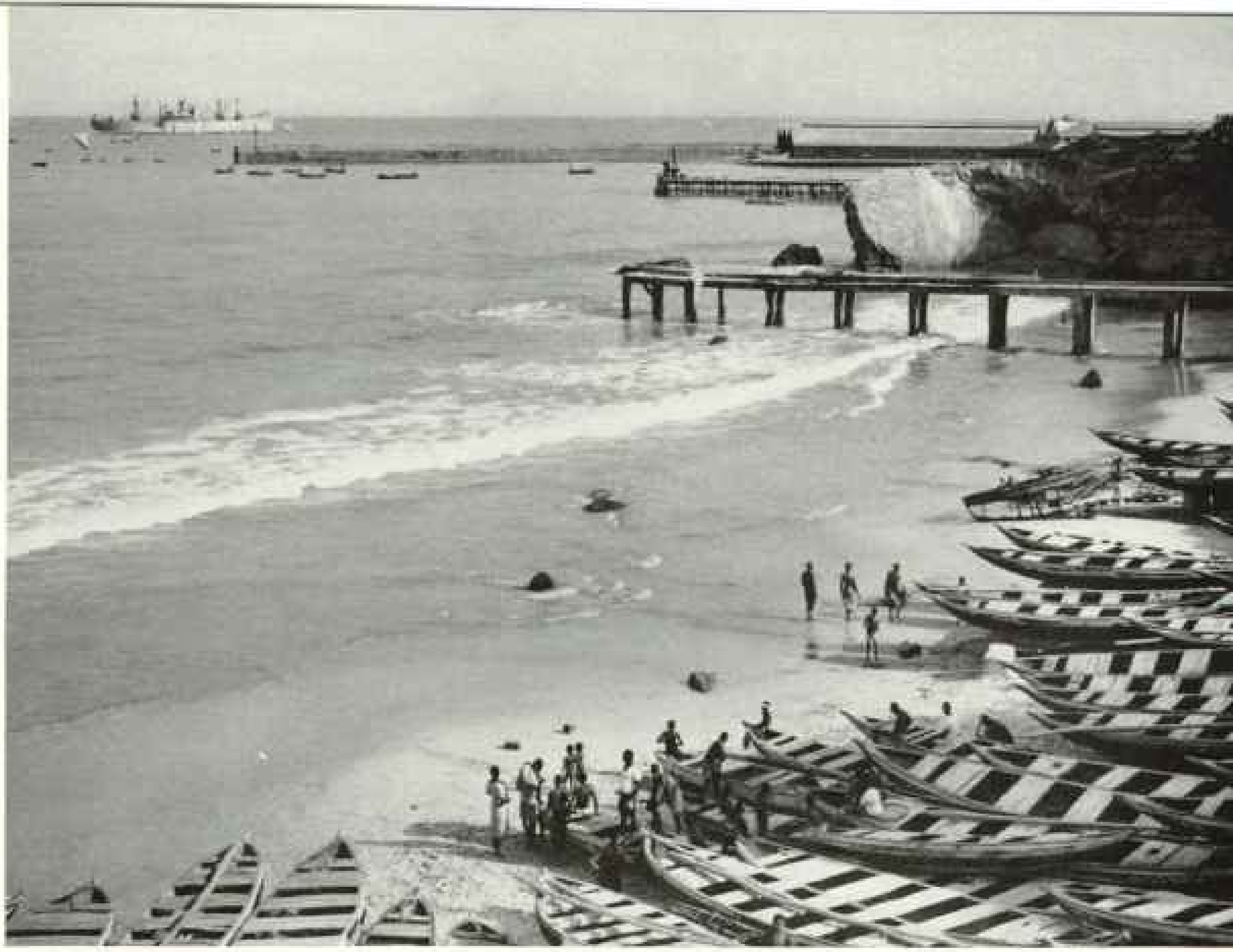
The slave trade was abolished by the British in 1807. Elmina, after centuries of bloody slaving history, passed peacefully, if anticlimactically, to Great Britain in 1872, by purchase from the Dutch. A year later, in its last military action, the castle was the target of an unsuccessful attack by Ashanti warriors from the north.

Elmina is a quiet place today, occupied by a force of some 300 mobile police under British command. These troops, their families quartered with them, are almost all Moslems recruited from the Northern Territories of the Gold Coast. Many were decorated for valor in World War II.

With troop inspection scheduled for sunup, bedtime came early at the castle. Our lullaby was the boom of surf on the rocks below, our alarm the dawn bugle.

Men in undress uniform streamed onto the paradeground as we crossed the moat with our hosts. Inspection was brief but thorough. At the risk of passing up breakfast, we remained to see the troops' setting-up exercises, in which the men of each tribe formed a circle and sang their war songs to the beat of clap-

George Abraham



Accra's Surfboat Fleet Ventures Out to Sea with Heavy Cargo for a Freighter

Sometimes lashed in pairs, the boats return with machinery, trucks, and other heavy goods (page 271). Here the paddlers pass Accra breakwater. Fishermen's canoes, sails aloft, cut across their path. Most fishing crews have already beached their seagoing dugouts. Wives and children wait for the stragglers.

ping hands, as each man took his turn dancing in the center. The sun, red and fat, came up out of the sea, and leaping bodies glistened in the early morning heat.

This was what we had come to see and record in Africa. Plugging into the jeep, we set the tape machine in the scanty shade of a lone palm tree. The singing troops increased their tempo. For this was something new to them, a powerful kind of white man's *juju* that became a magic delight when we finally called a halt, reversed the tape, and played their voices and songs back for them.

It was our first experience with the gaping awe that quickly changed to artless glee whenever we recorded and then played back the folk music of the tribes. We were to see this many times before the end of our music marathon; it invariably gave as much pleasure to us as to our listeners.

Hazards of Driving in Africa

One hundred and thirty road miles to the east, the candlelights and oil lamps of Accra were a welcome sight after we rode out an off-season tornado north of the city.

The unexpected, we discovered, is a standard driving hazard in West Africa, especially at night. Few African drivers have more than a slight sense of proportion about gasoline power or self-made obstacles in the roadway. Some miles from Accra, along a narrow passage between rows of soaring mahogany trees and cottonwoods, our lights found a large object directly ahead. We jerked to a stop. It was a native lorry, parked squarely in the middle of the road, lightless and seemingly abandoned.

"Driver!" I called. "Anyone here?" A shadowy bulk stirred on top of the lorry, and a man sleepily climbed down and stood blinking in the glare.

"Look here," I said, "where are your lights? Nobody see you if you don't have lights! That make plenty trouble."

"Lights?" he answered. "Massa, I got *fine* lights! Look, see!" He reached in and pulled a switch. The road lit up. He was right; he had fine lights. He switched them off again. "Yessah, Massa, I got lights." He was climbing back to his sleeping perch as we wormed our way past.

