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CONTENTS

SIXTEEN PAGES OF ILLUSTRATIONS IN FULL COLOR

"Nakwasina" Goes North

With 24 Illustrations and Map

JACK CALVIN

Nature's Scenic Marvels of the West

17 Illustrations in Duotone

The Eagle, King of Birds, and His Kin

With 23 Illustrations

ALEXANDER WETMORE

Eagles, Hawks, and Vultures

48 Portraits in Color from Life

MAJ. ALLAN BROOKS

Secrets from Syrian Hills

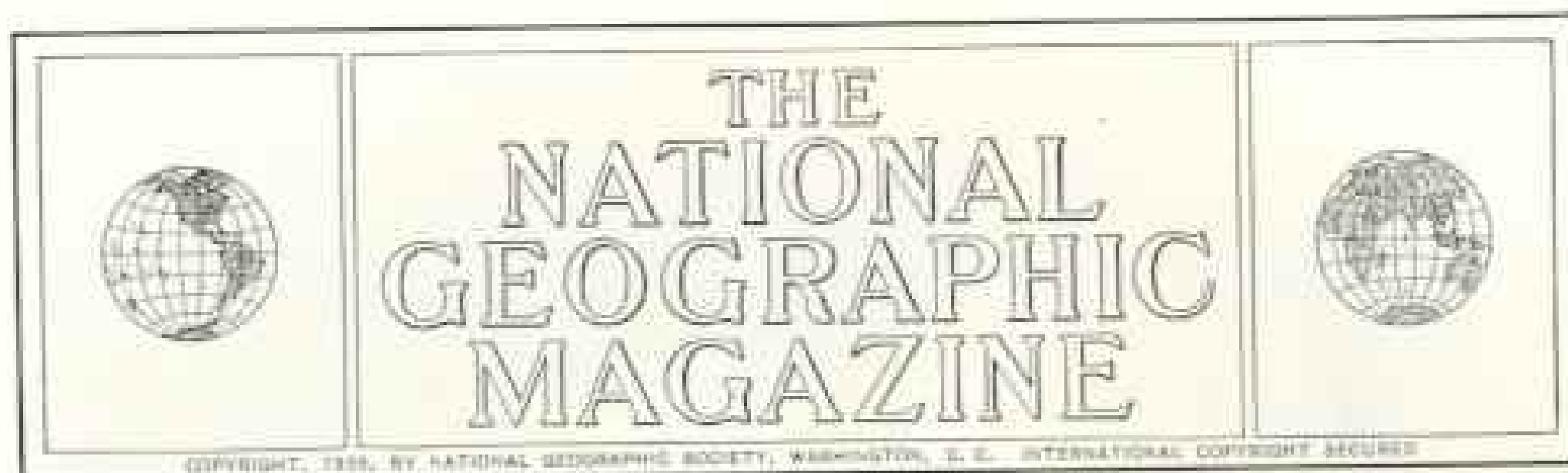
With 40 Illustrations and Map

CLAUDE F. A. SCHAEFFER

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“NAKWASINA” GOES NORTH

A Man, a Woman, and a Pup Cruise from Tacoma to
Juneau in a 17-Foot Canoe

BY JACK CALVIN

With Illustrations from Photographs by the Author

WHO would not go to a country where The Eye Opener winks across twenty-five miles of water and mountain at Dry Island?

Who could resist the delightful agnosticism of No Use Ledge politely questioning Yes Bay? Or of Howkan snorting at Restoration Cove, more pleasingly called Tsekwai? What dabbler in philosophy could not meditate for hours on the waters of Celestial Reef or off Khayyam Point? And a confirmed wanderer could but find incentive for farther wanderings in Danger Point, Misery Island, Turnagain Island, and Stop Island. If one is hungry, there is Ham Island, Tongue Point, and Dinner Rock, with Gorge Harbor as a warning of the possible result.

JUST FOR “THE FUN OF IT”

Could anyone resist the lure of such names, especially when to them are added thousands of place names drawn from the languages of every maritime nation in the world? Sasha and I could not. Neither could we check our round-eyed admiration for the Willits Brothers' canoe. The combination was irresistible. We would paddle up the Inside Passage to Alaska.

There was no motive for our voyage except the fun of the thing. But try to tell that to a fisherman or a homesteader!

“Are you doing it on a bet?” they asked, the while they filled *Nakwasina* with fresh vegetables, when they had them, and canned foods. “Is this a one-boat race? Is some magnate offering a \$25,000 prize?”

A few were more outspoken. “Say, are you shipwrecked, or do you belong to a suicide club?”

It was always the apparent danger of the cruise that first impressed the many friends we made along the way. Actually, there was no danger. We are ardent enthusiasts for our own make of canoe; but, in fairness to the waters of the Inside Passage, we must admit that any sound and seaworthy canoe could make the trip with almost equal safety.

There were many exciting and exhilarating moments, to be sure, but never one when we felt in danger of losing our lives or equipment. Our precious cameras usually lay on the carpet in the bottom of the canoe, and they did not even get wet.

Nor did we often wait for weather. If we had, we would still be in lower British Columbia. At Nanaimo, a favorite port of entry for American yachts, we were held up for five days while a howling nor'wester lashed the wide waters of Georgia Strait; but so were eight or ten American yachts.



Photograph by Roger Sturtevant

LETTING THE WIND DO THE WORK ON MONTEREY BAY, CALIFORNIA

Although it was possible to travel under sail only about 12 hours of the whole 53-day journey, the thrills of scudding along before the wind were among the outstanding experiences of the trip from Tacoma to Juneau.

Once a heavy fog compelled us to turn back at the start of a day's paddle, but for the most part we kept on our way, and *Nakwasina* took the weather as it came—rough water or smooth, windy or calm—with an ease and nonchalance that were a never-ending joy to watch. It is a fact seldom believed, except by experienced open-water canoeists, that a good canoe, properly handled, is as seaworthy as the average gas-boat of, say, ten tons' burden.

At times *Nakwasina* stayed out and made fast runs under sail when 30-foot launches were ducking for shelter. Again, our light weight and shoal draft made it possible for us to run narrows, dodging vicious backwashes and whirlpools and shooting overfalls, when gas-boats lay waiting for slack water. It was not a case of fools rushing in when angels knew better; merely that we had tried out our boat under every possible circumstance and knew exactly what it would do.

THE CANOE AND ITS EQUIPMENT

She was never manufactured, that canoe; she was created—created by two master craftsmen—built with the painstaking care that goes into a fine violin. She is 17 feet long, has a 34-inch beam, and is 12 inches deep amidships. With her crew of two, plus Kayo, the pup, and all our equipment, she drew no more than four inches of water.

The hull is built of two thin layers of Port Orford cedar, with muslin and marine glue between, and is fastened with some 7,000 tiny copper nails and brass screws. The inside planks run crosswise around the canoe from gunwale to gunwale. Thus no ribs are necessary; so that the canoe is smooth inside and out. The trim is mahogany; the weight of the bare canoe 65 pounds.

The equipment for the trip was necessarily cut to a minimum of weight and bulk. Three spruce paddles, a sail and sailing keel, a canvas grub box, eiderdown sleeping bags, a knapsack for clothing and miscellaneous articles, an ax, and a balloon-silk fly, besides the cameras and a waterproof film box, comprised most of our cargo.

Also, but by no means of least importance, there was a removable canvas deck, made especially for our cruise, which was usually stowed under the stern seat.

When it was on, as for rain or very rough water, the canoe very much resembled a z-hatch kayak, and, except for our lack of gut aprons, was quite as tight.

For navigating equipment we carried a small compass (never used) and charts—but more of the charts later.

Rounding each point, entering each passage, locating each night's camp site, was an adventure. Each day, often each hour, presented new problems of wind, tide, and navigation; and always there was the pleasurable task of handling our slim little craft, helping her to meet ever-changing conditions of wave and current. Nevertheless there was a certain sameness about the day-to-day traveling that makes a chronological account impracticable.

Paddling from six to ten hours a day, we made an average of about twenty miles. Some days, when we had to buck wind or current or both, we made as few as eight miles. At other times we made twenty-five miles, even thirty-five.

Once, just above Queen Charlotte Sound, we attempted to follow verbal directions to save our charts from a drenching rain. Instead of finding the pass we sought, which would enable us to duck behind the Ivory Island Light and escape most of the dusty weather in Milbanke Sound, we turned into an inlet called Berry Harbor. We camped at its head, just one mile overland, by the chart, from our starting point. A dismal camp, that.

FOOD NEVER A PROBLEM

Food was never a problem except when we ran out of money. When we left the towns and farms of the Puget Sound region, we found stores for fishermen and prospectors scattered along the way with such frequency that we were never more than four or five days between stores; also, we had many offers of food from fishermen, trap watchmen, and the occasional homesteaders. Most of the powdered and dehydrated foods that we took along for emergencies we either gave away or carried through to Juneau.

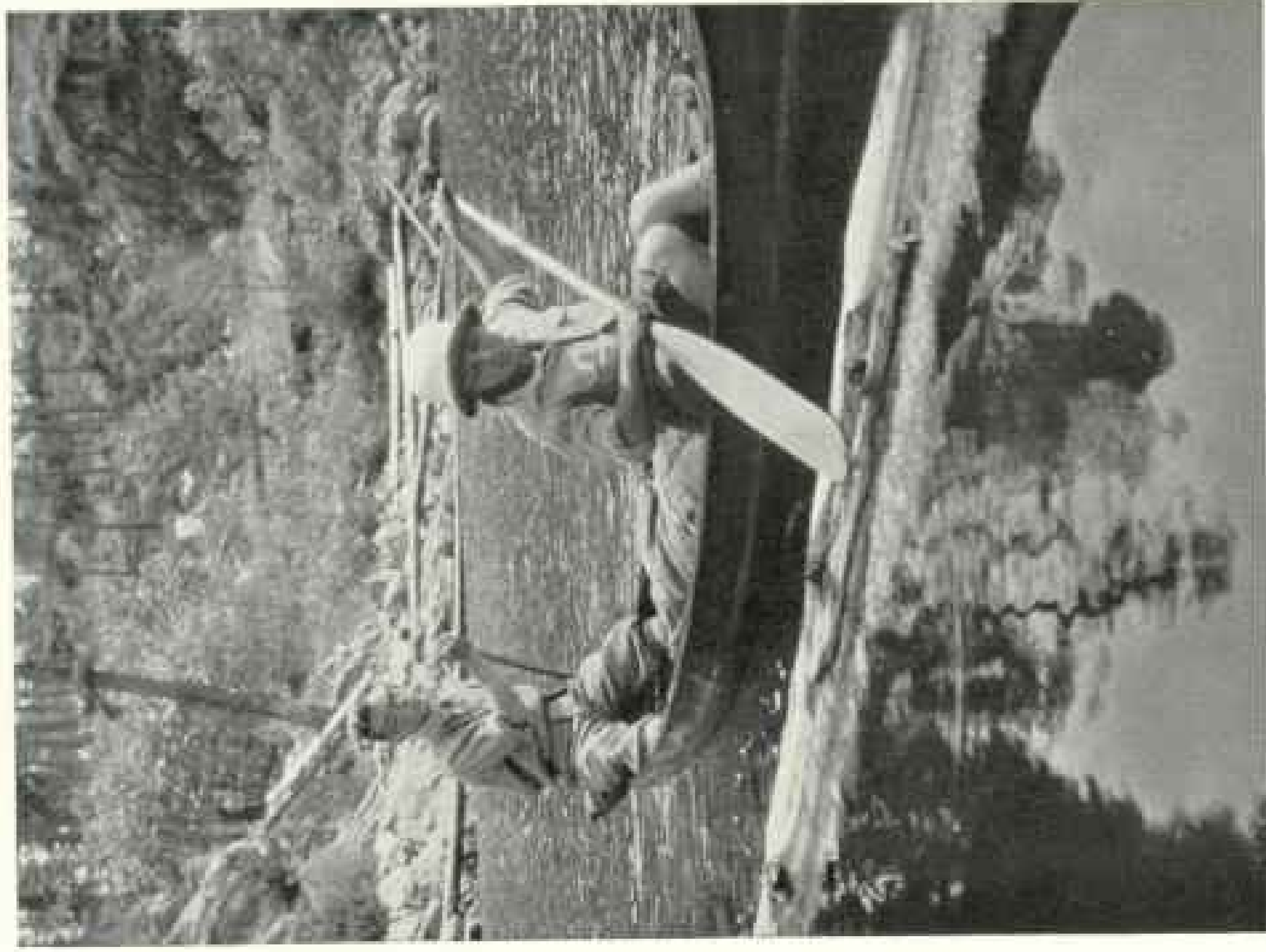
At Nanaimo, however, we found ourselves, for economic reasons, reduced to a diet of clams. By the end of the third meal we knew that we wanted no more clams for the rest of the voyage. With a dollar of our remaining capital we wired



Photograph by Bert Hutton

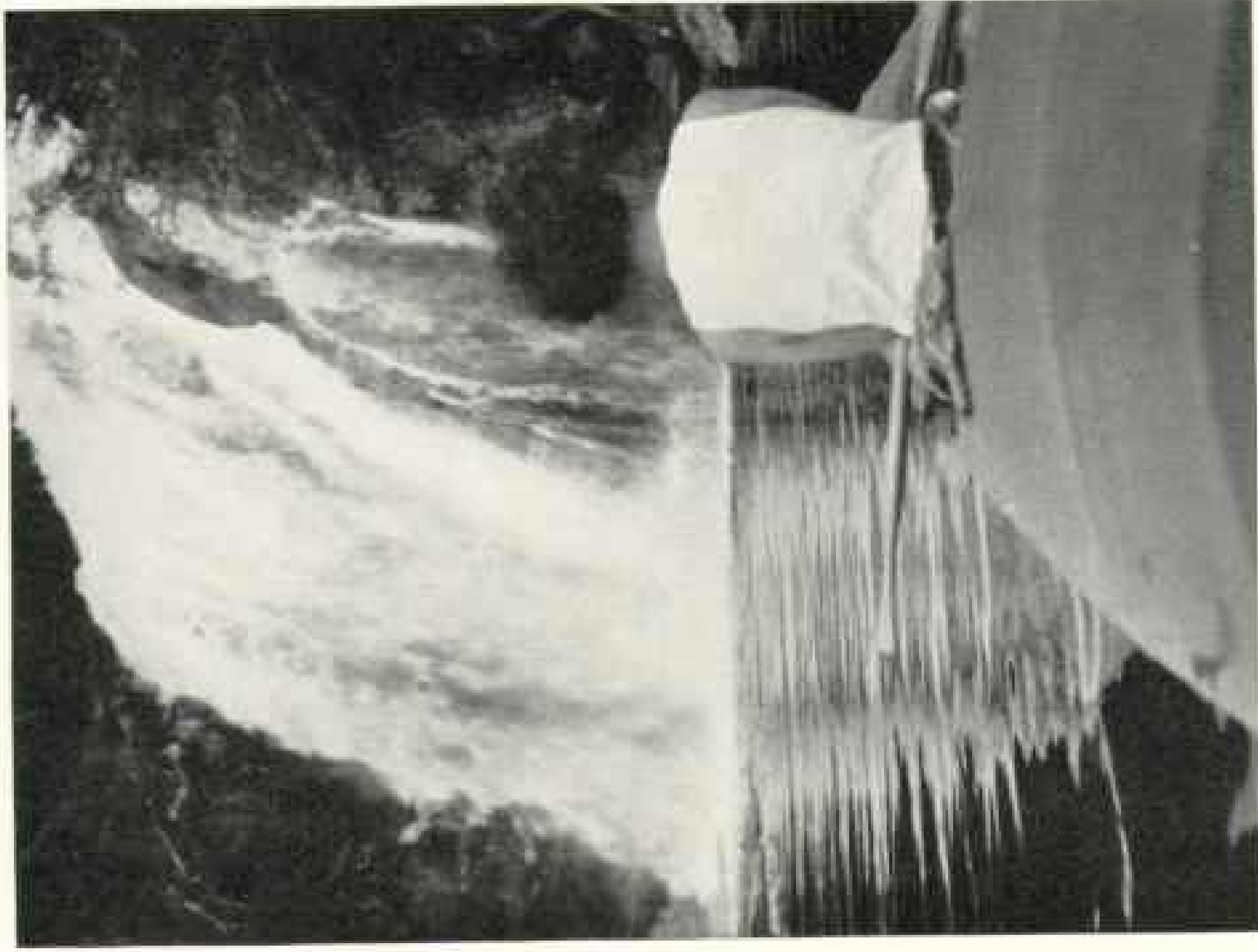
SUNSET SHEDS ITS MAGIC LIGHT OVER THE ISLES OF DREAMS

The San Juan Islands are the tops of submerged mountains. They are extremely beautiful and, being easy of access to Seattle, Tacoma, and Vancouver, are widely used as a summer playground. The view is from a point on the Pacific Highway near Bellingham, Washington.



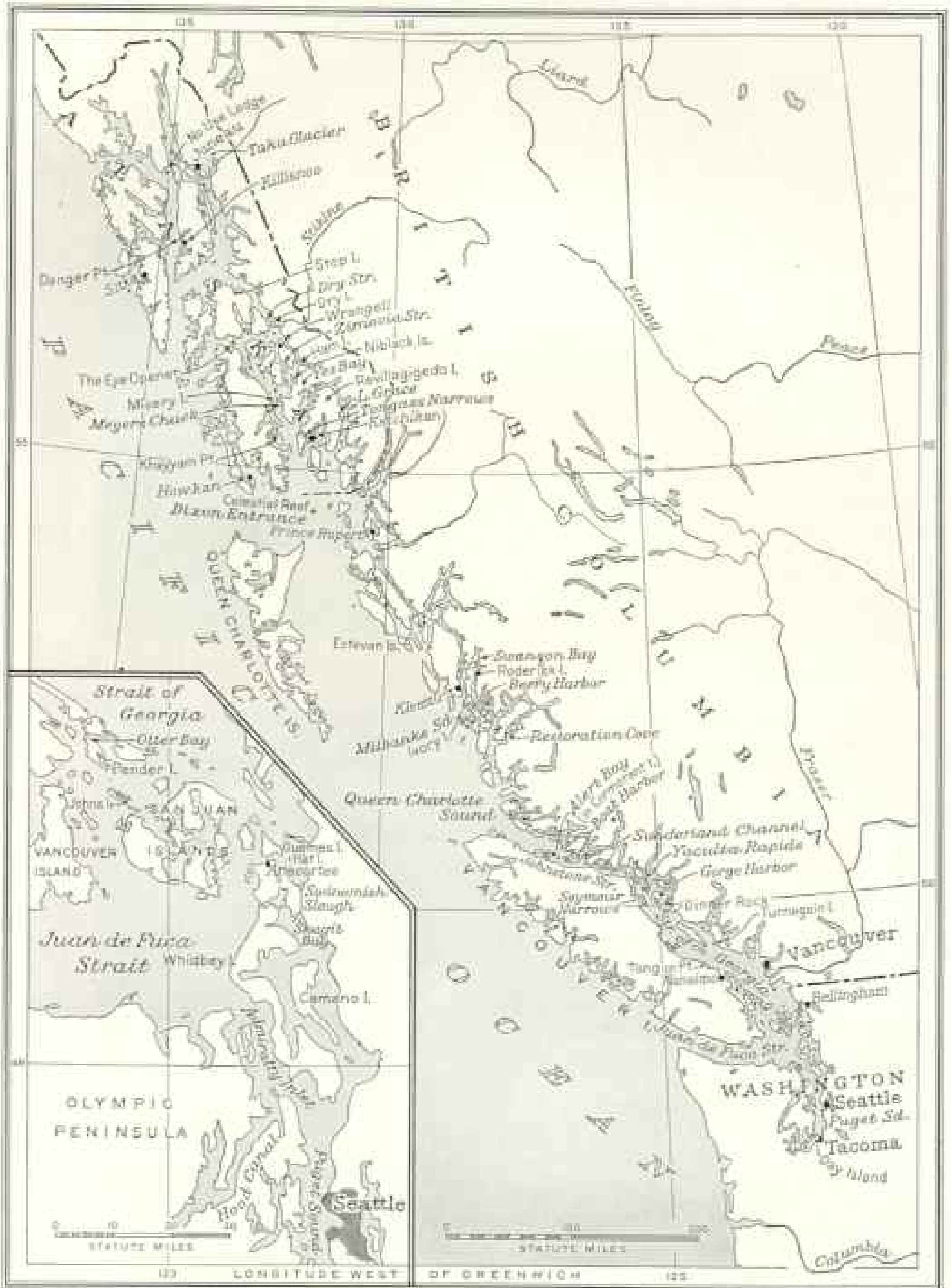
THE CANOE'S "ENGINES" GOT PLENTY OF ACTION

The author and his wife pulled from six to ten hours a day and averaged about 20 miles (see text, page 3).



DRY WEATHER ENHANCES THE BEAUTY OF A WATERFALL.

Early in the voyage up the Inside Passage, Nakemini's crew were enthralled with falls like this.



Drawn by Newman Donstead

THE ROUTE OF THE "NAKWASINA" FROM TACOMA TO JUNEAU

The trip from Washington State to Alaska, by way of the intricate Inside Passage, took 53 days and covered approximately 1,100 miles by sail and paddle, with occasional lifts from motorboats.



BREAKING CAMP IN LOWER BRITISH COLUMBIA

The balloon-silk fly tent which the author carried on his trip could be put up in a dozen different ways, thus adapting itself to any demands of topography or weather. Mr. Calvin is bending over the canvas grub box (see text, page 3).

for money. The other 63 cents we squandered on ice cream and cigarettes.

Fresh water was always a greater problem than food, for the first three weeks because of its scarcity, and after that because it poured down with such persistency that we were seldom dry for more than a few hours at a time.

During four and a half weeks of almost constant rain we camped in deserted shacks whenever they were available. Then a pan set outside the door would provide enough water in a few minutes to cook dinner without the bother of walking a few steps to the nearest stream.

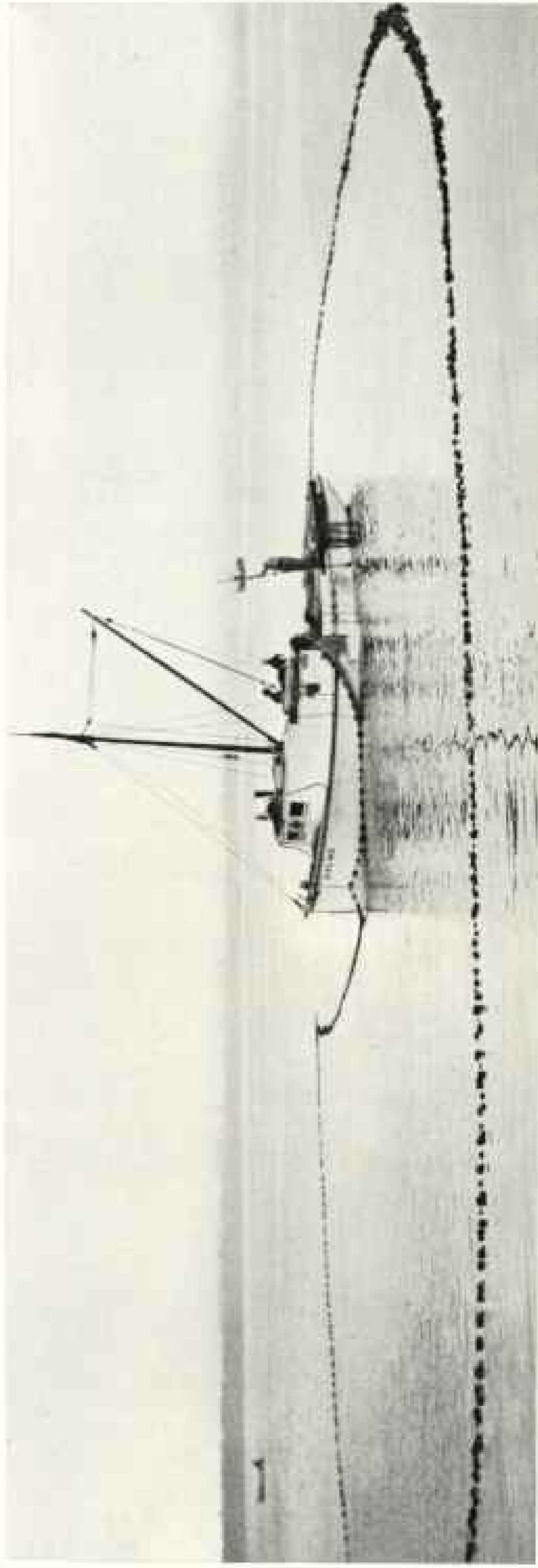
It was June 25 when we left Day Island, Tacoma, on the start of our voyage. Fifty-three days later, on August 16, we reached Juneau, having covered approximately 1,100 miles by sail and paddle. The total distance, because of our devious route, was greater than that; but, as I have said, the voyage was made for fun. Therefore,

when it seemed conducive to our comfort and happiness, we did not scruple to accept lifts from gas-boats going our way, once across the north end of stormy Georgia Strait by the motor yacht *Onatwa*, of Seattle, and again into Prince Rupert by a fast cannery launch.

CANOE VERSUS STEAMER TRAVEL

Thinking to save time for cruising in the more interesting Alaskan waters, and to avoid a long, tiresome passage, we even shipped across Queen Charlotte Sound, only to discover that we could have paddled across in the same length of time and in greater comfort than in the poky little steamer.

We had canoe-cruised before; both of us had been to southeastern Alaska several times by steamer; but tripping up the magnificent Inside Passage by canoe was a revelation. There is almost no point of similarity in traveling by canoe and by



Photograph by Curtin and Miller

PURSE SEINERS ON PUGET SOUND

Their equipment consists of a net, on the ground rope of which are rings with a line passing through them. When this line is hauled tight, it converts the circular net into a saucer. The slack then is gradually taken up until the fish are reached (see page 35).



Photograph by Hong and Ford

A SMALL SCHOOL OF BOTTLE-NOSED WHALES DISPORT THEMSELVES IN THE WATERS OF MILWAUKEE SOUND



Photograph by Capt. Collingwood Ingram

DURING GOLD-RUSH DAYS WRANGELL WAS THE OUTFITTING AND STARTING POINT FOR MANY A PROSPECTOR.

The town lies near the mouth of the Stikine River. It was founded by the Russians in 1834 and named for the then governor of Alaska. A short distance to the south is a long-established and important Indian settlement. Cruise steamers stop here on their journey between Seattle and the cities farther north.



Photograph by Winter and Pond

A CITIZEN OF KILLISNOO WHO THINKS WELL OF HIMSELF

The village was prominent as a hunting and fishing center in Russian days, but a serious fire nearly wiped it out a few years ago. The Killisnoo people are also known as Hootznahoo, and the liquor which they distilled from molasses came to be known in Alaska first as hootz, then as hooch, and so to colloquial English was added a word that soon spread all over the United States and Canada. Saginaw Jake's opinion of himself is told in the lines above his door.

steamer. We thought we had some degree of familiarity with the country, but seeing it again by canoe we found it vastly more beautiful, incomparably more interesting, and, of course, a hundred times as extensive.

In our carefully laid plans for the trip, we had made several errors in judgment. By the third day out of Tacoma we began

to acquire virtue through knowledge and understanding.

Lesson the first we learned through an unnecessary 12-mile passage opposite Seattle. It should have been a 3-hour paddle; actually, it was lengthened to four by a change of tide, and also, probably, by a certain lack of moral fortitude. We could not see our progress. The broad bluff on the southern tip of Whidbey Island, for which we were steering, seemed to taunt our futilely dipping paddles.

BATTLING THE SAN JUAN CURRENTS

Thereafter we made no long open passages unnecessarily, preferring to follow close enough to shore so that a rock, a tree, or a piece of driftwood would indicate the distance made good. When muscle serves as motive power, the relativity of distance becomes an important psychological factor.

The second lesson began the next day. We had counted greatly on the assistance of tidal currents, for we had blandly assumed, on the basis of tradition, fortified by

previous experience, that in inland waters the tide floods in one direction and ebbs in the other. Then we blundered up the wrong side of Camano Island, where the tide floods and ebbs in the same direction, south. So we learned to expect less help from the tides. And that was before we had discovered the San Juan currents!

On July 3 we were in the midst of the

San Juan Islands. The log-book entry for that day is in the bow paddler's handwriting, as the day's experiences had left the stern in too chastened a mood to write even the log. Here is her first-hand picture:

"Wednesday.—Broke camp at 7:30, to find we'd covered 2½ miles less than we thought last night. On to Johns Island (May God strike it pink!). Foolishly fought a current for three-fourths of an hour without gaining more than a foot; then turned and tried the east side of the island. Hellish current all the way.

"Reached north end of Johns Island 11:30 and lunched. On to Pender Island. Swept into passage by current—off our course. Thinking the current favorable, we attempted to go up east side of Pender. Swept back, we struggle up west side until exhausted. Shore nothing but sheer bluffs for hours. We hang on to a tree to rest and allow master to gather breath to express himself.

"On to Thieves Cove. Rest a few moments (3:30), and from there to Otter Bay find the current considerably lighter."

Later in the same entry the bow remarks: "Future looks bright, as to-morrow we hope to get into currents that follow natural laws. The young man (in Otter Bay) told us proudly that the San Juans have the worst currents in the world. Fame!"



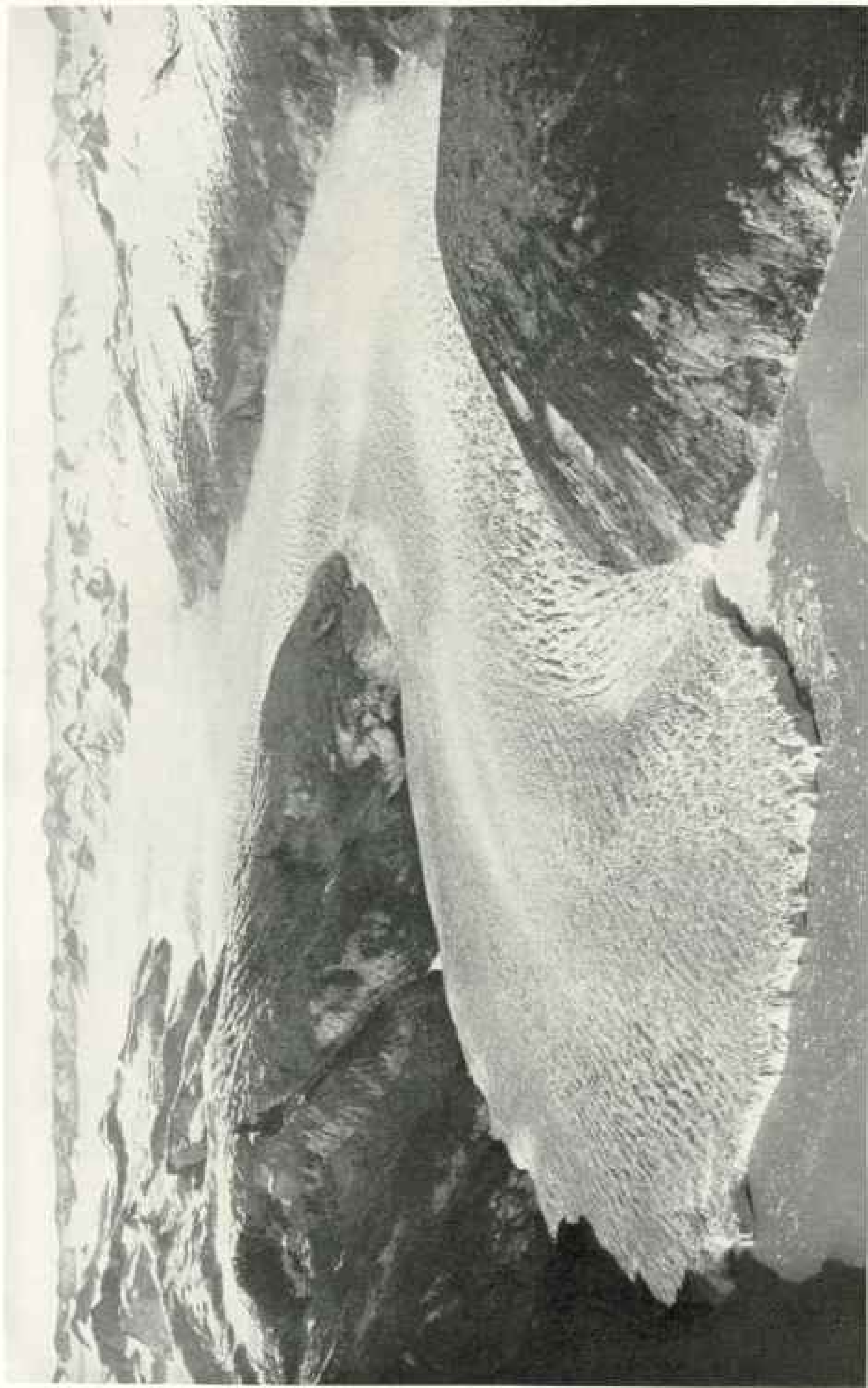
© Winter and Pond

RELICS OF DISAPPEARING TRIBAL CUSTOMS.

Chief Shake's totems at Wrangell, Alaska, are representative of those which once stood before the establishment of each chief or head man of a village. Some of them are 50 and 60 feet high and are elaborately carved over the whole length with figures of men, frogs, birds, and various animals. The figures atop these poles represent the killer whale (left) and bear. The latter totem shows the animal's tracks going up.

We asked this same young man why a near-by cove that we had passed, a rocky, dangerous-looking place, was called Boat Harbor. "Oh, that," he assured us, "is because no boat can live in it!"

The third lesson, too, we learned in Puget Sound, before the San Juans. On the theory that where we went was of little importance as long as we maintained



Official photograph, U. S. Navy

BLUE-WHITE WALLS OF TAKU GLACIER TOWER 300 FEET ABOVE THE WATER

The mighty stream of ice and snow is only a few miles from Juneau. It is a live glacier, moving forward about ten feet a day and detaching huge bergs in its progress. That the photograph was made from a considerable height is apparent from the specklike appearance of the large bergs floating in the foreground.



A FRIENDLY TRAP WATCHMAN PROVIDES SALMON FOR DINNER

He has a fine steel wire on the end of his stick, terminating in a lasso. He holds the noose under water (in the trap) until a fish tries to swim through. Then a quick pull catches it behind the gills.



CAPTAIN TOM OF THE "MARY T."

He could read neither chart nor compass, but had somehow brought his launch, all alone, from Seattle to Meyers Chuck, beyond Ketchikan, a distance of more than 650 miles (see text, page 41).



© Winter and Pond

ADEPTS IN THE ART OF BASKETRY FROM THE VICINITY OF SITKA

Many of the Indian women produce excellent examples of basket weaving, but the best come from the older generation of Aleuts, on the distant island of Attu, at the tip of the Aleutian chain. They may spend years in making a single basket, sometimes weaving it under water.

a general course, we had started with very small-scale charts, expressly intended only for offshore navigation.

In Skagit Bay, below Anacortes, our charts indicated shoals in a vague manner and barely hinted at channels. We found the shoals but not the channels. In water too shallow to paddle, we waded mile after mile, forcing our way against a current and a head wind. Frequently we dropped into holes and scrambled back into the canoe, only to get out and wade again after a few strokes. If either of the crew had suggested a camera, the cruise would have ended right there.

THE WEIRDEST EXPERIENCE OF THE TRIP

Next day we sought for the lower mouth of Swinomish Slough, which forms a sort of back-door entrance to Anacortes, and found it only when a fisherman came to our rescue.

By this time we had learned our lesson, but still another and unnecessary proof of the importance of large-scale charts awaited us.

It was dusk when we passed under the

bridges at the upper mouth of Swinomish Slough, but there was no apparent camping place nearer than Hat Island, five miles ahead. So, in the deceptive afterglow of sunset, we paddled on, over glassy smooth water, and thus began the most eerie experience of the voyage.

All about us salmon jumped with tireless enthusiasm, often nearly striking the canoe. A curious seal followed close alongside for a quarter of an hour. And Hat Island, which had looked inhospitable even at first glimpse, now took on, in the fading light, an aspect grim and forbidding. Halfway across we began to wonder if, contrary to the rule in the Puget Sound country, there was no friendly beach.

Astern of us the water, shore line, and sky had faded into soft, uncanny darkness. Ahead, Hat Island and the farther shores had become black silhouettes.

Paddling silently, our nerves tense in spite of ourselves, we neared the island, drew close under its towering rocky bluffs. Now we could see some details in the precipitous rock. The little remaining light



TWO BRITISH COLUMBIA TROLLERS RUN TOGETHER FOR THE SAKE OF COMPANY

Alaska's fisheries are among the most productive in the Western World. There are 135 known varieties of edible species which swarm the coastal waters, but comparatively few of them have as yet been sought after commercially. Salmon and herring are the leaders, and small boats such as these bring them in to the canneries and drying plants.



KAYO ASSUMES A CONTEMPLATIVE MOOD

Near the Alaska line the ship's mascot sights something in the water to lift his ears about. The canvas deck is on the canoe because it has been drizzling rain most of the day.

in the northwestern sky threw weird and fantastic shadows over the uneven surface, making it seem alive, sinister, menacing; and the water lapped gently against the nearly perpendicular wall of rock.

