

VOLUME LXIX

NUMBER SIX

THE NATIONAL GEOGRAPHIC MAGAZINE

JUNE, 1936

Special Map Supplement of Canada

Exploring Yukon's Glacial Stronghold

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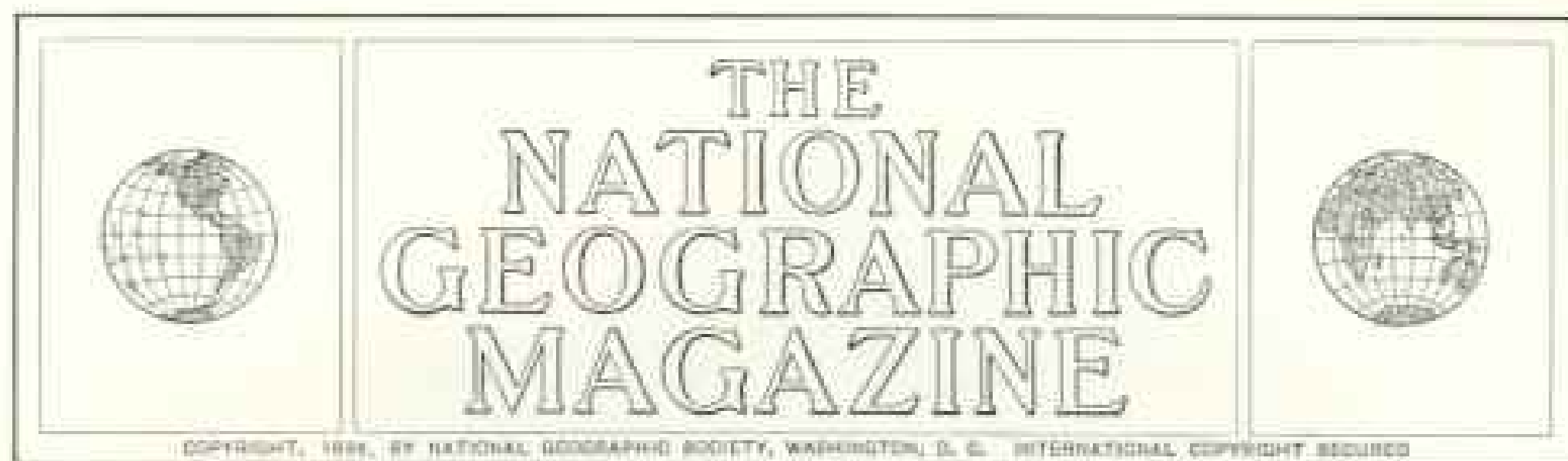
With 19 Illustrations FRANCIS WOODWORTH

TWENTY-FOUR PAGES OF ILLUSTRATIONS IN FULL COLOR

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
HUBBARD MEMORIAL HALL
WASHINGTON, D.C.

\$3.50 A YEAR

50c THE COPY



EXPLORING YUKON'S GLACIAL STRONGHOLD

BY BRADFORD WASHBURN

LEADER OF THE NATIONAL GEOGRAPHIC SOCIETY YUKON EXPEDITION OF 1935

With Illustrations from Photographs by the Author

NEARLY thirty years ago the National Geographic Society, and also the International Boundary Commission, sent a series of expeditions to map the western flank of the border between Alaska and Canada where it passed through the heart of the colossal peaks of the Saint Elias Range, and to study the unique movements of the glaciers in this last stronghold of the great Ice Age in North America.*

After these surveys there still remained an absolute blank, with an area of nearly 5,000 square miles, stretching south and west from Kluane Lake.†

Last year, under the sponsorship of The Society, an expedition was organized to attempt the first crossing of the Saint Elias Range and to map as completely as possible this unknown region of Canada eastward from the Alaskan boundary as far as the Alsek River.

Blockaded as it was on the west by the gigantic mass of the Saint Elias Range and on the east by 150 miles of virtually unmapped mountain wilderness, the mere approach to our region presented a decidedly

knotty problem. Summer weather in coastal Alaska is notably treacherous for photographic work or surveying, and the surfaces of glaciers at that season are apt to be cut by hundreds of impassable crevasses.

In the winter, however, despite the intense cold and frequent gales, the skies are generally much clearer than in summer. The glaciers are blanketed in a deep coat of snow that covers the dangerous cracks, and progress on skis from camp to camp is both safer and speedier than on foot.

WHY AIRPLANE WAS ESSENTIAL

From these facts and on account of the great distance of approach involved, the only reasonable transportation into our area was by airplanes equipped with skis.

The personnel of the Yukon Expedition formed a genial, hard-working group of men, all with experience either in mountaineering or skiing.

As a nucleus we were fortunate in obtaining Andrew M. Taylor, of Peekskill, New York, whose many Alaskan exploits place him in the top rank of American exploratory mountaineers; Robert H. Bates, of Philadelphia, with two years of rugged exploration on Mount Crillon in Alaska to his credit, and Adams Carter, of Boston, with whom I had made the first ascent of Crillon the year before.‡

The other men were Hartness Beardsley, of Springfield, Vermont, and Ome Daiber, of Seattle.

From Seattle we wired Taylor to take the

* See "National Geographic Society Alaskan Expedition," NATIONAL GEOGRAPHIC MAGAZINE, June, 1909; January and April, 1910, and June, 1911.

† See the National Geographic Society Map of Canada issued as a supplement with this number of the NATIONAL GEOGRAPHIC MAGAZINE, and map of The Expedition's surveys (pages 720-721).

‡ See "The Conquest of Mount Crillon," by Bradford Washburn, NATIONAL GEOGRAPHIC MAGAZINE, March, 1935.



TIME OUT FOR A LITTLE FUN WITH THE DOGS

Robert Bates, of Philadelphia, recorder during the aerial photographic survey, and Harold Dawson, of Carcross, play with a dog team while the plane is being loaded for a flight to the Lowell Glacier base camp. Eskimo dogs are powerful, but, if well treated, they are the best of companions.

supplies only as far as Carcross, some 60 miles north of Skagway, and to superintend the flying in of our gas cache to Kluane Lake.

A REGION NO HUMAN EYE HAD SEEN

Several days of terrific snowstorms blocked the railway into the interior, and it was only a short time after Andy had reached Carcross that Daiber and I arrived on February 25. Carter, Bates, and Beardsley were due on the next boat, three days later. The weather was perfect—clear, crisp, and cold—and it was decided that we should at once make a reconnaissance flight.