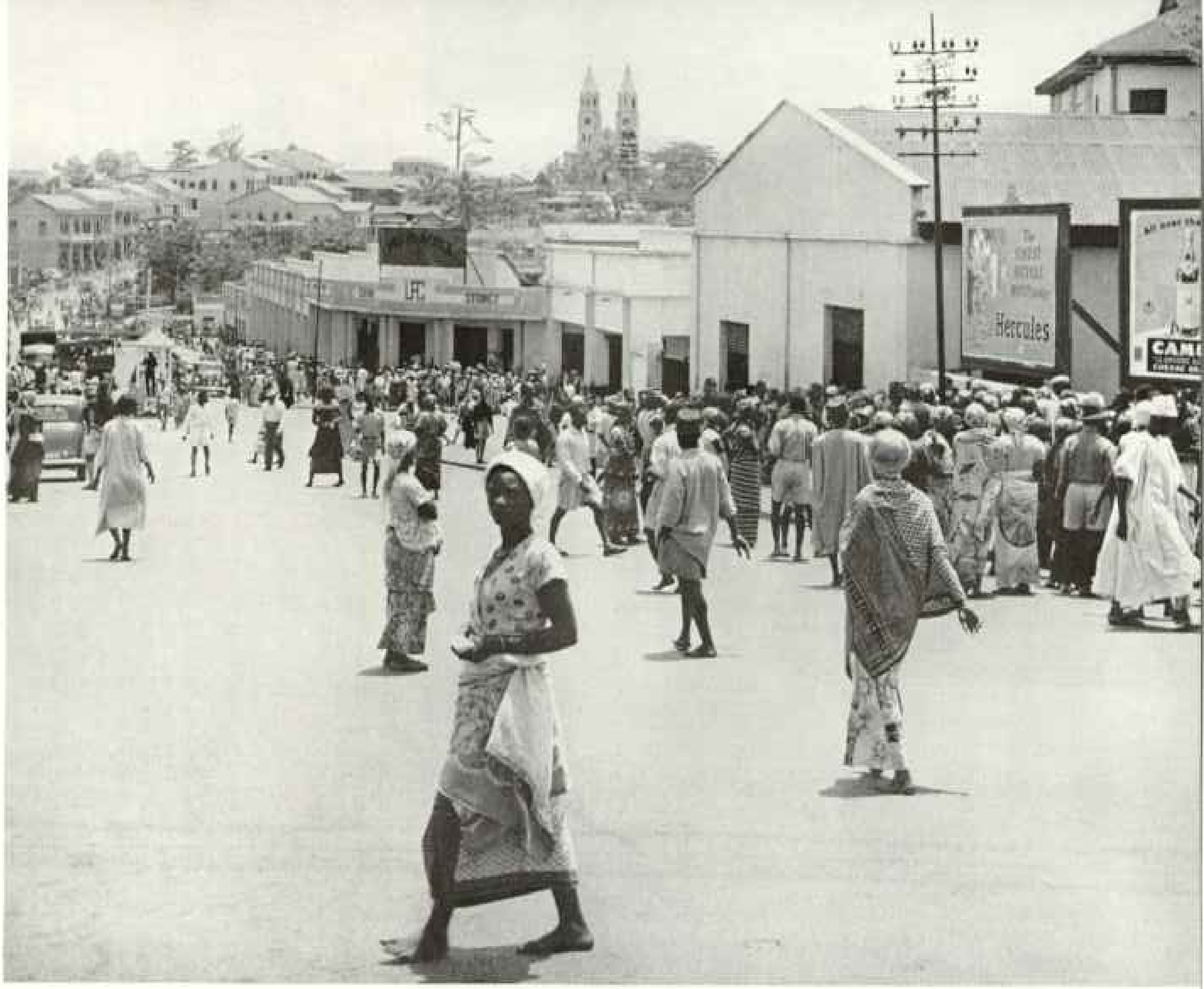
From daybreak until late at night, Accra is one of the most active cities along the

Dry-goods Sale Starts a Bargain-counter Rush in Kumasi

An African world's fair in miniature is the Kumasi central market. Here the shopper can find all the petty trade goods of the Gold Coast —combs, matches, tin funnels, bright beads, oil lamps, miscellaneous hardware and junk; as well as cheap khaki shirts and shorts turned out by male tailors hunched over sewing machines. One colorful section contains the cotton-prints market (page 271).

Some West Africans wear homespun blue-and-white cotton, but many prefer Europe's brighter, scarcer, and costlier prints, usually sold in 12-yard pieces. When a trading company offers such a lot, word of mouth quickly spreads the news, and bargain hunters gather by the thousands. Barefoot speculators, usually the first on the scene, snap up what they can, hoping to jack up prices several times.

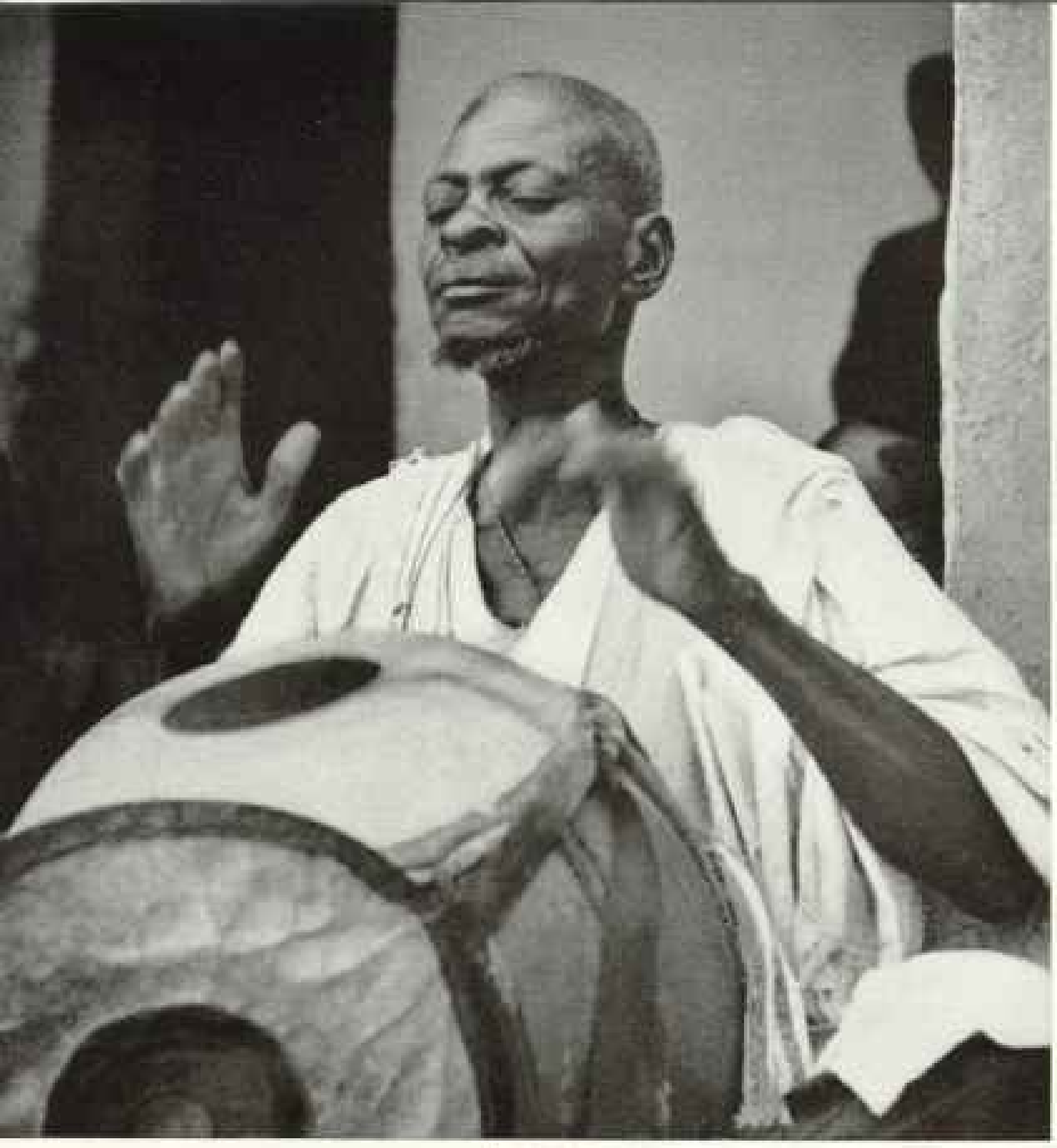
This buyers' queue waited outside the United Africa Company's store. Impatient customers, trying to cut into line, were chased away by police brandishing billies. Spectators, indifferent to the few cars and trucks, jaywalked across the street.



Atlantic's Surf and Cool Breezes Fan Apam, a Gold Coast Fishing Village 350 Miles North of the Equator

Expansive salt marshes hem in the settlement. Scores of fishing boats rest on the white-sand beach.

U. S. Air Force, Official



Prime Minister Listens to Earphone Magic

Words cannot describe the intensity of African music, but hundreds of records collected by the author are now making its qualities known.

Visiting Ouagadougou, capital of the Upper Volta, Mr. Alberts made recordings in the adobe palace of the Moro Naba, emperor of the Mossi tribe.

When the magnetized tape played back its frozen music, the court was almost speechless with astonishment. Even the emperor (right), clad in his state robes, was amazed, though he had a Paris education.

Here Mrs. Alberts (left) makes the recording. Four violinists play in concert.

The Americans felt smothered in the 130° temperature in the palace's shade. Their hosts, wrapped in layers of wool and silk, seemed comfortable.