Straining to see into the eerie darkness, we circumnavigated the island. Not a scrap of beach. Then we turned westward, having little to guide us now but the distant lights of Anacortes, for the sky was just enough overcast to exclude even the brightest stars.

Should we paddle on to the town, still several weary miles away? The only alternative was a night of drifting in the canoe, and that did not appeal. Seeming to sense our growing nervousness, the pup whimpered softly.

Choosing what seemed the lesser of the two evils, we headed for Anacortes. We were slipping past the mass of black shadow that was Guemes Island when the bow paddler paused. In the midst of the shadow she thought she saw a deeper blackness. It was but the difference between blackness and absolute blackness, but there it was. That meant a ravine, probably a cove.

Paddling slowly, we headed in. Gradually the blackness on either side deepened, telling us that there was land close alongside. Not only was there a cove, but we were in it!

A SHRIEK OVERHEAD

We rested paddles and listened. The silence was as oppressive as the darkness. The flashlight was packed, neither knew where, nor wanted to hunt for it. Another slow stroke; a pause. Suddenly the heavy silence was split by an ear-piercing shriek in the air directly over our heads. Kayo howled in terror. Both of us wanted to, even though the beat of huge wings told the rational part of our minds that it was only a great blue heron, disturbed by our penetration of his lair.

Another slow stroke. "Back-water!"

A gray shape, vague and ghostly, loomed above the bow—a driftwood log six feet in diameter. In all probability the log meant a beach at low tide. We nosed up to it, and in the same instant that the stem touched the log the keel ground on the six inches of beach that were still exposed.

Never, we thought, had mariners been so glad to get ashore. We hauled the

duffel and then the canoe across the logs, prepared a hot meal, and spread our sleeping bags on the debris that had collected between two logs, the only level place available.

Even in next morning's daylight the cove retained much of its weirdness, the trees on the slope above throwing long shadows over the beach and the still water.

CHARTS OFTEN INADEQUATE

So in Anacortes we bought large-scale charts. Later, in Nanaimo, Prince Rupert, and Ketchikan, we bought more, a total of twelve, always the largest scale available. Even these were often inadequate and, especially through long stretches of British Columbia, woefully incomplete.

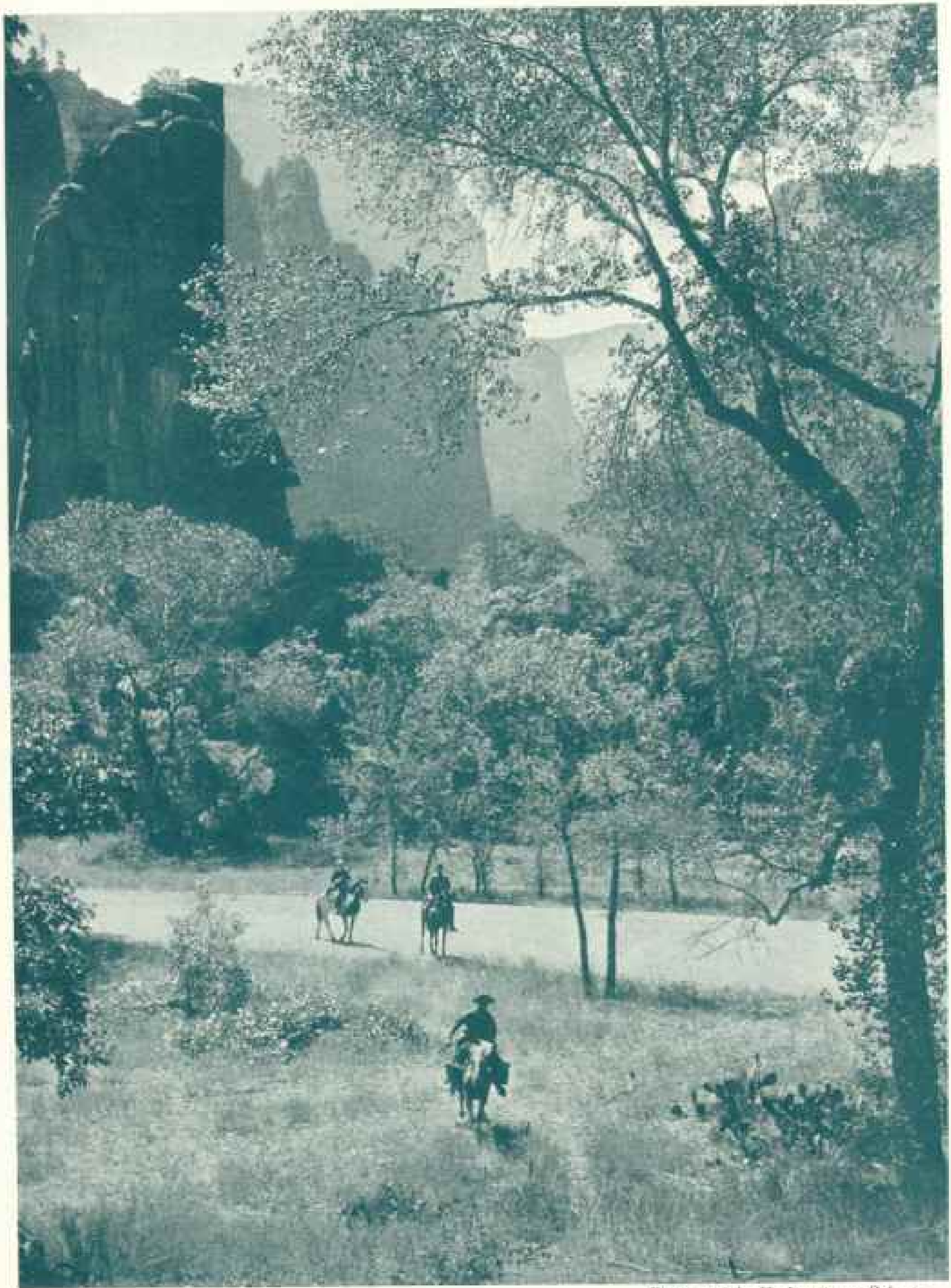
Above Milbanke Sound we paddled for three days in an unceasing rain through totally uninhabited country. Far from the steamer lanes, there was not a cannery, a fishing boat, a hand-logger's raft, not even a deserted shack to give us a night's shelter from the rain. For all we could tell, *Nakwasina's* slim oak keel might have been the first to part these waters. If a hydrographic boat had ever gone through, it must have been at high speed in a fog, for long stretches of ragged coastline, deeply indented with bays and passages, were indicated only by wavy or dotted lines.

Following instructions given by the owner of the *Onara* (see text, page 7), we followed an uncharted passage through what is shown on the charts as Roderick Island. Often we poked into bays and coves not even hinted at by the charts. All credit to the chart-makers, however, for where time and money did not permit of fairly accurate surveys they have indicated the lack. "Rock reported," they say. "Position doubtful"; "Passage reported"; "Anchorage reported." And then the hundreds of miles of wavy and dotted lines.

Several charts bear such warning notes as this: "Caution. The coast between Milbanke Sound and Estevan Island, as now shown on this chart, is very much in error. This chart should not be depended upon for navigating this area, pending its re-charting from recent surveys."

From a canoeist's point of view, most of the errors, omissions, and vaguenesses of the charts are delightful.

NATURE'S SCENIC MARVELS OF THE WEST



Photograph by H. Armstrong Roberts

TOWERING CLIFFS AND RAINBOW HUES PRODUCE THE MIRACLE OF ZION CANYON

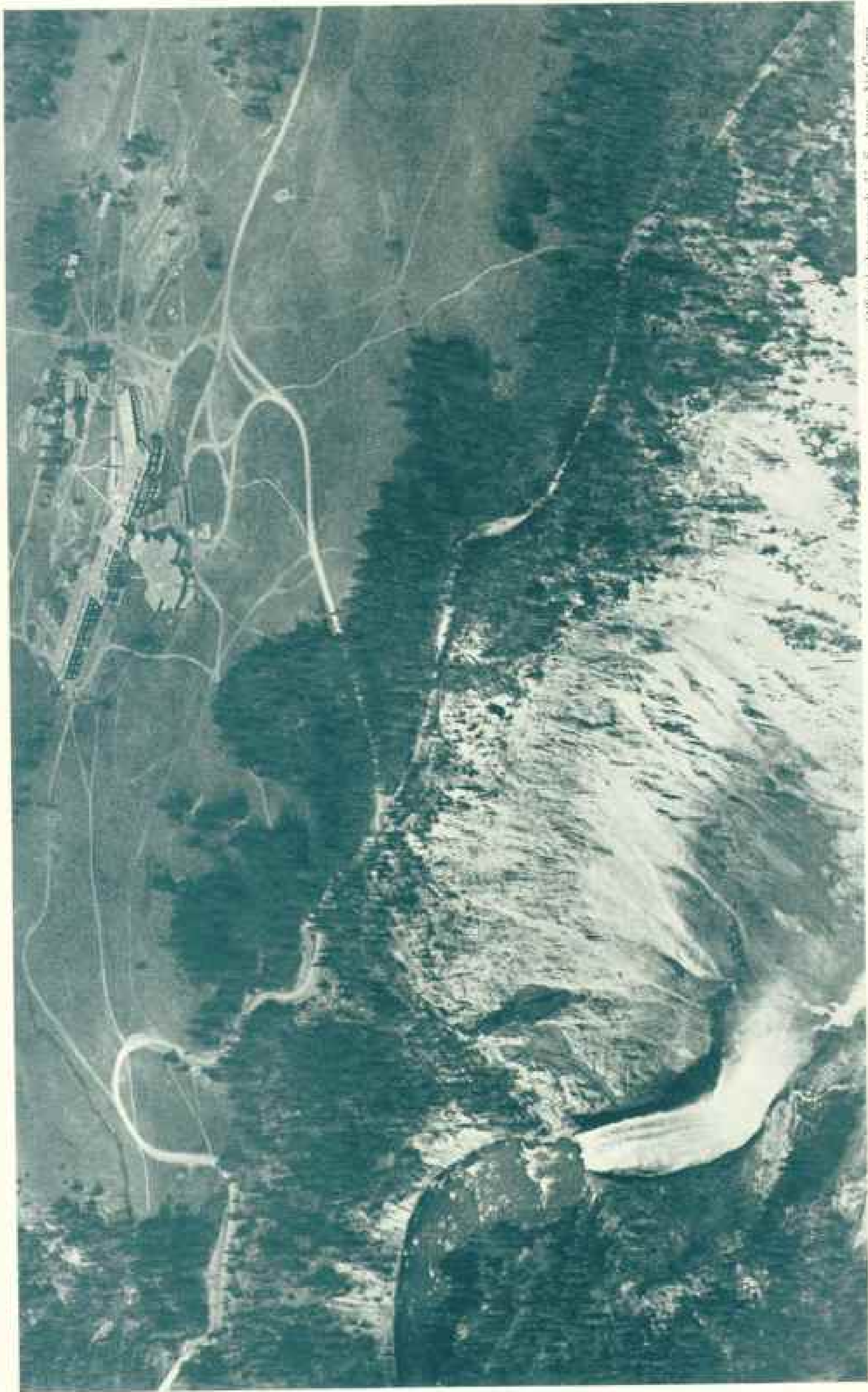
The early Mormon settlers gave the canyon its name and thought of it as a place of refuge to which they might retreat if they were driven from the settlement at Salt Lake City. The Master Sculptor has lavished some of His grandest handiwork on this deep-cut Utah valley (see Plate XIV).



Photograph courtesy the National Park Service

FROM THE GRAND CANYON'S RIM ONE LOOKS UPON A THOUSAND SQUARE MILES OF ROCKY PYRAMIDS AND MISERABLETS

With its tributaries, the Colorado gathers the waters of a mountain area nearly twice the size of Texas. In ages before the dawn of history, that mighty stream began fashioning a canyon that to-day is one of the earth's most sublime spectacles. This view looks south between Mojave and Pima Points, Grand Canyon National Park.



Official photograph, U. S. Army Air Corps

AN AÉRIAL VIEW REVEALS THE FULL GLORY OF LOWER YELLOWSTONE FALLS.

Here the Yellowstone River drops 308 feet into a canyon alive with color. Fumes from subterranean hot springs have worked on the rock formations to produce this painted effect. Yellowstone is the oldest, largest, and perhaps the best known of our national parks. Its more than 2,000,000 acres extend into three States, but are mainly in northwestern Wyoming. In the right background is a large resort hotel.



Photograph courtesy the National Park Service

SCOTT'S BLUFF, RICH IN SCENIC AND HISTORIC INTEREST, IS A CELEBRATED LANDMARK OF THE OLD OREGON TRAIL.

This bit of Nebraska was constituted a national monument in 1910. In the days when gold hunters were rushing to California, homesteaders to Oregon and Washington, and Mormon emigrants to Utah were thronging westward, this road through Mitchell Pass saw a wagon passing on an average of every five minutes during the summer months. This locality also was the scene of a number of Indian hostilities.



Photograph by Dr. C. O. Schneider

SOME FOREST GIANTS HAVE OCCUPIED THEIR PRESENT HOME IN SEQUOIA NATIONAL PARK SINCE BEFORE THE CHRISTIAN ERA

The National Geographic Society and some of its individual members, by supplementing a congressional appropriation, played a conspicuous part in saving the Big Trees now included in Sequoia National Park from the lumberman's ax and saw (see "Our Big Trees Saved," in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1917).



© Publishers' Photo Service

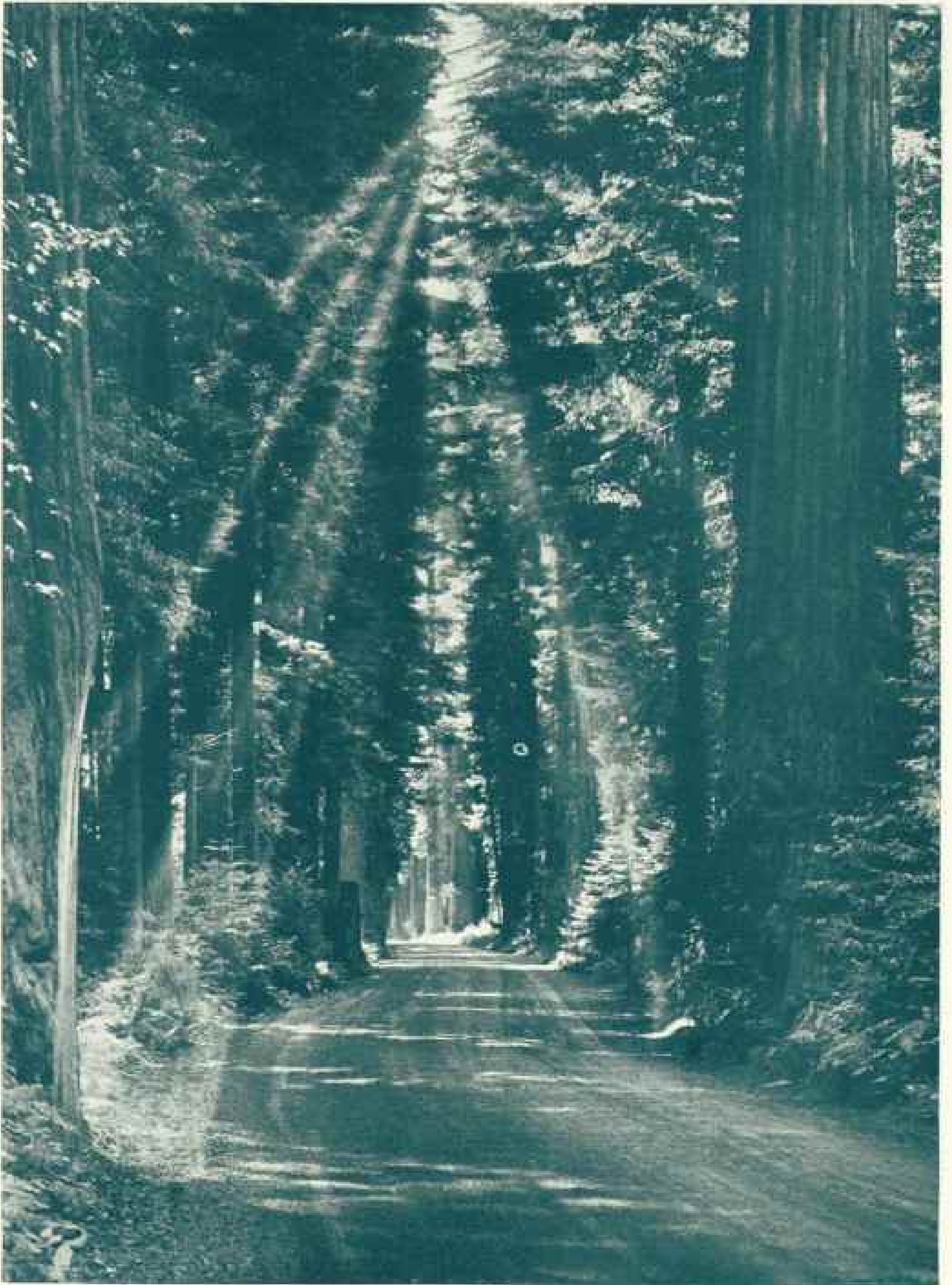
LOOKING FROM 7,242-FOOT HARNEY PEAK OVER A SEA OF BILLOWING CLOUDS THAT COVER SOUTH DAKOTA'S BLACK HILLS



© T. J. Hilman

GUNSIGHT MOUNTAIN LOOMS ABOVE THE WHITTING FOLDS OF SPERRY GLACIER

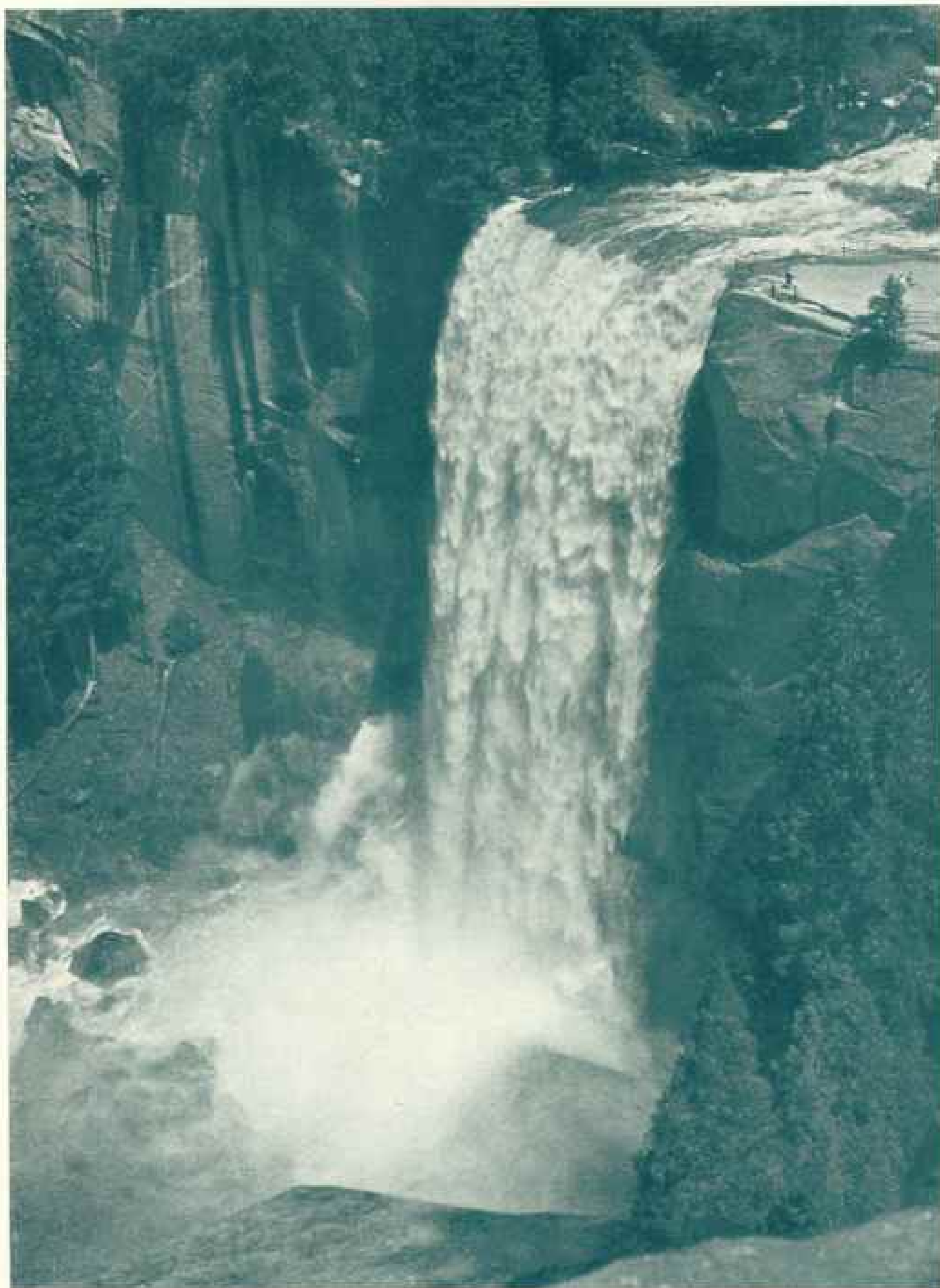
More than 60 small glaciers which lie within the limits of Glacier National Park give the area its name. They are all that remain of ice monsters which once covered all but the highest peaks. The park is in northwestern Montana, close against the Canadian border.



Photograph by Gabriel Moulin

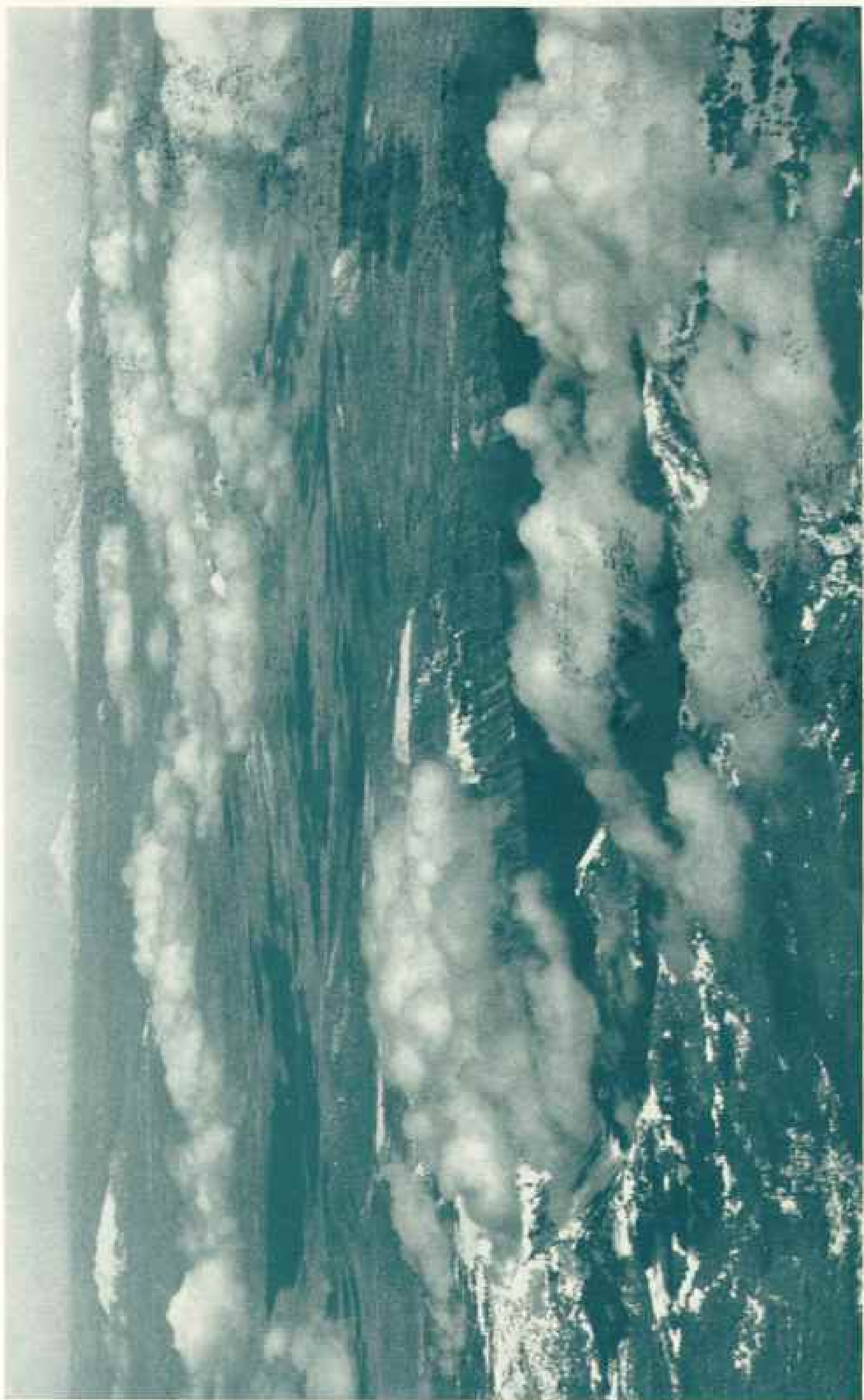
SUNBEAMS FILTER THROUGH THE FOLIAGE OF GIANT REDWOODS TO TRACE A PATTERN OF LIGHT ON FOREST AND HIGHWAY

The redwoods (*Sequoia sempervirens*) grow only in a restricted belt along the California coast north from Monterey. They are exceeded in size, but generally not in height, by their relatives the Big Trees (see Plate XI).



AT VERNAL FALLS WATERS OF THE MERCED RIVER PLUNGE 317 FEET IN A CLOUD OF FOAM AND SPRAY

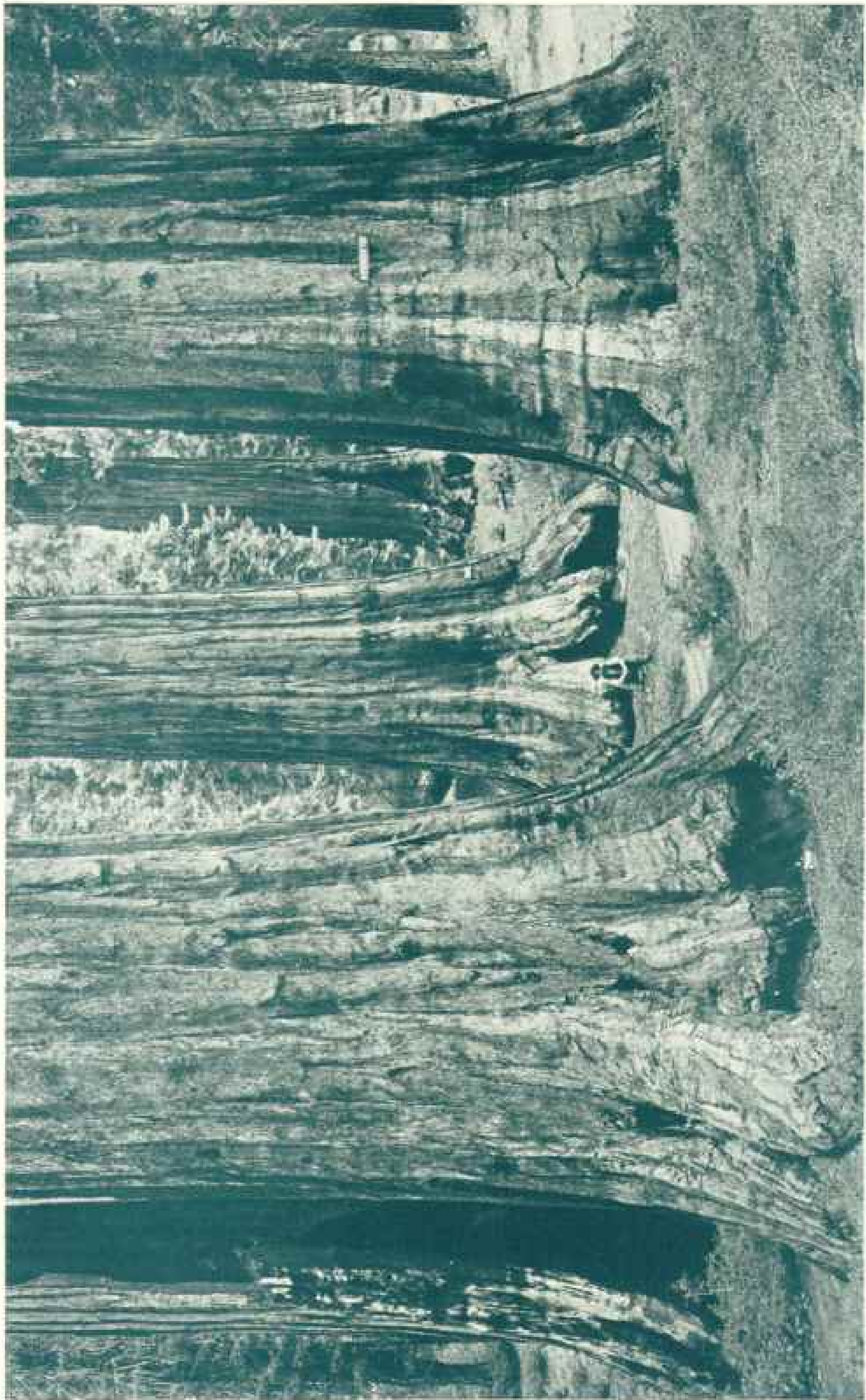
This cascade is nearly twice the height of Niagara, yet it is dwarfed by some of the others in Yosemite National Park. The tallest of them, Ribbon Falls, drops nearly a third of a mile—about three times the height of Washington Monument.



Photograph by Capt. Albert W. Stevens

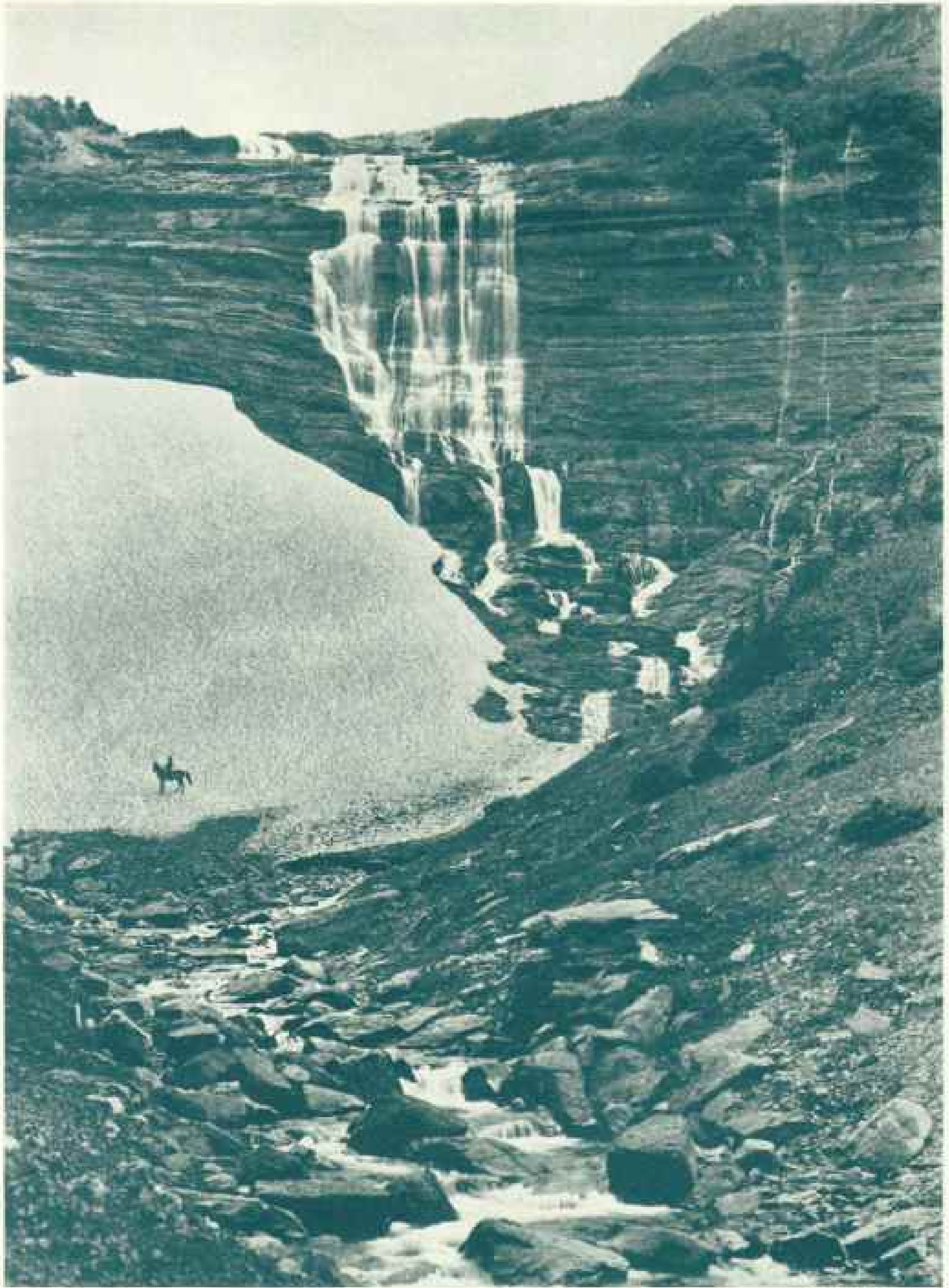
AN AERIAL VIEW TAKEN FROM HIGH ABOVE CRATER LAKE, IN THE CASCADE RANGE

On the horizon are Mount Hood and Mount Jefferson (left center), and to their right is the Three Sisters Mountain group. Below the horizon, on the extreme left, is Diamond Peak. Crater Lake is seen through the clouds in the lower right foreground.



NOTHING ELSE ALIVE IN THE UNITED STATES IS AS OLD AS THE "BIG TREES"

Members of the species *Sequoia gigantea*, of which there are some in Yosemite National Park, are patriarchs in the annals of longevity. Some of the trees in the Mariposa Grove are more than 3,000 years old, while a dozen of them measure more than 70 feet around the base and tower higher than 200 feet.



© T. J. Hilman

MORNING EAGLE FALLS CASCADE GRACEFULLY OVER THE ROCKS OF PIEGAN VALLEY

In a few more years the remains of this small glacier will be gone. The whole of the park is a disappearing remnant of the glacial age. These falls in Glacier National Park were a favorite meeting place of the Blackfoot Indians, from whom the park property was purchased.

NATURE'S SCENIC MARVELS OF THE WEST



LAVA CLIFFS OF SPECIMEN MOUNTAIN TOWER TO MORE THAN 12,000 FEET

Rocky Mountain National Park, where a number of massive peaks vie for dominance, is the most easily accessible of all our national parks. It is about 50 miles northwest of Denver and is well served by railroads and highways.



Photograph courtesy the National Park Service

AT ZION CANYON THE DESERT OF SOUTHERN UTAH FINDS GLORIOUS EXPRESSION IN A DEEP CLEFT BETWEEN MULTICOLORED SANDSTONE CLIFFS (SEE PLATE I)



Photograph courtesy the National Park Service

TRICKLING WATERS AND TIRELESS WINDS ETCHED THE SPIRES AND BUTRESSES OF BRYCE CANYON

In strict reality, this twentieth member of the national park family is not a canyon, but a huge bowl cut to a depth of 1,000 feet in the top of the Paunsaugunt Plateau. It is filled with a boundless variety of the products of erosion's sculpturing force. Astounding color pervades Bryce Canyon (Utah) at all times, but at sunrise and sunset it is especially gorgeous.



© T. J. Hileman

A SENTINEL OF THE WINTER ROCKIES IN GLACIER NATIONAL PARK

Throughout the year the Rocky Mountain goats find sufficient forage in the often scanty vegetation growing in high rocky places, and their heavy coats protect them from winter storms.



© T. J. Hileman

WILD SHEEP ADD INTEREST TO THE MOUNTAIN LANDSCAPE

Continuous hunting has caused this animal to disappear from much of its former range, but wherever, as in the national parks, effective protection is provided, it soon becomes numerous again.

What fun to paddle along an uncharted coast, poking into undreamed-of bays and inlets! What a glorious sense of discovery when we blunder into an uncharted passage! It makes us almost kin with Bering, Cook, Vancouver, Quadra, and La Pérouse.

But there were other times when we wished that we might know more accurately what sort of country lay ahead, whether we would find sheltered bays, whether the topography indicated probable beaches.

At Juneau we found an aerial survey in progress, but it may be many years before a similar survey penetrates to the byways of Alaska and British Columbia. For the Prince Rupert region, however, the Canadian charts are surprisingly detailed and accurate.

TIDAL DISTURBANCE MAGNIFIED INTO A REALISTIC MIRAGE

On the 19th day an amazing and terrifying experience awaited us, one that had nothing to do with charts, but much to do with the topography and idiosyncrasies of the country. A storm had been threatening for the past two days. Despite our circuit through the Yaculta Rapids to avoid Seymour Narrows, we had to traverse some fifteen miles of Johnstone Strait, a channel nearly sixty miles long with high mountains on either side.

Among local boatmen this stretch of water has the reputation of being the worst in British Columbia. Hence we were expecting to find rough water and hard paddling, even though we had learned to discount all local horror stories by at least 90 per cent; but certainly we were not prepared for what we saw.