Luck was with us. We awoke to the horrible rattle of our alarm clock at six o'clock the following morning. Despite a temperature of nearly 30 below zero, the job of gassing was completed by 7:30, and at ten minutes of eight we took off on one of the most glorious flights I have ever made.

The sun had just risen from behind the hills to the east as we headed the plane down the runway, marked with tiny spruce boughs stuck here and there atop the snowdrifts on the surface of the ice.

Climbing slowly, steadily, we soon left Lake Bennett far behind, and a sea of unknown, jagged peaks tossed below us. Far to the south rose the majestic summits of Crillon and Fairweather,

more than a hundred miles away, but clear and sharp against that frigid winter sky.

As we gradually climbed from the desolate chaos of whitened peaks, we began to pick up the mighty mass of the Saint Elias Range, still low on the horizon, 150 miles ahead. The sun rose higher and the thermometer on our wing had gone up to ten degrees below zero. At nine o'clock, far ahead but still clear and unmistakable in the brilliant light, we sighted the outlines of an immense glacier descending eastward toward us from Mount Hubbard.

As we approached, we distinguished the valley of the Asek River passing near its

end; we were looking into a region that no human eye had seen before.

We were so thrilled by the discovery of our new glacier, which was at least 40 miles long and traversed the whole territory we were going to map that we were taken by surprise when Everett Wasson, pilot, exclaimed, "Why, there's another!"

He pointed to the left, southward from our new glacier, and there it lay, possibly even longer, stretching far into the heart of the range from the narrow valley of the Alsek, now directly below us. And then, before we could compose ourselves after discovering two new rivers of ice as long as any previously known in North America, a third, considerably larger than either of the other two, appeared farther to the south!

We compared our finds with the large blank spot on our map. Everything fitted perfectly. To the east of us lay Bates Lake, final limit of mapped country in the Yukon, and ahead of us, beyond the last of our three new glaciers, rose the peaks of the International Boundary.

At ten o'clock we had passed the center of our unknown area and headed our course northward around Mount Hubbard.

As we glided past the tremendous cliffs of Hubbard, flying at 14,000 feet, a stupen-



THE YOUTHFUL LEADER AND HIS FLAG READY FOR ANOTHER INVASION OF THE UNEXPLORED AREA

Nearly a dozen flights were made with this plane from Carcross into the unknown mountains of the Yukon for photographic surveys and flying freight to camp. To protect the wings from night frost, which would prevent the plane from taking off, white cotton covers were tied on top. These cloths saved much vigorous brushing off of the ice crystals before flights. Over the motor hangs a canvas hood with a warming blowtorch inside (see page 719).

dous vista suddenly burst upon us. Dead ahead towered the colossal peak of Mount Logan, rising to 19,850 feet above the seemingly endless icefields of the Seward and Hubbard Glaciers. To our left was 15,690-foot Mount Vancouver whose summit no human eye had before viewed from this angle, and peering over its northerly shoulder, still 50 miles or more away, glittered the icy cone of lofty Saint Elias.

The Hubbard Glacier did not stop as it did on our map, beside Mount Vancouver,



BEWARE OF FORCED LANDINGS ON SUCH JAGGED RANGES AS THESE!

Virtually unmapped, these mountains rose so high that the "flying freight" had to keep to an altitude of never less than 10,000 feet to be safe from treacherous wind currents. The mountains were carved from a once-flat or gently rolling coastal plain after a terrific upheaval millions of years ago.

but wound northward for thirty more miles out of sight beyond the eastern buttresses of Logan. East of it stood two stunning new peaks, one well over 12,000 feet high, the other possibly nearly 13,000—neither on the maps we had!

The snowy slopes on the eastern side of the larger of our two new peaks dropped gently away to form a huge glacier that disappeared among a mass of mountains that must lie near Kluane Lake. This was probably one of the arms of the large Kaskawulsh Glacier, whose end appeared on all the early maps, but whose origin had always remained a mystery (page 730).

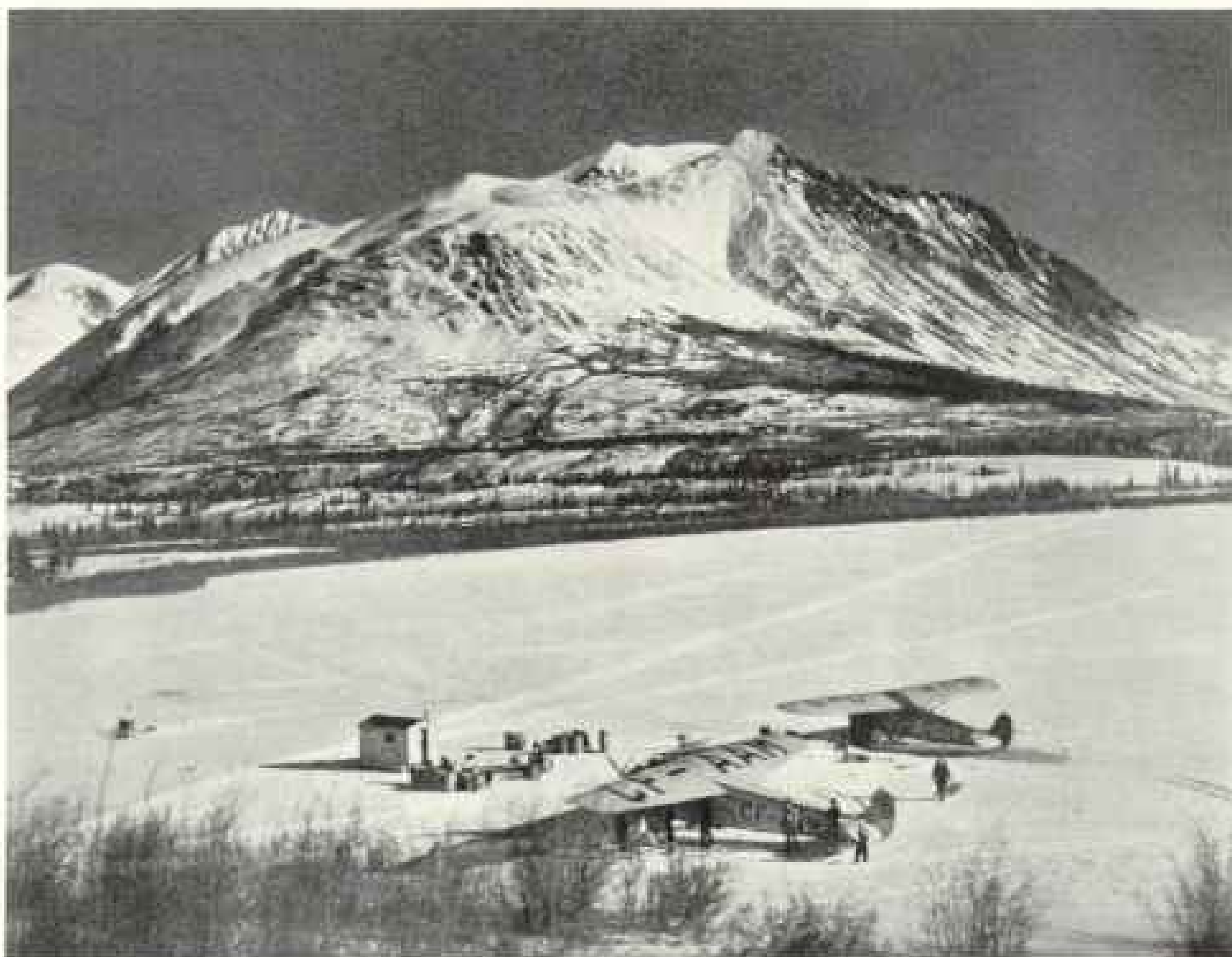
Circling over Hubbard Glacier, we took photographs. Then, anxious to investigate the course of the Kaskawulsh, we veered eastward and started down what we thought must be its southern arm. At first a series of wide, smooth snowfields, it quickly narrowed into a deep gorge two miles or more in width, with towering mountain walls on either side.