Drum and Violin Praise the Emperor

Ouagadougou's gourd drums, strong and majestic, were so deeply vibrant they gave the author the sensation of a blow in the solar plexus.

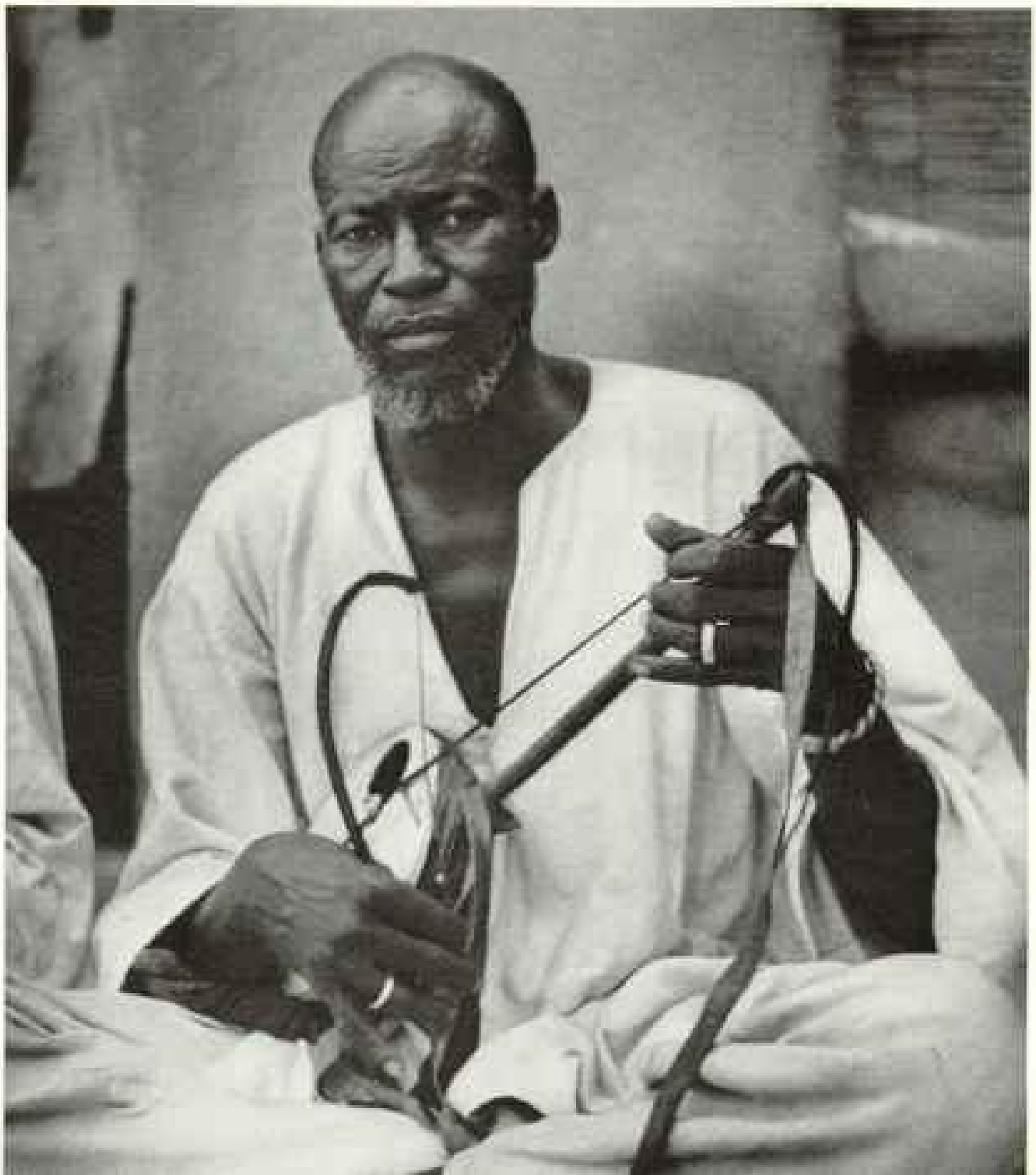
Using hands as drumsticks, this musician beats out the rhythm on an imperial drum. A goatskin is stretched tightly across the open end. The black circle, a thickened area, provides a second tone.

Variable-pitch, hourglass drums fill in with quicker rhythms.

The palace virtuoso bows a kind of single-string relic directly related to instruments found in Egyptian tombs. Its music, unlike that of other West African instruments, seems Oriental, especially when blended with Arabic songs of the palace vocalists.

Orchestra and chorus devote most of their efforts to booming out praise for their emperor (opposite).

The Mossi boast descent from a Nile River people. They are tall, thin, and long-headed; whereas their jungle neighbors are short, stocky, and round-headed.



coast. It is also one of the most cosmopolitan.

All races and tribes of West Africa meet at one time or another in Accra: Hausa traders from Kano; Fanti, Ga, Ashanti, Mossi, Ewe; Ibo houseboys from Nigeria, Kru boys from Liberia; men of Sierra Leone, the Ivory Coast, and Togo; cattle drivers from the French Sudan; an occasional Moor; and the families of most of these. They come and go by ship, by train from Kumasi, by native lorry, and by foot.*

Across the lagoon to the west is Korle Bu and its African hospital, one of many proofs of modern colonial interest in the native people.

North is Achimota, educational center of British West Africa. Patterned after the public school in England, Achimota was established to educate the African to be a teacher and leader of other Africans.

Accra's airport, a center of the vital trans-African supply route during the war, now accommodates a few passenger ships each week, and an occasional B-29 on a training flight from Germany.

Offshore from the city, an ever-changing, always-present fleet of merchant ships from everywhere stands beyond the shoals to take on new cargo and discharge the old. A hundred water bugs, each a 24-foot surfboat, do the loading job, as they have for the past 300 years, driving through the surf with any cargo from piled sacks of cocoa beans to automobiles (pages 263 and 267).

Accra's music is as diverse as its polyglot population. The African overtones of the calypso, samba, rumba, and blues rhythms give them a pulsing force that is rarely felt in their more polished Western forms.

Recording the music of the different groups presented only one problem. No African city is a quiet place, and Accra least of all. Extraneous noises have spoiled many a field recording; and we had no portable soundproof

* See "Dusky Tribesmen of French West Africa," 24 ills. in color, by Enzo de Chetelat, National Geographic Magazine, May, 1941.

Faithful Jeep Bore Author, Wife, and Equipment 6,000 Jolting, Unpaved Miles

Africans everywhere admired the car because it carried the white man's magic—a black box that played their own music back to them. Folding cots, mosquito nets, and blankets were stored on top. Only one spring broke during the entire trip. These French Sudanese, washing away a month's accumulation of red mud, earned prestige as well as wages by handling the Americans' wonderful car.

room. We finally located a thatched lean-to on the outskirts of town and used distance and the night air for insulation. The results equaled a studio off Times Square.

Tin Pan Alley Titles in Africa

We enjoyed the melodies and titles of the Nigerian Ibo dialect songs, which in many cases parallel the sentiments of Tin Pan Alley. Some of the translated titles are: "Who Is Beautiful Too Much, Everybody Love Them"; "Who Get a Lot of Money in This World, He Cannot Take It with Him When He Die"; "Man Want to Go to Steamer and He Be Late for Steamer and Man on Steamer Say, *'Why* You Be Late for Steamer?' "

Heading northwest from the coast with a first boxful of tape recordings, we beat our strenuous way toward Kumasi, capital of Ashanti Province. The African-owned cocoa farms on the way were a point of special interest.

Although some of the world's richest gold deposits are found in this country, its first product is cocoa. Today, however, the cocoa economy is upset by a widespread plant disease known as swollen shoot, the only known cure for which is the ruthless cutting-out of affected trees.

The road's thin coating of tar ended above Nsawam, 20 miles from the sea, and from there to Monrovia, more than 5,000 miles, it was a steady diet of red laterite, sand, or mud. Between cocoa farms green walls of tangled bush hugged the road. An occasional narrow footpath indicated villages near by. Giant mahogany trees pushed their foliage in high towers above the tangled growth below.

The great menace of the hinterland is the native "mammy wagon"—the modern mechanized jungle beast. Mammy wagons are light pickup trucks, equipped with stanchions and awnings, and enough mahogany planks to hold a tight-packed, double payload of passengers and baggage.