Entering Sunderland Channel late in the afternoon, we were thrilled and startled to see in Johnstone Strait, some five miles ahead of us, a huge wall of foaming white water making toward us at terrific speed. Across the channel, and at right angles to the wall of water, raced a tremendous green sea. I thought of mountainous seas I had seen in mid-Pacific during a storm, but none had even approached this one in size.

Stupefied, we rested on our paddles and watched. A tidal wave? Impossible. Neither the records of white men nor Indian traditions note any disturbance of such

colossal proportions in these inland waters. A mirage? It was too terribly real. That monster sea swept over and completely submerged two islands whose trees towered 150 feet above sea level! Even though we knew that if the wave were real it would catch us before we could land and climb above its devastating height, *Nakwasina* made for shore.

Behind a point and halfway to shore we paused. The water around us was still glassy calm. Cautiously we turned and nosed around the point, doubt mingled with apprehension. Still that swiftly advancing wall of water! It hurled into bays, piled high on rocky points, swept up the far side of Sunderland Channel, and broke along the shore. The islands had emerged again, the trees still stood erect. As yet, not a ripple of the disturbance had reached the smooth water where *Nakwasina* rested, awed by the sight of something she knew she could not weather.

Paddling close to shore, we went on. Gradually the turmoil subsided until, when we entered Johnstone Strait, we found merely a choppy sea and a normally vicious tide rip. We could but conclude that the late-afternoon sun, the approaching storm, and the heat had fortuitously produced air and light conditions that had magnified an ordinary tidal disturbance into a titanic and terribly realistic mirage, perhaps never seen before and never to be seen again.

OFFERS OF "RESCUE" DECLINED

Next day a stiff southeast wind sent us hurtling through Johnstone Strait. Then the storm broke.

Dwarfed to microscopic dimensions by the vastness of the country, by mountains rising sheer from the water's edge, and occasionally by large seas, *Nakwasina* must indeed have looked like a fragile cockleshell, a craft not of choice, but of desperation.

Time and again purse seiners, halibut boats, and trollers went far off their courses to offer us aid. They were unanimous in their generous impulse, very different in their reactions to our answer to their offer of rescue. Usually after declining assistance, with thanks, we added: "Bound for Juneau; so many days from Tacoma."

Often there was consternation aboard the gas-boat; sometimes polite disbelief.



OLD DUGOUT CANOES AT ALERT BAY

In constructing these boats, the Indians of southern Alaska and the British Columbia coast always use a single piece of timber, preferably white cedar. This they shape roughly and hollow out first with fire, then with a crude sort of steel chisel. Although they have no guide but the eye, the lines of their finished craft are correct and graceful. Some of the canoes made a century or more ago were 80 feet long and so deep that when a man stood on the bottom he could not see over the side.

When we had made our position clear, most of them offered us food and wished us luck; but once, a few miles below Ketchikan, we had to argue for ten minutes to prevent a crew of husky fishermen from rescuing us by force.

Another time a seiner's skipper rowed ashore to our evening camp. He noticed the salmon sizzling enticingly in our frying pan. He was embarrassed by our cheerful greeting and our evident satisfaction with life in general.

Our appearance did not jibe with his logical conclusion and he was loath to discard his major premise. We were shipwrecked, of course; but shipwrecked mariners should have bemoaned their hard fate the while they chewed ravenously on stewed fragments of shoe leather.

Had we lost our boat?

We indicated *Nakwasina*, resting comfortably over driftwood logs.

Yes, he saw the canoe, but where was our *boat*? What? We'd come all the 800 miles from Tacoma in *that*? Well, he'd be a pickled herring!

He admired the canoe, declined our offer of coffee, and rowed back to his boat. Possibly he still thinks that we had a comfortable motor cruiser anchored somewhere just out of sight.

The day after our accidental trip into Berry Harbor we were bouncing joyously through large cresting seas in Milbanke Sound, heading for a passage back of Ivory Island. A seine boat came up through the driving mist and hovered a quarter mile off our beam for half an hour. We were too close to the rocks for them to come safely.

When we reached the entrance to our passage, however, they came closer and



PURSE SEINES ACCOUNT FOR ABOUT 20 PER CENT OF ALASKA'S SALMON CATCH

Gill nets take another 25 per cent, while a little more than half of the total of about 74,000,000 fish are caught in traps. In Alaskan waters the dimensions of seines are restricted in the interest of conservation. The maximum size allowed is 600 feet in length and 75 feet in depth. The value of fishery products from Alaska averages, in recent years, about \$33,000,000 and the catch in the neighborhood of 600,000,000 pounds. The men are drawing in a heavy purse seine (see page 8).

hailed us in broken English, which, if we interpreted it correctly, bade us be of good cheer, for rescue was at hand.

A man on deck prepared to heave a lead line at us. In vain we waved them on, shouting that we did not need help. The padded lead shot through the air. Sasha ducked as it went over her head; then threw the line clear of the boat.

Still not understanding, the man coiled again. Fortunately, he missed. Now the skipper took a hand. If we were such lubbers that we couldn't pick up a line lying across our boat, he'd have to come alongside and pick us up bodily.

We had visions of our beloved canoe smashed to splinters against the solid side of the seiner. The danger was painfully real, so in desperation we resorted to a vernacular that sailormen of all nationalities usually recognize. At last they saw

our point and careened wrathfully away, no doubt heaping equally appropriate epithets on our heads.

CURIOUS INDIANS PURSUE THE "NAKWASINA"

Probably these men would have felt revenged had they known of the greeting we received a few days later from a boat-load of Indians.

We were paddling drearily in a drizzling rain when a battered, decrepit launch hove around a point and headed for us. When we changed our course to get out of its way, it followed us. Three times the maneuver was repeated.

That meant Indians, for they invariably pursued us in this manner until their boundless curiosities were satisfied. Often they gave us an uncomfortable moment in their small but vicious wake. Usually



THE "STREET" THROUGH INDIAN TOWN, ALERT BAY

This wilderness town on the British Columbia coast is an odd conglomerate of the Indian's and white man's ways. Its single street is lined with nondescript frame buildings, with here and there fantastic totems to bespeak the old order, and more prosaic gas drums to remind of the new. Airplanes from Seattle to Ketchikan often break journey here,

they then went about their business, pretending that they hadn't even noticed us. This time, however, after staring long and solemnly, they all burst into loud guffaws.

We had received many sorts of receptions, but never this one. "Indian go ahead, get gas-boat," we imagined them saying. "White man go backward, get canoe. Haw, haw!" With tingling ears we smiled, feeling properly chastened.

In British Columbia we developed high respect for the art and profession of hand-logging. An ax, a saw, and a peavey constitute about all of a logger's equipment. With these meager tools and a prodigious amount of labor, he fells and floats his logs, which a mill tug collects periodically. He lives in a shack on a raft, the more readily to move his base of operations, and frequently his family is with him.

Children in such quarters are a problem, and one mother solved the difficulty by keeping hers permanently in life-preservers and having a pike pole ready to hand to haul out the missteps. Apparently the system worked well, for a considerable flock was in evidence, life-preserved and happy.

NO HALFWAY MEASURES ABOUT ALASKA WEATHER

I have mentioned the rain before, but the log book mentions it nearly every day for the latter two-thirds of the voyage. There are seldom halfway measures about southeastern Alaskan summers. They are wet or they are fine. We had struck a wet one. Day after day we pretended that soon the weather would change, but we knew better. We must either go on

in the rain or confess ourselves beaten. Once we almost quit.

We had paddled for three days in a ceaseless downpour that penetrated oilskins and canvas deck as though they had been cheesecloth. For two nights we had tried to sleep in eiderdown bags that were reduced to the thickness and warmth of wet sheets.

To make matters worse, the shores were 99 per cent sheer rock; so that no driftwood collected. Only once each day did we manage a fire and have a hot meal, and on the second day we achieved a feeble fire only by pyramiding dripping splinters over the flame of a cigarette lighter. On the third day we found a new Japanese settlement and borrowed their kitchen. Before night we had reached the cannery at Klemtu, where the manager gave us a shack. It had been raining there for five weeks.

In the Klemtu shack we hibernated for three days, drying our equipment and debating. Should we go on, or should we ship to Juneau and take short cruises from there when weather permitted? By the time the three days were up we realized that our greatest need had been for rest. We couldn't quit. We had started out to paddle to Juneau and to Juneau we would paddle.

The fourth day was fair, and we started out, glad to be on our way again. That night, at Swanson Bay, we were told that 345 inches of rain had fallen there in 1925, and that sometimes the 5-inch rain gauge had to be emptied twice a day. We laughed without any rancor. One can get used to anything. A few days later we reached Prince Rupert.

On August 2, 39 days out, we crossed the Alaska line. To stamp that occasion still deeper in our memories, we had six miles of magnificent sailing in Dixon Entrance. Against deep ground swells from the Pacific a nor'easter sent a lively chop, and with a taut sail and a bending mast we raced over them both. During the entire cruise we had not more than twelve hours of sailing, but what we did have was tremendously exhilarating sport. Had we never sailed except that day in Dixon Entrance, we would have felt that the sail had paid its way.

After Prince Rupert our next town was Ketchikan, and when we reached it, on

the 41st day, we felt, despite the 300 miles between Ketchikan and Juneau, that our voyage was nearly over. Already we began to regret its ending. Rain and all, we loved it, and our faith in *Nakwasina* and our affection for her had grown almost to idol worship. But a few adventures still awaited us.

A TRAGI-COMEDY AND A CORONER'S VERDICT

We left Ketchikan at 9:30 in the evening, and found a beach with the aid of the flash. Perhaps it was Ketchikan beer; perhaps it was merely the fact that the tide tables had changed to Sitka time and we had not. At any rate, that night witnessed a diverting tragi-comedy. It was Kayo who woke us, wailing mournfully. The bow paddler tried to sit up to spank the pup, but gave it up.

"I can't get my feet down," she said in a puzzled voice.

"Down where?" I asked sleepily.

"Down to the ground," said she.

The situation sounded serious, so I hauled an arm out of my warm sleeping bag and plunged it down into six inches of cold salt water. We were floating, except for our shoulders!

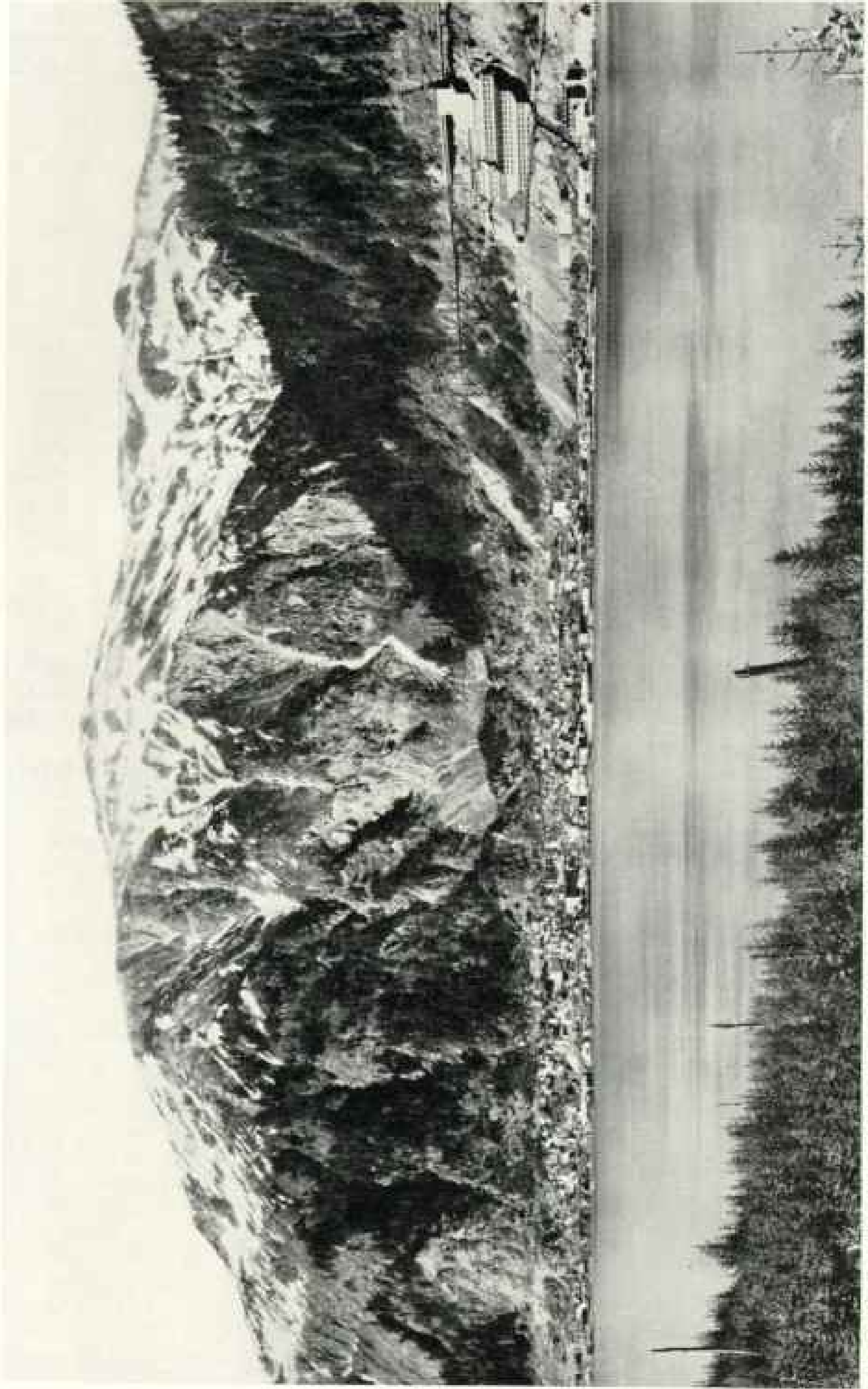
The next scene is one of confusion—rescuing the grub box and dripping clothes, diving for shoes by the last feeble rays of the water-logged flash, scrambling up the bank in the darkness and groping for a level spot. We found one, a very hard one, and went back to sleep.

That should have been enough for one night, but the chortling gods sent two great moons, shining side by side, to flood us with light. From behind the rattling moons came an injured voice: "Hey there! What's the idea, sleepin' in the middle of the highway?"

We moved and the ancient Ford crashed on its way. There was nothing left but the steep bank, with tree roots to keep us from rolling down into the brimming tide. This time we slept till the sun was high, and awoke to hear a coroner's jury in session on the beach below us. They had reached a verdict: Death by drowning.

"Gee," said a jurymen, "I'll bet he drowned, an' his canoe drifted ashore."

"No, sir," stated another. "He paddled ashore an' slep' here an' the tide got him an' he drowned."



Photograph by E. Andrews

A LARGE GOLD ORE STAMP MILL SPRAWLS AT THE MOUNTAIN'S BASE, ON THE OUTSKIRTS OF JUNEAU

Though north of the 58th degree of latitude, Juneau, by reason of ocean currents, enjoys a temperate climate. Mining has been its principal industry in the past, its low-grade Juneau Alaska Mine having a milling capacity of 12,000 tons daily. The town now has a growing trade in fish.



Official photograph, U. S. Navy

INCLUDED IN ALASKA'S 591,000 SQUARE MILES ARE LARGE AREAS UPON WHICH NO WHITE MAN HAS EVER LOOKED

Lake Grace, named for Mrs. Coolidge, was probably one of these until 1926, when it was discovered from the air by members of the Alaskan Aerial Expedition. The lake is located among the mountains on the eastern side of Revillagigedo Island (see map, page 6).



Photograph courtesy Rev. A. P. Kashenaroff

CEREMONIAL MASKS PLAY AN IMPORTANT RÔLE IN NORTH
PACIFIC INDIAN LIFE

Elaborately carved and painted, they are used in religious and other ceremonial dances, and mysterious powers are ascribed to them. Some are modeled after the heads of birds or beasts; others represent the human face in repose or distorted. An aboriginal "John Barleycorn" may have posed for this mask, in the collection of the Alaska Historical Museum at Juneau, for it has a magnificent red nose.

"Yeah, I'll bet that's the way he drowned."

"But his dog didn't get drowned. Ain't that lucky? Gosh! What a nice, cute little curly puppy baby! Gee, I'm glad it didn't get drowned, too."

ALL-NIGHT PADDLING—ONCE

To save our outfit from salvage operations, we announced our unfortunate survival to the assembled youngsters, and they dispersed, disappointed.

We moved camp to a less populous re-

gion, but stayed in Tongass Narrows all day because of a stiff head wind. At evening the wind went down. We would try night paddling. At 9:30, to Kayo's disgust, we broke camp and started paddling into the red-gold after-glow of sunset. Outside the narrows we bucked into a north-west breeze, which is reputed not to blow at night. Let me quote from the log the rest of that night's experience:

"In the course of two hours the sunset glow fades. The hard pull in the chill air makes our muscles very lame, so that by the time we get across the six-mile passage every stroke is painful. We'd willingly camp, but it is too dark to attempt a landing with the high sea. Also, the flash is out of commission. We must wait for daylight. It is too cold to remain inactive, we keep on paddling.

"Meanwhile there is hot coffee in the thermos bottle. I reach for it. My hand comes away warm and dripping. Coffee! The

bottle has exploded with a noise that we took to be a fish striking the boat. So there is a cold lunch of bananas and figs. Then more waiting for daylight, while tortured muscles scream for warmth and rest. At last the stars fade. By 3:30 we have nosed up to a beach in a sheltered bay. Less than half-conscious, we unload and flop on the gravel."

So that was the beginning and the end of all-night paddling. We had made good fifteen miles, but we were compelled to stay in camp and rest for a day afterward.

When we set out again, on our 45th day, we had a magnificent sailing breeze almost dead astern. On the forward slope of the large following seas, we rode like a surf-board, making an estimated speed of between ten and twelve knots. That speed was only for moments at a time, of course; but our average speed, as we tore past floating traps at one-mile intervals, made the trapmen stare open-mouthed.

CHART AND COMPASS PUZZLE OLD TOM

It was a making sea, however, and near Misery Island the water got uncomfortably sloppy, ragged seas that one could not meet, for they came from several directions at once, the result of a tide rip.

There was danger of broaching to; so we ducked into Meyers Chuck, a perfectly sheltered little harbor with a store and a settlement, deserted for the summer by the exodus of fishermen. There we met old Tom, of the *Mary T.* Tom asked questions while he puzzled over a chart. He, too, was heading for Wrangell. Which way was it?

The upshot was that we loaded *Nakwasina* aboard the *Mary T.* and set out. We would take a 25-mile lift into more comfortable waters and guide Tom that far.

In ten minutes the navigation of the *Mary T.* was in the hands of the skipper and mate of *Nakwasina*. Tom was amazed by our ability to identify mountains, islands, and lakes on the chart; and still more astonished when a crudely calculated compass course enabled us to proceed through a fog and emerge at approxi-



A FAIR BREEZE HAS DIED, SO THE BOW PADDLER TAKES IN SAIL.

mately the desired point. An expert navigator would have blushed at the way I laid that course, but Tom's faith was implicit.

When we unloaded at the Niblack Islands, Tom tied up at the float for the night, while we moved into the cabin of a deserted fox farm. Next morning Tom invited us to go on with him. We declined, but Sasha was worried.

"After all," she said, "we have taken on a responsibility. We should see Tom safely to Wrangell. No telling where he'll go by himself."

But we sent the *Mary T.* on without us, waited an hour for the tide, and then began our day's paddle. As we were entering Zimovia Strait, a white launch hove up astern.



Photograph by George H. King

KETCHIKAN FALLS, ONE OF THOUSANDS ALONG THE ALASKA COAST

The town of Ketchikan is perched on a mountain side, with this clear, foaming stream rushing down through it to the sea. In proper season salmon swarm up the creek and leap its waterfalls on their way to quieter waters where they may spawn.

"I wouldn't be surprised," said the bow paddler, "if that were old Tom." And old Tom it was. But Tom had a chart hung over his port window. Also, we were close against seaweed-covered rocks, nearly the same golden yellow as the canoe; so Tom did not see us. We were glad, for we had no wish to cause him unnecessary embarrassment. Where he had been for those three hours will forever remain a mystery, probably even to Tom.

We met Tom again in Wrangell, three days later, and there was mutual joy at the reunion. Weren't we tired of paddling? he asked. Wouldn't we like a lift the rest of the way? He'd take us right to Juneau.

The offer was magnanimous, but not enticing. We did go with him across Dry Strait, just above Wrangell. Where he went after that we do not know, for when

we reached Juneau, on August 15, 53 days from Tacoma, the *Mary T.* had not arrived. Nor did she appear during the two weeks that we stayed there before our prosaic journey homeward by steamer.

And now Tom is on our consciences. That is one of the reasons why we shall go up the Inside Passage again this summer—to look for the *Mary T.*

Of course, there are other reasons, too. There are dozens of inlets that we have not explored, scores of passages that we have not tried, many miles of coast that are but dotted lines on the charts, many Indian graves and villages to be hunted.

And there is the memory of 53 days of magnificent freedom, that made even mail undesirable, because mail constituted a connecting link with a world of realities we had left far behind.

Yes, we shall go back.

THE EAGLE, KING OF BIRDS, AND HIS KIN

BY ALEXANDER WETMORE

ASSISTANT SECRETARY, SMITHSONIAN INSTITUTION

With Paintings from Life by Maj. Allan Brooks

THE GEOGRAPHIC presents in this issue the fifth of a series of paintings descriptive of all important families of birds of North America. The first (*Humming Birds, Swifts, and Goatsuckers*) appeared in July, 1932; the second (*Ibises, Herons, and Flamingos*) in October, 1932; the third (*Crows, Magpies, and Jays*) in January, 1933, and the fourth (*Woodpeckers*) in April, 1933. The sixth of this series will be published in an early number of the NATIONAL GEOGRAPHIC MAGAZINE.—EDITOR.

THE eagle, symbol of bold strength and courageous character, has been used so widely as an emblem of power that, by name and by effigy, birds of the group to which it belongs are known familiarly to many who have little experience or conception of them in life.

Eagles and their many relatives among the hawks and vultures are distributed throughout the world, except over the open seas, the barren Antarctic Continent, and the smallest and most isolated of oceanic islands. Wherever found, they appeal even to the novice in knowledge of things outdoors because of their manner of life and predatory habits. Robust of form and strong in flight, they are remarked at every appearance.

The emblem of the Sumerian city of Lagash, in the third millennium before the Christian Era, was an eagle, which was engraved on the tablets and seals of the leaders and was carried as a military standard by the army. An eagle also appeared on the seal of the King of Ur, and continued in double-headed form in Hittite art, on certain coins of the Mohammedans, on the flags of Turkoman princes, and so on into modern times.

The eagle symbol is probably derived from forms similar to our golden eagle or closely allied to that species, as several species of that type are found in the regions mentioned.

To early Greeks the eagle was the messenger of Zeus and the only bird that dwelt in heaven—a fancy based, perhaps, on the high-flying powers of these birds. A silver eagle standing on a spear was placed on the military standards of the legions of Rome, and this emblem has been used widely as a conventional badge of military power. To-day it is a common decoration on flagstaves in many countries.

An American species of this group, the bald eagle, is found in the design of the coat of arms of the United States, which appears on the Great Seal. A representation of it is blazoned on many of our coins and decorations. It also appears on the President's flag, and on the President's seal in the bronze plate on the floor of the vestibule of the White House.

The fierce harpy eagle (*Harpia harpyja*), a bird of dauntless courage, called by the Aztecs "the winged wolf," is engraved on the official coat of arms and seal of Mexico and appears on the flag of that country. It is distinguishable from our species by its prominently crested head.

CONDOR APPEARS ON COATS OF ARMS

The great condor of South America figures in the coats of arms of Colombia, Bolivia, Ecuador, and Chile.

The eagles and their kin form the group of birds of the order Falconiformes, which includes about 288 distinct species, with many additional geographic races, so that in all there are recognized somewhat more than 700 living forms. The order is divided into four principal families.

The eagles, hawks, kites, and their relatives, forming the family Accipitridae (Plates III through XIII), include the largest number of forms. They are mainly birds of medium to large size, with broad wings, strong legs, feet armed with sharp claws, and strongly hooked bills. Many possess light-colored eyes, which, with their active interest in any movement that might indicate possible prey, give them a fierce and aggressive appearance.

Although many have rapid flight, others are slower and more sluggish in habit. Most of them delight in soaring in great



Photograph by David T. Griggs

YOUNG EAGLES TAKE OFF FROM THEIR NEST IN ALASKA

In three years these birds will perfect their plumage and they may live to be centenarians. Eagles are not popular with Alaska fishermen, for they take heavy toll of the salmon going up streams to spawn.

circles high above the earth, where they are conspicuous and are visible for long distances. Some of the species of this family are among the largest of flying birds.

FALCONS CAPABLE OF SWIFT FLIGHT

The falcons, with their relatives the caracaras, the family Falconidae (Plates XIV, XV, XVI), in general are smaller in size than the members of the other group of hawks, and have longer, more pointed wings, which give them swifter flight that may be maintained at high speed for long distances.

Though some, such as the chimangos, or carrion hawks, and the caracaras, may be in part carrion feeders, the majority, the true falcons, are fiercely predatory hunters, in the true sense of the word, whose appearance strikes terror among other birds. The bill of the falcons, sharply pointed at the tip, has a projecting tooth on the margin that is of assistance in tearing their food.

The New World vultures, family Cathartidae (Plates I and II), although

hawklike in form of body and spread of wings, have relatively weak legs and feet which are not used to seize or carry prey. Their beaks, though strong, are not prominently hooked, and except for their flying muscles these birds are far less powerful than their relatives.

These are the scavengers among birds, for whom no food is too repulsive, that spend their days in scanning the surface of the earth for dead creatures on which they may feast. They are confined to the Americas, the carrion-eating vultures of other lands belonging to the Accipitridae.

The secretary bird, the only living species in the fourth family, Sagittariidae, one of the most remarkable birds of the entire order, stands nearly four feet high, having long, slender legs like those of a heron. Though it has strong wings, it ordinarily runs on the ground, traveling at need with great swiftness. It is found only in Africa, from the Anglo-Egyptian Sudan and Senegambia to Cape of Good Hope Province. It feeds on snakes, lizards, and various other animals, often killing them by stamping on them with its feet.



Photograph by William L. Finley

A FULL-GROWN CALIFORNIA CONDOR ENJOYS A SUN BATH

He differs from the South American members in dress, but not appreciably in size. His head and neck are much more colorful and there is no caruncle. The tremendous wing spread here shown gives this bird marvelous powers of flight.

The most aberrant types in the entire order are the American vultures, which are far removed from the hawks and eagles and in some ways have peculiarities that set them off from most other birds.

Aside from the peculiar types just mentioned, the various species of this order are fairly uniform in build and form, differing principally in length of legs, grasping power of claws, and size and degree of robustness of bill. Thus, the bill of the eagle is strong and heavy, but that of the everglade kite is extremely slender and elongated.

The bateleur eagle (*Terathopius ecaudatus*) has the tail so short that it does not project beyond the wings—an anomaly in a group that as a whole has long, strong tail feathers. In spite of this peculiarity, the bateleur sails with ease, using its wings as planes, though it is said to have difficulty in keeping aloft when there are no wind or air currents to assist it.

One of the striking phenomena of some of our American hawks has been the fall migrations, in which hundreds, or even thousands, move together in southward

flight. Years ago, in eastern Kansas, in the pleasant weather of October, it was usual to encounter flights of red-tailed and American rough-legged hawks, in which these splendid birds drifted steadily across the sky for hours in never-ending procession. Occasionally, attracted by rising currents of air over some hill slope, they paused to wheel in enormous spirals.

MIGRATION OF SOME HAWKS SPECTACULAR

Often I lay on soft grass, in the warm sun, watching several hundred of these hawks turning slowly through the sky, some at such an elevation that they looked no larger than swallows. On occasion I have seen similar flights of the Swainson's hawk of the western Plains, these birds traveling in bands on migrations that carry them far into South America.

The migration flights of the sharp-shinned and Cooper's hawks in the East are better known, though they are seen only in favored localities. Point Pelee, which projects as a long peninsula from the Canadian shore of Lake Erie, for many years has been famous for its hawk



Photograph from C. M. Wagner and W. Boesert

NEW JERSEY OSPREYS MADE WISE CHOICE OF HOME SITE

From their nest in an old telephone pole in Middlesex County the birds have a clear and unobstructed view of the surrounding country and easily may detect the approach of an enemy.

flights. In October, 1931, in the course of a few hours, I saw there several hundred sharp-shins drifting down with the north wind, alternately flapping their wings and sailing with pinions outstretched, passing without pause out over the waters of the lake toward the distant American shore.

While there were never many in sight at one time, they passed at intervals of two or three minutes in a steadily moving stream. Elsewhere in the fall I have observed Cooper's and sharp-shinned hawks scattered over the entire sky, moving steadily toward the south. These flights of hawks are most marked in fall, for

in spring the birds seem to travel northward over wider areas.

At a number of places it is regular practice to shoot these birds for sport, and many thousands have been killed in this manner. Occasionally, as near Cape May, New Jersey, they are used for food.

The different species of the hawk group vary widely in the extent of their migrations. Some, such as Swainson's hawk, make journeys that carry them from the western Plains south into Argentina, while others, such as the sparrow hawk, may be quite sedentary except in the northern sections of their range.

In general, birds of this group withdraw at least in part from the extreme northern areas that they inhabit, probably because food becomes scarce and difficult to obtain. The gyrfalcons, however, are typically northern, never coming far

south, and rough-legged and allied hawks course over the northern plains in the greatest extremes of cold weather.

FLIGHT METHODS VARY

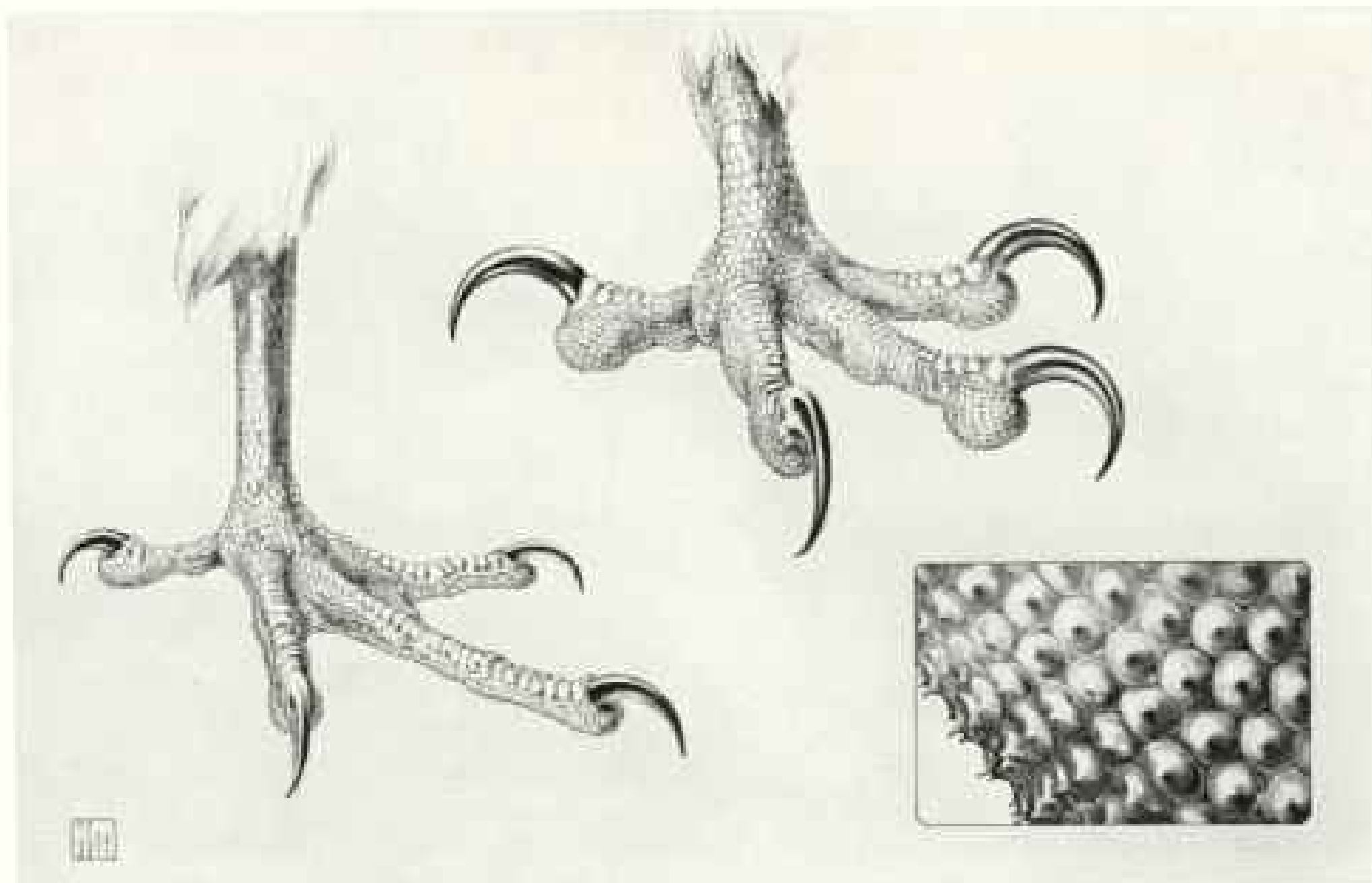
Flight in the hawklike birds varies considerably, according to the kind. Eagles, the large hawks, and the vultures, both of the New and Old Worlds, have broad wings which they flap slowly. Frequently they soar with set wings, utilizing air currents rising from the heated surface of the earth, or currents generated by winds. These birds frequently soar for hours with scarcely a wing beat, turning and wheeling in the sky, often at such



© Wright M. Pierce

COASTING HOME

The American osprey is a strong and graceful flyer. When about to land at the nest he sets his wings and coasts in (see "The Nest Life of the Osprey," by Capt. C. W. R. Knight, in the NATIONAL GEOGRAPHIC MAGAZINE for August, 1932).



Drawing by Hashime Murayama

TWO TYPES OF FEET FOUND IN THE HAWKLIKE BIRDS

The foot of the osprey, at right, illustrates the development for grasping and holding, characteristic of the predatory forms of falcons and hawks. The foot of the turkey vulture, at left, is a weaker type, fitted for walking and perching and not for seizing living prey. The inset shows an enlarged view, magnified four times, of the spines on the foot pads of the osprey, which enable it to hold slippery fish, an arrangement found only in this species.



© Press Cliche

TRIBESMEN OF RUSSIAN CENTRAL ASIA SET OFF FOR A DAY'S SPORT WITH THEIR HUNTING EAGLES



Photograph by Capt. Collingwood Ingram

A REMINDER OF THE DAYS WHEN HAWKING WAS THE SPORT OF KINGS

Very few practice the sport now, but in medieval days it was an aristocratic pastime, with more than one royal devotee. The falcon has just dispatched its quarry on Salisbury Plain, England.

altitudes that they appear as mere specks against the blue

The turkey vulture is a well-known species that is particularly adept in this art. In fact, it finds this method of progression so adapted to its needs that frequently it remains in its roost through the day when the air is heavy and still.

The falcons have longer, more pointed wings, that enable them to fly with great speed, and, though they may enjoy soaring, they do not practice this so constantly as the other hawks. The larger species can capture the swiftest-flying sandpipers and ducks on the wing without the slightest difficulty.

THE DUCK HAWK IS A DESPOT OF THE AIR

The flight of the duck hawk, perhaps the best known of the falcons, is truly exhilarating to watch, as it is executed with a dash and vigor that mark it from that of all other birds.

On the Bear River marshes, at the northern end of Great Salt Lake, in Utah, I have spent many hours in observing this falcon, both in its hunting and when at play.

The birds at rest perched in low willows, or on logs or bits of drift, where they had clear view of the teeming bird life about them. When hungry, they dashed across the open flats at high speed, striking ruthlessly at any birds that appeared, from small sandpipers to large ducks.

Their appearance in the air was always the signal for chattering cries of alarm from blackbirds and avocets that put all



Photograph by W. L. Finley and H. T. Rohlfman

ALMOST READY TO LEAVE HOME

This young golden eagle is about ready to fare forth from the eyrie, which has been his home for two months, and start learning how to make a living for himself out in the world. His parents are stern but effective teachers, and when they finally drive him away he will be well versed in the lore of the wild.

their bird neighbors on the watch. These warnings had little effect, however, as the duck hawk, killing practically at will, was truly despot of this realm.

I have seen this falcon dash through closely massed flocks of flying sandpipers, striking out two or three with as many thrusts of the claws, allowing each bird to drop and then wheeling swiftly to seize the falling prey in mid-air before it reached the ground. Again, I have seen one in a stoop, swift almost as light, knock a redhead duck to the ground, where it landed with a broken wing and other injuries.



Photograph by Dr. A. A. Allen

SWALLOW-TAILED KITES SOAR AND CIRCLE ALOFT WITH BUOYANT GRACE

So well provided with wing and tail surface are these larger prototypes of the barn swallows that they spend nearly all of their time in the air. They even feed in the air, often on small water snakes, which they deftly snatch from among the reeds and devour aloft.