As we descended, another immense glacier joined the one below us from the left and we realized that this was unquestionably the Kaskawulsh. Ahead, as we rounded a sharp bend, shone the frozen surface of Kluane Lake. The chaos of ice ended, and trees once more dotted the valley below us.

At noon we circled a cluster of cabins at the southern end of the lake and landed near our gas cache on the shore.

SEARCHING FOR A BASE CAMP SITE

While Wasson and several boys from the settlement near by gassed the plane, Taylor and I discussed the vital problem of our base camp. Both of us felt that the wisest point for a center of operations would be about halfway up our first new glacier, which descended from Mount Hubbard to the Alsek. At this point the glacier forked. One half found its source at a lofty divide just north of Mount Hubbard. The other fork swung sharply



THE FROZEN SURFACE OF NARES LAKE SERVED AS A BLEAK AIRPORT

So intense was the cold that all oil had to be heated in a small hut on the ice before it could be poured into the motors. The safety of the expedition depended upon the careful tuning by the mechanics on this wind-swept lake near Carcross, which offered no hangar for shelter.

to the south, skirting the southerly precipices of Hubbard, and joined the Hubbard Glacier slightly east of the Alaskan border.

After lunch we decided, before returning to Carcross, to make another short flight up the Kaskawulsh to its head and then down the northern fork of our new glacier to the Asek River, to take detailed pictures of the region which would assist us in choosing our final camp site.

This flight ended with the most bitter disappointment of the expedition. As we had expected from our morning's trip, a beautiful natural glacial landing field lay only a few miles north of the fork in our glacier, several thousand feet wide and extending for at least four miles up the gently rising valley toward Mount Hubbard.

We circled low over its surface again and again to be certain of the nature of the snow. It appeared from our altitude to be slightly less than 6,000 feet above the sea. But when the order for a landing was given, the pilot shook his head. The plane

was not sufficiently powerful, he declared, to take off again in the rarer air, once it had descended at such an altitude.

Our gasoline supply was low and there was nothing left to do but to return to Carcross, there to concoct some new plan.

The icy job of developing our photographs in a pitch-dark cellar only a few degrees above zero brought surprising results. About 30 miles below our would-be airport and some three miles from the lower end of the glacier, a beautiful, smooth patch of snow-covered ice indicated a perfect site for a landing.

One day of flying and a night of desperate reorganization had transformed a modern expedition, with the airplane as its very backbone, into an exploit that was to use the plane as little as possible and that was to depend entirely upon the backs of our men and a team of dogs!

At dawn the next day Andy and Wasson started for the glacier with a full plane-load of food and gasoline (fuel for our



WHEN A LEAD DOG STOPS, OTHERS CROWD AROUND—RESULT, A HOPELESS SNARL!

Here Haydon and the author, on a skijoring expedition, are trying to untangle their "steeds." Each took three dogs and, hanging on to the traces, was towed from one survey station to the next at high speed. Since the skis offered little friction, the dogs never tired all day and the skier could hold on with one hand for hours at a time. Haydon carries one of the cumbersome survey markers, an empty 5-gallon gasoline can nailed to an 8-foot spruce pole. A line of these stations was laid 50 miles across the range.

stoves). Dalber and I stayed in Carcross to check and organize all of our equipment that still filled the baggage room of the tiny station. At noon Bates, Carter, and Beardsley arrived in high spirits on the northbound train from Skagway, and at last we were all united.

A high curtain of clouds sped in from the west as the short winter day drew to a close. Snow flurries were beginning and darkness had almost closed down on Carcross as Wasson and Andy dropped in to a landing out of the forbidding skies. They had landed the plane successfully at exactly the spot where we had hoped they could.

After making a storm-proof cache of our supplies in a high pile near the middle of the glacier, they had flown to Kluane, 80 miles to the north, and engaged Jack Haydon, a boy from the settlement there, and six of his dogs to help us freight our supplies—for we must move everything at least 20 miles farther up the glacier before we could establish our final base. Then, loading a dog sledge, 50 gallons of gaso-

line, and 250 pounds of dog food into the plane, they had traced their route southward to the glacier once more.

A FIVE-DAY STORM—AND REST

Unloading these golden supplies at our fast-growing cache, they climbed aboard once more and had just slipped into Carcross with the night, exhausted, but supremely happy.

The magnificent cloudless weather of our first few days in the Yukon vanished the next morning in a snowstorm with the thermometer at nearly 20 below zero. The storm hit us with all its fury that afternoon and lasted unbroken for five days.