Their drivers, who have the stuff of jet pilots, know just one control: "Full speed ahead, and let the pedestrians fall where they may." When a warning comet's tail of red dust shows in the distance, wise men go off to one side and wait for the mammy wagon to pass, its wheels hitting the high spots, its

passengers hanging on like stunt men, and its trailer bouncing from side to side. Soon the dust settles, bush birds resume their perches, and it is safe to proceed—until the next time.

No respectable mammy wagon gallops down the road of annihilation without a motto of reassurance painted on front or sides for the benefit of driver, hapless passengers, or pedestrians (page 279). Such mottoes include these: "Fear Not, Death Comes Suddenly"; "Experience Is Essential"; "Don't Worry, God's Time Is Best"; "Who Knows the End?" and "Remember Thy Creator in the Days of Thy Youth."

Recorder "Steals" a Tongue

In addition to the tribespeople of the Ashanti country, tall, regal Moslems from the Northern Territories roamed the area. The tribal music of both groups, including Ashanti forest songs and ceremonial and talking drums, showed an abrupt change from the coastal strip near by, toward more primitive forms and delivery.

The proven magic of our recording machine became even stronger as we traveled away from the coast. One pagan tribesman, on hearing the playback of his voice and drumming, shouted the Twi language equivalent of: "It has stolen my tongue!" Eyes rolling, he danced stiff-legged around the recorder, menacing it with his short spear. After his exhortations had cast the "devil" out of the box, we pacified him by showing him his tongue in a mirror.

South of Kumasi, we followed lumber-camp trails deep into solid bush, to photograph the felling and trimming of giant trees. A team of loinclothed lumberjacks, perched above ground on a platform of poles bound with vines, takes about four hours to knock down a 3-foot-thick, 120-foot-high hardwood. The softer woods make easier cutting, but, except for dugout canoes, are used rarely.

Well off the nearest trail and 100 miles from the sea, were three natives leisurely carving a dugout from a fallen cottonwood tree with their primitive adzes. Sooner or later, it would be carried south to Cape Coast on a number of heads and eventually launched.

Close by, a big sapele tree came crashing to earth like a broken powerhouse chimney. Bushwhackers swarmed over the trunk, stripping it of vines and foliage with their razor-sharp knives. Sawed by hand into main sections, it was skidded out of the bush by tractor, for shipment to the coast.

The central bush is airless, suffocating, and malarial. We were soon off again, feeling deep respect for the handful of white supervisors whose work kept them there for 18 months or more at a time.

Kumasi is more than the capital and the crossroads of the Gold Coast interior. It is also the historic center of one of West Africa's most important civilizations. Under a despotic, blood-thirsty, slave-raiding system, which nevertheless set high cultural standards, the Ashanti were responsible for much of the intertribal warfare that kept this part of Africa in fear and chaos until they were pacified at the beginning of the present century.

Their last attempt to drive out the white conqueror took place in 1900, when the Ashanti besieged a small British force in Fort Kumasi, a mud-walled strong point of colonial authority which still stands on the hill above the city. *

The Ashanti today show little resemblance to their warlike forebears. Having turned their energies toward politics, trade, and agriculture, they are proving that in many fields new to them Africans can function as capably as their white counterparts.

One leading figure in this new Africa is the Hon. K. A. Korsah, Justice of Kumasi district. A distinguished public servant, impressive in the traditional red robe and powdered wig of the British bench, he enjoys the admiration and respect of the colonial administration as well as of his own people.

Kumasi Market an African World's Fair

Kumasi's central market is one of the largest in the Gold Coast. Here, shown to a casual public in orderly rows of booths, are all the petty trade goods of the area (page 268). Judiciously located in a separate street of its own are pungent piles of dried and smoked fish of many varieties. Other fragrant delicacies compete with the deadly aroma of fish in speeding the uninitiated on their way.

Here, too, occasional examples of an old Ashanti art may be found, the geometric gold weights and so-called "proverb" weights, illustrating the varied activities of the tribespeople, and cast in bronze by the *cire perdue*, or lost wax, method.

These weights were once in common use among the Ashanti for weighing specific quantities of gold dust, in a kind of African Bureau of Standards. Such examples of the Ashanti art, as well as the magnificent bronzes of Benin, in Nigeria, were being cast in this manner by these "savages" at least as long ago as the 15th century.

Off to one side of the market, in a section all its own, is the highly colorful "gray" market in printed cotton cloth. These unusual prints, produced in Europe for the African trade, are prized by all non-Europeanized

* See "Revolt of the Ashantis," National Geographic Magazine, June, 1900.

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Gold Coast's Elected Representatives Hear the Acting Governor Speak

Accra's English-speaking Legislative Council, familiarly called Legco, demonstrates the natives' strides in democracy. Here, at the 1949 opening session, the British acting governor faces African clerks, legislators, tribal chiefs (left), bewigged justices, military aides (in white), other dignitaries, and visiting wives.

natives as the sartorial equivalent of Brooks Brothers or Hattie Carnegie.

Always in short supply since the war, the cloth is quickly gobbled up at the European trading stores by barefoot speculators.

Despite all this activity, Kumasi was comparatively quiet at night. Whatever the cause, this rare silence helped simplify our recording of local music.

When musicians gathered after dark inside the high walls of our compound, our audience was limited to a few inquisitive heads jutting over the brickwork, like coconuts with round, white eyes.

This was to be the last private session with our musical juju. In French West Africa we and our recording musicians were to play to audiences of as many as five thousand.

Some days after leaving Kumasi, we were checked out of the Gold Coast at Sunyani, 80 miles up the line, by the district commissioner, who offered us a mild warning. "T'ief men," it seemed, were in the vicinity, and we would do well to be wary in the desolate area as far as Bondoukou, our gateway to the Ivory Coast. At the same time, he cautioned, it would be against British law to use firearms, even in self-defense, before first being attacked with an equivalent weapon.

Followed by "T'ief Men"

Before long I realized that we were being followed. A small black sedan cruised at a constant distance to our rear all morning and into the afternoon, slowing and stopping when we did. At one stop I could make out a pair of Africans in native robes. Here, apparently, were the DC's "t'ief men"—tribal highwaymen in a modern getaway car. I said so to my wife.

"Looks as if we'll have to break British law," she said. I doubted it. Stopping the jeep abruptly, I stepped out and walked toward our pursuers, feeling foolish about the whole thing. They were closer now; I could see what looked like a shotgun barrel, but could have been a broomstick, behind their windshield.

King of Ashanti Tribes Pays a State Visit to the Gold Coast's British Governor in Kumasi

Descending from the dais, the Asantehene, or paramount chief, wears a gold-and-silk gown. Rattles on ankles and wrists indicate his authority. The royal umbrella awaits him. Prized possession of the Ashanti is the Golden Stool. Legend says it is of divine origin, and it is believed to contain the soul of their nation. Warring over its possession, the Ashanti besieged a British garrison in Kumasi half a century ago.

Suddenly, they backed, turned, and took off in the opposite direction. Whether we were mistaken, or because I had ostentatiously slipped cartridges into my carbine, we were free to proceed without benefit of escort.

The border between the Gold and Ivory Coasts is more than a line on a map. Almost instantly, the country becomes more rugged, the people more primitive in appearance and custom, the men more inclined to let their womenfolk do the heavy work while they, as heads of families, take the responsibility of heavy thinking and palaver in the shade.