On one occasion a pair of duck hawks harried a helpless nighthawk, stooping at it playfully until one in passing gave it a quick squeeze with one foot. It then allowed the nighthawk to fall, when it was seized by the other duck hawk. Then the pair flew away, and the one with the booty at intervals dropped it, so that it could be seized in air by its mate.

THE DUCK HAWK A PRACTICAL JOKER

When not hungry, the duck hawk, feeling its superior strength, frequently indulges in harmless play at the expense of its bird neighbors.

Often I have seen them flying along the river channels, driving ahead of them a motley flock of blackbirds, herons, avocets, and other birds, herding them in disorder like sheep, but without offering to harm them. Again, as night herons flew ahead of my launch, a duck hawk would dart at them repeatedly, forcing them down lower and lower, until finally, with protesting squawks, they struck the water. They were not allowed to rise, but had to swim into the shelter of the willows to escape.

One pleasant afternoon in fall I heard a great roaring of wings overhead and looked up to see a cormorant that a few minutes before had been soaring peacefully high in air, dashing down with set wings toward the river, with a duck hawk a few feet behind. Just above the water the hawk suddenly accelerated, tapped the cormorant lightly on the back, then circled easily away, while the frightened quarry took refuge unharmed in the water. Frequently falcons at play dashed at top speed through milling flocks of flying sandpipers, scattering them like leaves in the wind, but not striking any of them.

The food of birds of the hawk group is highly varied, though it is taken entirely from the animal kingdom. The larger species of falcons subsist mainly on various kinds of birds and small mammals, but the smaller kinds, such as sparrow hawks and falconets, eat lizards, grasshoppers and other insects, and mice. The common red-tailed hawks and their allies, known universally as "chicken hawks," may on occasion eat birds or even visit hen-yards for prey, but confine their attention prin-



Photograph by Dr. A. A. Allen

LOOKING OUT ON THE WORLD FROM A MOSSY NEST

Mr. and Mrs. Kite, of the swallow-tailed kites, built their home in the top of a tall tree near a watercourse. Dry twigs, sticks, hay, and moss were used. The birds of this family breed over a wide range of territory and incubation may start any time from March to June.

cially to mice and rats. Therefore, they are in the main beneficial, as they destroy large numbers of rodents that are injurious to crops and orchards.

VULTURES AS "BONE-BREAKERS"

The bearded vultures of the Old World are said to carry turtles and large bones from the carcasses of dead animals to a great height, in order to drop them on rocks, where they break open so that the bird can eat the marrow. From this habit the Spanish call these birds *quebrantahuesos*, signifying "bone-breakers." The ancient naturalist Pliny relates that the Greek poet Æschylus (who died 456 B. C.) met untimely death when one of these vultures, mistaking his bald head for a stone, dropped a tortoise on it from the air!

Some species of hawks, particularly certain forms that range in the Tropics, eat snakes as their principal food. There is one group of species found in India and adjacent regions in which this habit is so constant that the birds are known as "serpent eagles." The osprey and some of the

sea eagles confine their attention mainly to fish, which they capture alive by plunging after them as they approach the surface of the water.

As their name implies, the peculiar bat-eating hawks (*Machærahamphus alcinus*) from the East Indies and Africa feed on bats. Since these hawks capture their prey on the wing, they are abroad in the evening and early morning, being at least partly nocturnal in habit. The honey buzzards of the Old World (*Pernis*) are fond of honey and of the immature stages of bees.

Swainson's hawk, a bird of large size, feeds extensively on grasshoppers, the broad-winged hawk is fond of frogs, the everglade kite subsists on large fresh-water snails, and the powerful harpy eagle feeds regularly on monkeys.

Possibly the strangest food in the group is the repulsive carrion eaten by the vultures. These birds spend the daylight hours soaring in the air, while they scan the earth below them in search of dead animals that may supply food. Small animals, dead fish, and birds are bolted entire or are torn into suitable fragments. The



Photograph by American Colony, Jerusalem

A BEDOUIN OF TRANS-JORDAN WITH HIS HUNTING FALCON

skin on large carcasses may resist the bills of the scavengers until softened by putrefaction, when the birds gorge on a meal of the utmost repulsiveness (see page 56).

While we may turn in physical revulsion from contemplation of this habit, we may ponder on the adaptations that seemingly give these birds absolute immunity to the poisons, generated in decaying flesh, that would destroy any creature of ordinary digestion.

The bird-eating hawks pluck most of the feathers from their prey and then tear the flesh into bits that may be swallowed. Mice are often swallowed whole, but rabbits and mammals of similar size may be partly skinned and the feet may be discarded.

The food passes down into a stomach that is thin-walled and capable of considerable distention, and in the throat there is developed a distensible crop that holds a large amount of food until the stomach is ready to receive it.

Bones, feathers, fur, and other hard elements that cannot be digested are formed into pellets and regurgitated to leave the stomach empty for another meal. These pellets accumulate beneath favored perches and offer a valuable index to the food preferences of these birds. Hawks, falcons, and eagles carry food in their talons to their young in the nest, but vultures, which do not have powerful feet and legs, feed their young by regurgitating the contents of the stomach.

Whether the carrion-feeding vultures locate the carcasses on which they feed through sight or through the sense of smell has been a subject of much controversy among naturalists, and, in spite of many observations on these abundant birds, it is far from being a settled question.

VULTURES POSSESS KEEN SIGHT

One group of observers contends that, as these birds soar back and forth through rising currents of air or against the wind, sometimes at high and sometimes at low elevations, they encounter the odor from carrion and follow this scent to its source. Others believe that in their flight the piercing eyesight of these birds brings to view possible sources of sustenance, and that vision accounts for the facility with which vultures locate their food.



AFTER FIVE WEEKS IN THE NEST, YOUNG DUCK HAWKS TEST THEIR WINGS

As soon as feathers began to develop, the young birds flapped their wings vigorously, often tipping themselves over in the process and sending bits of down flying in all directions. This nest is near Hanover, New Hampshire.



Photographs by C. A. Proctor and B. B. Leavitt

STANDING GUARD NEAR HIS NEST

Duck hawks are strong and courageous, and this one, having just alighted on the nesting shelf, seems to be challenging anyone or anything to try conclusions with him. The duck hawks are the nearest American relatives of the peregrine falcons, famous hunters of the Old World.



Photograph by George Shiras, 1d

A DUCK HAWK FINDS HIS PREY A WOODEN DECOY: SANDUSKY BAY, OHIO

The hunting method usually pursued by these birds is to rise in spirals until directly above the victim, and then to drop swiftly upon it. However, they are fast flyers and are capable of catching other birds in direct chase.



Photograph by C. A. Proctor and B. B. Leavitt

LUNCH TIME IN A DUCK-HAWK NEST NEAR HANOVER, NEW HAMPSHIRE

The fifteen-day-old youngsters have been expressing their appetites vocally and their complaints are at last producing results. The menu consisted entirely of birds, and, when the victim was small, only wing and tail feathers were wasted. A small bird's claw may be seen projecting from the bill of one of the chicks.



Photograph by Dr. A. A. Allen

A PAIR OF DUCK HAWKS HAVE CHOSEN FOR THEIR NESTING PLACE A HIGH AND SECLUDED LEDGE NEAR TAUGHANNOCK FALLS, NEW YORK STATE

The eggs were laid on the shelf of rock in the lower left foreground, where the young birds may be seen. One of their parents keeps a watchful eye out to see that no danger threatens them. The falls are 215 feet high, which is higher than Niagara Falls.

In warm weather, proponents of the scent theory have concealed bodies of animals so that they could not be seen, and claim that in a short time, as the carcasses became odoriferous, turkey vultures gathered. Even though the carrion was so concealed in buildings or under other cover that the birds could not get at it, they remained on hand, attracted by the odors, in the attempt to locate this potential food supply. Experiments dealing with this matter began in the days of Audubon and have been continued by other naturalists until the present day.

There is not the slightest question but that the turkey vulture will find food that is concealed in such a way as to be en-

tirely invisible to a bird overhead, even though such a bird may be only a few feet distant. However, in most alleged instances of location by scent, keen sight has probably played some part.

That the turkey vulture is an observant creature, with keen perception where food is concerned, is obvious if one watches it a little, though there may be doubt as to the extent of its intelligence in other respects. These birds regularly patrol beaches to obtain dead fish, and recently have learned to watch the modern hard-surfaced roads, where speeding automobiles are constantly killing small birds, snakes, rabbits, cats, and other animals.

Also, they seem to know that the



Photograph by Alistair Schallick

UNOFFICIAL HEALTH OFFICERS KEEP THE BEACH CLEAN AT SANTOS, BRAZIL.

These carrion-eating vultures dispose of carcasses quickly and efficiently and the law forbids anyone to shoot them. The picture shows a group of the birds at their highly essential work.

movements of men through the country will bear scrutiny, as frequently men leave behind them food in the form of animals killed, or offal from large bodies that have been butchered.

To test this, it is necessary only to sit on the open ground while skinning a rabbit or some large bird, and if you are in a region where turkey buzzards are common, it will be only a few moments until one or two are wheeling overhead. If there is promise of food, they remain; if not, they continue their search elsewhere.

In South America yellow-headed buzzards (*Cathartes urubitinga*) have followed me into woodland where I was seated on the ground entirely concealed and engaged in examining birds that I had killed for specimens. The buzzards alighted a few feet away to watch me curiously. I have had buzzards come to eat the flesh from carcasses of their own kind which I had skinned where I had shot the birds. Possibly this was unintentional cannibalism, as there was nothing about the bodies to distinguish them from the skinned bodies of any other birds.

There can be no doubt that the buzzard has learned to watch the actions of dogs whose activities may indicate the presence of carrion concealed in caves or holes. There is also the probability that the presence of buzzing flesh flies that breed in carrion may be an indication to the buzzard of a concealed food supply. Therefore, admitting that the turkey buzzard has a well-developed olfactory nerve, and thus might be expected to have some sense of smell, to me present evidence indicates that it finds its food mainly, if not entirely, through its acute sense of sight.

MAN'S HAND IS AGAINST THE HAWK TRIBE

The hand of civilized man has been raised universally against the hawk tribe, and birds of this group are shot or otherwise destroyed at every opportunity. It is rare, indeed, for hawks to come within gun range of a hunter without receiving a charge of shot, and they are killed in many localities by setting steel traps on the tops of posts or poles that the birds utilize as perches.

In England it is the duty of gamekeepers to kill all "vermin" that appear on the property under their charge, hawks being included in this category. On a large estate near the Thames I once saw a

"keeper's larder" where, near a frequented path, the gamekeeper had hung up his kills for display. These included the drying skeletons of sparrow hawks (a species related to the American sharp-shinned hawk), kestrels (allied to the American sparrow hawk), magpies, and jays, with a few small predatory mammals.

Belief in the destructiveness of hawks is almost universal. In most minds there is no distinction between hawks that habitually prey on birds and may destroy a certain amount of game, and the sluggish, heavy-flying species that feed consistently on wild mice and other destructive rodents, and so are beneficial to man.

The game commissions of many States have offered bounties for the heads of hawks and have expended hundreds of thousands of dollars in the destruction of untold thousands of them. The result is that in the eastern half of the United States these birds have decreased to less than a tenth of their former abundance.

Since the decrease has affected the beneficial kinds even more heavily than those that are classed as injurious, there has been an increase in destructive rodents formerly held in check by hawks, with the result that these animals have done severe damage to agricultural interests.

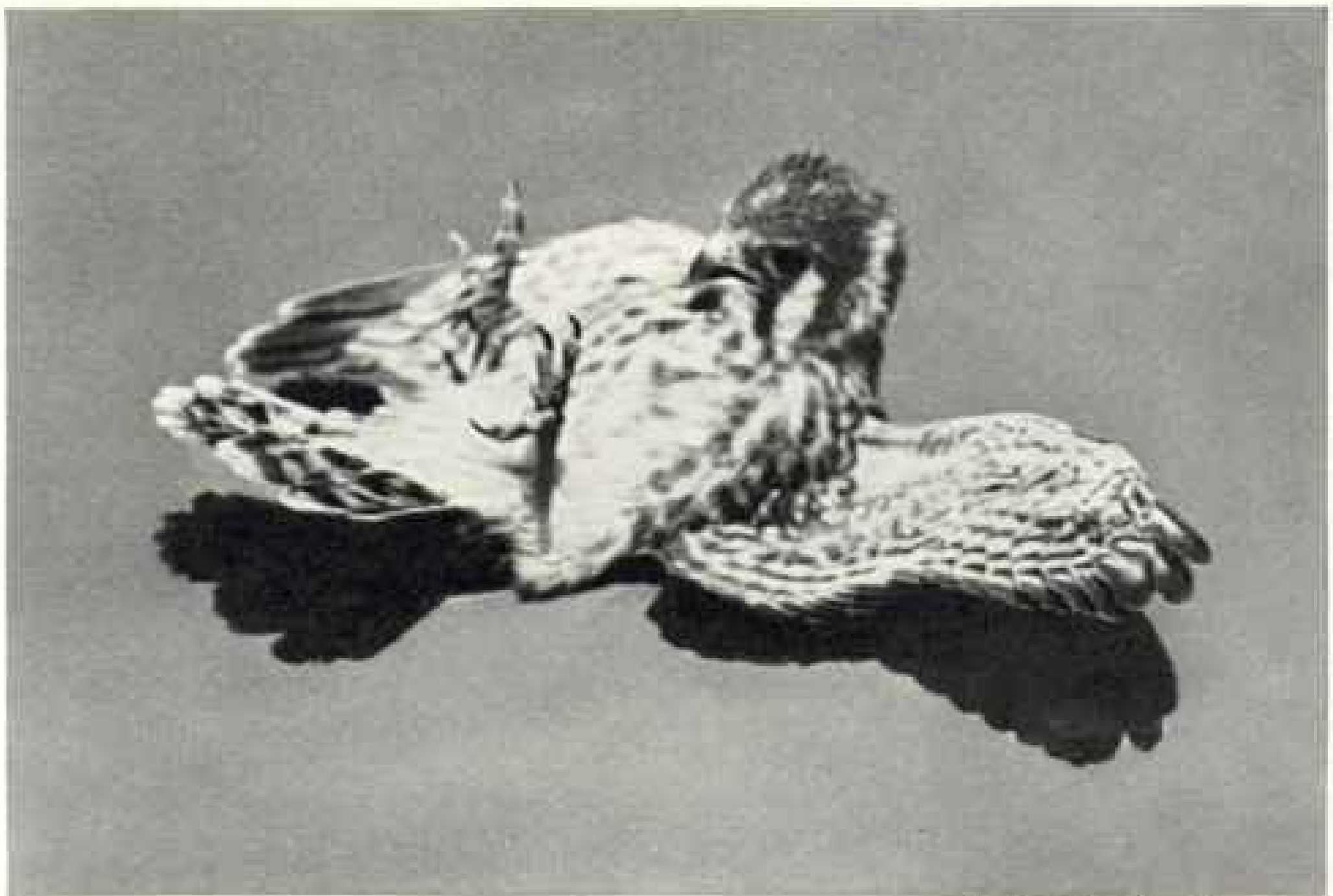
The Cooper's hawk and the goshawk are the principal species that are destructive to game, with the marsh hawk to be added in certain localities where pheasants and other game birds that range in the open are concerned. It may be permissible to keep these hawks in check, and to include among those to be killed the occasional individual of the red-tailed hawk or other species that acquires the habit of coming to the farmyard for chickens. There is, however, no excuse whatever for the widespread slaughter of all kinds of hawks that has been the fate of these birds for years.

Sportsmen have justified the indiscriminate killing of hawks on the ground that they were conserving game; in other words, with the excuse that they were providing more game for men to kill. Nowadays, with nature lovers, who do not hunt, equaling sportsmen in numbers, some consideration may be given to the rights of those who enjoy seeing hawks alive and studying their interesting ways, aside from the value that most of these birds have from their beneficial food habits.



Photograph by William L. and Irene Finley

WEIGHING FROM 20 TO 25 POUNDS, THIS OLD CONDOR HAD TO BACK-PADDELE VIGOROUSLY IN LANDING ON THE PERCH



Photograph by Dr. A. A. Allen

DOWN BUT NOT OUT

A young sparrow hawk, not at all sure of the photographer's good intentions, assumes a characteristic defensive attitude. However, despite the belligerent pose, this species is perhaps the most friendly and sociable of all the hawks. When fully grown, the bird will not measure a foot in length.

Action should be directed against the injurious individuals rather than toward the group as a whole, for the killing of most hawks is as foolish a policy as would be the wholesale destruction of any other element that contributes to our welfare.

The majestic bald eagle, our national bird, has also fallen under the displeasure of some farmers and has been rather relentlessly hunted.

Bird lovers have taken up the fight on behalf of this great bird of freedom, declaring that he has been misrepresented and that his occasional thefts of poultry are more than offset by services in keeping our beaches clean of dead fish.

ABILITY OF EAGLES TO CARRY WEIGHT EXAGGERATED

The carrying or lifting power of hawks and eagles has been frequently exaggerated. The largest eagles can carry off young lambs and fawns, but in these the weight is not great. In observations in Montana, Cameron found that the golden eagle could bear away jack rabbits that weighed seven pounds or more. One seized and bore aloft a small cat, but dropped it quickly when the cat realized its plight and got into action.

Larger prey may be killed, but it is eaten on the spot and not carried away. Though the strongest eagles may be able to raise a weight of 10 or 12 pounds, it is doubtful whether they could carry this for more than a few feet.



Photograph by Charles Martin

A SOUTH AMERICAN CONDOR WHOSE PERMANENT RESIDENCE IS WASHINGTON, D. C.

This monarch of the Andes is one of the prime attractions in the fine collection of birds, animals, and reptiles housed in the National Zoological Park. The bare skin of his head, neck, and caruncle is dull red, and contrasts sharply with the white "fur" collar and dark plumage.

The hawk tribe consists of fierce, aggressive birds, and there is widespread belief in stories of eagles attempting to carry off children. Probably such tales are based in the main on the fierce manner in which these birds often swoop at those who intrude near their nests.

In Greek mythology we read the fanciful story of Ganymede, the beautiful Phrygian shepherd boy who was carried off by an eagle to Olympus to serve as cup-bearer to the gods. Also, in every mountainous country where there are eagles,



Photograph by William L. and Irene Finley

NEARLY EIGHT WEEKS OLD AND HARDLY HANDSOME

A young California condor still in the downy stage, whose feet seem to be growing faster than the rest of him.

there are current stories of the predatory attacks of these birds on children.

Possibly in primitive times, if small babies were left exposed, an eagle might have attacked them, just as it would a kid or a lamb under the same circumstances; but such a happening in the present day would be quite improbable.

In the Philippine Islands the powerful monkey-eating eagle (*Pithecophaga jefferyi*), a bird weighing from 16 to 20 pounds, is believed by the natives to attack men. R. C. McGregor was told of an instance where one of these birds, in protecting its nest, killed a Negrito; but he did not place entire credence in the story, as it came to him through hearsay.

When their nests are disturbed, falcons and other hawks swoop fiercely at the heads of intruders, and on occasion may actually strike a climber and cut him with their claws. But such attacks are usually more threatening than serious, though they are executed with a vicious dash that might well frighten the timorous.

Among the Indians of North America is a widespread belief in a "thunder bird"

of huge size. The legend may be based on former wide distribution of the California condor, or possibly on the extinct condor known as *Teratornis merriami*, a huge bird whose bones are found in Ice Age fossil deposits in California and Florida.

SOME HAWKS WHISTLE, CHATTER, AND LAUGH

The voice of most hawks is a harsh sound that in many instances is as wild in tone as the fierce birds themselves. Uttered as they float on broad pinions high in air, the weird cadences of their screams seem fitting and appropriate to the spreading landscapes they survey. Some species utter piercing whistles, others chattering calls. In some the notes are quite pleasing, though none possesses what might be termed a song. The adult turkey vulture is entirely silent except for a hiss, though the young are vociferous.

The strangest notes that I have heard from birds of this group have come from the handsome laughing falcons (*Herpethores cachinnans*) of the American Tropics. My first experience with these



© William L. Finley

"LET ME WHISPER IN YOUR EAR"

These old condors showed great affection for each other and for their chick. Condors do not nest every year, and raise only one chick when they do.

birds was in the Argentine Chaco near the Pilcomayo River, at that time a wild region where ranchers were just beginning to invade the territory of the primitive Toba Indians.

On my first evening in this remote section, I was engaged at twilight in setting traps for little animals at the edge of a forest. I remained on the alert for any possible dangers in a country that was new to me, as many tales had been told regarding the Indians.

Suddenly, through the trees a hundred yards away, came a loud shouting sound, repeated steadily, then varied at short intervals with a series of other calls, all uttered in curiously human tones. After a minute or two, another voice joined the first, and the two called rapidly in a strange medley that left me completely puzzled as to whether the authors were bird, beast, or human, as I crouched among the bushes, gun in hand, with my skin tingling pleasantly at the thrill of the unknown in a strange and possibly dangerous land.

It was a day or two later that I traced these weird, unearthly duets to the large, white-headed, bushy-crested laughing fal-

cons that were found everywhere through the forests.

The flight and appearance of hawks and other birds, and certain of their anatomical features, were used by the augurs of ancient Rome in their prophecies of the future.

INDIANS USE EAGLE FEATHERS AS
ADORNMENT

A more practical use of these birds was found among the North American Indians, particularly of the Plains and Pueblo groups, when beautiful headdresses were made from the large feathers of the golden eagle, and other ornaments and decorations were fashioned from the smaller feathers of this bird and from the feathers of hawks. The downy bases of the eagle feathers sometimes were twisted in strands that were woven into feather blankets of a peculiar and interesting type. Hawks and eagle claws were used to make necklaces and other decorations.

The Pueblo Indians kept hawks in captivity, as they did turkeys and macaws, presumably to use their feathers in their prayers and decorations. Numbers of

bones of eagles and hawks were found in the excavations of the National Geographic Society at Pueblo Bonito. In some cases certain rooms seem to have been given up to these birds.

Occasionally hawks have been eaten for human food, but this is not a widespread practice. In Puerto Rico and Haiti I found that in some sections the natives considered the red-tailed hawk an excellent meat. The sharp-shinned hawk is eaten occasionally in the United States. From personal experience I can say that they have a fair flavor.

HAWKS USED BY MAN IN HUNTING

From the earliest times of which we have record, hawks of various kinds have been trained by man for use in hunting.*

For this purpose young hawks are taken from the nest, or adult birds are trapped alive. In either case, the birds are accustomed to man and his ways and are trained to come to be fed until they are tame and can be handled. They have the eyes covered with a soft leather hood and thongs attached to their legs, by which they may be tethered if desired. In hunting, trained hawks are taken afield until game is sighted, when the hood is removed, so that the hawk may sight the quarry.

As it flies, the hawk ordinarily maneuvers so as to rise and strike down at the game from above. In the case of wily, fast-flying birds, there is often a prolonged pursuit, in which only the most skillful hawk may hope to be victorious.

The peregrine falcon, distributed over most of the world, has been a favorite with hawkers, because it is fierce and at the same time is tractable in training. Several other falcons have been used, but to less extent.

These birds kill their prey in swift flight in air, striking a quick blow with the foot that knocks the victim end over end and frequently kills it outright. The goshawk is also used in hunting. This species kills in short, swift flight, bears its prey to the ground, and holds fast with its long claws until its quarry is dead.

Among native peoples of Central Asia, the golden eagle is trained to hunt small antelopes, foxes, and even wolves. These

heavy birds are carried afield perched on horses or on stands swung between two horses. In some cases they rest on a heavy leathern gauntlet on the forearm of the hunter, whose arm is supported in a forked stick resting in the stirrup (p. 48).

Scenes depicting hunting with hawks are found among the ancient paintings in the tombs of Egypt, and this sport was well known in India, Asia, and Europe at a very early date. Practiced originally to obtain wild game for food, it finally developed into the sport of the nobility and the wealthy. Though it fell into decadence with the development of gunpowder and guns, it is even practiced to-day in a limited way, both abroad and in our own country.

Though most birds of the hawk group range from large to medium in size, there is considerable variation in this respect.

The smallest are the little falconets of the Indian region and Africa. They are not much larger than bluebirds, but are as fierce as the largest falcons. They eat many insects and also kill small birds and mammals. They have been known to kill birds four times their own weight, and are so aggressive that in captivity they often dominate other hawks much larger and stronger.

The largest members of the group are the larger vultures of the Old World and the condors of America, which reach a length of 40 to 50 inches, with a spread of wings that is broad in proportion.

The nests and eggs of hawks vary widely in location and appearance. The majority build nests of sticks and branches in trees, where they are often located at a considerable height from the ground. Some of the larger eagles and vultures nest on cliffs and rock ledges, where the sites may be reached only by the boldest of climbers.

Marsh hawks nest on the ground in prairie or marsh regions; sparrow hawks occupy holes in trees. Falcons lay their eggs in cavities in the face of cliffs, or, in some species like the hobby (*Falco subbuteo*) of Europe, occupy the abandoned nests of other hawks or of rooks and similar birds.

In some species the same nesting site is used for many years in succession. Since new material is added annually to the nest, in many cases it may grow to huge proportions. This is especially true with birds like the ospreys and eagles.

* See "Falconry, the Sport of Kings," by Louis Agassiz Fuertes, in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1920.



Photograph by George E. Stone

GALÁPAGOS HAWKS HAVE NEVER LEARNED THE FEAR OF MAN

The wild life of these Ecuadorian islands has evolved in almost complete isolation, and as a result has always been tame. The confidence which hawks have reposed in the human race has often been abused, but for some reason they are still outstanding in their fearlessness. The tree is a bursera, the small leaves of which are short-lived, leaving it bare most of the time. Its bark exudes an aromatic scent when it is brushed.

The eggs of this group are moderate in size relative to the bulk of the parent, particularly when the larger species are considered. They have strong, heavy shells, usually with roughly granular surface. In some instances the eggs are plain white, bluish white, or greenish white, but in most there are markings of brown, which appear slaty where overlaid by a thin film of the calcareous shell.

The eggs of most falcons are heavily spotted with reddish brown, being among the most handsomely and richly marked known.

Many species exhibit considerable diversity in the extent and amount of markings, the eggs in some cases varying from plain white without markings to those that have the background completely obscured by a heavy wash of warm color.

CALIFORNIA CONDOR

(*Gymnogyps californianus*)

The California condor shares with the condor of South America the honor of being the largest living hawklike bird found in the New World, exceeding in size the largest of the eagles, and being much larger than its relatives, the turkey and black vultures.

Formerly quite abundant, according to recent estimate by Mr. Harry Harris, possibly ten individuals still exist in California. Little is known of them in Baja California, save that Indians hunt them for ceremonial purposes. But it is certain that few remain, and the species is one that may easily become extinct.

In days past, the California condor ranged into open valleys and other regions where it was easily accessible, but, to see it now, it is usually necessary to penetrate the wildest and most difficult mountain sections.

CONDORS ARE EASILY DISTINGUISHED

By those who penetrate its haunts, the condor is confused with no other bird. Straining eyes may examine distant eagles and turkey buzzards, but when a condor is sighted there is no mistaking it for its smaller relatives. Its enormous size and the broad sweep of its wings distinguish it almost at a glance when it is far distant. When nearer at hand it is marked by prominent white patches on the under side of the wings.

The condor uses soaring flight as consistently as does the turkey vulture, but is more a master of the air and can travel at higher speed. The birds range widely over the mountains, but seem to have certain limits within which they may be found at all seasons of the year. Several may occur together, except during the nesting season, when they separate into pairs and resent intrusion of others.

Although not ordinarily quarrelsome, it is said that, when provoked, the condor can drive the golden eagle from its haunts.

The food of the condor is composed of the flesh of dead animals, either fresh or in a state of decay. The feet are not adapted for seizing, but the birds hold down their food while they tear it apart with their strong bills. A diet of carrion would seem to be taken partly because the birds have no other choice. In captivity they are fed

on fresh meat, and some individuals, when accustomed to this ration, have refused to take flesh that was at all tainted.

The size of the California condor is indicated by its wing spread, which ranges by actual measurement from 8 feet 4 inches to 9 feet 9 inches. There are numerous reports of birds with a breadth of wing in excess of the maximum given, but these seem to be based on estimate and have not been substantiated. Though many statements that attribute larger size to the South American condor have been made, authentic measurements indicate that it and the California condor are similar in size.

The California condor places its single egg on the bare surface in a recess, cave, or pothole on a rocky cliff, often in a cavern formed by leaning slabs of stone, and formerly was reported nesting in hollow tree trunks and hollow logs. The egg, found from January to March, is white with a bluish or greenish tinge, and measures about 4½ by 2½ inches, or about the size of the egg of the domestic goose.

The young when hatched are covered with white down, except for the head, which is bare. From captive individuals it appears that these birds are not adult until they are more than three years old. Young birds utter curious hissing, growling calls, but adults are silent.

The nestlings grow slowly and are under parental care for about six months before they are able to fly. They seem to have greater longevity than most birds, since three living in captivity in the National Zoological Park in Washington, D. C., are now thirty years or more old.

AGES AGO THIS MIGHTY BIRD RANGED EAST TO FLORIDA

The California condor in historic times ranged from the Columbia River south along the western slopes of the Sierra Nevada, and from Humboldt County, in the same State, through the Coast Ranges into northern Baja California, extending casually into Oregon, Washington, and southeastern California.

It is now confined to the Coast Ranges in northern Ventura County, southwestern Kern County, and southeastern Santa Barbara County, and to the San Pedro Martir Range of northern Baja California. Its bones are found in ancient caves in Texas, Nevada, and New Mexico, and in Ice Age deposits in Florida.

EAGLES, HAWKS, AND VULTURES



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These figures are approximately one-tenth natural size

CALIFORNIA CONDOR

Bird on perch and one flying best by, adults; upper and lower flying figures, immature



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BLACK VULTURE

Upper

Approximately one-eighth natural size

TURKEY VULTURE

Lower

BLACK VULTURE*(Coragyps atratus atratus)*

The black vulture is distinguished from the turkey buzzard, even at a distance, by its short, square-ended tail, and by the peculiar method of flight in which the wings are flapped rapidly, followed by a short sail with stiffly extended pinions. Large light patches across the ends of the wings form another prominent mark for field identification.

The black vulture subsists on carrion, and often gathers in greedy hordes that soon leave the bones of large carcasses picked clean. It is active and aggressive, and at its feasts will drive away the meeker-spirited turkey vulture. It is said to kill young chickens, young pigs, and lambs when opportunity offers, so at times it may be quite destructive.

Occasionally it utters a low, guttural note, quickly repeated, that is barely audible a hundred yards away.

Because of their scavenger services, these birds are seldom molested and often become so tame as to be almost domestic, coming into towns to feed familiarly with dogs on refuse in the streets and barely moving aside to avoid passing animals or men.

They often frequent heron and pelican rookeries, where they pick up dead fish beneath the nests, and also swallow young birds left unprotected.

The nest is placed on the ground, usually under dense bushes, but occasionally in hollow trees, logs, or recesses beneath boulders. The eggs rest on leaves or on the bare ground. Where abundant, the birds often breed in colonies. Two eggs constitute the usual set, with one or three found occasionally. The color is light green, spotted rather sparingly with brown and lavender.

The young when hatched are covered with buff-colored down quite different from the white found in the turkey vulture. The nestlings are fed entirely by regurgitation.

These birds are not known to carry food or any other object, either in the feet or in the bill.

The black vulture is found from western Texas, southern Illinois, and southern Maryland south into Mexico and Central America, being recorded casually north of its regular range. An allied form is known in South America.

TURKEY VULTURE*(Cathartes aura septentrionalis)*

A master of the art of soaring, the turkey vulture or turkey buzzard wheels in the sky by the hour, turning in lazy circles and spirals, seldom moving the wings except to adjust them to the air currents through which it moves to maintain its elevation. Although graceful on the wing, when at rest all attractiveness of appearance is lost.

With broad wings folded against its relatively slender body, its bare head and its awkward attitude, the buzzard seems uncouth or even repulsive.

Like other members of the family, it subsists on the bodies of dead creatures, eaten fresh or in advanced stages of decomposition. I have had them come to tear the flesh from the body of a dead bird that I had just skinned, and have found them feasting on putrid flesh.

WINDLESS DAYS KEEP THE BUZZARD AT HOME

Turkey vultures by day cover wide areas in search of food, and at night gather to sleep in some tract of woodland, several hundred often congregating in one roost. In early morning they sit with wings expanded to catch the warmth of the sun, and on dull, cloudy days, when the air is still, may remain in their roosts throughout the day, as without moving currents of air they find flying difficult.

The turkey vulture places its nest in some recess beneath large boulders, in a hollow log or tree, or in sheltered situations beneath shrubs. The handsome eggs, usually two in number, rarely one or three, are creamy white, spotted with brown and lavender. Occasionally one is found without markings.

The young bird when disturbed utters a curious growling, hissing call, like some angry cat, turning its back the while and striking the ground sharply with the tips of its spread wings in a manner that is truly startling. The adult is silent except for a hiss made by expelling its breath from the windpipe.

The turkey vulture ranges from southern British Columbia, Wisconsin, and central New York south into northern Mexico. Closely allied races extend through Cuba and Central and South America to the Falkland Islands. The bird has been introduced into Puerto Rico.

SWALLOW-TAILED KITE*(Elanoides forficatus forficatus)*

The swallow-tailed kite, delighting in its aerial powers, spends hours on the wing wheeling and turning without apparent effort. The deeply forked tail, the white plumage, and black wings and tail form unmistakable marks for field identification.

This species feeds extensively on snakes and also eats lizards and large insects. All food is seized expertly in the feet, and the birds customarily eat while flying, tearing their prey apart with their bills. They are believed to be entirely beneficial.

The nest of the swallow-tailed kite is built in trees, often from 60 to 125 feet from the ground, and is composed of twigs and moss, the nesting material being seized while flying. Two eggs generally constitute a set, although from one to four may be found. These vary in ground color from dull white to a delicate cream, and are spotted and blotched with brown. The call is shrill and high-pitched, being heard mainly during the nesting season.

Formerly this beautiful hawk was common throughout the eastern United States, but in the last 30 years its numbers have lessened steadily, and now it is found mainly in the southern section.

The species breeds locally from Minnesota, Indiana, and North Carolina south into Florida and eastern Mexico, wintering south of the United States. An allied form is found in Central and South America.

MISSISSIPPI KITE*(Ictinia mississippiensis)*

The Mississippi kite is another species that spends hours in the air in tireless movement.

The food of this bird consists principally of insects, with occasional reptiles and frogs. I once encountered a band of a dozen coursing over a range of low hills, and at intervals darting down to seize a cicada. Held in the hawk's foot, the insect buzzed protestingly until, without a pause in the bird's flight, it was swallowed.

The Mississippi kite builds a small nest composed of twigs, in part with leaves still attached, placed in trees from 25 to 60 feet from the ground. The birds breed in May and June, later in the season than most species of this family.

The eggs number two or three and are pale bluish white, without markings, though often stained by the decaying green leaves of the nest lining. Only one brood is reared each season. The immature bird in the first fall is whitish below, streaked with dark brown and buffy.

This kite nests from northeastern Kansas, southern Illinois, and South Carolina south to Texas and Florida. In winter it is found from Florida and Texas to Guatemala. It has been noted casually from Colorado to Pennsylvania and New Jersey.

WHITE-TAILED KITE*(Elanus leucurus majusculus)*

Like related kites, this species is master of the air and flies with extreme ease and skill. It delights in high winds, breasting them like a gull without the slightest difficulty.

It is found over tree-dotted prairies and savannas, marshes, and semi-open valleys. Though fifty years ago it was common, it has decreased steadily until now it is to be classed among our unusual birds. Despite the fact that it has been afforded protection in recent years, the species does not seem able to increase.

The white-tailed kite, in feeding, frequently hovers with rapidly beating wings over one spot for several minutes, watching the vegetation beneath closely, ready to pounce down whenever prey appears. It lives on small snakes, lizards, frogs, and large insects, and seems to be entirely beneficial.

The note of this kite is said to be somewhat like that of the osprey, but terminating in a guttural or grating sound.

The nest, built of twigs and lined with soft materials, is placed from 25 to 50 feet from the ground.

The eggs, varying from three to five, are creamy white, heavily marked with blotches of brown. The young have the plumage tinged with brown and are indistinctly streaked above.

The white-tailed kite is found in California from the upper Sacramento Valley and Humboldt County, south to northern Baja California, and from Texas, Oklahoma, and Florida to Guatemala.

An allied race ranges in South America, and similar species are found in the other inhabited continents.

EAGLES, HAWKS, AND VULTURES



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Approximately one-eighth natural size

SWALLOW-TAILED KITE
Perched and flying adults, above

WHITE-TAILED KITE
On ground at left

MISSISSIPPI KITE
Perched at right and flying in distance



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EVERGLADE KITE

Upper: adult perched and immature flying

Approximately one-eighth natural size

MARSH HAWK

Lower: female at nest with young; male flying

EVERGLADE KITE

(*Rostrhamus sociabilis plumbeus*)

This resident of fresh-water marshes is suggestive in form, white rump, and method of flight of the much larger, longer-tailed marsh hawk. It enjoys soaring, frequently ascending to considerable altitudes, but does not have the graceful, accomplished flight of our other kites. The everglade kite is sociable, and, where plentiful, a hundred may be observed together. In Florida, however, it has been so reduced that flocks are unusual.