By March 4 every detail of our equipment and plans had been altered to fit the new conditions. That night we went to bed beneath a gorgeous starlit sky with the temperature already at 25 below zero and still dropping fast.

In winter in the Yukon one does his work in formidable spurts during the short streaks of clear, icy weather between an apparently endless series of terrific bliz-

zards. The intense cold on the early morning of March 5 held us in Carcross till nearly 9 o'clock before the plane could be warmed and the first load to our glacier camp could get away.

At 8:50 in the morning, Andy, Ome Daiber, and I left with a 1,000-pound load of tents, food, and skis in the Fokker plane.

We landed at our cache at 10:15 with the thermometer at 45 degrees below zero and a frigid westerly breeze drifting the snow down the glacier toward us from Mount Hubbard. The three of us spent the whole morning pitching the tents of the base camp and preparing them to live in.

Wasson flew back to Carcross after leaving us and returned late that afternoon with Carter and Beardsley, as well as another load of supplies. The gasoline stoves were roaring away, heating coffee for a red-hot supper. The National Geographic Society flag fluttered from the main tent pole.

Our day's work done and the expedition safely ensconced in its mountain base, Wasson and I sped back toward Carcross above a breath-taking, unforgettable sea of savage snow-clad peaks, which slowly melted from ivory through fiery red and into fearsome darkness as we finally glided down Lake Bennett to a perfect landing just at dusk.

On the morrow, while Bob Bates and I awaited the return of the Fairchild plane from its mail trip to Telegraph Creek so that we could make a photographic flight, Wasson flew still another load of equipment to the base camp.

Flights such as these, where a single moment of motor failure would mean a fatal crash amid a chaos of icy granite peaks, gave us an unbounded respect for our pilots and for the mechanics.

PEAKS NAMED FOR KING GEORGE AND QUEEN MARY

Good weather blessed us for one more day on March 7. Bob Bates and I, piloted by Bob Randall, left at daybreak with two jobs to complete: first, to fly westward past the base camp and through the very heart of the Saint Elias Range on our long-planned winter flight about Mount Logan; secondly, to pick up Jack Haydon and the six dogs at Kluane and fly them to the base camp to make our ground crew complete for speedy freighting up the glacier.

Stopping at camp for a hasty cup of coffee, the three of us pressed westward, slowly gaining altitude as we circled the

southern ramparts of Mount Hubbard. Bearing northward up over the vast ice-fields of the Hubbard Glacier, we passed lofty Mount Vancouver and its twin neighbor peaks (see page 724), later named by us King George and Queen Mary in honor of the Royal British Jubilee.

Flying at almost 18,000 feet above the sea, we wheeled for picture after picture, the first airplane ever to disturb the eternal stillness of the great Seward Glacier which stretches between those mighty monarchs of the Saint Elias Range, Mount Logan and Mount Saint Elias (see maps, pages 720-1).

The temperature, bitterly cold when we left the ground, had been warmed by some curious air currents to only 20 below zero as we neared 16,000 feet and continued our flight safely across the jagged maze of peaks north of Mount Logan, and northward again across the great glacial pass between Mount Logan and Mount Lucania.

While temperature and visibility were perfect, the wind was terrific.

Massive, fleecy cloud banks hovered over the Pacific and a high, threatening haze was advancing steadily toward us from the west. We landed at camp at 2:30 in the afternoon and Bob Randall and Andy left at once for Kluane to pick up the dogs.

While they were away on their mission, Bob Bates and I gave final instructions for the freighting work up the glacier that was to commence as soon as the dogs arrived. Carter and Andy had already made a long reconnaissance on their snowshoes up the valley and found the going excellent, but the distances much longer than we had expected.

At 4:30 the Fairchild returned from Kluane loaded to overflowing with the craziest mass of freight that I have ever seen. Randall sat at the controls and behind him in the small cabin of that plane were sandwiched Andy, Jack Haydon, a small dog sledge, and six robust huskies!

Bob and I had almost resigned ourselves to a night at camp, doubled up with the others in their sleeping bags, when the plane finally appeared.

We just managed to pour in ten more gallons of gasoline and were off again for another twilight flight to civilization. The white peaks seemed to float beneath us on a sea of shadowed valleys as the sun sank behind the mountains to the west. The ocean mists were fast marshaling their forces for trouble. Clouds were swiftly



SECOND HIGHEST IN NORTH AMERICA, MOUNT LOGAN RAISES ITS MASSIVE BULK ABOVE HUBBARD GLACIER

This is the first photograph made of the south side of this 19,850-foot peak, which rises sheer above the glacier at its foot. The twin top of McArthur Peak (horizon, center) is dwarfed by Logan's huge size. The jagged shadow (left) is cast by Mount Vancouver. Mount King George rises in the right center (page 733).



SCALY LIKE A FISH APPEARS THE CREVASSED SURFACE OF HUGE HUBBARD GLACIER WHERE IT CRASHES INTO DISENCHANTMENT BAY

Every tiny black crack in the picture is a yawning ice cavern at least 40 or 50 feet across. This glacier, named for Gardiner Greene Hubbard, one of the founders of the National Geographic Society and its first President, was discovered by the expedition to be more than 90 miles long and in several places ten miles wide—three times its previously known size. Twenty-five miles beyond the hills in the upper left corner lies the village of Yakutat.

following us. Logan had disappeared and Hubbard was almost hidden by evil-looking black masses wrapped about its lofty summit.

That night Bob Bates, Randall, and I had a serious conference.

To cross the Saint Elias Range was one thing. To map it, photograph it, and still cross it, was another. To establish our upper base soon enough to complete our job before the June thaws meant either more dogs or further assistance from the plane.

RANDALL PILOTS THE "FLYING FREIGHT"

On our flight that day we had made one discovery—that Bob Randall was an amazing pilot. Bates and I put our problem up to him, pointing out that any airplane which had flown us three all day at 16,000 feet should have no trouble taking off on a limitless wind-packed landing field at only 5,000 feet—the supposed altitude of the glacier fork.

The next day, working beneath leaden skies on instructions marked upon one of the pictures we had developed at Carcross, Randall flew two loads of our equipment from the lower camp to the fork, landing them exactly where we wished. As the clouds rolled up Lake Bennett and we realized that we were again trapped by storms, we were elated at having saved the men at the base many days of heart-breaking work.

While the base campers toiled steadily, freighting supplies up the 20 miles of glacier which separated them from the airplane cache at the forks, Bates and I sat restlessly in Carcross, storm after storm preventing us from making our last, short photographic flight.