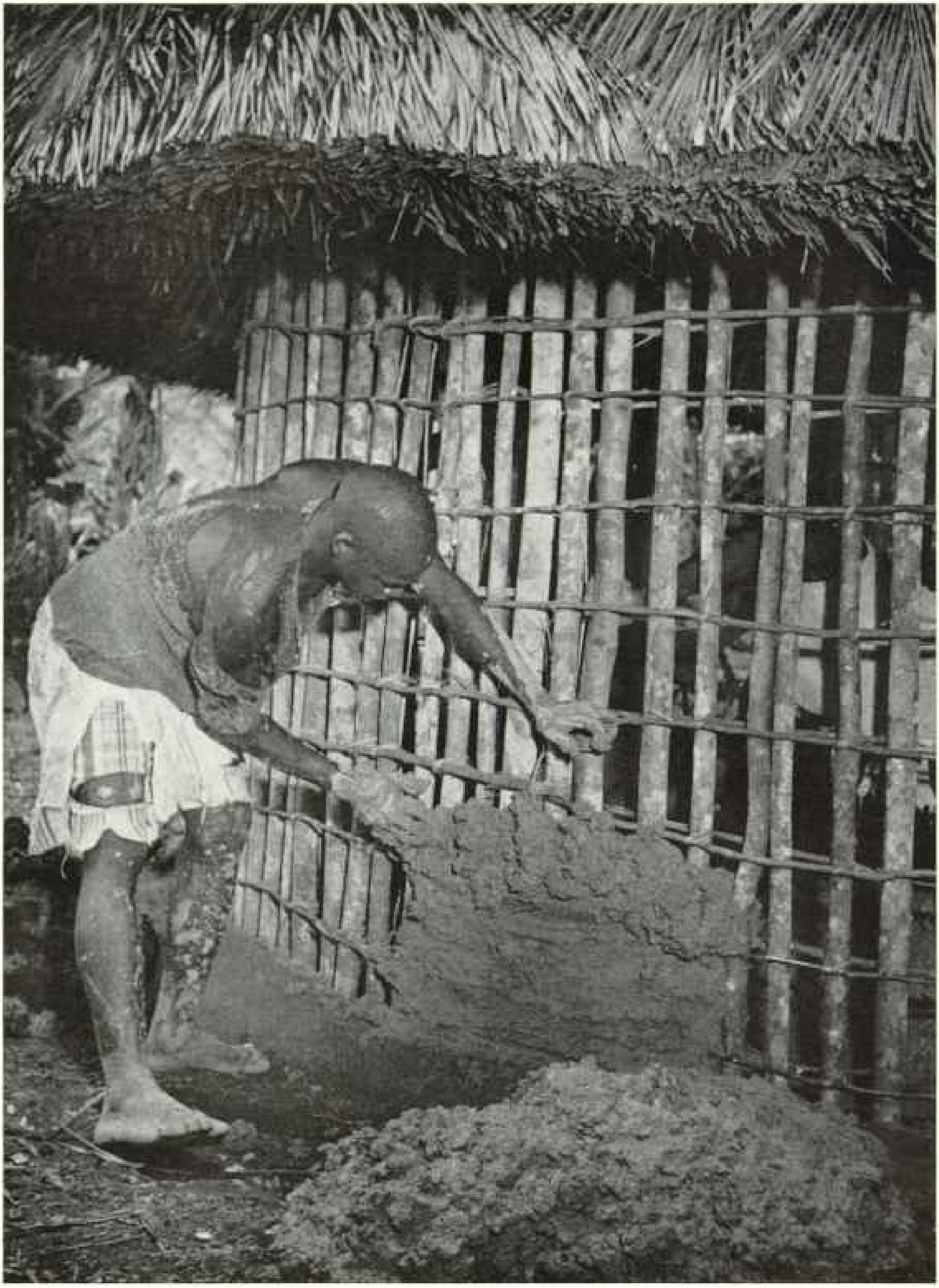
Here, too, thatch replaces the common tin roofs of the Gold Coast, and people dress less gaily, for want of good cloth, but their shaded villages reflect the landscaping policy of French colonial administration.

At Bondoukou, a Moslem village of Sudanese architecture, we were advised by the French commandant of the district that we must go off our course 300 miles south to Abidjan, capital of the Ivory Coast, in order to enter the country through proper channels. It came as a blow. Determined to get it over with as quickly as possible, we were off toward Abidjan at sunup.

Travel along the eastern Ivory Coast was bushbeating at its worst. This was rough, hilly country, a perfect cover for the cloth, cigarette, and whiskey smugglers who frequent the wild border areas.

Beyond, among the widening hills, were large cocoa and coffee areas. Columns of smoke rose high above the forest, where local tribespeople were burning off tracts of bush to prepare their farms for the next rainy season. Once cleared, the still smoking soil, black with decayed vegetable matter, is neatly hoed into ridges and hills to hold seeds and seedlings above the flooding rains.

The jungle track we followed to Abidjan was a nightmare of frustration, suitable for elephants but not for jeeps. Curving narrow gullies were cut as deep as three feet in the lumpy road surface by the rains of many



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Thatch, Poles, Vines, and Mud Solve the Jungle Housing Problem in Cocopa, Liberia

Fearing drafts and wild animals, the builder leaves only one narrow door. Cooking smoke filters through thatch, disturbing snakes and rats. Plaster comes from towering "bug-a-bug" hills, homes of termites. Mud and water mix beneath bare feet of dancing workers. Total labor: two man-weeks.

years. Streams were bridged by hand-squared logs stretching from bank to bank, with frequent gaps to catch a straying wheel. Fallen trees were roadblocks to be skirted precariously. Deep pot-holes gave the jeep a camellike motion.

Plainly, this country was not made for the Western sacroiliac. We envied the easy progress of natives on their way to market, women with loads on head and arms free, men walking ahead unhampered.

Close to Abidjan were the first signs of organized European activity in this rich agricultural country. Here the jungle was rooted out; rows of cultivated banana trees covered the rolling hills. Juicy pineapples grew on other plantations. Such large-scale agriculture may some day help feed land-poor European nations.

Abidjan itself, seat of the Ivory Coast government, appeared pink, new, and overcrowded with French government servants, small businessmen, and their families. The city is a fine example of French African architecture and colonial administration. With its sidewalk cafés, bicyclists, tree-lined avenues, and general air of informality, it is not unlike a metropolitan French town of the provinces.

What Evil Spirit Dares Penetrate Mask of White Clay?

Timid Ewe girl clutches mother's knee in fear of the staring eye of the author's camera. Having suffered a cold, she is treated with white clay, African equivalent of a rabbit's foot. Glass beads form a G-string, worn on the streets of Ada village, Gold Coast.

With our entry into French West Africa now officially correct, we lost no time in heading north again, into Baoulé territory. More than 200 years ago, the Baoulé left the parent Ashanti tribes and settled in what is now the French side, after conquering the local inhabitants.

A peaceful people today, they are not as advanced as are the Ashanti under British rule. Largely pagan, they are producers of cocoa and coffee, and are forgetting the fine wood-carving and bronze-casting techniques in which they once took pride.

It was among the Ivory Coast Baoulé that we recorded the most purely primitive music of our entire trip. At one village in the central bush, a combination of circumstances evoked the kind of uninhibited, uninfluenced drumming and group singing and chanting that has been largely lost to the coastal areas.

Twins a Bad Omen

The morning of our arrival a woman of the tribe had given birth to twins. This, a cause for rejoicing elsewhere in the world, produced only dismay and heated palaver among chief and elders. These Baoulé look upon twins of the same sex as mildly suspicious; these were a boy and a girl, clearly full of bad witch spirits, and therefore downright calamitous. No one questioned that the boy, on reaching

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Top Hat, Tails, Shorts, and Sneakers Glorify a Town Crier

Ringing his bell, the young Ashanti calls attention to a demand for wider home rule. His handbills advertise a political rally in Kumasi, Gold Coast.

maturity, would kill his father out of witch-inspired jealousy, and the girl, her mother.

When the palaver was finished, they buried the newborn twins alive.

After this close brush with the spirits, a full yellow moon that night intoxicated the jittery tribespeople. There was more to come, although no one expected it, an eclipse of the moon and a final attack by evil spirits.

In the afternoon we had paid the customary courtesy call on the village chief. A Bacchuslike figure of jungle wisdom and dignity, he sat in the shade on his crude stool of office, his cotton-print cloth draped loosely around his ample belly. With the help of the village elders, he was coming to a serious decision. The subject at issue was chickens: which one of several trussed-up, squawking chickens would make the most effective sacrifice to propitiate the low-flying spirits of evil.

Music Box a Weapon Against Devils

After promising a fine gift to the chief's subjects, we described the powerful magic of our music box and offered to place it at his disposal that night, as an extra weapon in the local anti-devil arsenal.

The moon was up when we returned. The village, en masse, was grouped around a battery of square and round Baoulé drums in a chorus of musical exhortation calculated to make even hard-of-hearing devils sit up and take notice. Dancing women and drummers were black rhythm against the light of blazing bonfires. It was a far cry from a masterworks sound-recording studio.