The birds utter a rasping, chattering call of little volume, and are especially noisy during the mating and nesting season.

For food this kite depends on the large fresh-water snails belonging to the genus formerly called *Ampullaria*, known now as *Pomacca*. The kite seizes them in its long claws and bears them away to some low limb or mound, where, with the slender, sharply hooked bill, it draws the snail from its shell.

Occasionally the kite extracts its food as it flies, dropping the shell when empty. I have seen accumulations of dozens of the shells gathered beneath favored perches. So far as known, this kite eats no other food. Such extreme specialization in diet is unusual among birds. The slender form of the bill and the claws, developed for this peculiar habit, is remarkable.

The everglade kite in Florida nests from January to May, the season varying locally. The nest is made of small twigs placed in a myrtle or other bush, in the top of a clump of saw grass, or, rarely, in a tree, being usually at only a few feet elevation and ordinarily above water.

The eggs number two to five or rarely six, two or three making the usual set. The ground color is pale greenish white spotted with rusty brown, the spots in most cases being so numerous as almost to conceal the lighter base. The young of the everglade kite are fed on the same large snails relished by the adult, the parent usually bringing food in the crop and feeding its family by regurgitation.

In the United States the everglade kite is found only in Florida. To the south it ranges in Cuba, eastern Mexico, and Central America, and a closely allied race occurs in South America as far as Argentina.

MARSH HAWK

(*Circus hudsonius*)

The marsh hawk, an inhabitant of open country, ranging over prairie regions, grasslands, and cultivated fields, is marked by its slender form, long tail, and a prominent white spot on the rump. Except during migration or in mating season, this bird seldom flies far above the ground for any great length of time.

It is entirely predatory, feeding on mice, ground squirrels, and other small mammals, as well as snakes, lizards, frogs, and insects. In addition, it captures a good many ground-inhabiting birds, especially in summer and fall, when young birds are about. At times it kills game birds and in some localities, particularly where pheasants are stocked, the marsh hawk has proved a pest. In general, however, it is beneficial, and should not be destroyed except where it is found to be actually injurious to game.

A FEATHER RUFF ADORNS THIS HAWK

As a peculiar feature, the face in this species is surrounded by short, stiffened feathers forming a ruff like that found in owls, a feature that is present in no other group of hawks.

The marsh hawk places its nest on the ground, usually in a marsh or on a prairie, ordinarily at the foot of a bush or a clump of grass, and in marshy ground on a tussock. It is composed mainly of dried weed stems and grass, sometimes with a foundation of twigs, lined with fine grasses and feathers.

From four to six eggs constitute a set. These are pale greenish or bluish white in color, usually without markings, though at times blotched and spotted with brown. The male is attentive to the female during incubation, bringing her food, which she often rises to seize in the air as he drops it.

As is often the case with ground-nesting birds, the young wander about on foot near the nest before they are able to fly.

The marsh hawk breeds from northwestern Alaska, central Quebec, and Newfoundland south to northern Baja California, southern Texas, and southeastern Virginia. In winter it is found from British Columbia and the northern United States south to the Bahamas, Cuba, Haiti, Puerto Rico, and Colombia.

SHARP-SHINNED HAWK*(Accipiter velox velox)*

This small hawk, one of the most widely distributed of the group in North America, is an inhabitant of thickets and woodland. It may be readily identified by its short wings and long tail, the square end of the latter distinguishing it from the larger Cooper's hawk. Though fiercely predatory, flying swiftly in pursuit of prey, this bird spends long periods in resting quietly in trees or bushes. As it usually perches among limbs or leaves, it is often overlooked until it flies.

The sharp-shin feeds almost entirely on birds and is highly destructive. Although it preys mainly on small species, such as sparrows, warblers, and similar forms, it does not hesitate to attack birds as large as itself, regularly killing quail, mourning doves, and flickers.

In southward migration in fall, these hawks often follow definite lines of flight, so that thousands may pass leisurely by certain points in the course of a few days. Sometimes during these flights stuffed owls are used as decoys to attract the hawks, so that they may be shot.

The sharp-shinned hawk makes a bulky nest of twigs, sometimes without an inner lining, but often with a slight padding of soft bark or a few feathers. The nest is frequently placed in pines or spruces against the trunk of a projecting limb from 20 to 50 or more feet from the ground.

**SHARP-SHINNED HAWKS WILL FIGHT
FIERCELY FOR THEIR NESTS**

Three to five eggs usually make a set, though as many as seven have been found in one nest. The ground color is pale bluish or greenish white, blotched and marbled with brown and lavender. The sharp-shin is bold in defense of its nest and I have had one strike fiercely at me, returning with chattering calls to the attack time after time.

The immature sharp-shin has the underparts longitudinally streaked with dusky. The female is much larger than the male.

This species breeds throughout most of the United States and Canada from the northern limit of trees south to Florida, Texas, and south-central California. In winter it is found from British Columbia and the northern United States south to Panama. Allied races are found in the Greater Antilles.

COOPER'S HAWK*(Accipiter cooperi)*

This hawk, in appearance and habits, is a large edition of the sharp-shin. Since the sexes differ markedly in size, the female being much larger, a small male Cooper's hawk is about the size of a large female sharp-shin, the rounded instead of the square-ended tail offering the most evident character for distinguishing between the two.

The Cooper's hawk is the ogre in the world of our birds. Fierce and ruthless, it attacks grouse or other species as large as itself, and destroys smaller birds without the slightest difficulty. It darts through thickets with such ease that it is difficult for its victims to find cover for safe sanctuary. Rabbits and other small mammals, reptiles, and insects are eaten occasionally.

The bird is bold and fearless in pursuit of its quarry, and has been known to return several times to attack a chicken, even when people were present and threatening it. It is one of the hawks that merits the name of "chicken hawk" and must be considered entirely destructive. Indeed, it is responsible for much of the damage in the hen-yard for which its larger relatives that live more in the open get the blame. It is also a consistent enemy of ruffed grouse and quail.

This species often follows the lines of fall migration frequented by the sharp-shin, but is less abundant; so that it is killed by hunters along these flyways in smaller numbers.

Cooper's hawks may appropriate the last year's nests of crows or other hawks, or may build a new structure. In either case the nests are composed of coarse twigs lined with finer material of the same kind, the whole frequently mixed with fragments of bark.

The eggs range from three to five in number, with the ground bluish white or greenish white, sometimes plain, but more often spotted with brown. In the nesting season the Cooper's hawk is quite noisy, uttering loud, harsh notes that are rapidly repeated. The immature bird is streaked underneath with dusky.

The Cooper's hawk nests from southern British Columbia, southern Quebec and Nova Scotia south through the United States into northern Mexico. In winter it is found south into Costa Rica.

EAGLES, HAWKS, AND VULTURES



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SHARP-SHINNED HAWK
Upper; adult female

Approximately one-seventh natural size

COOPER'S HAWK
Lower; adult male



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GOSHAWK
Upper

Approximately one-seventh natural size

HARRIS'S HAWK
Lower

GOSHAWK*(Astur atricapillus)*

The goshawk, one of the fiercest and most destructive of our birds of prey, exceeding the large falcons in this respect, inhabits the forests of the north and of the western mountains. It comes south sporadically from the far north during winters when there is a failure of its food supply, but at other times seldom is seen except along our northern border. Its flight is swift and powerful, and I have seen it easily overtake grouse and other fast-flying birds on the wing.

In the north the goshawk eats Arctic hares, lemmings, and ptarmigan. In its southern invasions it is the foremost enemy of the ruffed grouse, so that in the year following a goshawk flight there always is noted a decrease in these game birds.

With these propensities, naturally this hawk is highly destructive to poultry, seizing chickens and boldly carrying them away. When its hunting instincts are aroused, it seems to lose all sense of fear, so that it will return for chickens even after having been stung with shot. It does not hesitate to attack other predatory birds and will fight with large owls until both combatants are killed.

The goshawk builds bulky nests of sticks in either conifers or deciduous trees, but usually in heavy forest. The bird is fierce in defense of its home and will not hesitate to attack a human intruder.

The eggs vary from two to five, with three or four as the usual number. They are pale bluish white, often unmarked, but sometimes with a few spots of brown. The call is a shrill note sharply repeated, being heard principally in the breeding season. The young in the first fall have the under surface streaked like the immature Cooper's hawk.

Two races are recognized. The eastern goshawk, *Astur atricapillus atricapillus*, paler in color, breeds from Alaska, Quebec, and Nova Scotia south into British Columbia and the northern United States, extending south as far as western Maryland. In its sporadic southern flights it comes into the Central States and irregularly into the Southwest. The western goshawk, *Astur atricapillus striatulus*, nests in the Pacific coast region from Alaska south to California and northern Mexico.

HARRIS'S HAWK*(Parabuteo unicinctus harrisi)*

This is a handsomely colored hawk, common only in a restricted area in the United States. Although accomplished in flight, so that it delights in turning in huge circles high in air, it is of quiet demeanor and often rests for hours on open perches from which it may survey the land.

In southern Texas it is remarked frequently on telephone poles along the highways. In this region it is fairly tame and unsuspecting, often allowing automobiles to pass without taking flight, but in other areas it has been reported as wary.

The call is a harsh scream, and the birds at times are quite noisy in the vicinity of their nests.

Though in South America a closely related race has been reported consorting with vultures and caracaras and feeding on carrion, such is far from the case here.

In Texas, Harris's hawk has been observed dashing quickly through mesquite thickets, searching for wood rats and ground squirrels, and in southeastern California Dr. Loye Miller found parts of a green-winged teal in the stomach of one, and bird remains, including a gilded flicker, in another. They are said also to eat lizards, and seem, on the whole, to be beneficial in their habits.

The nests are composed of sticks, small branches, and weeds, lined with rootlets and grasses. They are placed in trees or sometimes on the tops of the Spanish bayonet or the giant cactus.

From two to four eggs are deposited, these being dull white or with a faint greenish tinge, some without markings and some spotted irregularly with brown or lavender. The birds ordinarily offer no objection when their nests are approached, beyond uttering their usual calls and circling in the air overhead.

The young differ from the adults in having the under surface buffy white and broadly streaked with blackish brown.

Harris's hawk is found in southeastern California, southern Arizona and New Mexico and the lowlands of south Texas, extending to Louisiana and Mississippi, and ranging south into Baja California and Central America as far as Panama. It has been observed casually in Kansas and Iowa. A related race is found in South America.

RED-TAILED HAWK

(Buteo borealis)

This fine bird, under the name of "chicken hawk," is universally known, as it is conspicuous and widely distributed, although ranging by preference in hilly or mountainous regions where there are forests. It is strong and graceful on the wing and spends hours in soaring in wide circles, sometimes so high in the air as to be almost out of sight. Its flight is not particularly swift, and it often rests for long periods on limbs or the tops of dead trees, where it has a commanding view.

The red-tail is preëminently a mouse hawk, meadow mice particularly being a staple article in its diet. It also eats other mice, squirrels, gophers, rabbits, kangaroo rats, wood rats, moles and shrews, has been known to attack skunks, and also kills snakes and lizards. In summer and fall, particularly in the Western States, it consumes many grasshoppers when these appear in pestilential abundance.

Ground-inhabiting birds are eaten at times, but, on the whole, the red-tail is distinctly beneficial, meriting protection except where some individual acquires the habit of eating chickens. In spite of the good that it does, it is shot on every occasion and has been so reduced in many sections of the eastern United States that it is now a rare bird.

The nest of the red-tail is a large structure of sticks, sometimes with a slight lining of soft materials. The eggs vary from two to four, being creamy white, occasionally unmarked, but ordinarily spotted with shades of brown. In the South these birds begin to nest in February, the nesting period being governed in the North by the date of the opening of spring.

The voice is a high-pitched scream, a stirring sound usually being given as the birds circle high in the air. The immature bird in the first fall has the tail brown, barred with blackish.

This is one of the species that formerly appeared in southward migration in abundance, but the soaring flocks of early days are now things of the past and each year the birds seem to become fewer.

In its wide range from Alaska through central Canada to Nova Scotia and south through the United States, the red-tail is divided into five geographic races, and other forms are found in the West Indies and Central America.

RED-SHOULDERED HAWK

(Buteo lineatus)

This common cousin of the red-tail ranges in wooded country, and can maintain itself where groves and trees border cultivated fields. Though it delights in soaring, it seems somewhat less active than the red-tail. It may be distinguished on the wing by the narrow barring of the under-wing surface.

The food is highly varied, including mice, rats, snakes, frogs, fish, large insects, centipedes, spiders, crayfish, earthworms, and snails. It seems to take even fewer birds than the red-tail, and only occasional individuals acquire the chicken-killing habit or attack game birds. There are numerous instances on record where these birds have nested in woods adjacent to hen-yards without attempting in any way to molest the poultry.

On the whole, this hawk should be protected, though many are wantonly killed by hunters, so that the species is decreasing in many localities.

"RED-SHOULDERS" NEST HIGH OR LOW

The nest of the "red-shoulder" is made of twigs, placed in trees often at a considerable elevation, but occasionally as low as 18 or 20 feet. The number of eggs in a set varies from two to six, with three or four as the usual number. These are white, sometimes with a yellowish or bluish tinge, marked with shades of brown and gray. Eggs without markings are rare.

The calls of the red-shouldered hawk are loud, wailing screams that may be heard for some distance. They are mimicked by the bluejay so perfectly that it is often difficult to distinguish the imitation.

The northern red-shouldered hawk, *Buteo lineatus lineatus*, ranges from southern Canada to southern Kansas and North Carolina, migrating to the Gulf coast in winter. The Florida red-shoulder, *Buteo l. alleni*, which is smaller, nests from Oklahoma and South Carolina to Louisiana and southeastern Florida.

The insular red-shoulder, *Buteo l. eximius*, still smaller and paler in color, is found in the Florida Keys.

The Texas red-shoulder, *Buteo l. texanus*, with richer color below, nests from southern Texas to Tamaulipas; and the red-bellied hawk, *Buteo l. elegans*, with more rufous below, is found in California and northwestern Baja California.

EAGLES, HAWKS, AND VULTURES



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RED-TAILED HAWK

Upper: adults perched and flying above,
immature bird flying at left

Approximately one-sixteenth natural size

RED-SHOULDERED HAWK

Lower: adult (left),
immature bird (right)



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BROAD-WINGED HAWK

Upper; adult perched,
immature flying

Approximately one-seventh natural size

SWAINSON'S HAWK

Lower; adult in light phase on ground,
light and dark phases flying

BROAD-WINGED HAWK*(Buteo platypterus)*

The broad-wing, smaller than the red-shoulder and red-tail, lives in woodlands, where it is seen only by those conversant with its habits, as it perches usually under cover of the leaves. In soaring it frequently rises until it is nearly out of sight. Swampy woodlands and broken country covered with forests are favorite haunts of this species, and as the trees are cleared it decreases in abundance.

It is entirely inoffensive in its habits. Except in migration, comparatively few are shot, as most depart for the South before the season for fall hunting.

The food is mainly mice and other small mammals, frogs, reptiles, and insects. It eats small fish occasionally, but seldom takes birds. Large caterpillars are a regular item in its diet. It is partial to grasshoppers, crickets, and large beetles, and has been known to eat centipedes. It must be considered beneficial and worthy of every protection.

The nests of the broad-wing are constructed of twigs, placed in a large tree, often at a considerable elevation. Green leaves are often found in the nest, and some birds add fresh leaves to the nest lining nearly every day. The eggs range in number from two to five, with two or three as the usual number. They are dull grayish white, or occasionally greenish, spotted more or less extensively with different shades of brown and lavender.

Occasionally these birds will dash at an intruder. I remember distinctly, as a small boy, the start that one of these hawks gave me by swooping at my head as I sat on a limb beside its nest, high above the ground, admiring the eggs and the nest construction. The ordinary call is a shrill, double-noted whistle high in pitch, which is accompanied by chattering, scolding notes.

The birds vary considerably in color and markings and occasional individuals are found that are entirely black.

The broad-winged hawk nests from central Alberta, New Brunswick, and Nova Scotia south to the Gulf coast and central Texas. It migrates south to northwestern South America, wintering mainly from southern Florida and southern Mexico southward. Allied races are found in the islands of the Lesser Antilles.

SWAINSON'S HAWK*(Buteo swainsoni)*

Swainson's hawk lives in regions where tree growth is scant. Though strong in flight and delighting in soaring, it spends hours resting on some open perch where it may watch the country. Except when it has been unduly persecuted, it is tame and unsuspecting, allowing close approach without taking alarm.

The food of this hawk is varied and includes more insects than usual in a bird of its size. It feeds extensively on grasshoppers in late summer and fall, and also eats mice, rats, lizards, snakes, frogs, and rabbits. Though on rare occasions it may attack poultry, it is considered one of the most valuable hawks in the West in its relation to agriculture.

Swainson's hawk nests in trees or on cliffs, where its bulky home, composed of sticks, is often visible at a distance. The eggs, varying from two to four, are greenish white or yellowish white, spotted with brown and lavender, occasionally being without markings.

HAWK AND SONG BIRD NEST IN SAME TREE

In the regions of scanty tree growth inhabited by these hawks, it is a regular occurrence to find an isolated tree with nests of several species of birds clustered in it. Western kingbirds and Bullock's orioles often nest within a few feet of the large structure made by Swainson's hawk, and all live in harmony. Indeed, the home of a kingbird has been found located among the coarse sticks in the base of the hawk's nest.

In migration, both north and south, these hawks often gather in straggling bands, from 500 to 2,000 birds having been noted in such groups.

This hawk, like some of its relatives, has distinct light and dark color phases, these being illustrated in the flying birds of the opposite plate. Swainson's hawk has three of the outer primaries with the inner webs cut out or indented near the tip, and the red-tail has four. This difference will always serve to distinguish these birds in the hand.

This species breeds from British Columbia, Great Slave Lake, and Manitoba south to northern Mexico, and is found in winter in South America. Stragglers have been taken at many points in the Eastern States.

AMERICAN ROUGH-LEGGED HAWK*(Buteo lagopus x. johannis)*

From its summer home in the north, the American rough-leg comes into the United States in fall migration, often traveling in flocks. As the name indicates, the rough-legged hawks differ from our other species in having the leg feathered to the toes.

The American rough-leg is large and powerfully built, but, in spite of its strength, it feeds principally on mice, lemmings in the north and meadow mice in the south being staple foods. Rabbits are eaten where they are abundant, and large insects, such as grasshoppers, are eaten occasionally. The bird is entirely harmless, as it seldom kills other birds or poultry.

This hawk nests in the far north, ranging there in open country, seldom coming into densely forested areas. The nests are composed of sticks, the cavity lined with dry grass and feathers, and are built on ledges along bluffs or are placed in trees. The same location may be used for years, and the nest grows in bulk until it is of large size.

Eggs are two to five in number, with three or four making the usual set. They are pale greenish white, fading to dingy white, spotted and blotched with brown of different shades, and shell markings of lavender and gray. One brood is reared each season.

FEATHER LEGGINGS KEEP OUT THE COLD

The birds vary considerably in coloration from light to dark, but may always be distinguished by the feathered legs, or tarsi. The feather growth is heavy, particularly in fall and winter, so that the severest cold may be withstood. In the West they remain in the Northern States during the coldest weather of winter.

The note, heard mainly during the nesting season, is a low mewling call, suggesting the sound made by a young kitten.

The American rough-leg nests from the Aleutian Islands, the Arctic coast of Alaska, and northern Quebec, south to northern Alberta and Newfoundland. In winter it is found from southern British Columbia, Colorado, and southern Ontario south to southern California, Texas, and North Carolina. Closely allied races are found in Europe and Asia.

FERRUGINOUS ROUGH-LEGGED HAWK*(Buteo regalis)*

This handsome hawk, so large that it is often called an eagle, is found in regions of prairies and plains, avoiding heavy timber. It lives only in the western part of our continent, and in uninhabited sections still remains fairly common. However, when an increase in agriculture takes place in any part of its nesting ground, it is crowded out.

In much of its range it is known as "squirrel hawk," as ground squirrels and prairie dogs form a considerable part of its food. It also eats many pocket gophers. Birds, particularly meadowlarks, are captured during the summer season, and an occasional grouse may be taken, but these hawks are not known to harm poultry. They also eat large snakes. They are considered beneficial because of their destruction of harmful mammals.

Frequently hunting in pairs, they capture game that might otherwise escape. In hunting prairie dogs, the hawks rest until the animal is away from its burrow, when one gets between the prairie dog and its hole, thereby making capture an easy matter. The birds are strong and powerful and can carry rabbits to their nests with ease.

The nests are placed on cliffs, on sloping hillsides, or in trees, sometimes in localities difficult of access, sometimes where they can be approached without trouble. They are often occupied for years, and occasionally grow to large size, Taverner recording one about ten feet high. They are composed of sticks, those in the base being often of large size, with a lining of grass and other soft materials.

The eggs are two to five and are greenish or creamy white, blotched and spotted handsomely with brown and lavender. One brood is reared each season.

On their nesting grounds these hawks utter screaming calls that have been likened to those of eagles, and the young are said to be quite vociferous.

The ferruginous rough-leg breeds from southern Alberta and Manitoba to northeastern California, New Mexico, and Kansas. It is found in winter from California and Montana to Baja California and northern Mexico, and has been observed casually in Wisconsin and Illinois.

EAGLES, HAWKS, AND VULTURES



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Approximately one-seventh natural size

AMERICAN ROUGH-LEGGED HAWK
Upper; ordinary light phase; adult perched,
immature flying

FERRUGINOUS ROUGH-LEGGED HAWK
Lower; adult in light phase (left),
dark phase flying (right)



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MEXICAN GOSHAWK

Upper; adult (right), immature (left)

These figures are approximately one-seventh natural size

MEXICAN BLACK HAWK

Lower; adults perched and flying

MEXICAN GOSHAWK*(Asturina plagiata plagiata)*

Of graceful, rapid flight, this handsome species frequents groves of cottonwoods and other trees along streams in the open valleys, or in the foothills of the mountains. It is migrant within our limits, appearing rather late in spring and moving south early in the fall. The birds are usually tame, as in the wild country they inhabit there is little to molest them.

LITTLE ECONOMIC EFFECT CAN BE
ATTRIBUTED TO THIS HAWK

Lizards, abundant in its haunts, make up much of its food, and it feeds extensively on large insects, including grasshoppers and large beetles, which are said to be seized expertly on the wing. At need this bird can fly with a dash and speed which approximate those of a falcon. It eats various mice and rats, and also kills rabbits and ground squirrels.

It appears that this hawk is one of negative economic importance in the United States, and that, as an interesting species, it should not be disturbed or killed.

The nests of this goshawk are placed in trees. They are usually frail in construction, and made of twigs plucked green, so that they are still covered with leaves; this makes them difficult to see, as they match the dense green foliage in which they are placed. The nests are shallow and contain two or three eggs, the smaller number being more common. In color the eggs are pale bluish white, more or less stained from the nest lining of leaves; occasionally one is marked with a few spots of brown.

This species, although not brilliantly colored, from its contrasted markings is one of the handsomest of the hawks in our limits, its comparative rarity lending interest to the naturalist. It is an active bird, with powerful flight that enables it to dash through trees or other cover with ease, turning at need with the greatest facility. The call is a peculiar piping note that has been likened to the sound made by the long-billed curlew.

In the United States, the Mexican goshawk is found in southern Arizona, southern New Mexico, and the lower Rio Grande Valley, apparently being most common in Arizona. To the south it is found through Mexico, being replaced in Central America by a smaller race of paler color.

MEXICAN BLACK HAWK*(Urubitinga anthracina anthracina)*

The present form is another that enters the southwestern borders of the United States in a limited section, where it is an inhabitant of dense groves of trees. Though quiet and given to resting for long periods on some partly concealed perch, it is a bird of swift and active flight and rises at times to soar in the open air, being particularly sportive in spring.

The nest is a large structure of sticks that is frequently occupied year after year. It is often placed in a cottonwood or in a pine from 15 to 60 feet from the ground. Part of the sticks used for nesting material may be gathered on the wing, the bird dropping gracefully, sometimes from high in the air, to seize a dead branch in some tree top, snap it off, and carry it away without pausing appreciably in its course. From one to two eggs are deposited, being grayish white with a slight greenish tinge, spotted with brown and lavender.

In the north the birds rear but one family each season, but in the Tropics, if one set of eggs is taken, they often continue their domestic duties with a second or even a third nesting.

In British Honduras, where these hawks are common and are little molested, they are said to be very bold, sometimes perching only five or six feet away while their young are being examined.

The food of these birds, from what little has been recorded, seems somewhat varied. They are said to eat a good many snakes and lizards, and also to consume frogs and fish. Sometimes they pursue birds, and along the coast of Central America they are reported to live to a considerable extent on crabs, large land crabs being favored food. They are said also to eat rodents of various kinds and large insects.

They are too rare within our limits to have any particular economic status, but should not be destroyed wantonly, as they are interesting and peculiar, and represent a group not otherwise found in our fauna.

The call of this bird is described as high-pitched and quavering.

The species is found from southern Arizona and the lower Rio Grande Valley in Texas south into Central America, being mainly migratory in the United States. Allied forms are found in tropical America.

GOLDEN EAGLE

(*Aquila chrysaetos canadensis*)

The golden eagle, one of the most powerful of American birds of prey and a keen and courageous huntsman, is principally an inhabitant of wild and unfrequented areas. From its great expanse of wing it is readily identified. The bald eagle in immature dress is the only bird with which it might be confused, but as these two ordinarily range in different types of country, there is little opportunity to mistake them.

The golden eagle has feathers extending clear to the toes, but in the bald eagle the lower part of the leg is covered with hard scales. This difference serves to distinguish the two in any plumage.

Where prairie dogs are present in large numbers, these are favored food; a pair of eagles will destroy several hundred in the course of a season. At times they turn to sharp-tailed grouse when these are abundant, proving a scourge to the flocks. Jack rabbits, cottontails, marmots, and ground squirrels are killed in large numbers. In winter, when other food is scarce, they may come to dead carcasses, being sometimes hard put in severe weather when the meat is frozen, even with the great strength that they possess in bill and feet.

They also attack lambs and fawns on occasion, and E. S. Cameron records that three golden eagles working together pulled down and killed a pronghorn antelope during severe winter weather when other food was scarce. They will kill and eat coyotes caught in traps, and will also steal the bait when wolf traps are baited with meat. Snakes and wild ducks, and an occasional goose, also may figure in their diet.

Birds and jack rabbits usually are partly plucked before being eaten, but most small mammals are swallowed—skin, hair, and all. These eagles kill many rattlesnakes, being said to feint at them until they uncoil, when the reptiles may be seized without danger.

The lifting powers of this bird have been exaggerated, since it has been claimed that the golden eagle was capable of carrying prey weighing 15 or 20 pounds. Reports from reliable observers, however, indicate a weight of eight pounds as about the maximum which they can carry. When larger prey is killed, it is necessary to eat it on the ground. In the case of geese when they fall in water, the eagle is said to

tow them to land. Frequent reports that these birds have attempted to carry off children are, so far as the experience of naturalists goes, without basis. However, it is interesting to note that these stories are prevalent through the extensive range occupied by golden eagles in both Old and New Worlds.

During most of the year golden eagles are undemonstrative, but in the nesting season they call in shrill, high-pitched tones, and the male often tumbles in the air somewhat like the male marsh hawk. This is accomplished from a high elevation by suddenly closing the wings and dropping headfirst toward the earth, checking the fall just before reaching the ground; then rising again to repeat the performance.

The nest is placed on the ledge of a cliff or is built in a tree. Often it is a large structure, as the birds may use the same site year after year and add to the nest each season. It is built of sticks and limbs, usually with a lining of some softer material, and often is decorated with twigs of green pine. Bendire describes one, from notes made by Denis Gale in Colorado, which was 7 feet high by 6 feet wide, and was said to contain at least two cartloads of material.

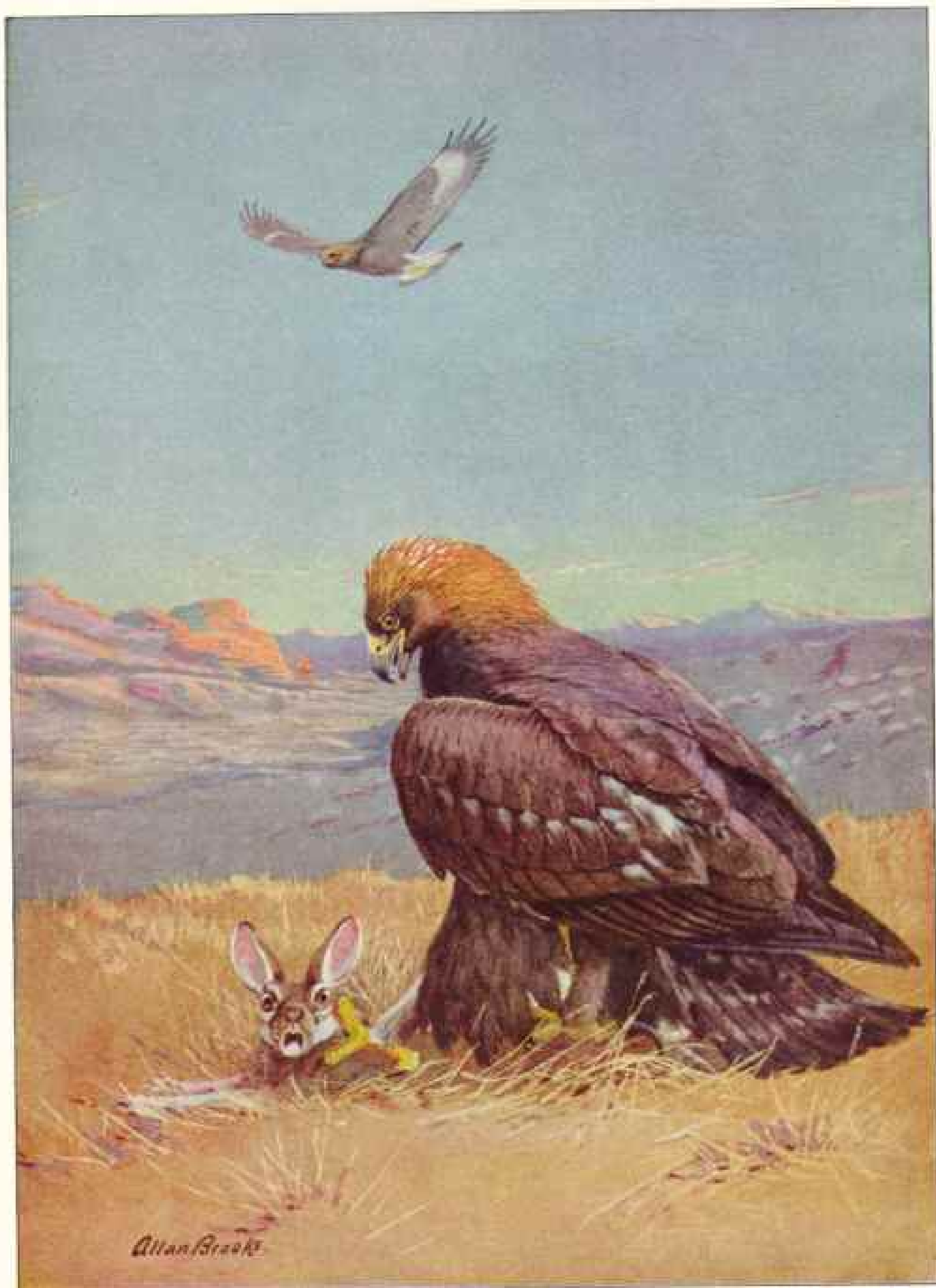
Two, or rarely three, eggs are laid, these varying from dull white to pale cream color, with blotches and spots of brown, pearl gray, and lavender. Where there are two eggs in the set, one is usually a little larger than the other. Some believe that the two young constitute a pair, though I know of no certain proof that this holds true.

A TRUE AVIAN ARISTOCRAT

Either from its size or demeanor, the golden eagle gives an impression of intelligence distinctly above that of other birds of prey. As one of our finest forms of wild life, it is to be hoped that the huge bird may hold a place in our fauna for many years.

The golden eagle breeds from northern Alaska and Mackenzie to northern Baja California and central Mexico, and in winter is found south to northern Florida and southern Texas. It formerly nested east of the Mississippi River, and possibly may still do so in North Carolina and Tennessee. Closely allied forms occur in the Eastern Hemisphere.

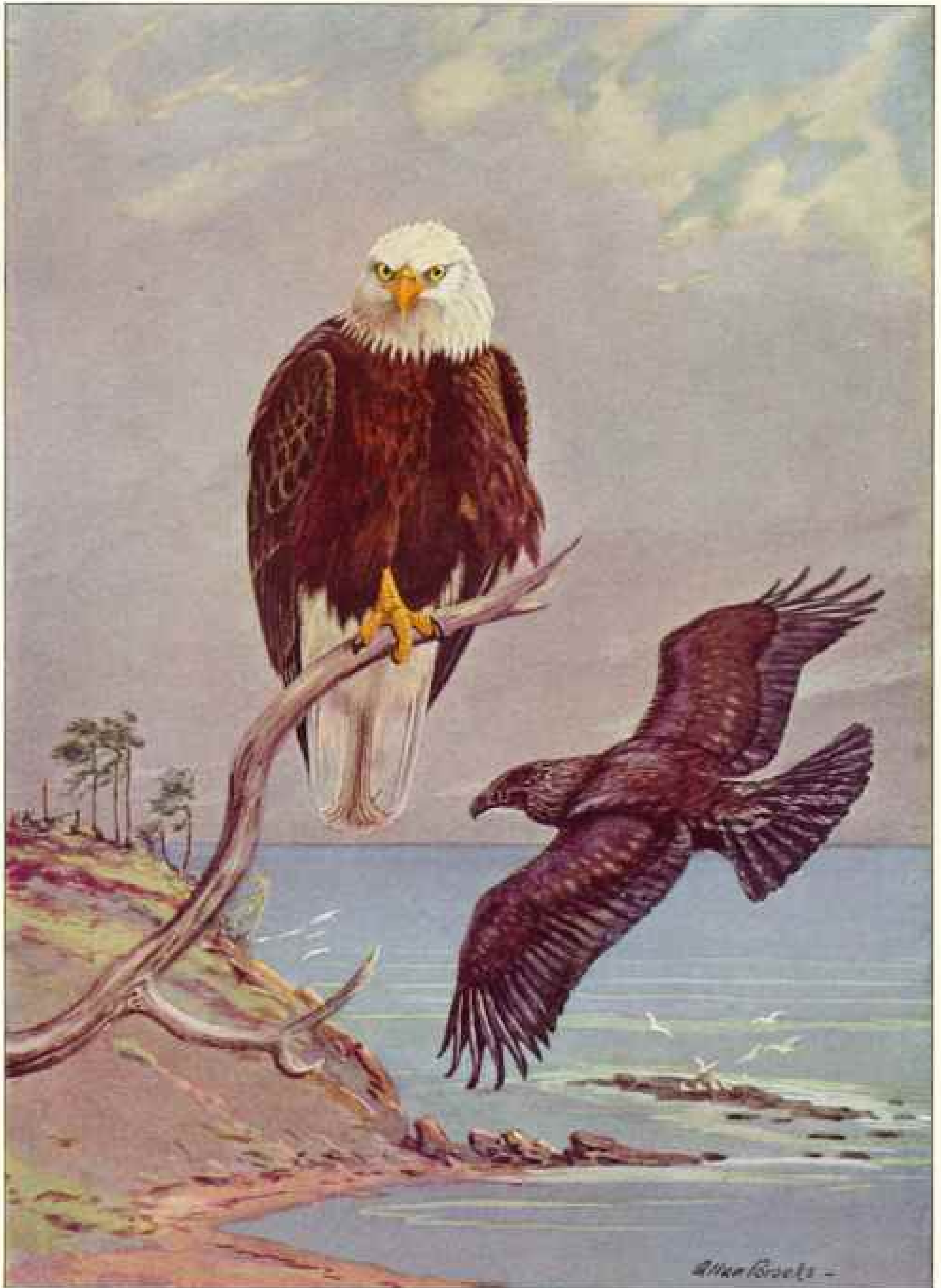
EAGLES, HAWKS, AND VULTURES



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Approximately one-eighth natural size

GOLDEN EAGLE
Adult on ground, immature flying



© National Geographic Society

Approximately one-tenth natural size

BALD EAGLE
Adult perched, immature flying

BALD EAGLE*(Haliaeetus leucocephalus)*

Our national bird, the bald eagle, chosen in the early days of the Union, is figured on many of our coins, is a favored design in matters of patriotic interest, and in general is considered symbolic of our freedom. Its enormous size and the striking markings of the adult make it a prominent species that is noted on every appearance. A bird of great strength and of swift and powerful flight, it is master in its haunts and has no potent enemies except man. Its life is led in the vicinity of water and only casually is it found far from that element.

The food of the bald eagle is mainly fish. In Alaska severe complaint has been made that it destroys salmon during their annual runs up the streams to deposit their eggs. As the salmon cross shallow bars or cascades, leaping from pool to pool, there is no question that many are taken by eagles.

Elsewhere the eagle often fishes by plunging from a height, descending at an angle on its selected prey, sometimes going beneath the surface. Rarely it grapples prey so large that it cannot rise with it and is under necessity of towing it to shore. This eagle also robs the osprey, being fiercely predatory in such encounters.