When it did clear once, a take-off on the rough ice shattered a vital part of the motor mount on the Fairchild and meant the loss of three golden days of cloudless weather, welding and repairing the plane unsheltered on the surface of the lake.

My finger tips still feel numb with cold as I recall screwing and unscrewing the windshield bolts to permit the tip of the acetylene torch to reach the cracked sections of tubing.

No sooner was the airplane in flying shape than another storm came screaming in from the coast, and it was not until the twenty-second, nearly two weeks after our last trip to the glacier, that the clouds broke again.

The weather was not yet good enough

to make our last photographic flight. The barometer had suddenly started down again, as the sky cleared on the evening of the twenty-first, and we realized that we must make an attempt to get in to the glacier with the last load of dog food.

We had hoped to combine the two flights, taking the pictures after leaving 600 pounds of cornmeal and beef tallow for the dogs at camp, but we could not postpone the food a minute longer. The last dog food at camp had, we figured, already been eaten one day before and the dogs would be fast making a tremendous hole in our cereal and butter supply.

As we warmed up the plane shortly after daybreak, ominous storm-caps were forming on the hills all about Carcross and a thick, frosty mist hung over the lake. Only Bob Randall and I went on the flight. We hoped against hope that the other men had been able to push their way through to the airplane cache at the forks. If the weather broke, we might even help them up with a last load or two from their lower camp.

Circling low over town after a quick take-off, we climbed steeply westward toward the mountains. The clouds tossed in somber, leaden banks to the west and south. A blustering northerly wind blew huge twisters of powdery snow off the peaks passing beneath us. Now and then, flying at 10,000 feet, we soared over patches of threatening mist. Higher clouds rose ahead in dense banks, and we climbed to 12,000 feet to clear their shimmering crests.

An hour and a half out of Carcross a tiny gap in the mists showed ahead, just east of the towering mass of Mount Hubbard. Our glacier lay below us, a broad silver streak with sickly gray cloud shadows scudding swiftly across it. We cut the motor and started down in wide circles.

The lower camp was nowhere to be seen. All about where it had been were endless banks of fresh, untrodden snow, burying any vestige of a trail. One tiny black dot, half covered by the immense drifts, might possibly be a lone tent. We could not tell.

NEW CAMP FOUND THROUGH A HOLE IN THE CLOUDS

Speeding on up the valley, we circled over the upper cache eighteen miles farther on. There to our joy stood the new camp, nestled cozily beneath the cliffs at the left side of the great ice barrier that separates the upper from the lower half of the glacier.



LIKE SHIPS OF THE DESERT, SLEDGE DOGS PLOD THE DESOLATE WASTES OF LOWELL GLACIER

A surface such as this made excellent sledging, but deep, fresh snow was impossible until the wind, blowing for 36 hours, had packed it to a firm base. Backbone of the expedition was the dogs, which trekked 18 miles day after day through April and May with few rest periods. Each has his own harness "tailored to fit." A strap or trace on each side leads back and is snapped to the harness of the dog behind.



EVEN INDIAN BOYS LIKE TO "DRESS UP"

Sandy McCloud of Carcross puts an arctic parka around his little brother. An excellent school is provided for Indian children about two miles east of the town across Nares Lake.

We zoomed low beneath the clouds and settled to a perfect landing in the feathery snow a quarter of a mile below the tents. The wind was blowing so hard that we came to a stop almost the second we touched the ground. During our restless hours of waiting in Carcross, Bob Bates and I had made a small demountable beaverboard hut to be used as a base camp office, and we hurriedly unloaded this in sections while Jack Haydon, Andy, and the dogs sped out from camp to meet us.

The dog food had been used up, as we had figured, two days before, and the pups had already gorged luxuriously on six meals

of our oatmeal and rice! Everything but one plane-load had been sledged up the glacier between the storms.

As we piled the sections of beaverboard and sacks of meal in the drifting snow beside the plane, we watched the weather anxiously. A hideous wall of fog was rushing in toward us up the north fork of the glacier. Our hole overhead was fast closing in. We didn't dare stay a moment longer, even if it saved a week of sledging.

We delivered the mail and gave Andy a few hasty instructions about moving Carter and Daiber up to the main camp as soon as weather permitted. A northwesterly gale swept us homeward at a terrific pace. The clouds closed in behind and we

were alone in an icy, blinding world above what seemed to be an endless sea of fog. Once in a while a tiny hole would melt open, disclosing beneath us a mass of jagged granite peaks, gray and forbidding below the advancing storm.

But all went well. Twenty miles from Carcross the overcast below us began to break, and just before noon we landed safely on the lake.

The last wait was not so long. On March 28, one of the wildest and most bitter blizzards that I can remember came to an end, and Randall landed Bob Bates and me at the upper camp after a short, important

photographic flight nearly to the Pacific Ocean down the gorges of the Alsek River.

READY FOR WINTER IN A GLACIER CAMP

With this flight the aerial work of the Yukon Expedition came practically to a close. When the plane left that afternoon for Carcross, it was the last time we were to see it till it returned late in April for a final exploratory trip northward toward Mount Lucania.

Ahead of us lay the myriad difficulties of mapping accurately the 40 miles of our glacier from the Alsek River to Mount Hubbard and thence extending our ground survey southward and westward over 30 more miles of mountain wilderness to the International Boundary.

To complete the mapping of our glacier and the terrain to the north we should have to establish what might be one of the highest survey stations ever occupied in Canada. To push this survey to the Alaskan border meant accomplishing in the first three weeks of May the entire crossing of the Saint Elias Range to the small coastal town of Yakutat, nearly seventy miles away.