We played back the first reel of tape for all to hear; the loud-speaker was

A Gold Coast "Mammy Wagon" Carries the Driver's Favorite Slogan in Boxcar Letters

An ordinary pickup truck fitted with mahogany-plank seats and attached to a two-wheel trailer becomes the West African mammy wagon. Humanity and its baggage, including caged chickens, pack every inch of space. Knowing no speed limit, recognizing no curves, the driver is more dangerous than the leopard, but he solaces his victims with signs such as "Fear not; death comes suddenly," or, "Who knows the end?" (page 272).

drowned out by high cries of astonishment and simple joy at the miracle. Then chants and drums took up again at redoubled tempo, with changing rhythms merging and parting in the individualism of jungle bebop.

Hours later, when the singing had reached a peak of intensity, the chief, who had been taking the celebration calmly enough, suddenly stood and pointed dramatically at the moon. Those devils were back again!

As the earth's shadow swiftly put out the light of the moon, there were, first, awed silence, then a few scattered wails and shouts and, finally, when the bright crescent of the moon reappeared, a rush of exultant rhythm that marked final triumph over the spirits of evil.

In this nightlong jamboree we and our potently magic music box were on the side of the angels, equaling and duplicating the polyrhythmic drumming, chants, and exhortations. All in all, it was truly an exhibition of powerful juju.

We, too, were beginning to be plagued by evil spirits. Several days before, pushing our way along a particularly desolate and especially brutal section of bush trail, one of our tortured rear springs suddenly gave up the ghost. A brief inspection showed us heeled over like a sinking ship. The nearest village that might produce a mechanic of sorts was 50 miles to the north. It was mid-morning. By nursing the jeep along, we got there by dark.

The lone white man in Toumodi was French. More important, he was a professional mechanic. In his open-air garage, which he shared with a group of native coffee-bean sorters, he looked over the damage. His low whistle was eloquent.

Plainly, nothing could be done that night. Could we spend the night in the village? But yes, there was a government resthouse.

Borrowed Lodgings

A quick visit revealed that no one could sleep in the resthouse except the snakes, bats, and vermin with which it was infested. Was there, perhaps, a mission in the village? But of course! Only, the missionary had gone with his wife and children two weeks before to Kankan, across the world in French Guinea.

Although the front doors of the mission house were locked, the back was not. It seemed like a big improvement over native thatch and airless mud walls. A host in absentia would be better than no host at all.

With a silent apology for the intrusion, we set up our cots and spent a pleasant night under a luxurious tin roof.

The morning sun of Africa has a way of solving many problems. After a good breakfast, we returned to the garage. The mechanic was smiling now, two African boys were busy with wrenches, and the jeep no longer drooped.

No, we would not need to send to Abidjan for parts. Our French friend had cannibalized his own pickup truck, taking leaves from his springs to replace our broken ones. It was a high point in Gallic hospitality, and our jeep was fit for active duty again.

The potentially rich Ivory Coast, long a neglected area in the French African empire, is beginning a policy of postwar development.

Cotton Mill in the Bush

Deep in the savanna bush, north of Bouaké, this change shows itself in the form of a modern cotton processing and weaving mill, employing local labor under French management. Its massive, tin-roofed factory buildings are an anomaly on the tropical landscape. The mill winds native-grown cotton into thread, and dyes and weaves it into brightly patterned cloth for distribution throughout French Africa.

The mill draws its all-male labor supply from a near-by aboriginal Moslem village. Here a Moslem elder and his lone assistant were putting the finishing touches to a brand-new mosque which, for form and ingenuity in construction, has few equals in West Africa.

We came blinking out of the dense forest belt. The Ivory Coast lay behind; this was the Upper Volta, a colony embracing the broad area north of the Gold Coast and south of the big bend of the river Niger.

The bush, no longer green and comparatively cool, now shimmered white with dry furnace heat from which there was little escape. Dwindling trees offered occasional shade. Villages were few.

This, the game charts said, was elephant* and lion country. But after several days of searching the empty scenery, it seemed to us that most of West Africa's big game had been taken off to the zoos. "The only animals here are on the map," said my wife, with some justification.

At that point we almost ran down a baboon. Jaywalking in front of the jeep, a bunch of bananas in its doglike mouth, it vanished into the tall grass. Other baboons came up to race the jeep, diving into the bush and returning to the open roadside. Antelope walked carelessly through the grass. We saw no lions, but were satisfied.†

A few miles south of Bobo Dioulasso, cross-roads of the Upper Volta, the Falaise de Banfora, a broad, rocky escarpment, rises high above the savanna. Here, almost without transition, was a different Africa, a transition in itself to the barren wastes of the Sahara to the north. Almost treeless, supporting little more than scrub grass across its infinite flatlands, this is the subdesert area of blinding heat and minimum humidity.

Bobo Dioulasso is the heterogeneous metropolis of Upper Volta Territory, a city of brown mud and dazzling white stucco which sits on the end of the single-track, narrow-gauge, wood-burning railroad from Abidjan. The bulk of its white population is comprised of shopkeepers, traders, truck drivers, restaurateurs, mechanics, and professional men, in addition to a liberal scattering of civil servants. As in Abidjan, we saw that a community of French colonials, unlike the British, closely represents a cross section of a like community in metropolitan France.

The tall, long-headed, long-gowned natives are Moslem and pagan, with a small number of Christian converts. Their desert-style mud quarters adjoining the "white" city have changed as little in the past hundreds of years as has their manner of dress.

Their women set a high standard of dark beauty, their stiff, upcurving braids topped by squares of gaily printed cotton tied in back and draped to give an almost Parisian effect. The immaculate, intricately embroidered gowns of Moslem traders stand out among the grubby loincloths of laborers. The children, as usual, appear in various stages of nakedness.

Bobo Dioulasso is, most of all, the city of a thousand balaphons, the ancient percussion instrument from which our xylophone and marimba are derived.

Combining sophisticated elements of African rhythm and melody, the balaphon has long been a favorite native instrument throughout the Niger belt.