Large birds are sometimes captured, including ducks, coots, and geese. Although the eagle is sufficiently swift to seize them in flight, it ordinarily gives chase on the water, where it is able to tire them by forcing them to dive until they become exhausted.

Although the bald eagle is said to feed on healthy birds, my own experience with it has been principally that it is constantly in pursuit of birds crippled by shooting or injured in some other way.

During the hunting season I have often seen an eagle swing over rafts of ducks, which it scatters. Then, if cripples appear, they are pursued, and if none is sighted the eagle passes on to other hunting. The taking of such injured birds can hardly be condemned. These eagles have been said on occasion to kill lambs and foxes, the latter furnishing an indication of the birds' strength.

In addition to living food, the bald eagle is prone to search for carrion, following regularly along shores for dead fish cast

up on the beaches, and eating dead animals of other kinds as they offer. Because of this habit, many words of opprobrium have been hurled at it.

There was much discussion before the bald eagle was finally adopted as our Nation's emblem by act of Congress on June 20, 1782; Benjamin Franklin in particular favored the wild turkey. In spite of all that may be said against it, however, it must be conceded that the bald eagle is a bird of fine and noble appearance and that it is a master of the air.

EAGLES GO IN FOR NEST-BUILDING ON A LARGE SCALE

The nests of the bald eagle are large structures of sticks, usually placed in trees, often at a considerable height, though occasionally on cliffs, or even directly on the ground. Nests 5 to 6 feet in diameter and the same in height are not unusual, and nests 12 feet high have been recorded. Herrick found that one near Vermilion, Ohio, was used continuously for thirty-four years.*

Ordinarily two eggs are laid, with occasional sets of three or one. They are white, very rarely with slight markings of buffy brown. Where two eggs are laid, one is nearly always larger than the other. Incubation requires nearly a month, the duty being shared by both parents. The young remain in the nest for about two and a half months, and during that time the old birds are most solicitous of their welfare and safety.

The young bald eagles do not attain the plumage of the adult for three years, and during the first year they are actually larger than their parents.

The southern bald eagle, *Haliaeetus leucocephalus leucocephalus*, nests from the northern United States to Baja California, central Mexico, and Florida. The northern bald eagle, *Haliaeetus leucocephalus alascanus*, breeds from northwestern Alaska and British Columbia to the Great Lakes and Nova Scotia, coming in winter south to Washington, Montana, and Connecticut.

A related species, the gray sea eagle, *Haliaeetus albicilla*, is resident in Greenland, and is found also in Europe and northern Asia.

* See "The Eagle in Action," by Francis H. Herrick, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1929.

OSPREY

(*Pandion haliaëtus carolinensis*)

Known ordinarily as the "fish hawk," the osprey is found about large bodies of water. Being dependent on fish for food, it never strays far from water except during casual wanderings when in migration. Though it may eat an occasional water snake or frog, practically all of its food is composed of fish, most of which it captures alive.

In fishing, the bird flies slowly from 30 to 100 feet above the water, scanning the surface closely until a fish is sighted, when it turns and drops swiftly, sometimes even going beneath the surface. Rising with its victim held firmly in both feet, the osprey pauses for an instant, supported by broad-spread wings, to shake the water from its plumage; then flies to some perch where its meal may be enjoyed. As it rises, it adjusts its grip so that the fish is carried end on, thus affording a minimum of resistance to the air.

FISH HAWKS ARE NOT EPICUREAN
IN THEIR TASTES

Any fish of proper size that come near the surface are taken. Toadfish are as acceptable as other varieties. Such species as menhaden, which go in large schools, are favorites. In summer on Chesapeake Bay I have seen fish hawks feeding regularly on eels.

The birds have habitual perches to which they carry food, the ground beneath these being strewn with fish bones accumulated from many meals. Where fishermen sort the catch from their nets, I have seen ospreys gather in flocks to pick up discarded dead fish, seizing these from the water or picking them from the sandy beach.

Occasionally ospreys are known to strike fish too large for them to handle, and when their claws become caught the birds are pulled beneath the surface and drowned.

In its fishing the osprey does not always continue unmolested, as the bald eagle, also with an appetite for fish, often resorts to robbery. Watching until an osprey has made its catch, the eagle descends on the fish hawk, in an effort to make it give up its prey, continuing in relentless pursuit with broadly beating wings until the smaller bird drops the booty.

If an osprey is obstinate, the eagle finally strikes, knocking it through the air to make

it release the catch. As the fish falls, the eagle descends swiftly to seize it in the air, or picks it up from the surface of the water. On rare occasions an osprey with a small fish may escape, but ordinarily the bird is so burdened that its flight is hampered to a point where it can make no definite resistance.

Where two eagles combine in this robbery, the case is hopeless, for, wherever the osprey turns, one of the eagles is soon upon it and it can find no avenue of escape. The plate illustrates the beginning of such a scene, with one eagle descending on an osprey that has just made its catch, and another swinging about in the background.

Relieved of its catch, the osprey may strike angrily at the robber, but the larger bird easily wards off such blows with its broad wings. Occasionally, however, the tables are turned, for when ospreys gather in colonies several may band together and harry marauding eagles from the vicinity.

The nest of the osprey ordinarily is a huge structure of sticks, cornstalks, weeds, and other rubbish, placed in the top of a tree, on a rock ledge, on the summit of a pinnacle rock, or occasionally on the roof of a building or chimney. It may also place the nest on the ground.

Frequently grackles, night herons, and English sparrows place their nests in the base of the huge structure occupied by the osprey. The larger bird pays no attention to its smaller neighbors.*

OSPREYS RANGE OVER A LARGE PART OF
THE NEW WORLD

The eggs, from two to four, with three making the usual set, are creamy white, spotted and blotched with brown and lavender. With their rich colors and bold markings, they are among the handsomest eggs found in this order of birds.

The osprey is easily distinguishable at a distance from the eagle and from other hawks by its white breast and long, angular wings.

It breeds from Alaska, Hudson Bay, and Nova Scotia to Baja California and the Florida Keys, wintering from Florida and Baja California to the West Indies and South America. Allied races are found in the Bahamas and in the Old World.

* See "Photographing the Nest Life of the Osprey," by Capt. C. W. R. Knight, in the NATIONAL GEOGRAPHIC MAGAZINE for August, 1932.

EAGLES, HAWKS, AND VULTURES



© National Geographic Society

Approximately one-eighth natural size

OSPREY
Two bald eagles flying above



© National Geographic Society

PRAIRIE FALCON
Upper; adult perched,
immature flying

Approximately one-seventh natural size

AUDUBON'S CARACARA
Lower; adult (right),
immature (left)

PRAIRIE FALCON*(Falco mexicanus)*

This pale-colored falcon has the active, graceful flight of the duck hawk. In a way, it is the arid country representative of that species, but may be distinguished from it by smaller size and paler, sandy coloration.

The nest is placed on a cliff, being often in a recess or small cave, where the eggs are laid on the bare surface, with only whatever rubbish may have accumulated for nesting material. Two to five constitute a complete set, three or four being the customary complement. The ground color of the eggs is creamy white, more or less overlaid with a suffusion of cinnamon, and blotches of reddish brown and chocolate. They are considerably paler than the eggs of the duck hawk.

The prairie falcon feeds on birds of various kinds, blackbirds, horned larks, mourning doves, and others of similar size being favorites. It captures quail and prairie chickens on occasion, and also secures domestic pigeons where flocks of these are found within its range.

I have seen them harry colonies of yellow-headed blackbirds so mercilessly that these unfortunates set up a loud outcry whenever a falcon appeared in the distance. The prairie falcon also feeds on mammals, taking gophers, ground squirrels, and various kinds of rats and mice. In addition, it takes insects, particularly grasshoppers when these are abundant.

In feeding, these hawks sometimes watch from cliffs or open perches in trees until suitable prey appears, or again fly lightly and gracefully along, traveling rather swiftly as they hunt. They have been known to harry marsh hawks and make these birds drop their prey. The falcon seizes its booty in the air as it falls.

About their nesting cliffs these falcons are quite noisy, uttering shrill screams and cackling calls when disturbed. At other seasons they are mainly silent.

The prairie falcon nests from southern British Columbia to Baja California and southern Mexico, extending east to the eastern border of the Great Plains. It is casual in occurrence in Manitoba, Minnesota, and Illinois.

A related species is found in the Southwest, the aplomado falcon (*Falco fusco-coerulescens septentrionalis*).

AUDUBON'S CARACARA*(Polyborus cheriway auduboni)*

Although related to the falcons, this peculiar species, often called "Mexican eagle," has many of the habits and mannerisms of vultures. It is found in prairie regions where there are open groves, preferring open country to heavily forested sections. Its flight is straight and rapid, and it sometimes circles high in the air, especially on days of oppressive heat.

In Florida these birds frequently nest in cabbage palmettos; in Texas they occupy mesquites and other trees, and in Arizona giant cacti are sometimes selected. The nests are bulky masses of twigs, weeds, coarse grass, leaves, and Spanish moss, usually piled together in an untidy manner. The eggs number two or three, the ground color being creamy white when it is visible. Most eggs have the entire surface obscured by a wash of cinnamon rufous and blotches of reddish brown.

This bird eats lizards, snakes, frogs, and small turtles, and also takes small mammals. It is fond of rabbits, cotton rats and other mice, and grasshoppers and other large insects. Crabs and crayfish, too, are on its bill of fare.

The caracara is also partial to carrion of all kinds, and frequently comes to carcasses on which vultures are feeding. The caracaras make the larger birds stand aside, as they are strong and aggressive, striking with both bill and feet. On the coast of Texas caracaras have been seen in pursuit of brown pelicans to make them disgorge fish that they had swallowed.

Caracaras are active on the ground, their long legs and relatively short claws enabling them to walk and run with ease. Their voices are peculiar rattling, creaking, screaming calls, in uttering which the birds frequently throw the head backward until it touches the back.

On Guadalupe Island, Mexico, off the western coast of Baja California, there was formerly found the Guadalupe caracara, *Polyborus lutosus*. The last of this species was recorded about 1905.

Audubon's caracara nests from northern Baja California, southwestern Arizona, central and southern Florida, and Cuba south through Mexico and Central America. It has been recorded accidentally in Ontario. An allied race occurs in northern South America.

DUCK HAWK

(Falco peregrinus anatum)

The duck hawk, finest of the falcons of our continent, lives in regions where cliffs furnish it aeries. Truly a master of the air, it kills at will, and its food is composed almost entirely of birds.

Resting on a commanding perch or flying easily, the hawk, when its appetite is aroused by some luckless bird, descends with a rush of wings so swiftly as almost to elude sight, and strikes its unfortunate victim like a veritable thunderbolt. Ducks, shore birds, robins, meadowlarks, flickers, pheasants, grouse, pigeons, and many others have been recorded as its victims.

When it has tiny young, it obtains warblers, sparrows, and other small birds to feed them. No form of bird is safe from it, as it has been known even to capture the agile chimney swift. A duck hawk comes nearly every winter to the old Post Office Department tower in Washington, and lives on pigeons captured as they fly over the grounds of the Smithsonian Institution or above the near-by buildings. Mammals are seldom taken.

The duck hawk usually places its nest on a cliff, often in a spot where it is practically inaccessible. Occasionally it resorts to large hollows in trees, or very rarely to old nests of eagles or hawks. The only nesting material consists of whatever rubbish may have accumulated on the chosen site, this usually including bones and other fragments from birds the duck hawk has eaten.

Three to five eggs are laid, four being the usual number. These are creamy or yellowish white, irregularly blotched, streaked, or otherwise heavily marked with various shades of bright brown.

The parents are noisy during the breeding season, uttering quick, cackling calls. When their nests are approached, they circle rapidly about, harrying unmercifully other birds that chance to pass, and even killing ruthlessly when enraged.

The duck hawk nests from Alaska and the west coast of central Greenland to Baja California, Kansas, and Maryland. In winter it ranges south to Panama. Peale's falcon, *Falco peregrinus pealei*, a darker race, nests on the Aleutian and Commander Islands, coming south in winter to Oregon. Allied races are found in the other continents of the world.

GYRFALCON

(Falco rusticolus)

This hunting falcon of the north in early days was the type most prized by the devotees of the sport of falconry. Swift in flight and possessed of almost endless endurance, these birds were desired above all other hunting hawks.

They range far beyond the limits of tree growth, apparently to the limits of land. They become so accustomed to resting on the ground or on rocks that in captivity they actually seem to prefer such locations to a perch.

The gyrfalcons of North America appear to like birds better than other food, capturing them ordinarily on the wing. In the far north they often nest in the vicinity of colonies of auks, great piles of whose bones accumulate beneath the gyrfalcon homes.

From Labrador to Alaska these falcons are the scourge of the ptarmigan. They also capture gulls, guillemots, shore birds of various kinds, and snow buntings, as well as lemmings and Arctic hares. On St. George Island, one of the Pribilof group in Bering Sea, Hanna records that one winter gyrfalcons came in abundance and nearly exterminated the little wren and the rosy finches.

The gyrfalcon nests on ledges on the face of cliffs, placing its eggs on accumulations of its own pellets, or, where there is woody vegetation, it sometimes occupies nests of sticks. The eggs, usually three or four, are creamy white, very heavily marked with reddish brown, and are among the most handsome eggs of their group. Nesting may come in May in the far north, so that the nests are frequently hung with icicles.

The races of gyrfalcons found in North America are in some confusion because of the considerable variation in color among these birds. In Greenland there is found the white gyrfalcon, *Falco rusticolus candidus*, which also has a dark phase in which the plumage is mainly gray. This race may breed also in eastern Arctic America, and is casual in winter south to British Columbia, Montana, and Maine. A darker form, varying from gray to nearly black, known as the black gyrfalcon, *Falco rusticolus obsoletus*, nests from Point Barrow to Labrador, and in winter ranges south into the northern United States.

EAGLES, HAWKS, AND VULTURES



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Approximately one-seventh natural size.

DUCK HAWK

Upper; adults (left), three young (right)

WHITE GYRFALCON
Young

BLACK GYRFALCON



© National Geographic Society

SPARROW HAWK
Upper; male (right),
female in nesting hole

Approximately one-sixth natural size

PIGEON HAWK
Lower; adult male (right),
immature female (left)

SPARROW HAWK

(Falco sparverius)

The handsome sparrow hawk, most familiar of American falcons, has adapted itself readily to the changes brought by our civilization, being so evidently harmless that it has escaped much of the destruction aimed universally at its larger companions. It is equally at home in the diverse environments found between the green pasture lands of the east and the arid cactus forests of Baja California.

The sparrow hawk feeds principally on mice, large insects, lizards, and frogs. On occasion it attacks birds, and may kill quail, jays, or other birds as large and heavy as itself. About cities it destroys many English sparrows and starlings.

Often it hovers in the air with rapidly beating wings, intently watching the grass below until a mouse or other prey comes far enough out in the open to be caught.

CITY LIFE SEEMS TO AGREE WITH THE SPARROW HAWK

The sparrow hawk nests in cavities, old nesting holes of the flicker or other large woodpeckers being favorite shelters, and has come to occupy bird boxes about houses. It frequently lives in cities, and in Washington is found about the roofs of the Smithsonian buildings. The number of eggs in a set ranges from three to seven. They vary in ground color from white to cream and cinnamon buff, spotted and blotched with brown.

The call of this hawk is a rapidly repeated *killy killy killy*, from which it is often known as "killy hawk."

The eastern sparrow hawk (*Falco sparverius sparverius*) nests from the upper Yukon, southern Quebec, and Nova Scotia to northwestern California, eastern Texas, and northern Alabama.

The desert sparrow hawk (*Falco s. phalaena*), which is somewhat larger and paler, breeds from southern New Mexico and southern California south into Mexico.

The San Lucas sparrow hawk (*Falco s. peninsularis*), smaller in size, is found in southern Baja California, and the little sparrow hawk (*Falco s. paulus*), also of small size but darker in color, resides in Florida and the Gulf coast region.

Allied races range through the West Indies and Central and South America.

PIGEON HAWK

(Falco columbarius)

The pigeon hawk derives its name from its curious resemblance to a pigeon in certain attitudes, or in mannerisms of flight that it may assume, though at other times it is obviously and unmistakably a falcon.

It is found in wooded areas or in semi-open country, depending upon where its search for food may take it. It is a bird of swift and graceful flight and travels at high speed with little apparent effort.

Like related falcons, the pigeon hawk feeds extensively on birds. Its speed of flight and its strength are attested by its capture of swallows and even of the chimney swift, and its killing of meadowlarks, flickers, and small doves. Mice are taken occasionally and large insects more frequently.

When not hungry, this active little hawk delights in chasing birds merely to display its mastery, threatening but not actually harming them. Jays and crows may be the butts of this sport, or again the hawk may pursue flocks of sandpipers. When in search of a meal, its whole action changes and it kills speedily and ruthlessly.

The pigeon hawk builds a nest of twigs and bark lined with softer materials, and places it in a tree, often only a few feet above the ground, on a rock ledge, or occasionally in a hollow tree. Four or five eggs constitute a set, being pale creamy white, with a wash of reddish brown and spots and blotches of deep brown. About the nest the birds utter piercing cries and chattering, scolding notes.

The eastern pigeon hawk (*Falco columbarius columbarius*) nests from eastern Canada to Maine and Manitoba, migrating in winter to the Gulf States and northern South America.

The black pigeon hawk (*Falco c. suckleyi*), blackish brown in color, nests in western British Columbia, wintering in the coastal region south to northern California. Richardson's pigeon hawk (*Falco c. richardsoni*), lighter in color than the ordinary form, is found from Alberta and Saskatchewan to Montana and North Dakota, wintering from Colorado to northwestern Mexico.

The western pigeon hawk (*Falco c. bendirei*), darker than Richardson's, breeds from northwestern Alaska to California, in winter ranging to Mexico.



GIGANTIC STONES WHICH HAD BEEN PLACED AS COVERS OVER MANY TOMBS AT RAS SHAMRA PROVED SERIOUS OBSTACLES TO THE EXCAVATORS



MORE THAN 300 YEARS AGO THESE JUGS OF WINE AND OIL WERE BURIED WITH A SYRIAN KING FOR HIS USE IN ANOTHER WORLD

SECRETS FROM SYRIAN HILLS

Explorations Reveal World's Earliest Known Alphabet, Deciphered from Schoolboy Slates and Dic- tionaries of 3,000 Years Ago

BY CLAUDE F. A. SCHAEFFER

AUTHOR OF "A NEW ALPHABET OF THE ANCIENTS IS UNEARTHED," IN THE NATIONAL GEOGRAPHIC MAGAZINE

With Illustrations from Photographs by the Author

OF ALL man's inventions, none has served him better than his alphabet. Long before the A B C's, as we know them, man could write and read after a fashion, using crude word signs and pictorial symbols. Several such systems are known, from Babylonia to Yucatan.

However, so many years of hard work were needed to learn these ancient hieroglyphs that the art of writing and reading, and the many sources of knowledge reached through it, could be enjoyed by only a few people, usually professional scribes who belonged mostly to the caste of priests.

WHO INVENTED THE ALPHABET?

In those days no king could publish a new law or send a diplomatic note, or a humble merchant even sign a simple contract, without calling in a scribe to write the words. The power, then, which such scribes and letter-writing priests came to wield in public and private life was enormous. How they used that power—and abused it—is recorded in the annals of many oriental States of antiquity, before the days of the alphabet.

The scribes and priests lost their special privilege when the alphabet came into use. Then writing and reading became so easy and simple, compared with deciphering the hieroglyphic and other ancient forms, that the public no longer had to depend upon the priests and other professional scribes.

But who, you ask, actually invented the alphabet? And when?

All evidence found so far shows that our A B C's were first used by the ancient cultural nations who dwelt around the eastern shores of the Mediterranean. Among these were the Phoenicians, and for a long time scholars insisted that they were the first to devise and use our alphabet. But to-day newly found Cretan hieroglyphs,

the Sinai inscriptions, and other influences cause many modern historians to abandon the belief that the Phoenicians gave us the alphabet.

Such was the situation when, in May of 1929, excavating at the ruined city of Ras Shamra, in northern Syria, I dug up some written slates of clay on which was used a new kind of cuneiform alphabet never before encountered. This information, sent to the Academy of Paris, aroused the scientific world.*

In Egypt the scribes had to know many hundreds of word signs and symbols in order to write the hieroglyphic systems; at Babylon, or among the Sumerians, they also used many signs in cuneiform writing.

But on the clay slates at Ras Shamra, its ancient inhabitants had found a simple way to write with only 28 letters!†

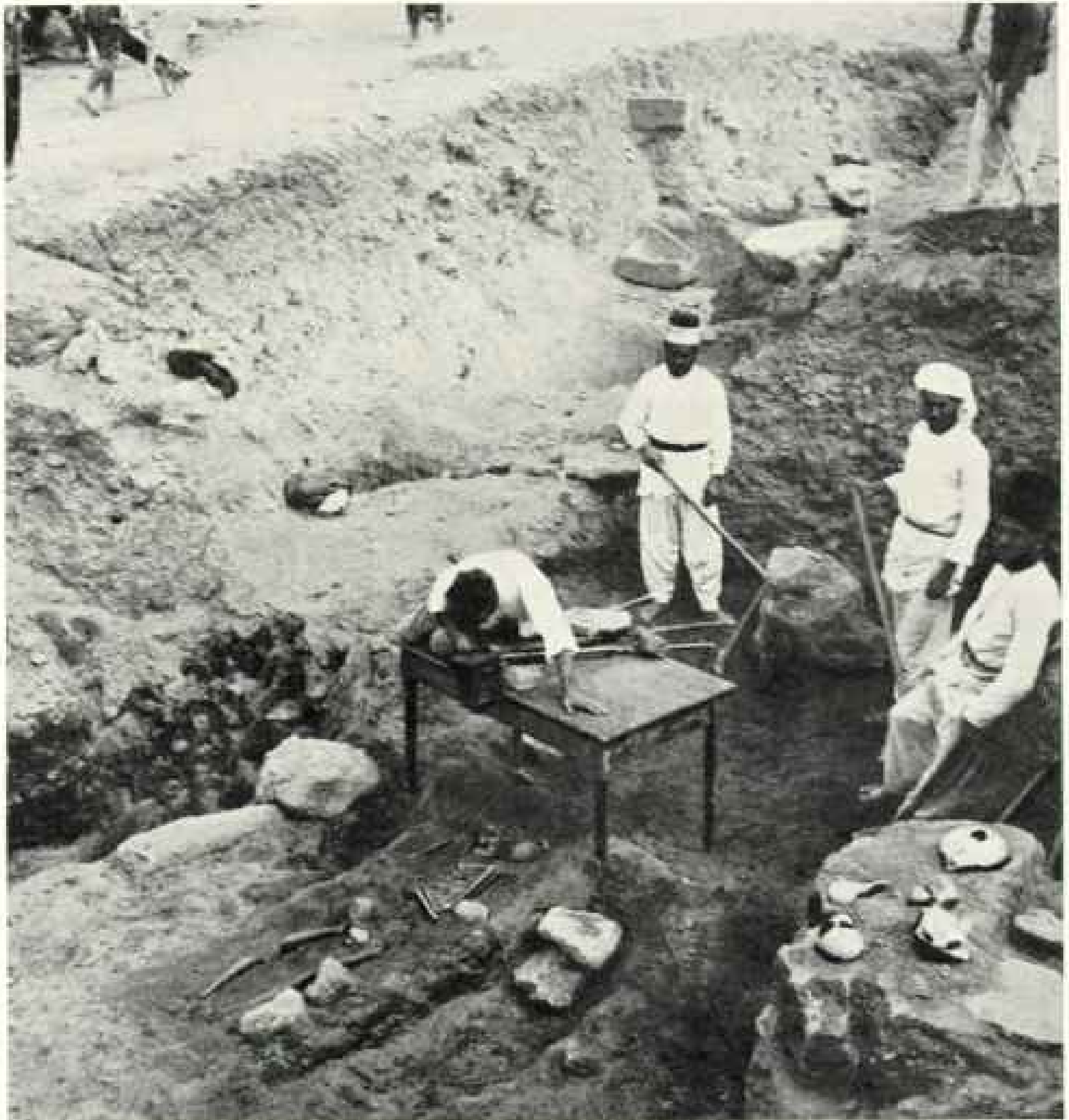
These slates, according to the archeological evidence I found with the assistance of my colleague, Georges Chenet, date from the 14th or 15th century B. C. On one old slate, in the current diplomatic language of Babylon, is a document which describes the boundaries between certain States near Ras Shamra. Similar in literary style to the diplomatic correspondence of the last Pharaohs of the 18th dynasty (between 1400 and 1360 B. C.), this Ras Shamra slate writing no doubt belongs to the same epoch.

SECRET-SERVICE CODE SYSTEM HELPS DECIPHER CLAY SLATES

When in 1821 the French scholar Champollion deciphered the Egyptian hieroglyphics, he had certain known word signs

* See "A New Alphabet of the Ancients Is Unearthed," by Claude F. A. Schaeffer, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1930.

† First studies showed an alphabet of 27 letters, but further research has revealed an additional letter.



OPENING TOMBS MORE THAN THIRTY CENTURIES OLD

Each skeleton was carefully uncovered and photographed in its undisturbed position in the ground, and then measured anatomically. Despite their age, some were fairly well preserved.

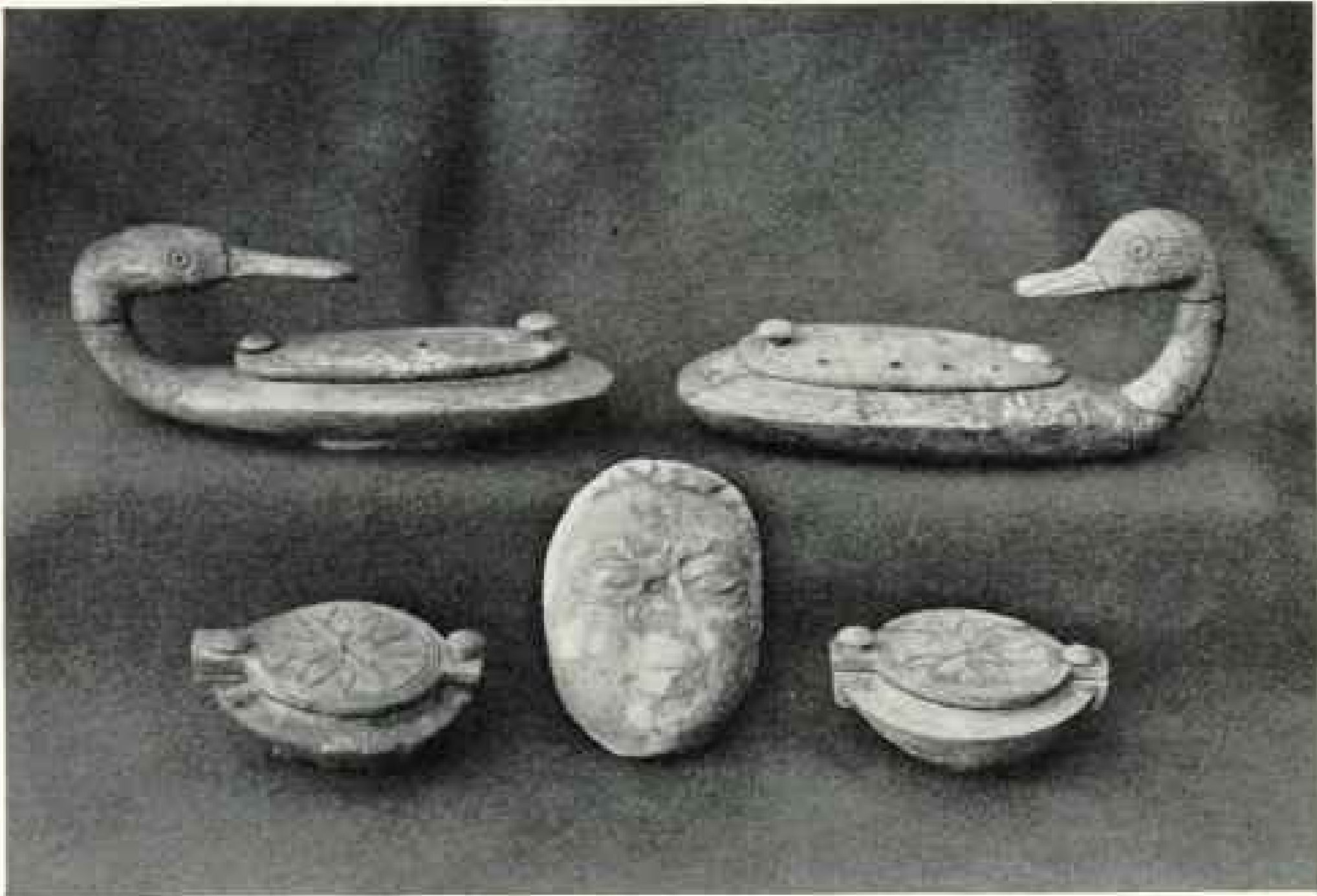
to guide him, taken from the famous Rosetta Stone, found in 1799 near the Rosetta mouth of the Nile. It bore text in hieroglyphics, demotic characters, and Greek.

But we had found no bilingual texts at Ras Shanra. It was, therefore, extremely difficult to decipher our clay slates. Yet translations were made, and by three different scholars at almost the same time. This feat was achieved by Prof. Charles Virolleaud in Paris, the Dominican Friar Emile Dhorme in Jerusalem, and Prof. Hans Bauer in Halle. To each of them

we owe a considerable part of the solution of the difficult problem.

In deciphering they made use of almost the same method as that employed by the secret service of foreign offices in deciphering diplomatic codes.

Each modern language has certain letters of the alphabet which frequently recur. They often correspond to the repetitions in cipher telegrams. Much skill and patience, exact knowledge of the language in question, and active imagination in guessing at the probable contents of the text to be decoded thus lead to the



ODDLY DESIGNED COSMETIC JARS ADORNED THE DRESSING TABLE OF A PRINCESS. Formed like ducks, with their heads twined gracefully backward, the upper vessels are rouge jars. Their wings, inlaid with blue, serve as covers (see page 112).



GOLD PENDANTS FROM THE NECKLACES OF A ROYAL LADY

The center pendant of each necklace was a golden plate. On one of these, second from the right, is shown Astarte, Goddess of Love and Fertility, with her holy creatures, the lion, the ram, and the snake (see page 121).



TWO "COMICS" OF 3,000 YEARS AGO

These strange silver gods wore gold necklaces and gold aprons about their hips. The tall male, with the long apron, is about 11 inches high. They were found hidden in an urn in the courtyard of the temple of Ugarit (see text, page 117).

identification of certain letters. With these as a basis, the code expert continues his work.

The writing on our slates from Ras Shamra was found to employ a very finished alphabet. The language in which the text is written is closely related to Phoenician, but it also contains several words in an enigmatic and as yet unknown language, which makes it difficult to understand all of the text. Therefore, the reading of the first slates with cuneiform writing which we found in 1929 remains unintelligible in many respects.

We placed much hope in our later explorations in Ras Shamra. In 1930-32 the Académie des Inscriptions in Paris, the Louvre Museum, and the Department of Public Education of France jointly asked me to lead new expeditions to Ras Shamra in order to search for other alphabetic texts and archeological remains. The result of these new excavations surpassed all expectations and made Ras Shamra one of the most important archeological sites of the ancient Orient.

HOMES AND TOMBS OF ANCIENT KINGS

The funds for my new expeditions to Syria had been considerably increased, thereby enabling me to buy better equipment and to employ more than 250 native diggers. Having settled labor questions and the salary scale with the sheiks who came to see me, I ordered their subjects to report for work. Before sunrise on the following day they were squatting on the beach.

Among them I selected the best of my former workers, who greeted me with pleasure. I rejected the loafers and replaced them with other men. I also employed numerous Turkomans from a region north of Minet-el-Beida. They are strong, willing, and honest workers. They speak no Arabic, but employ a Turkish dialect. As pious Mohammedans, they despise the Alaouites, who cling to a secret religion. Planted among the other workers, these Turkomans, I felt sure, would report to me any theft made by their religious enemies.



PEASANTS CLEAR A FIELD SO THAT DIGGERS MAY EXPLORE IT

Never dreaming what treasures lay but a few feet beneath, generations of farmers have tilled their crops and pastured goats on the site of Ras Shamra. Beneath this grain patch lay a cemetery of 1800 or 2000 B. C.

In the necropolis of Minet-el-Beida we started our excavations. Near a large royal tomb (which in 1929 rewarded our work with a beautiful alabaster vase and a lovely Mycenaean ivory relief from the second millennium) we uncovered a walled passage leading westward from this tomb. Following it, we found a large building which contained no less than 30 rooms and corridors and several wells.

In the dirt beneath these rooms we discovered many offerings, such as weapons and tools of bronze, brooches of gold and silver, and many kinds of idols. Among these were large phallus sculptures, which served the cult of fertility.

Almost everywhere in this strange building we found ritual or funerary objects. It was, no doubt, built especially for the dead kings, with whose tombs it was connected by a tunnel. Here the ancient idea that the deceased should have with him in the next world all the comforts to which he was entitled according to his rank had been exemplified in a magnificent way.

Not only were the material needs of kings in the next world provided for;

above each tomb, or near the sanctuary, the royal memory was honored and offerings also made. When we uncovered the chapels of the dead, the stone altars were still standing upright; around them were scattered votive vases of painted ceramics, often adorned with reliefs (see page 111).

On frescoes in Egyptian tombs of Tutankhamen's time, such decorated vases were mentioned as tributes to the Pharaohs from the Cretan and Syrian kings. From this source we obtained definite dates for our finds in Ras Shamra.

TREASURES FROM THE TOMB OF A ROYAL PRINCESS

We had the luck to discover the tomb of a princess with most of its contents intact. As with other burial places, this tomb had been despoiled in ancient times. However, the friends of the dead girl had been wise enough not to bury her real treasures in the tomb itself, where ghouls might search for them, but in a room somewhat apart from the tomb.

In that room we found more than 1,000 clay vases of different forms; with these



THE AUTHOR AND HIS FAMILY IN CAMP NEAR THE EXCAVATIONS

Double tent walls afford more protection during midday against the burning Syrian sun. Breakfast had to be served early to be eaten in the open air.

were hundreds of small, delicately made perfume bottles, as well as cups, jugs, plates, and large amphoræ, or two-handled jars, which apparently had formed the table service of the princess. Many of the vessels had been crushed by the heavy pressure of the earth in which they had been buried for thousands of years. However, more than 200 were entirely intact and others only slightly damaged.

It was no easy task to bring the very brittle vases out of the ground undamaged. Weeks passed and the rays of the sun were burning us pitilessly, but our efforts were crowned with success. In one large jar we found a collection of 21 phials and boxes made of beautiful, white, transparent alabaster. Each piece differs from the other in form and size, and there is no doubt that this was a toilet outfit.

This supposition is confirmed by the discovery of seven carved ivory vases which stood among the alabaster vases. They have partly the form of a duck resting on the water, with the head gracefully turned backward and with the wings serving as a cover (see illustration, page 99).

Such masterpieces of Egyptian and Syrian ivory work have been found also in the tombs of Egyptian princesses, still holding the red, blue, and yellow cosmetic paint used on the girls' dressing tables.

On the floor of this princess' chamber at Ras Shamra her jewels were found scattered, including necklaces of costly varicolored glass, of carnelian and other kinds of beads. Seven golden plates with chiseled images of Astarte, Goddess of Love and Fertility, served as breast ornaments (see pages 99, 121).

Now Easter time had come—in this land that celebrates five Easters, because it is so greatly blessed, shall we say, with religions and sects. Not to lose too much time, we participated only in the Easter celebration of the Alaouites, since most of our laborers would observe that day.

Long before the festival our men were excited. Instead of sleeping as usual during the noon hour, their heads covered from the sun, they fell into heated discussions. From time to time groups would rise, join hands, and dance a round dance. Their dance steps and movements are slow, and are accompanied by much clapping of hands. One of the men leads the dance and keeps time with a cane or a cloth which he holds in his raised right hand. He sings a very ancient song, in the chorus of which other dancers join. Nobody could or would translate it for me.

When some sheiks came and asked permission to stage a *fantasia* in our honor, I gave it, hoping I might make a motion picture of the performance.

MUSICIANS ALSO ARE ACROBATS

The sheiks who rode to work every morning on their donkeys came to the performance on horseback. Close to us they dismounted, bowed before us, and ordered their subjects to approach. These advanced, led by a little band whose instruments were a kind of bagpipe, a large drum both sides of which are beaten at once, and a clarinet. Even for Christian ears, this pagan rhythm had a strange, alluring charm.

Before our tents a group of dancers now went into action, encouraged by the fantastic gesticulation of the band boys. To our astonishment, these musicians now turned acrobats, jumping madly about, still playing their instruments without missing a note—not unlike a jazz band.

Suddenly both music and dance came to an abrupt halt, and Badur, one of our best workers, stepped in front of the drummer.

With a silver 50-piaster coin in his raised right hand, Badur looked at me and muttered a formula, of which I understood only that he wished I might live eternally in health and happiness. Then he gave the coin to the drummer, who pounded wildly on his instrument and sang loudly that Badur's wish might be granted by the spirits.