PLANS MADE IN BEAVERBOARD "OFFICE"

The little beaverboard house, which we had christened the "Empire State Building,"

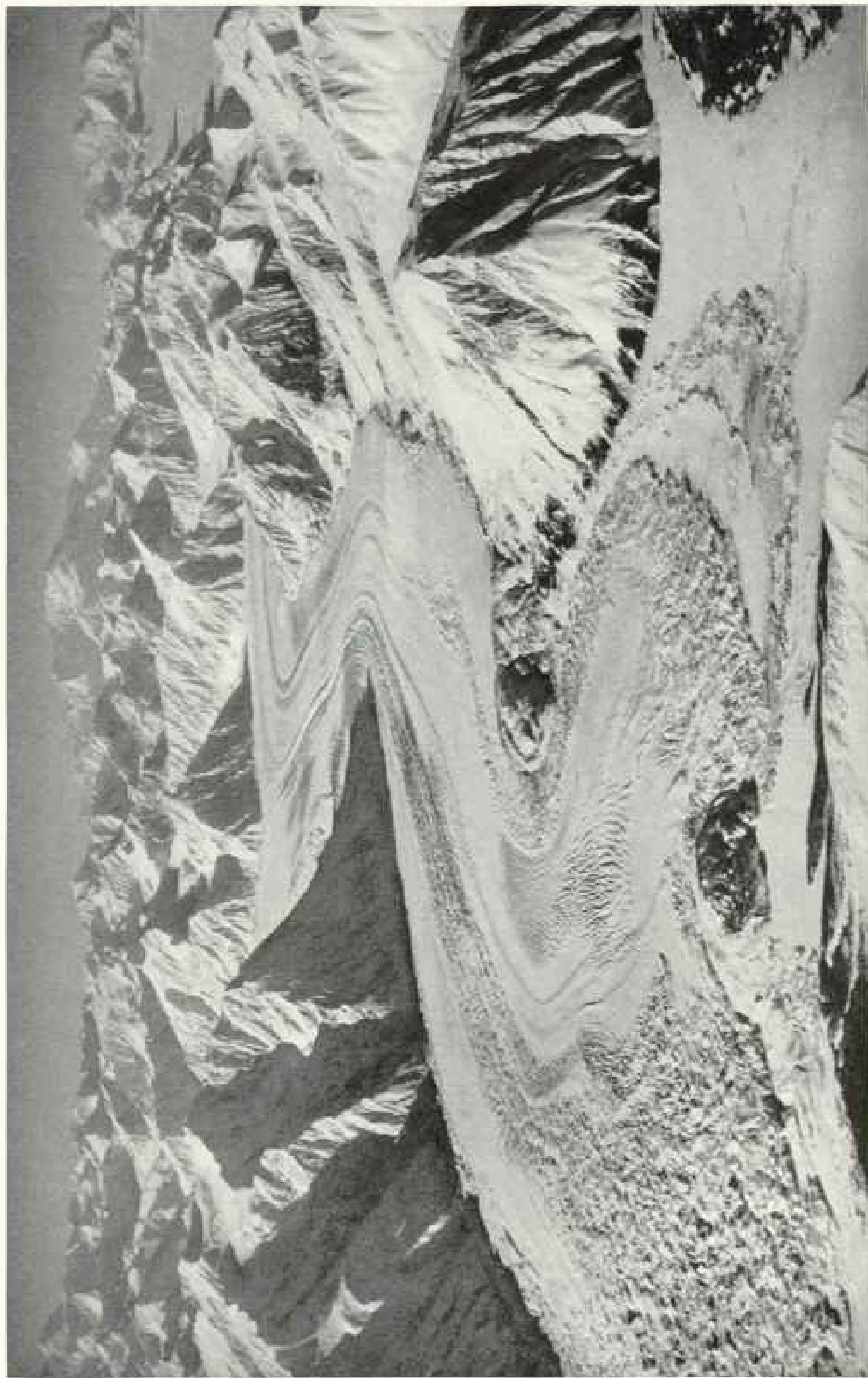


BEARDSLEY AT WORK IN THE "EMPIRE STATE BUILDING"

This tiny shack of beaverboard siding was brought by plane in knocked-down form and set up on the ice at camp. A warm place to compute the survey and make a map was provided by the hut. Reference books and the journal were kept on shelves made from sugar boxes. Light was furnished by a gasoline mantle lamp.

had been set up opposite the large cook tent, and, after supper, when the general mail-reading had somewhat subsided, we gathered in my "office" for a council of war.

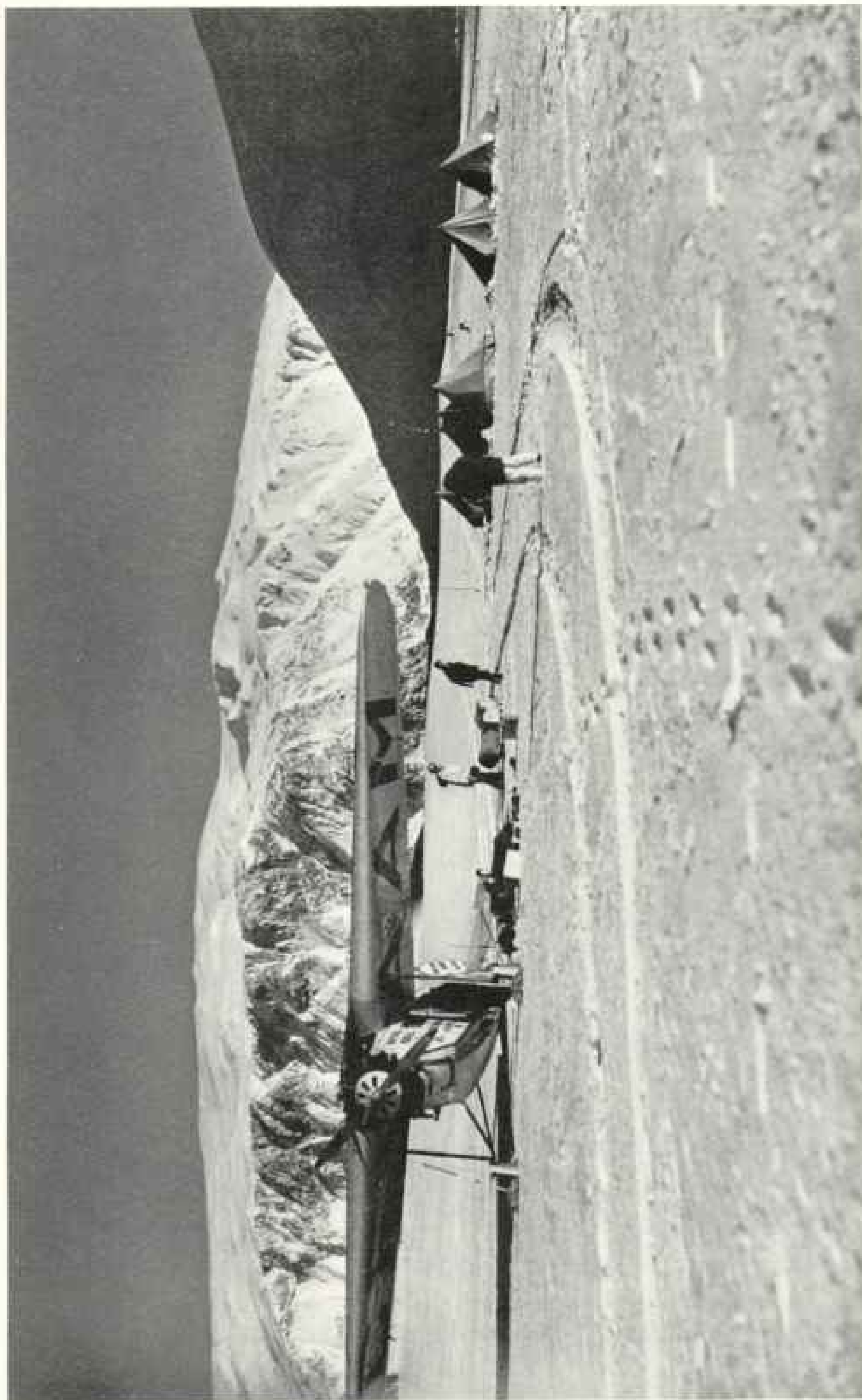
Jack Haydon and Harty Beardsley offered to work from dawn to dusk every day, without rest, so that the supplies from halfway down the valley might be rushed through to the base camp. Bob Bates, Andy Taylor, and Ad Carter were to make several long trips, putting up spruce poles for survey markers at a series of points both