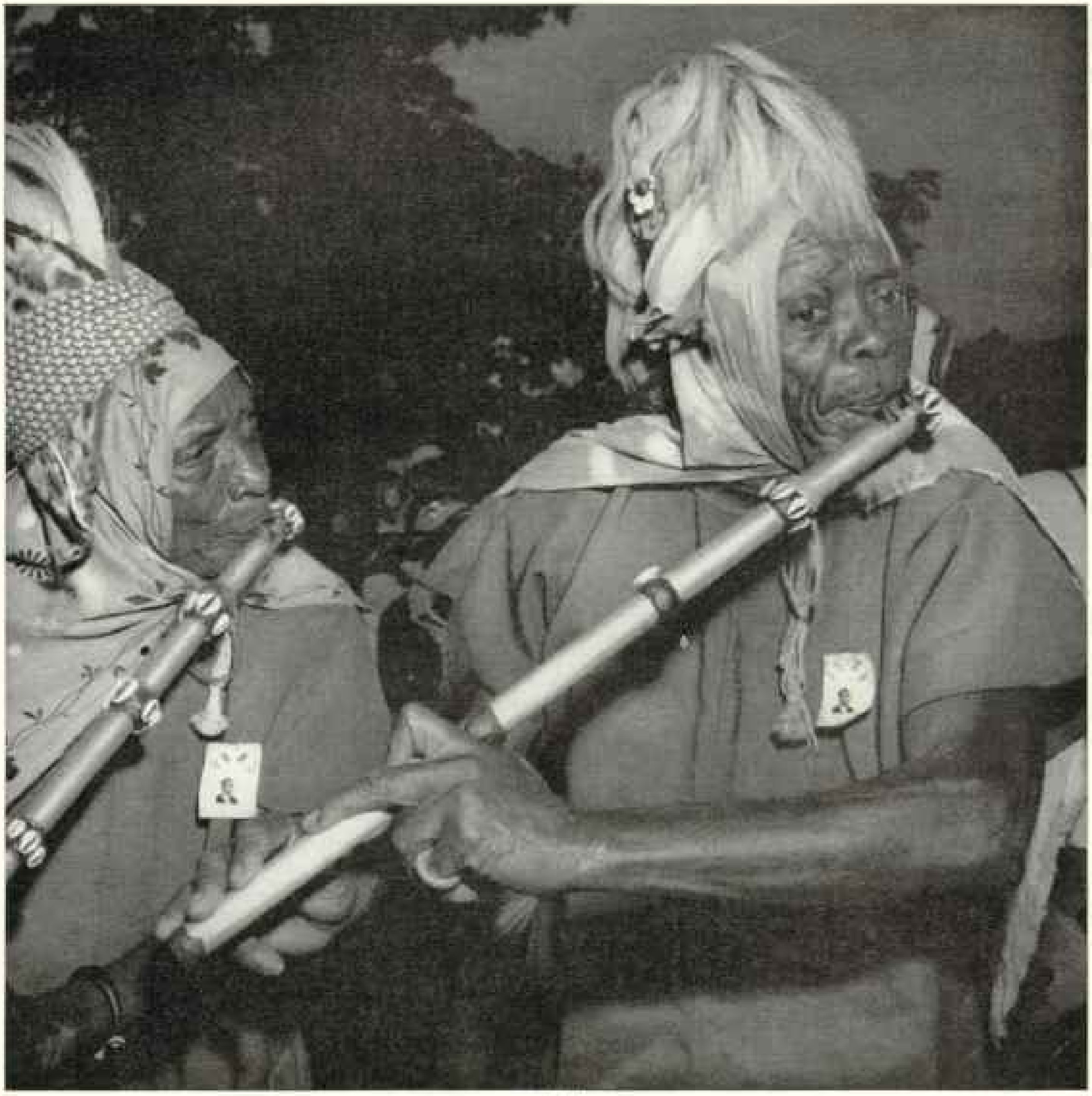
African Jam Session

Twenty-four hours a day, with a partial diminuendo during the extreme midday heat, its sometimes tinkling, sometimes clanging tones, often accompanied by the nasal voices of the area, fill the air of Bobo Dioulasso. Cruising the lumpy paths of the native city, we made friends in the hot-box adobe native dance houses, and made our recordings in the less stifling night air outside.

This kind of music was a free-for-all African jam session, with each balaphon

* See "Africa's Uncaged Elephants," 14 ills., by Quentin Keynes, NATIONAL GEOGRAPHIC MAGAZINE, March, 1951.

† See "Roaming Africa's Unfenced Zoos," by W. Robert Moore, NATIONAL GEOGRAPHIC MAGAZINE, March, 1950.



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Kissi Warriors in Lion-mane Wigs Blow Bamboo Flutes and Simultaneously Hum the Tune

These French Guinea men, last survivors of a Kissi army which fought the French half a century ago, claim 80 years. Both wear photographs of a tribal representative in Paris. Their flutes, studded with cowrie shells, produce melodies sometimes almost European in feeling.

player taking his turn at dominating the others in the group. As usual, our playback of their music served as a catalytic agent that brought out the best they had to offer. Even the audiences, normally raucous, were still, as players' wrist rattles and hammers flashed in the torchlight.

Then Lizahbet' drifted in from somewhere in the pagan quarter, and a form of musical discipline took over. Lizahbet' was a roving chanteuse of local fame, whose cocky manner announced to all and sundry that recording was made to order for her.

In honor of the visitors from America, Lizahbet' wore her brightest finery, a pink rayon slip from shoulders to hips, above the conventional wrap-around skirt. This Western touch clearly showed her superior status in a community where laissez faire above the waist is generally acceptable.

A Case of Mike Fright

At the crucial moment, nevertheless, Lizahbet' provided us with the first and only case of pure mike fright we saw in Africa. Her song choked in her throat; she made several false starts, giggled nervously, and tried again.

It wasn't until my wife stepped in, took her hand and encouraged her to go on that Lizahbet' slowly overcame her fear of the

microphone and was a confident glamour girl again (page 264). The crowd, which had snickered at her moment of weakness, was now with her all the way.

Not far from the pagan quarter was the sleepy café of the Hotel du Palais, whose habitués had apparently been in Africa too long. As we sat there one afternoon, waiting for darkness and a recording session with a group of pagan musicians, an ostrich walked by.

Alone, head high, it shambled along with the air of a serious-minded citizen out for a quiet afternoon stroll. It was a fascinating sight, but only for us. No one else bothered to look up as this fine-feathered pedestrian continued slowly around the bend.

The true test of the traveler in Africa is made whenever his fuel tank is filled. This is no simple operation in a land where even hand pumps are few and far between. Gasoline is customarily poured from the 54-gallon drum in which it comes into a topless 20-liter can which serves as a measure, and thence, preferably through a filter funnel, into the tank itself, with the loss of one liter out of four.

Night Travel to Escape the Heat

Gassing up for the long pull to Ouagadougou, 250 miles to the northeast, was, as usual, a one-hour trial in the sizzling midafternoon sun. There was considerable African hilarity when we solved the waste problem by elevating a smaller can of precious fuel and siphoning it into our tank through a somewhat porous length of old rubber tubing.

Because of the heat, we were now traveling almost entirely at night, taking off after midnight to arrive at our destination before the sun was high.

As we rolled into Ouagadougou, administrative seat of Upper Volta and capital of the far-flung Mossi empire, a long tail of swirling dust followed our wheels down the broad, unpaved streets. The whole mud-built city shimmered in the dancing waves of superheated air.

Ouagadougou lies some 300 miles south of Timbuktu (Tombouctou) and the upper bend of the Niger River. Far from the sea and the nearest railhead, its place is nevertheless justified as both a mid-African crossroads and a political center.

We made our special excursion into this inferno, away from our ultimate destination in Liberia, to meet the Moro Naba, powerful emperor of the Mossi tribes; and, if possible, to record the unique music of his palace orchestra.

The Moro Naba greeted us with all the courtesy of a king. Welcomed to the large Moorish-arched palace which he prefers to the modern house built for him by the French Government, we were promised a concert by the court musicians.

Educated in France, the Moro Naba is familiar with many of the gadgets of the West. Even he, however, was impressed with the tape recorder when the music of his Mossi musicians was played back to him. Dressed in a brilliant robe of green and gold brocade, and flanked by his ministers in equally colorful robes, the Moro Naba evoked a picture of African civilization that is, perhaps, too little known in the United States (page 271).

The round calabash drums of the palace orchestra were not as tall as the barrellike war drums of the Ashanti, but their pitch was the rumble of slow thunder. High above the drums was the un-African, definitely Eastern wailing of the section of one-stringed Mossi violins.

This instrument has come down through the ages virtually unchanged from ancient instruments played in Egypt, a thousand years and more before the birth of Christ (pages 270 and 271).

Ouagadougou was the turning point of our continuing search for the varied music of West Africa. We now prepared to head generally west, out of Upper Volta and across the Sudan, then south through French Guinea and Liberia.

We left late at night, grateful for the cool breeze. There was thunder in the distance, and lightning played among the gathering clouds. Abruptly, the road was hidden by a driving dust and sand storm which soon gave way to a gusty, torrential rain from the east. The hard earth filled with water, and little rivers cut channels across the roadway.

African "Cold Wave"

In half an hour the temperature collapsed to 60°, a bitter change after many weeks of fever heat. Angling the jeep with its back to the storm, we wrapped ourselves in a blanket, shivered, and slept.

The sun was up when we awoke. Roadside lakes were diminishing, and, by the time we had cooked a hot breakfast, we could travel again. Ahead were the soft balaphons of the Sudanese Bambara, the banjos, harps, flutes, and minstrel singing among the Kissi of French Guinea (page 281), the tribal music of Liberia, and the fascinating English-language ballads of Monrovia. The music of West Africa is indeed as diversified as the country and its people.

For additional articles on the area traveled, see "National Geographic Magazine Cumulative Index, 1899-1950."

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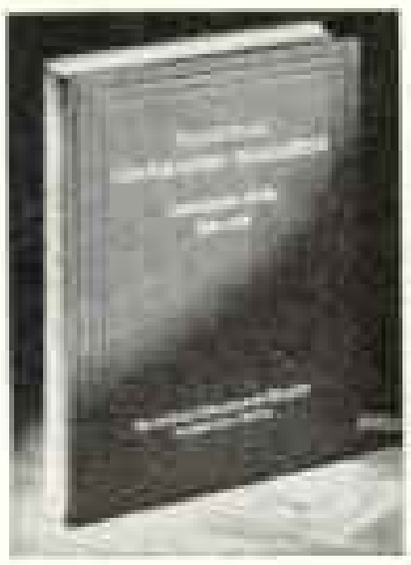

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An allergy is a disorder or a *sensitivity* which some persons develop to normally harmless things like pollens, foods and dust. Many other factors may also be involved, such as chemicals, bacteria, etc.