Drawn by Newman Dunstead

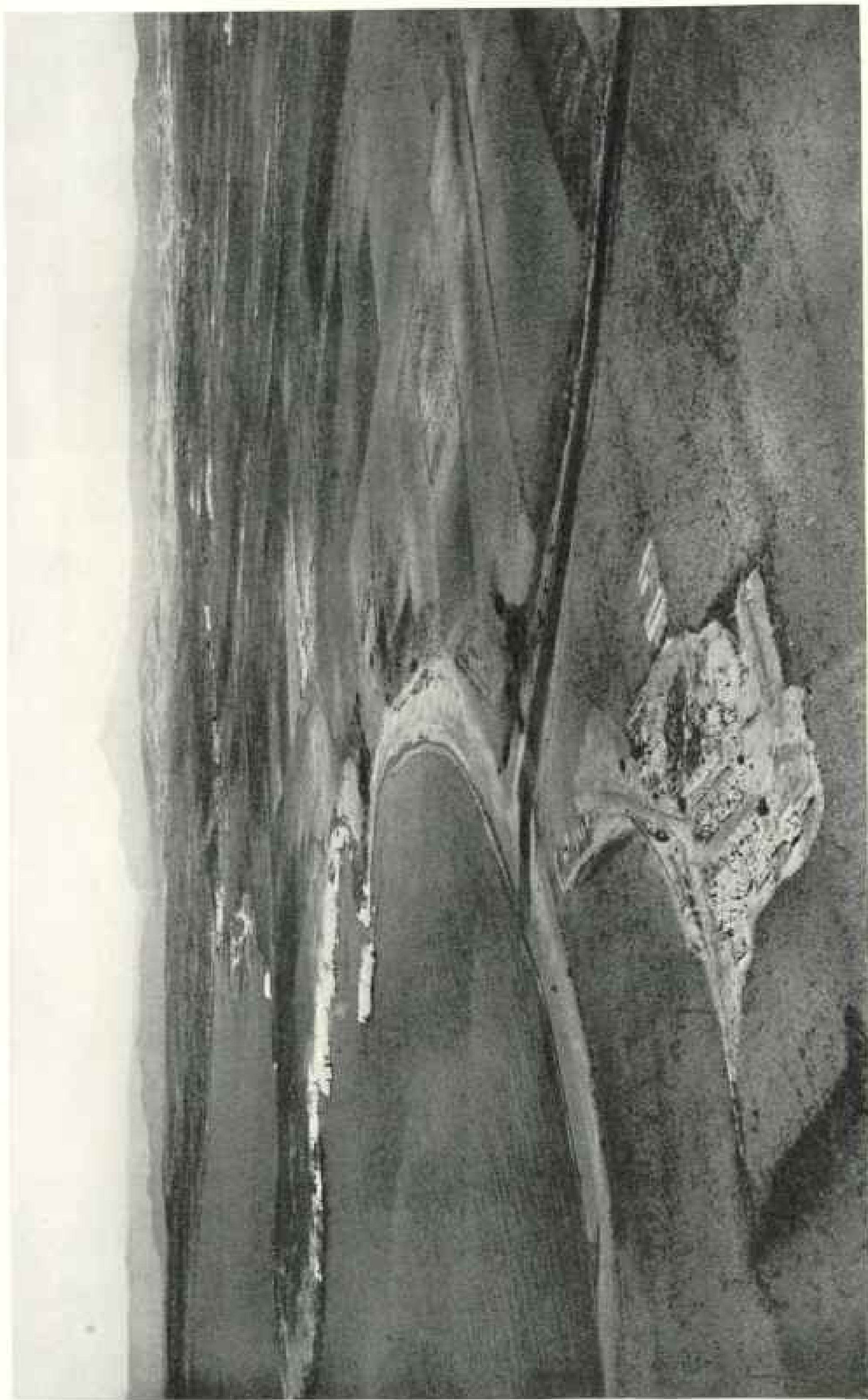
THE LAND OF THE ANCIENT ALPHABET

In the country of the Alaouites, between historic Damascus and Antioch, of chariot-race fame, the Expedition found clay slates and inscribed idols which added an epochal link to the history of human writing.

Badur threw another silver coin, a sacrifice to insure the health of my wife. Then he threw a third for our little daughter, and a fourth for our friend Chenet. Still louder the musician-sorcerer sang his incantation. Again Badur started with me, as another silver coin left his pocket for that of the sorcerer.

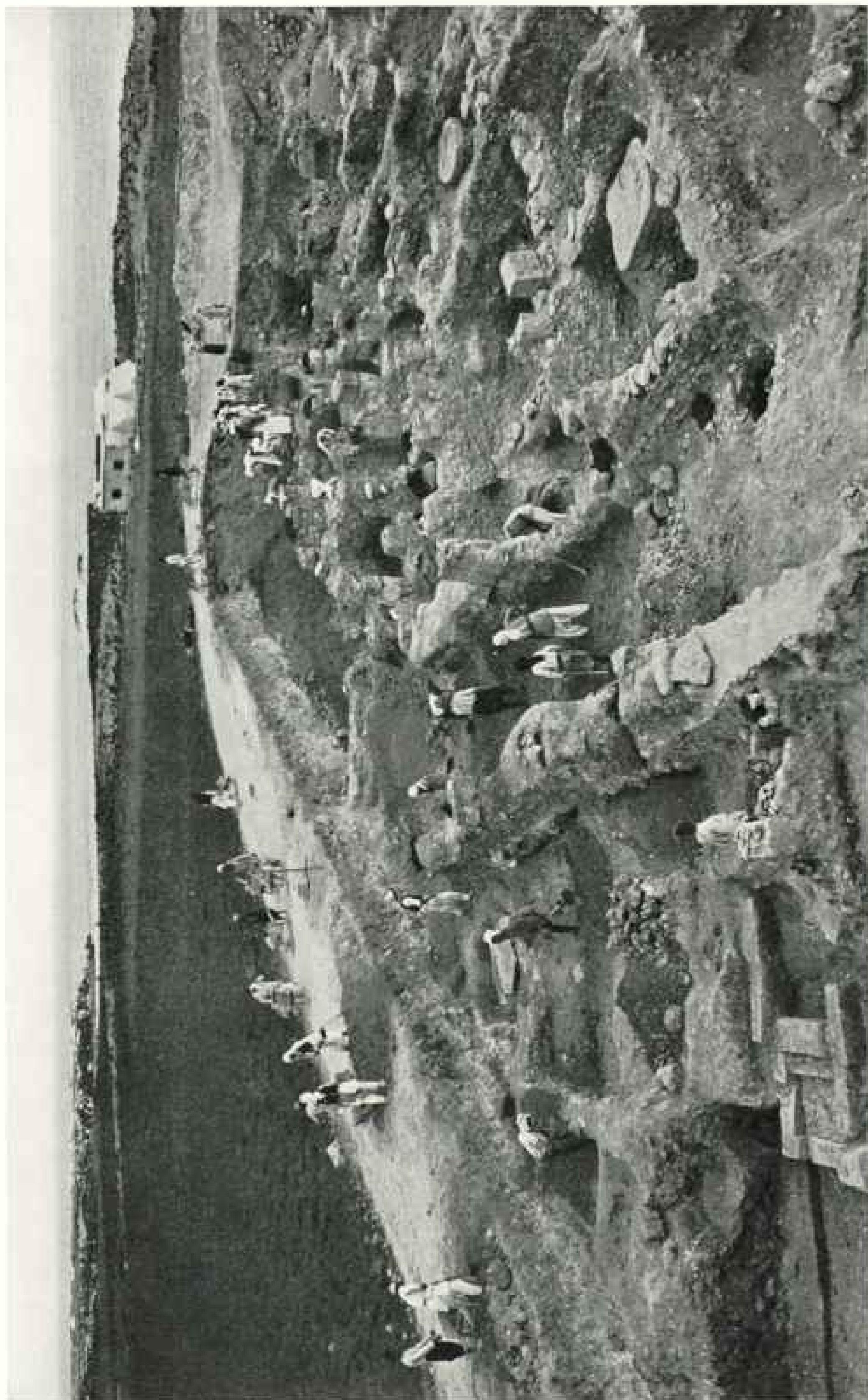
You can imagine what this sacrifice meant, since each coin Badur was throwing away represented a whole day's heavy work under the burning sun. I objected to this folly, but could not stop it.

The sight of the silver being thrown away and the continuous wild singing moved the crowd to frenzy. Badur got so excited that he actually threw away his



THE "WHITE HARBOR" OF THE ANCIENTS IS NOW A DESERTED PORT

The Bay of Minet-el-Beida, so called from the calcareous rocks at its entrance, lies at the eastern end of the Mediterranean (see map, page 103). In the foreground is the Ras Shamra royal cemetery. On the horizon looms the Djebel Ansariya, or mountains of the Alacuite country, the peak of Djebel Akra rising high in the center. Known also as Mount Casius, it was there the Phoenicians made offerings to Baal. Romans, too, revered the peak, and the Emperor Julian made a pilgrimage to it.



ARAB WORKERS UNCOVERING THE RUINS OF A PALACE BUILT TO HOUSE DEAD KINGS

Among all excavations at Ras Shamra, no spot yielded more astounding secrets of the past than did these royal tombs. Altars, idols, gorgeous decorations and sculptures peculiar to the cult of fertility filled the many rooms and hallways. Bronze weapons and tools, vases, gold and silver brooches—everything symbolic of regal splendor was here for the dead monarchs' comfort in the life to come.



A MAUD MULLER OF THE ALAOUITES

When harvest hands cleared the crops from a spot where the author wished to dig, many pretty Alaouite girls joined in the work.

last cent, but others took his place, wildly throwing money to the sorcerer. The scene became so noisy that my little girl was frightened; but finally the sorcerer grew so hoarse that he could not conjure any more, and the money stopped flying. He quieted down and began to drum a soft, rhythmical beat, as the crowd ebbed away (see pages 108, 113, 116).

After this Easter interruption we went to work digging into the mound or "city hill" of Ras Shamra. We felt this hill might yield treasures, because in a near-by grain field we had found a fragment of Egyptian inscription and the broken statue of a Pharaoh.

To speed up our digging, I ordered the grain field harvested in a hurry. Observing the customs of the country, I employed the nomad harvest workers of the Turkish border regions, whose habit is to hire themselves out in places where the grain is ripe and where their help is needed. They use

huge iron sickles and on their left hands they have talonlike finger protectors of bamboo. These hooklike shields aid them in raking up bundles of wheat straw. They are poor, wandering devils, sleeping always out of doors and owning nothing but their tools. Yet they sing and joke the livelong day.

In their wake come grain collectors, Alaouite women with their children. Bossed by lazy husbands, the women must pick up every stray head of grain. Some of their daughters are striking beauties.

When these farm hands quit the field the digging of the trench was started. One foot down we encountered the walls of a large sanctuary with stone basins which probably had served for ritual bathing. Near by were some costly weapons of bronze, and hunting implements; among these was an artistically formed spear point, the shaft of which was adorned with two heads of wild boars.



THIS NOMAD HARVEST HAND SWINGS A LONG AND WICKED SICKLE

The peculiar-looking bamboo tubes worn on the fingers of his left hand are for protection in handling the rough barley stalks.

From the forms of these bronze articles, as well as from the ceramics found close by, we judged they dated from 1300 or 1400 B. C. Traces of a conflagration indicated that this last city on the hill of Ras Shamra, as well as the sanctuary, had been destroyed some time in the 12th century B. C.

The dimensions and plans of the sanctuary were astonishing. It was set in a vast rectangular courtyard surrounded by strong walls, and consisted of a mighty block of hewn stones upon which the images of the gods had once stood.

Long ago these figures had been knocked down and the broken pieces left here by vandals. We found the remains of a female statue, probably the Goddess of Fertility, as well as fragments of a male statue in life size, which showed a pure Egyptian style and which must have been the work of one of the greatest sculptors of that time.

Close to this large courtyard was another slightly smaller figure. Here also the destroyers had been active, never dreaming with what care and patience later excavators would one day search these ruins! In spite of the fact that the statues of the gods and the dedicatory inscriptions had been broken intentionally, we found piece after piece and could thus again knit together the most important temple documents.

TEMPLE GIFTS FROM THE EGYPTIAN PHARAOHS

In the south courtyard of the sanctuary, near a broad, monumental staircase, we found pieces of a great sphinx of green stone, the Egyptian origin of which is plain. On this sphinx's breast is an inscription in hieroglyphics with the name of the Pharaoh Amenemhat III (1850-1800 B. C.) and an engraved dedication, from which we learned that this sphinx was a



CHORUS BOYS OF THE ALAOUITES PERFORM THEIR ANCIENT STEPS

Keeping time with a stick, the leader drills his dancing boys as might a Broadway ballet master. He sings an old song as the boys join in the chorus. To the author they would not explain this song (see text, page 103).

gift from the Pharaoh named to the god of the temple of Ras Shamra. Near by we found the sculptured portrait of the Egyptian Princess Khnumit Nofr Hedj, who became the wife of the powerful Pharaoh Senusert II.

Both these statues had been wilfully destroyed by the despoilers of Ras Shamra, and we shall soon learn why.

Although damaged, their inscriptions place these objects among the most important historical documents ever recovered from Assyrian soil. They prove that as early as the 20th century B. C., at the time of the Middle Kingdom, Egyptian influence and power extended into northern Syria.

But why did the Princess Khnumit and the Pharaoh Amenemhat III send gifts to a temple as far away as Ras Shamra? Because, as we know from the diplomatic correspondence of the later Pharaohs of the Tutankhamen epoch, found in the deserted palaces of El Amarna (Tell-el-Amarna), in Upper Egypt, Egyptian

rulers liked to have Syrian princesses for their harems. Political aims, plus the charms of beautiful ladies of foreign lands, were jointly the reason for this policy.

Many of these imported wives became favorites in Egypt and some were made queens. If a Syrian queen's child became sick and an Egyptian doctor could not cure him, the queen would send back to her native Syrian city to borrow her favorite temple goddess to cure the child. Should the cure be effected, a gift would be sent to the temple in Syria from which help had come.

RAS SHAMRA ARTISTS INFLUENCED BY EGYPTIAN WORKS

Such royal gifts, sent from Egypt to Syria, not only graced the temple at Ras Shamra, but also served the native artists as models. Near the Egyptian sphinx of Amenemhat III we found the broken pieces of a much larger sphinx of whitish limestone. Its rougher work betrays the hand of an unschooled Syrian artist.



A STYLISH WOMAN OF RAS SHAMRA

The eyebrows are brown; the nose and ears are pierced, and no doubt once held gold rings. It was taken from a royal family tomb.



A SCHOOL SLATE FROM 1400 B. C.

Though he first ruled off his slate with lines to keep his writing straight, this lesson betrays the schoolboy's clumsy hand (see page 114).



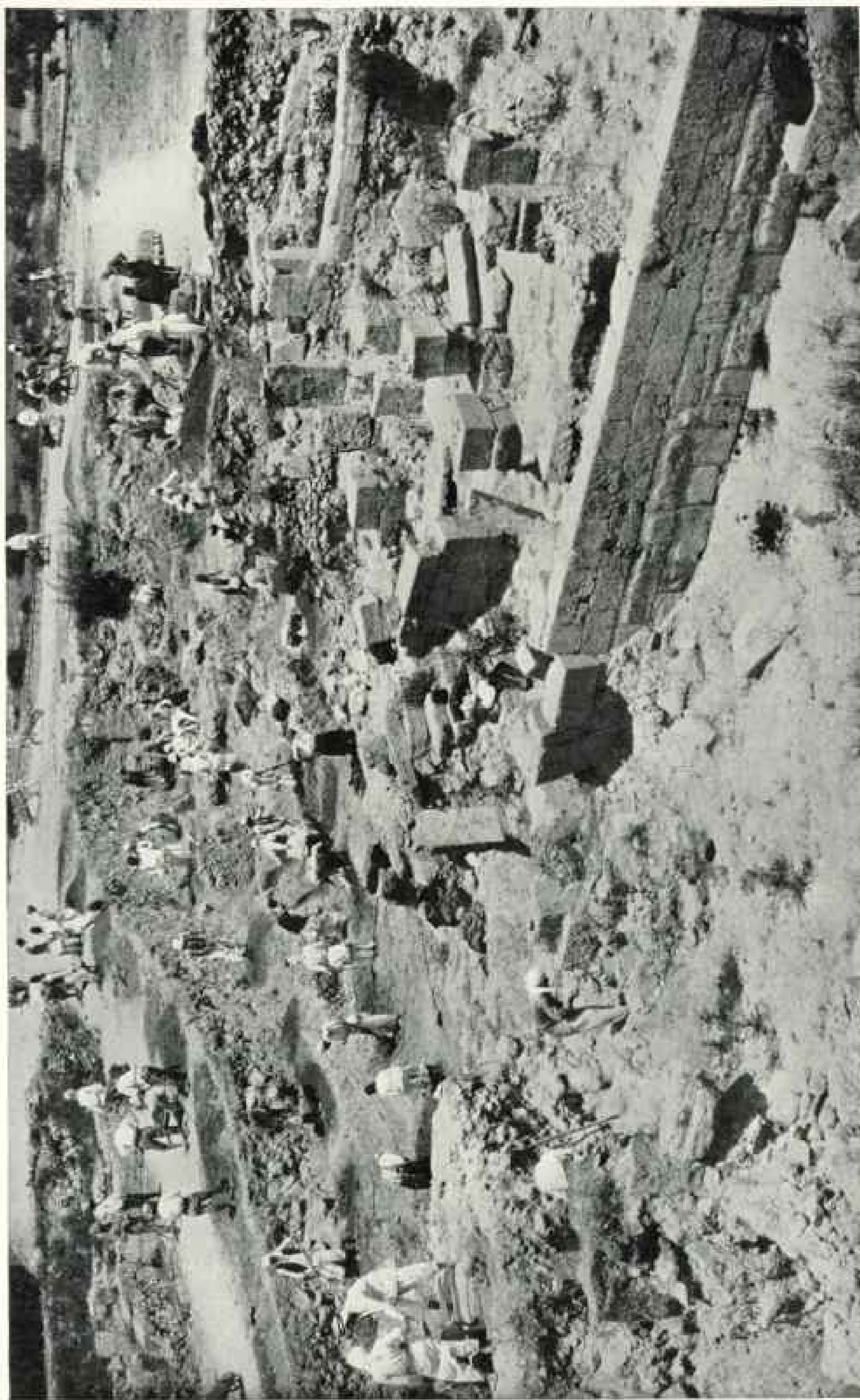
A BRONZE VESSEL FROM THE TEMPLE

Found hidden with other bronze objects, this tripod had been presented to the high priests of the temple of Ugarit (see pages 120-1).



TO THE WELL ONCE TOO OFTEN

This broken, painted pitcher was buried in the royal cemetery as an offering. It is distinctive in its arrangement of handles.



UNCOVERING PARTS OF THE TEMPLE LIBRARY AND SCHOOL OF JOURNALISM AT RAS SHAMRA

When this school for scribes was flourishing, centuries before the New Testament was written, men who could write were rare and therefore wielded great power. Often not even a king could publish a new law, or send a diplomatic note, without a scribe's aid (see text, page 97).



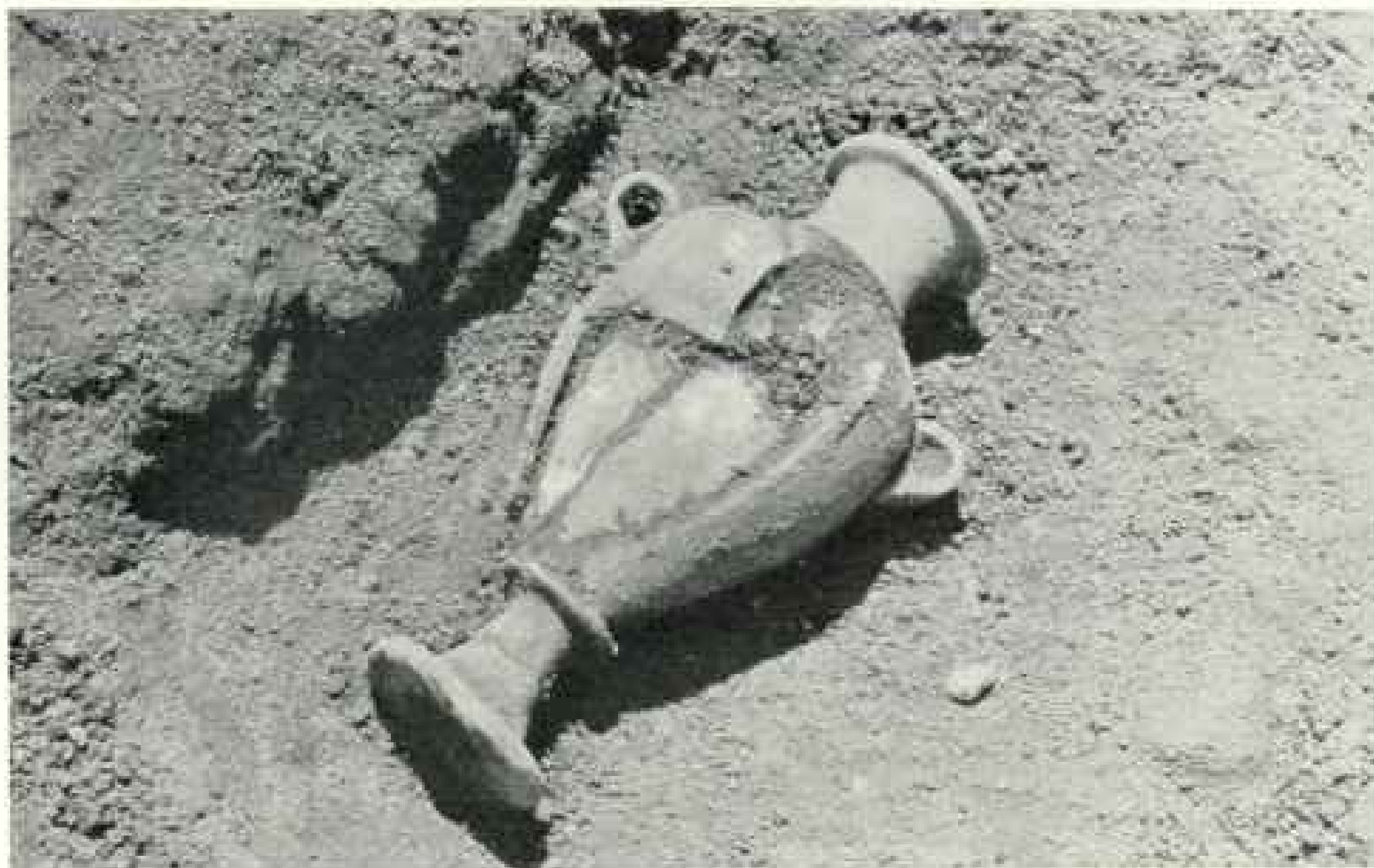
ALAS, POOR YORICK!

He, too, may have been a "fellow of infinite jest." But they buried him—his head apart from his body, with offerings all about—after the manner of old Kas Shamra.



STONE ALTARS WERE FOUND STANDING UPRIGHT

The royal sanctuaries were built like palaces for the living, with large rooms, halls, wells for water, and altars for honoring the memory of the royal dead (see text, page 107).



THIS ALABASTER VASE WAS CRUSHED UNDER THE PRESSURE OF THE EARTH.

What the ancients called alabaster was really a kind of marble. To-day the word commonly applies to a form of soft mineral gypsum, white, pink, and yellowish, often with dark streaks, much used in carving statuary.



BEAUTY AIDS TO AN ANCIENT PRINCESS.

The box atop this alabaster toilet set is strikingly like powder jars used on modern dressing tables. These costly rouge pots, ointment containers, and perfume bottles, found in a large clay vase, were practically intact (see text, page 102).



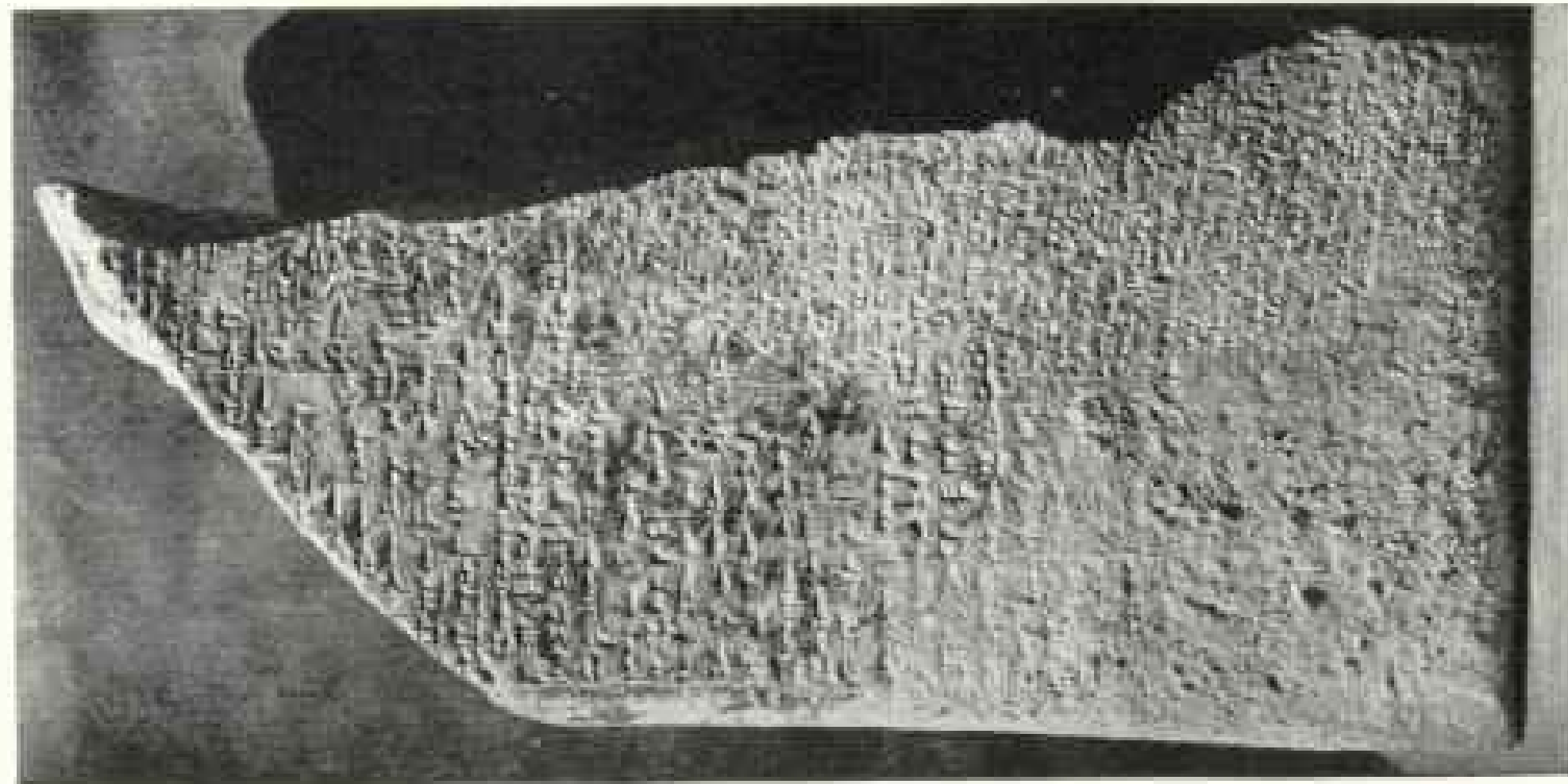
DURING THE NOON HOUR NATIVE WORKERS PRACTICED THEIR EASTER DANCES

The performers are grouped according to the villages from which they came. Each group had its leader, who trained the dancers in the rhythmic steps and led in chanting the ancient songs (see text, page 103, and illustration, page 108).



BRAHIM, A POPULAR DANCER OF THE ALAQUITE BOYS

All digging ceased at Easter time, and the Alaouites, with other sects among the workers, turned to religious celebrations. While not professional dancers, to these men the art is old, and they rehearse each performance for many weeks.



SOME SCHOOLBOY'S "WRITTEN WORK"!

Starting with large characters, he had to make them smaller and smaller, to crowd all his text on his slate (found at Ras Shamra). In another error, he wrote across the vertical line of the first column into the second, and had to draw a fine, crooked line (upper center) to keep his paragraphs from being mixed (see pages 119, 124).



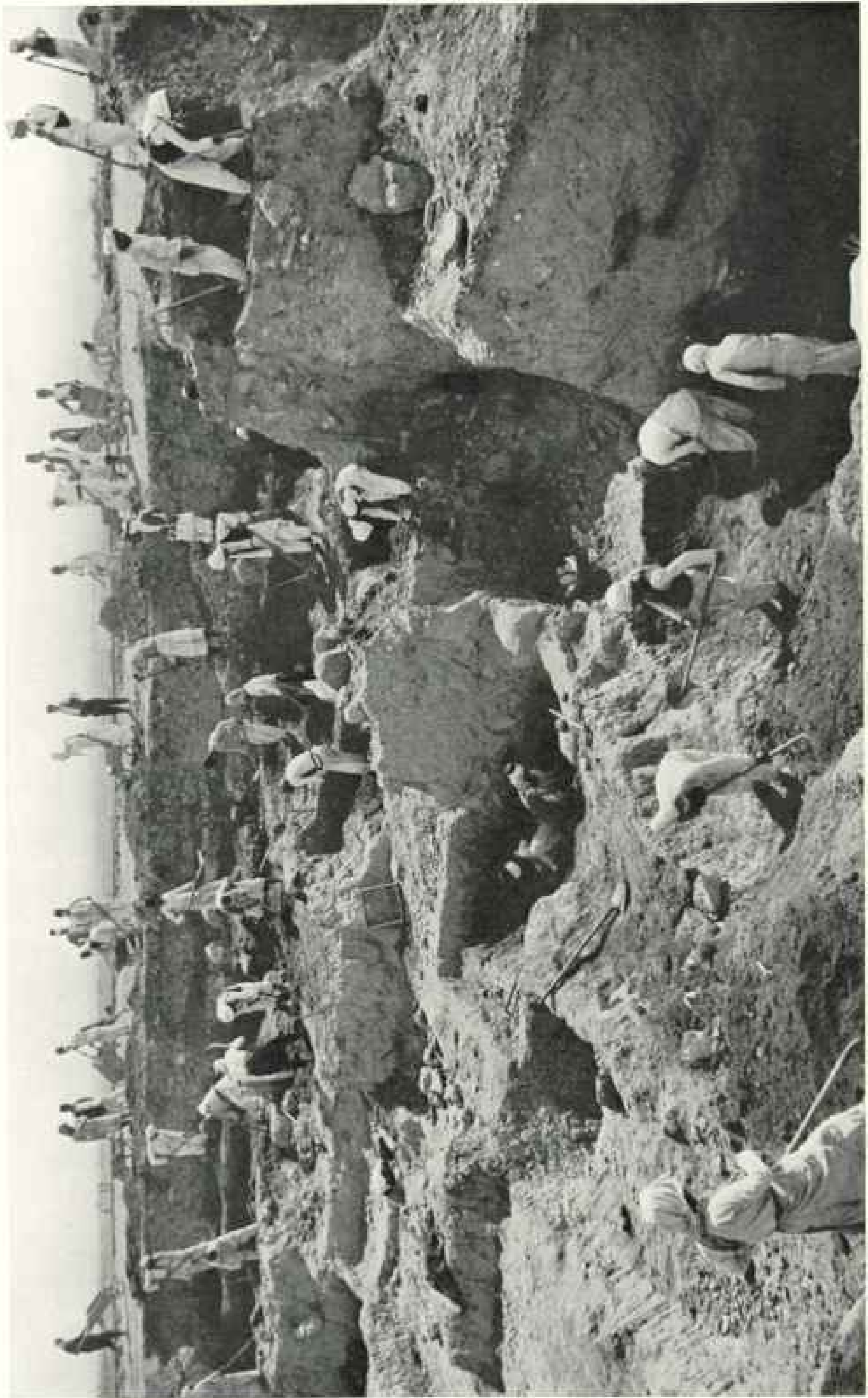
THE GOD OF THUNDER AND WAR

The smaller human figure, entrusting itself to the god's protection, probably represents the man who gave this sculpture to the temple. In his left hand the god holds a spear, from the shaft of which springs a young tree. The sculpture is now in the Louvre, Paris. It strikingly resembles the Egyptian style.



TESHUB, WAR GOD OF THE HITTITES

In this Egyptian-style relief the King wears the high ostrich feather crown of Nile deities. From his brow springs the mysterious horn of the Syrian gods. Although he holds an Egyptian scepter, he carries also the spear and dagger of Asa Minor and wears Hittite sandals (see text, page 116).



THOUSANDS OF TONS OF EARTH AND STONE WERE MOVED TO UNCOVER THE MYSTERIES OF LONG-BURIED RAS SHAMRA

Painstaking care was necessary, as any careless blow of a pick might otherwise injure a priceless object. Excavating the royal tomb, which were arranged in three stories, revealed many altars, idols, and ornaments of gold (see illustrations, page 109).



AN ALAQUITE SORCERER POUNDS HIS DRUM AND UTTERS INCANTATIONS

On the left, holding out a coin to the drummer, is a native excavator. In return for the silver coin, the sorcerer drums more wildly and shouts a formula supposed to bring good luck.

We discovered a life-size sculpture of the Snake Priestess, which apparently had been made by the same Ras Shamra artist. This had also been mutilated by vandals, its head being knocked off. Around the breast and hips of the priestess is coiled the thick body of a large snake, the neck of which the priestess holds in her hand.

SNAKE WORSHIP WIDELY PRACTICED

Snake worship was practiced in pre-Christian Crete, Syria, and Palestine; the members of this strange cult offered small snakes of silver to their goddess, and many such objects have been found around the Ras Shamra temple.

West of the two large temple courtyards

we uncovered a number of rooms, halls, and staircases used by the priests. Beside a cistern fed by a stone water pipe stood an odd stone table on which animals for sacrifice had no doubt been laid.

Outside of the sanctuary's west wall the land slopes sharply toward the lower city. It seemed likely that some monuments might have fallen down there when the buildings were destroyed, and I had the slope excavated.

"Look here!" a worker suddenly called, as he uncovered a tapering hewn stone. We carefully turned it over—and what a strange, graven face it was that stared back at us, after 3,000 years of undisturbed sleep in the ground!



IN THESE STONE BASINS THE FAITHFUL PERFORMED THEIR SACRED ABLUTIONS.

More than 250 native laborers were employed for excavating. Among them were many devout Mohammedans, who regard as infidels the Alaouites, who have a secret religion.

This hewn god held a lance in his left hand; a high crown adorned his head and from his forehead sprang the strange horn of the Syrian deities. The narrow kilt around his hips and the bent scepter in his right hand were of Egyptian origin. On the other hand, his sandals of leather straps hinted at a Hittite shoemaker from Asia Minor. No other god than Teshub, war lord of the Hittites, wore these original sandals with the high-pointed toes.*

Since it was the Hittites who, with other conquering nations, put an end to Egyptian rule in Syria, it was also they, no

* See "Skirting the Shores of Sunrise," by Melville Chater, in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1925.

doubt, who destroyed Ras Shamra, one of the most important kingdoms under the Egyptian protectorate. When they had wilfully wrecked all monuments which reflected the power of the Pharaohs, they built a sanctuary for their own gods. Its wall we found west of the great temple; and within these walls we were to discover many fascinating things.

A PAIR OF SILVER GODS IN AN URN

Among these was a large vase which contained a strange pair of gods (p. 100). These gods were neither beautiful nor graceful, but of very high historical value. Their Anatolian style and origin are beyond doubt. Some silversmith who came



"SPIT CURLS" ON A COQUETTISH GODDESS

This wide-eyed beauty looks out from the side of a multicolored drinking cup of faïence found in a royal tomb at Minet-el-Beida.

to this country with the Hittites made them. These solid-silver statues, overlaid with gold, seem to represent a votive gift to the temple from some rich donor.

True to the custom of the time, he must have promised to give these silver statues to the deity in return for a favor. In this promise he had said how much the statues should weigh. Then, when the silver-smith had cast the images, they proved not equal to the weight promised; so the donor placed enough raw silver beside the statues in the urn to make up for the shortage. We had the luck to find these same extra chunks of silver!

Near the silver statues we came upon a huge stele, or stone slab, which had fallen

down from its socle, happily without breaking. When we hoisted this stone, which weighed more than a ton, to the surface, we found that on one side it bore the war god, Hadad, in Egyptian bas-relief. In his left hand the god held a lance with its point on the ground. From its wooden shaft sprang small twigs, and thus the weapon of war had been changed into a peaceful, fruit-bearing tree! (See page 114.)

A LIBRARY AND A SCHOOL FOR WRITERS

Our excavations led us back to the place where we had found the first clay slates with the new and, till then, unknown cuneiform writing. So we decided to dig more thoroughly thereabout, to uncover the whole ruined building which once had stood there.

Early one May morning I saw Dibo, one of our best workers, suddenly throw up his arms. At first I feared he had been bitten by a scorpion, for that had happened to many workers, because they would not wear shoes when excavating. Then I saw that Dibo was laughing. He had found the first new clay slate covered with beautiful cuneiform writing.