Photograph by Russell Dow

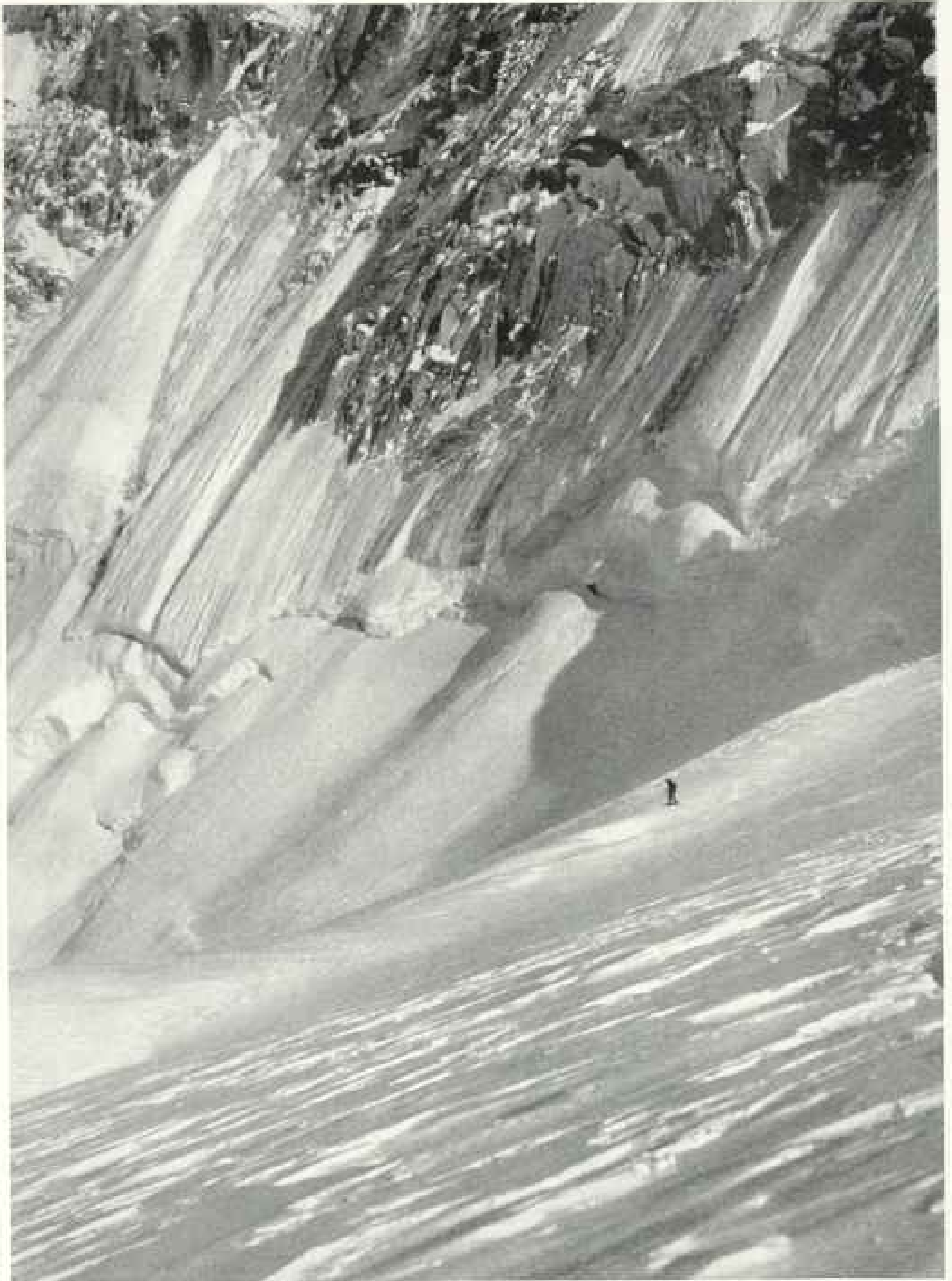
TWISTING AND WINDING, THE GREAT KASKAWULSHI GLACIER FLOWS OUT FROM A REGION NEVER BEFORE SEEN BY THE EYES OF MAN

A knob in the foreground divides it. The right half flows in a round-about route, 1,400 miles long, to Bering Sea, but waters from the left flow directly to the Pacific. On the horizon at the extreme left is Mount Alverstone, in the center Mount Vancouver, and extreme right Mount King George. This is one of the photographs taken by Mr. Dow on March 20, 1936, rushed to Seattle by boat, and thence by plane to Boston to help fill in the last blank area on the map (pp. 720-1).