The discomforts that occur when these trouble-makers come in contact with sensitive tissues are believed to be caused by a chemical called histamine. This chemical is apparently released by the body's cells in such large amounts that the tissues themselves are affected and their normal functions upset. This results in sneezing, skin rashes, digestive upsets, and a variety of other discomforts.

Today, treatment for all types of allergy is becoming increasingly effective. There are diagnostic tests which help doctors identify even quite obscure causes. In addition, there are also new drugs which aid in controlling many allergic symptoms.

1. If you have an allergy, ask your doctor about *the antihistamines*. When administered under a physician's advice—as they must be, since they are toxic to some degree—they often give rapid, though *temporary*, relief.

The antihistamines are especially beneficial in those allergies which are caused by substances that are inhaled. For best results, however, these drugs should be used along with other measures designed to give more lasting relief.

2. If you have hay fever, the doctor may recommend that desensitizing treatments be given early in the year, long in advance of "the hay fever season."

This helps build up protection and enables many patients to go through the season with little or no discomfort. Prompt and proper treatment is desirable, as studies show that persons with untreated hay fever often develop asthma.

3. If you suspect a food allergy, consult your doctor about diagnostic tests which reveal foods that should be avoided.

Authorities caution against self-prescribed diets to relieve food allergies, because essential foods may be unnecessarily omitted.

It is especially important to follow this safeguard in infants and children who have digestive upsets or skin rashes thought to result from eating certain foods.

Emotional difficulties have been found to play a part in allergy disorders. Consequently, doctors may study the patient's background in an attempt to find and clear up emotional situations that may lead to more frequent or more severe attacks.

Today, through prompt and proper treatment—and *complete* cooperation between the doctor and the patient—most allergy victims can be greatly helped.

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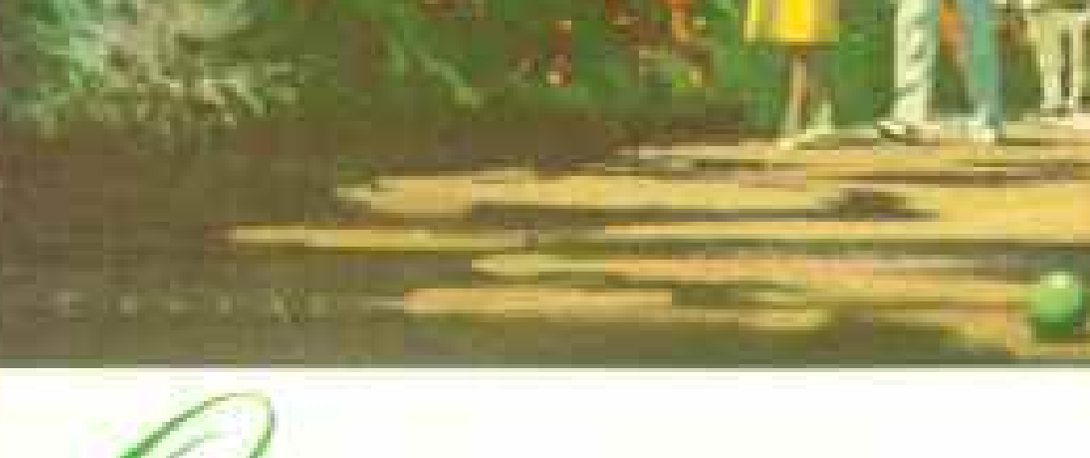

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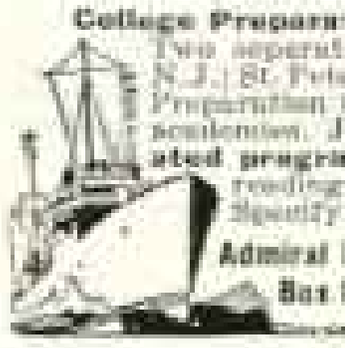

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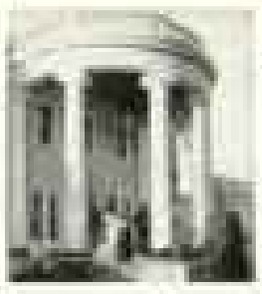

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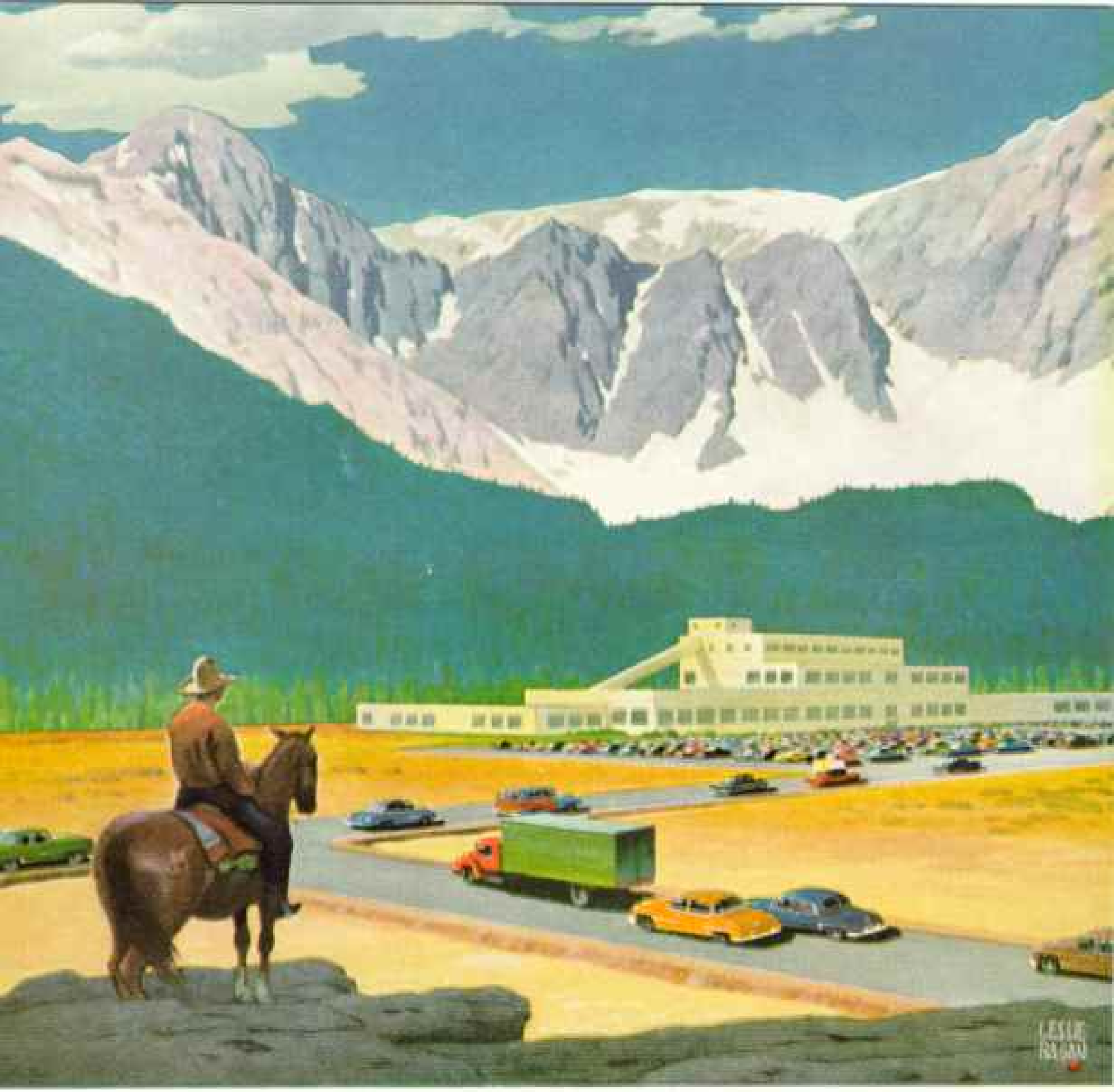

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