"Sheik Nasser," I called to the foreman, "put Dibo down for a baksheesh." These words electrified all the workmen to redoubled effort. That word baksheesh, or "gift," was often heard, for each day brought us one or two, and many times three slates. Often they were found together in "nests"; at other times we would find a slate broken and its pieces scattered all around.

Each slate or fragment was carefully measured and photographed for translation, so that their distribution within the walls might tell us what purpose each room had served.

In our excitement we worked feverishly, indifferent to the scorching sun. Brown as negroes, we ran about minus our tropical sun helmets, clad only in shirts and pants. Instead of heavy European shoes, we wore leather Alaouite sandals.

Long ago we had given up the habit of drinking during the hot hours. Not until 6 o'clock did we drink a cup of hot tea from the thermos bottle. Then back to work again.

Our enthusiasm spread to the natives. They sang at their work, and only when the midday heat was most scorching did they

need a word of encouragement or reproach.

Now came a discovery so stupefying that all of us, foreigner and native, forgot both heat and fatigue. Digging under the stone floor of a room, we came upon some beautiful silver vessels and vases, which were strangely heavy as we lifted them out. They were filled to the neck with objects of gold and silver—rings, figures of animals, jugs of silver, plain and inscribed, earrings, beads, and golden necklaces with all kinds of pendants! Why were all these treasures left buried under a stairway in this ancient schoolhouse for scribes?

DICTIONARIES FROM THE SECOND MILLENNIUM B. C.

In this wrecked building the rooms of the scribes were grouped about a courtyard. A well-preserved staircase proved that the building even had a first floor. In the courtyard a deep, walled well furnished fresh water. The finds in the rooms proved that here was not only a library, but also a school for scribes who were taught by priests from the near-by temple of Baal.

One of the teachers was named Rabana, son of Sumejana, and he called himself a submissive slave of the Goddess Nisaba. He had carefully compiled a clay slate dictionary, in the margin of which he wrote his name as author. We also found practice lessons of the students, including small clay slates on which the same word had been written several times, and slates with clumsily drawn cross-lines so that the student might write more evenly. Coarse letters betrayed the unskilled hand (see page 109).

Among the slates is a Babylonian dictionary listing certain words of about the same meaning. Thus the writers were trained in synonyms and taught style in phrasing. This slate is a real dictionary of synonyms, of the same kind as those of to-day (see page 122).



THREE GRACES FROM A POTTER'S WHEEL

Designed by some forgotten genius of 3,300 years ago, these slender perfume bottles might well be displayed in a perfumer's shop to-day.

Men drove close bargains in those old days, and price cutting was a boost to sales, as shown on one slate.

A "LLOYD'S REGISTER" 3,000 YEARS OLD

In deciphering another dictionary, under the word *gamba*, which means price, we find listed the following explanations: the "great" price (with which the bargaining begins), the "small" price (with which it ends), the "gross" price, the "net" price, the "fixed" price, the "good" price, the "beautiful" price, the price "in the city," etc.—all the subtle variants of prices with which the oriental traders haggled in the bazaars 3,000 years ago, and over which they haggle to-day!



IN THE COURTYARD OF A VILLAGE SANCTUARY, IBNI HANI

This Mecca for Alaouite pilgrims is about an hour's ride from Ras Shamra (see page 122). Through the central gateway the donkeys of the author's party rushed to the big well, only to find it dry. The building at the left is the festival hall where ceremonial dances are held.

The same slate also listed all the different kinds of ships which the water-front reporters of Ras Shamra saw enter their harbor. The list begins with *ma-tur*, or small barge; then follow moon-shaped barges, passenger ships, war ships, army transports, fishing boats, racing craft, ferry-boats, ships of 60 *kur*, 50 *kur*, 40 *kur*, etc., terms which, although denoting smaller scale, correspond to our present-day terms for the tonnage of steamers.

Of extraordinary interest is one cuneiform slate. It contains six columns of text in bilingual plan, like a modern French-English dictionary. Made particularly for lawyers, it lists Sumerian juridical terms as they were used in the land of Ur, although a Babylonian or Phoenician translation parallel with the Sumerian text is not shown, as we might have expected.

There does appear an entirely unknown language, which has not yet been made out.

On the margin of the slate the author has written his name and address. Unfortunately, it is a little defaced, as the slate has a crack there. At the end, however, is the name Ugarit. Another Ras Shamra slate carries the date of the third year of the reign of a king of Ugarit, and the same city name of Ugarit also appears on several other slates discovered by us.

From Egyptian texts and from Pentaur's work commemorating the victories of Rameses II, we learn that Ugarit was a well-known Egyptian port in northern Syria, for which archeologists have long been searching. Here it is! (See p. 122.)

During the Hittite revolt against Rameses II, this city sided with the enemies



ACROSS SOME PROUD BEAUTY'S BREAST THIS BRILLIANT NECKLACE ONCE FLASHED

It is strung with amethyst and carnelian beads, and two golden pendants at the bottom carry images of Astarte, Goddess of Love and Fertility. With other objects of gold and silver, this necklace was found hidden in an urn, buried near the temple library.

of the young Pharaoh in Asia Minor; wherefore Rameses punished it after his victory at Kadesh, south of the Lake of Homs. Our Egyptian finds in the sanctuary of Ras Shamra date from the time of Rameses II; after that come the decidedly Hittite influences on the local sculpture.

EIGHT LANGUAGES USED IN ONE CITY

There can scarcely be any doubt that the city which we have uncovered on the hill of Ras Shamra is the famous Ugarit, the bulwark of Egyptian power and influence in northern Syria. This find may furnish a key to many hitherto-obscure secrets of early history in the Near East.

Within the walls of Ugarit no less than eight languages were spoken or understood. This surprising fact recalls the

Biblical story of the confusion of tongues at the Tower of Babel. Proof of this polyglot Ugarit character lies in the fact that in the temple library and in the school for scribes we have found actual documents in the eight different languages which the priests taught their pupils.

Here is a list of these tongues: (1) The local language of the land of Ugarit, closely related to classical Phœnician, which was written in the cuneiform alphabet discovered by us; (2) Babylonian, the diplomatic language of that time, in which the official correspondence with Egypt and other foreign countries was written; (3) Sumerian, the language of the theologians, lawyers, and scholars of Ugarit, who preferred to express themselves in the language of the country of Ur much in the same manner as to-day many priests and



ALAQUITES MAKING A SACRED PILGRIMAGE

Women are allowed to participate only once a year in festivals at Ibbi Hani (see page 120). On that day, also, matters of policy are decided by the sheik. This sanctuary, once a Roman city, now counts but a few fishermen, a lighthouse keeper, and priests to care for the tomb of the saint, which is the flat building in the right background.



A PAGE FROM A DICTIONARY USED MORE THAN 13 CENTURIES BEFORE CHRIST

Arranged like a modern Spanish-English dictionary, this volume reveals a hitherto-unknown language. It also discloses that the old name of the city at Ras Shamra was "Ugarit" (see text, page 120).

scholars still use Latin.

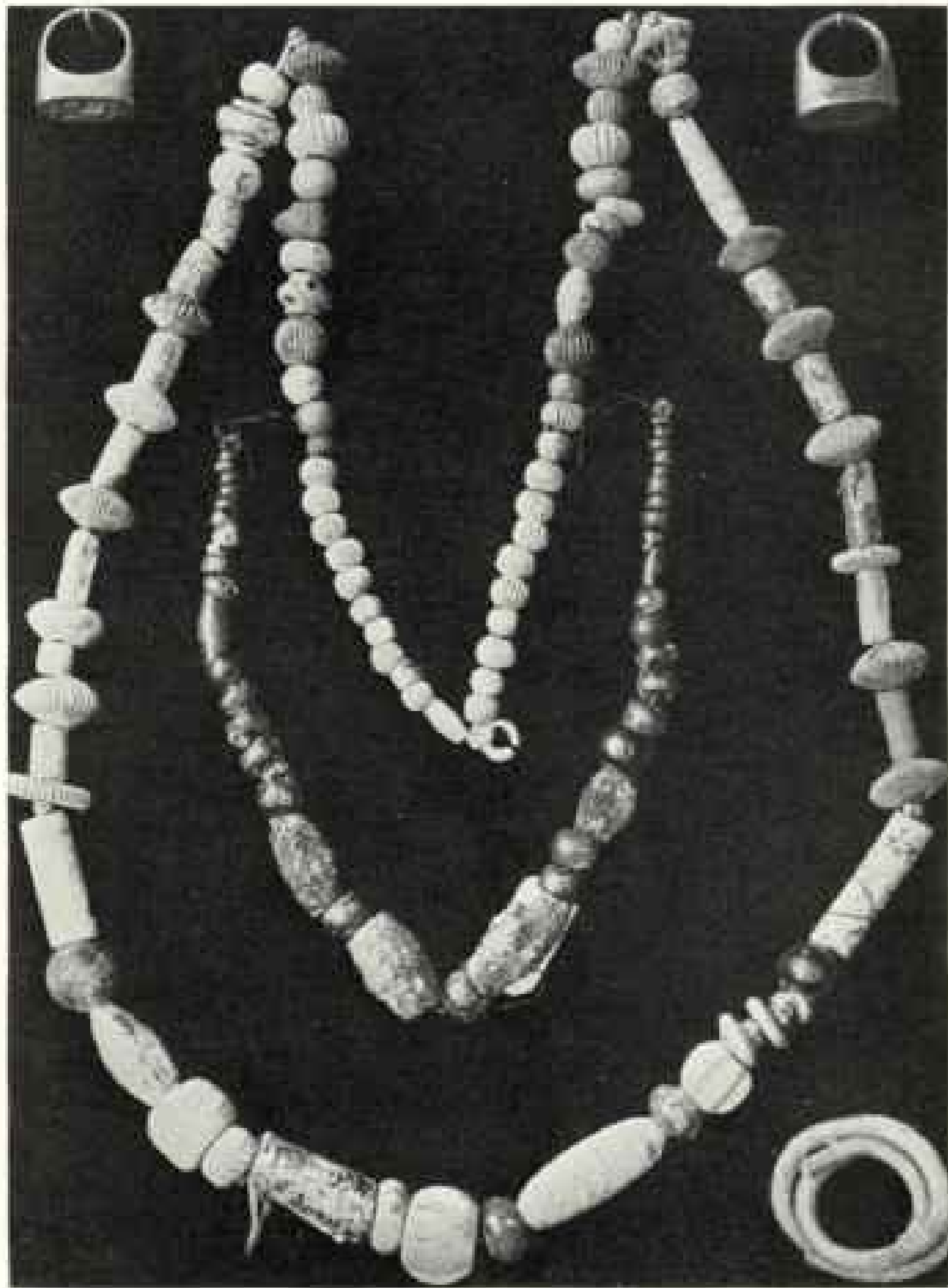
Four and (5), two still unknown languages, which are found in the cuneiform dictionaries; (6) Egyptian, in whose hieroglyphics the inscriptions on the gifts from the Pharaohs to the temple of Ugarit are written; (7) Hittite, the language of the later rulers of Ugarit, who came from Asia Minor and put an end to the Egyptian rule in Syria in the 14th century B. C. (8) Another unknown writing whose alphabet, according to Prof. René Dussaud, of Paris, resembles many Cypriote and Cretan letters.

THE PORT OF UGARIT AND THE CYPRIOTE COPPER TRADE

We found an inscription written in these characters on a silver tray hidden in the temple library of Ras Shamra.

Ugarit's polyglot speech was a result of its geographic location, at the crossing of the trade routes from Phœnicia, Mesopotamia, and Asia Minor. It was also a trading port for the eastern Mediterranean, dealing with Cyprus, Crete, Greece, and Egypt. In exchange for Asiatic commodities, goods from all these countries flowed into Ugarit, as has been proved by the variety of articles found in the royal tombs of Minet-el-Beida.

The most important trade was the import and export of Cypriote copper. Of all Syrian ports on the mainland, Ugarit was closest to the island of Cyprus, whose port of Salamis, near Famagusta, was separated from Ugarit by only a little more than 100 miles—a one day's sea voyage with a good wind.



COSTUME JEWELRY OF THE LONG AGO

Found on an ancient bedroom floor, along with rings, gold pendants, and other jewelry dropped there by a pagan princess.

Thanks to the location of its port, Ugarit had acquired a monopoly of the Cypriote copper trade. It may be imagined what riches and privileges thereby accrued to it, at a time when iron was not used and when weapons and tools of all cultured nations were still made from copper and bronze.

SOME EPICS OF OLD PHœNICIA

Ugarit was not only important in trade and politics. Great authors and philosophers lived there 3,300 years ago. We found whole chapters of their works in the temple library of Ras Shamra. They also wrote in cuneiform signs, divided into several columns, on extra-large slates.

Many times the author had not esti-



THESE TWO CRETAN-STYLE VASES WERE FOUND IN THE ROYAL SANCTUARY

A cuttlefish in brown paint adorns the vase at the left. In high relief, on the other vase, appears the head of the sacred bull.

mated the length of his work correctly, so that he lacked space for the last chapters. Therefore he had to bring the lines closer together toward the end, as modern typists do in "single space," and to squeeze his last lines into tiny letters. Of one work we have several chapters consisting of more than 1,000 words, but the complete writing may have consisted of more than 3,000 lines. It represents a heroic epos.

Long before Homer's immortal "Iliad," Phoenician authors in Ugarit wrote epics about the strange adventures of a legendary hero called Taphon. He was a favorite of some of the gods by whom the Phoenician pantheon was densely populated. The Ras Shamra text tells us that

no fewer than 50 gods and 25 goddesses lived there. Taphon could not avoid making bitter enemies among them because he took sides in their quarrels. These Phoenician gods reveal themselves as warlike, vindictive, and cruel.

El, the very old father of the gods, whom the author calls *Mlk-al-sum*, *Melek* or *Moloch*, the "King of the Year," strives in vain to keep peace among his descendants. However, he is not omnipotent, for much against his will he must often comply with the wishes of his divine wife, *Asherat*, the Goddess of the Sea. She has no fewer than 70 sons, some of whom she favors at the expense of the others. This favoritism is the source of all quarrels in the kingdom of the gods.

The young god *Baal*, a born tyrant who aspires to the absolute monarchy, is El's most bitter opponent. The story about the struggle between

the old and just King of the Year and *Baal* is of rare dramatic interest and rich in exciting episodes. *Baal* is finally victorious, and youth, with all its cruelty and injustice, defeats venerable age. Therein lies the bitter lesson which the author wished to portray.

THE FIGHT BETWEEN MÔT AND ALEIN

Another Ras Shamra slate depicts the fight between *Môt*, who symbolizes fruit-bearing Nature, and *Alein*, who rules over rain and wind.

Môt has killed *Alein*, and the humans complain to the gods. The earth has become dry, and wild animals are hungrily roaming outside the cities. The goddess

Anat, sister of the rain god who was killed, calls Môt to account; but the latter lies about his deed and proposes (in Alein's place) to change the deserts into green fields. But he fails; and all offerings made to him by humanity in the hope of getting rain are in vain.

Then, her patience at end, Anat takes a sickle and kills Môt. She burns his body or partly eats it and scatters the remains over the fields. Thus Môt himself becomes the crop which falls under the sickle, to give bread to mankind.

After Anat's revenge, Alein rises from the dead and ample rains fall again.

Other gods of the Phœnician pantheon participate in the story, each with his own mission: El-Hokmot, the God of Wisdom, who admonishes the mortals to patience and resignation to their fate; Adon, Adonis of the classical Phœnicians, who fills them with enthusiasm for beauty and love; the Goddess Amat, servant of the powerful Asherat, Mother of the Gods, who shows human beings how they can make bricks out of clay to build houses and temples.

Baal himself decides to fight the seven-headed serpent which human beings particularly feared. Ltn is its name in the corresponding Ras Shamra text. (The vowels are not written out either in Phœnician or in Hebrew.) In Isaiah 27:1, and in Psalm 74:14, in the Bible, the serpent is met with under the same name, "Ltn," but spelled leviathan there. Here we touch information of sensational and revolutionary importance.

We all remember Daniel, who, with



A SUMERIAN DOCUMENT HAS THE "O. K." OF RABANA, SON OF SUMEJANA (SEE PAGE 119)

The scholar and priest added to his signature the notation, "Mubi aiti bari," meaning "The lines have been verified and are complete."

Noah and Job, was among the most pious men of his time. Daniel appears in one of the Ras Shamra texts under the name of Din-el, which must be translated as "justice of God."

EARLIEST MENTION OF ADAM AND EVE

As a matter of fact, Din-el protects the weak and oppressed ones and takes particular care of widows and orphans. Thus we here find pity in its most noble form, shown as a symbol for humanity.

Hundreds of years before the composition of the Holy Book, the fundamentals of Christian morality were laid in Ras Shamra, the ancient Ugarit.

Even Adam and Eve are mentioned in



FROM THIS TALL TOWER THE AUTHOR SUPERVISED HIS NATIVE DIGGERS

Though the 250 native workers, soldiers, and prisoners displayed habitual good humor, constant diligence was needed to prevent careless handling of precious ancient objects unearthed. From this "eye," photographs of the excavations were made.

the Ras Shamra texts. They live in a magnificent garden in the East, a rather vague address, which, however, corresponds to that given in the Bible. Here are the oldest-known documents to mention the famous pair in whom, centuries later, the author of the story of Creation saw the parents of all mankind.

In the story as written by the Ugarit author, Adam was the founder of a nation, the Canaan Semites, probably one of the oldest sheiks or kings, and therefore apparently a historic personality.

THE EVOLUTION OF EVE

Eve, however, who tempted Adam, is described as originally of a much more cruel nature than we gather from the charming story of the fall of man as told in the Bible.

The author from Ugarit calls her the most vivacious of all goddesses. As a matter of fact, Eve here distinguishes herself as the most cruel and revengeful of them. In the mind of the author, she is

the symbol, or the queen, of a foreign race of conquerors from Asia Minor who reduced Ugarit to ashes and ruins. Thus Eve may also be a historic personality.

But it would be unwise to speak more of these strange and famous persons from the Bible before the Ras Shamra texts have been completely deciphered and before the last doubt as to the correctness of the identification has been removed. However, the American and English discoveries in Ur have already proved, with regard to the Deluge, that the Biblical stories are more than mere poetic fiction. They are based upon historical events.*

That is also proved by our excavations in Ras Shamra, which led to the rediscovery of the city of Ugarit and the costly slates with cuneiform writings from its temple library and its school for scribes.

* See "New Light on Ancient Ur," by M. E. L. Mallowan, and "Archeology, the Mirror of the Ages," by C. Leonard Woolley, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1930, and August, 1928, respectively.



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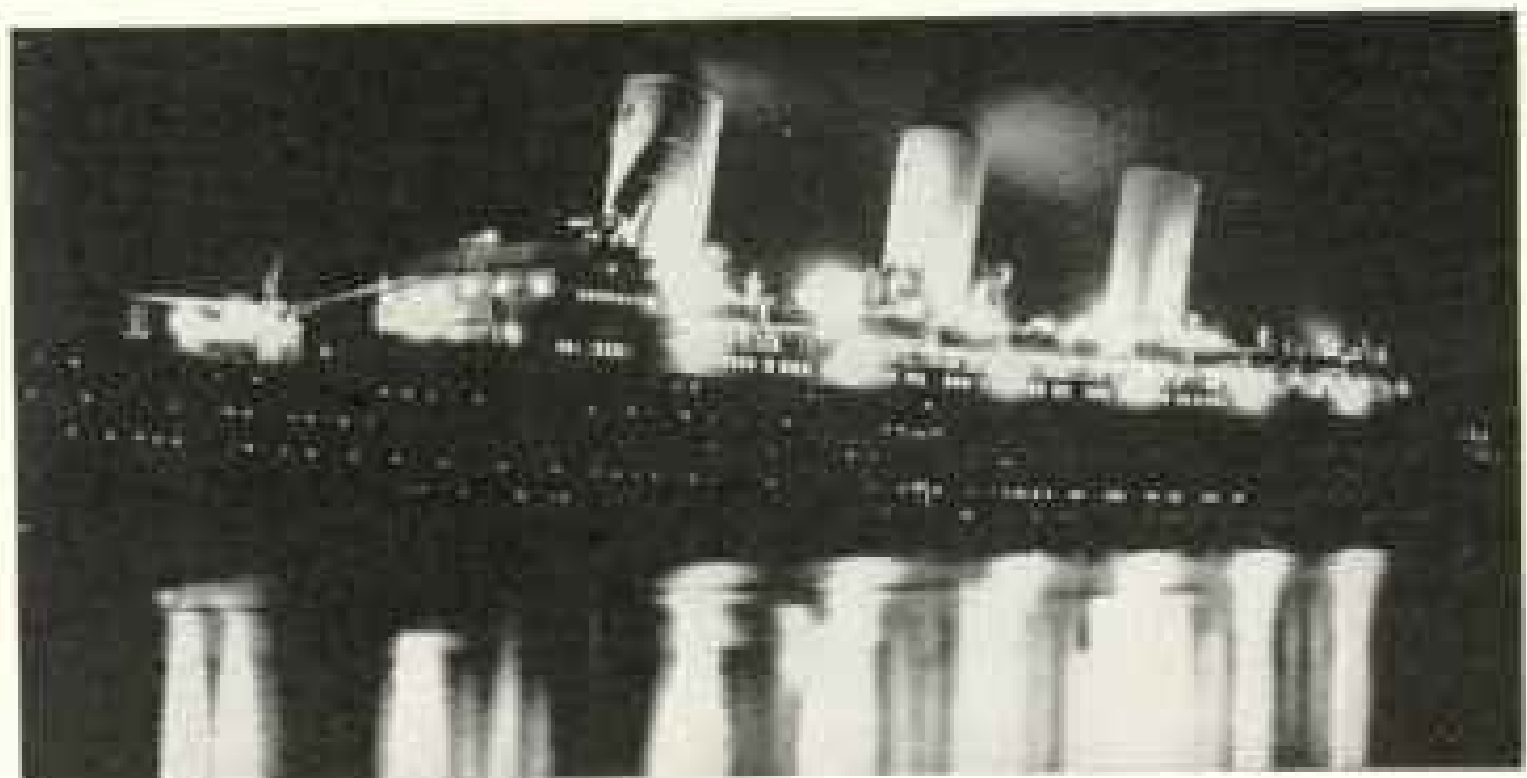
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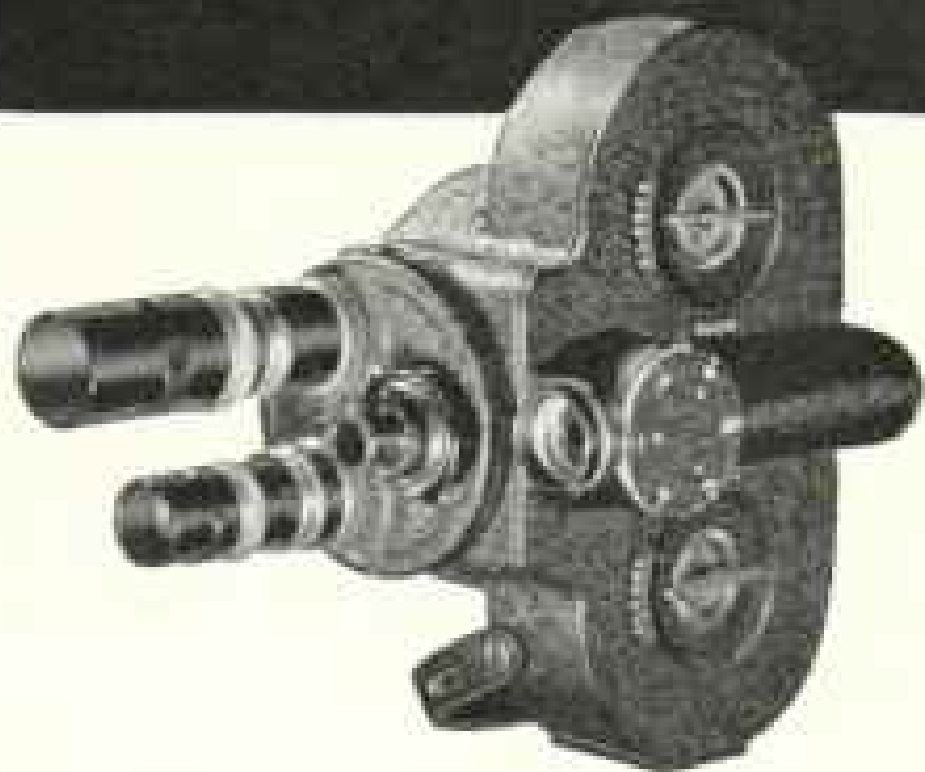


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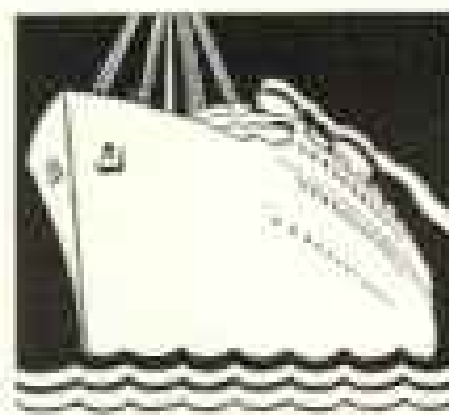
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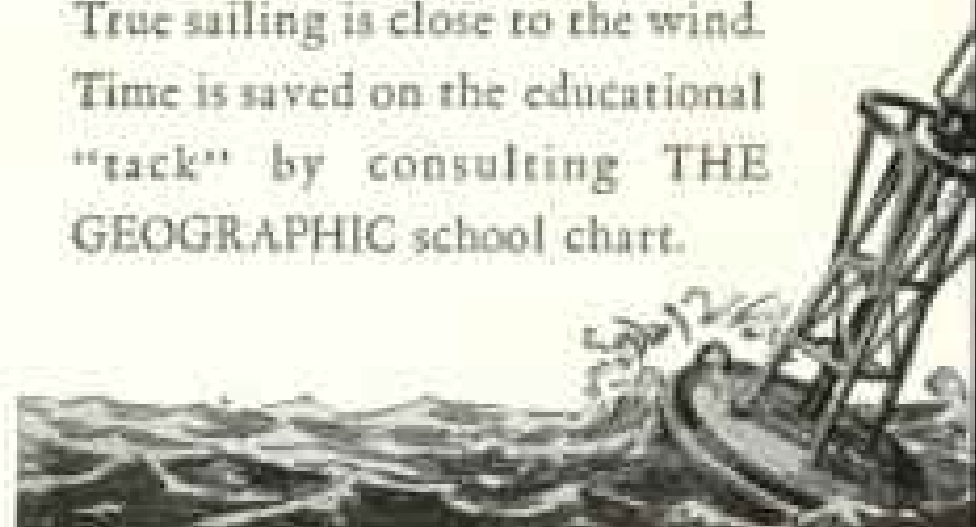
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Read the life-saving instructions under the diagrams; then practice them with a friend. Once learned, they will never be forgotten and by means of them you may save a life that is dearer to you than your own.

Do not wait to remove clothing but begin at once to apply artificial respiration. Lay the person face down on floor or ground, one arm extended directly forward. Bend the other arm at elbow and rest cheek on back of hand, mouth toward finger tips. Kneel, straddling patient's right or left leg, or both legs, at the thigh.

Place your hands on each side of back, just above the belt line, with your wrists four inches apart, thumb and fingers together; the little fingers over and following the line of the lowest rib; the tips of fingers just out of your sight.

COUNT "ONE"



While counting "one," "two," (a second for each count) with arms straight, (not bent at the elbow) swing weight of body forward until shoulders are directly over hands.

COUNT "TWO"



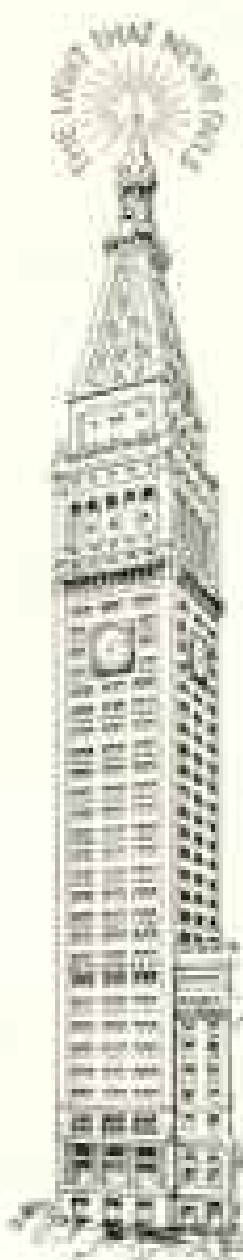
While counting "three" snap the hands sideways off the patient; at the same time, swing your relaxed body back to a resting position on your heels. While counting "four," "five"—rest.

Repeat these operations rhythmically, deliberately swinging forward and backward twelve to fifteen times a minute—a complete respiration in four or five seconds.

COUNT "THREE" (hands off)
COUNT "FOUR" and "FIVE"
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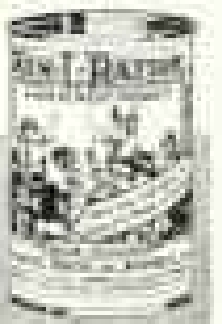
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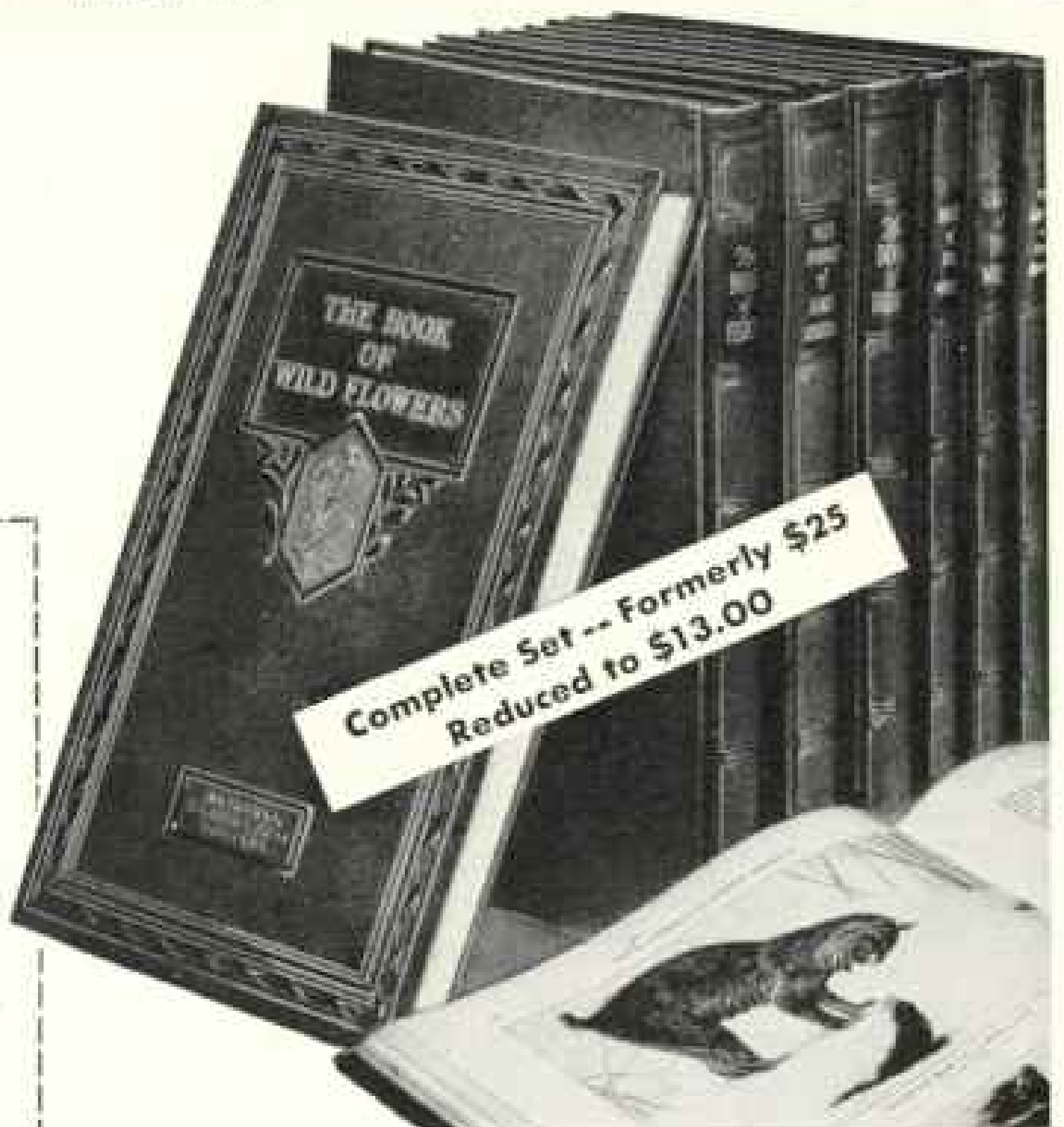
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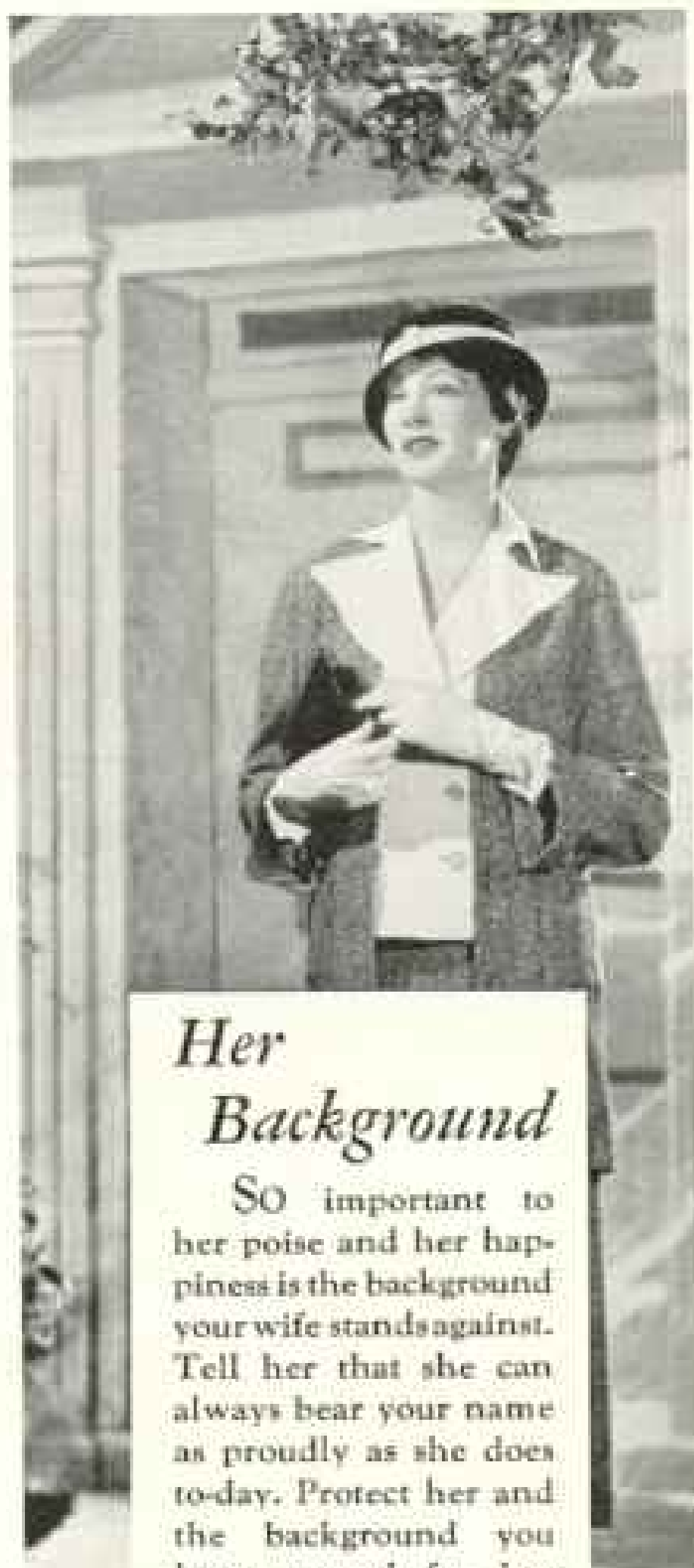
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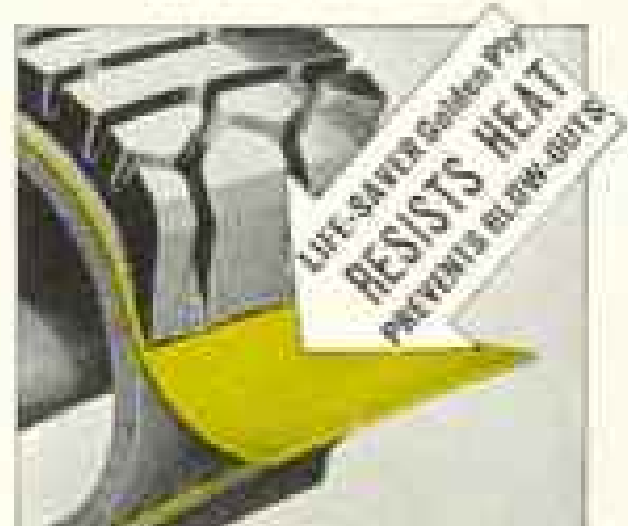
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