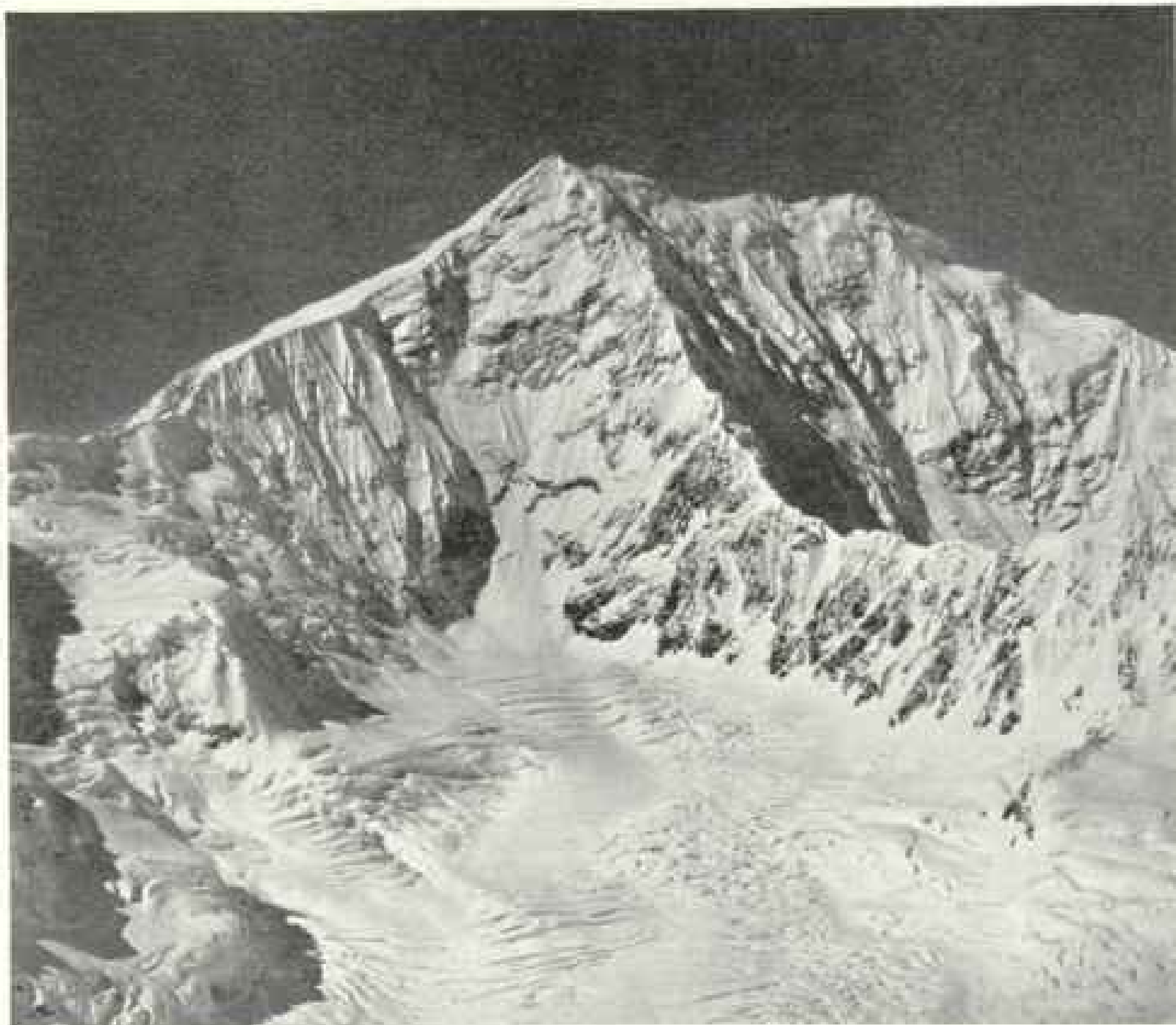
DOGS, TENTS, MEN, AND SLEDGES WERE LANDED BY THIS PLANE ON LOWELL GLACIER, PACKED SMOOTH AND SOFT BY WINTER BLIZZARDS

All rocks, ridges, and cracks are completely buried beneath the hard-packed snow. Many flights over the mountain ridges in the background were made by the plane to bring supplies from the base at Nares Lake to the camps on the glaciers. Skis on the plane were wide and made of three layers of hard, pliable wood. To prevent the plane from "stopping its toes" and turning a somersault when landing, huge rubber bands were attached from the wing to the tip of each ski.



A LOST SNOWSHOE MADE POSSIBLE THIS DRAMATIC PICTURE

So constant were the snow avalanches down this cliff and so steep the path that the men descended on the run when passing here. Jack Haydon, on his way home to camp from the highest survey station, was obliged to stop long enough to fasten his shoe. Festooned with feathery frost and ice, these rose-granite, eastern cliffs of Mount Hubbard rise almost vertically 6,000 feet above the camp. Such precipices suggest crags in the Himalayas of Asia.



MOUNT KING GEORGE (12,300 FEET), DISCOVERED BY THE NATIONAL GEOGRAPHIC SOCIETY AND NAMED FOR THE LATE BRITISH MONARCH

In a little radio shack at Yakutat, Alaska, the expedition leader received the following message from Sir John Simon, British Secretary of State for Foreign Affairs: "THE KING COMMANDS ME TO EXPRESS TO YOU THE SINCERE APPRECIATION OF THE COMPLIMENT WHICH THE NATIONAL GEOGRAPHIC SOCIETY-YUKON EXPEDITION HAVE PAID TO HIS MAJESTY AND TO THE QUEEN IN NAMING TWO NEWLY DISCOVERED PEAKS AFTER THEIR MAJESTIES STOP THE KING CONGRATULATES THE EXPEDITION ON . . . EFFECTING THE FIRST CROSSING OF THE ST. ELIAS RANGE FROM YUKON TO ALASKA."

up our valley and down the south fork toward the Alaskan boundary (page 722).

Daiber and I, also assisted by Carter, were to measure a 2,000-foot base line for the survey on the flat snowfields of our base camp airport and extend this with the theodolite so that before the end of the first week we should know the exact position of the Asek River, 20 miles to the east.

Wonderful weather sped us on our way. Every evening a new survey station was reported set and more gasoline and dog food poured in on daily sledge-loads from the lower cache, nine long miles down the valley. The last load of freight came through on schedule from the lower cache

on April 4, and next day Harty and Jack sledged 500 pounds of supplies to a new cache eight miles farther up the valley above Cascade Camp.

On the sixth, Harty took a well-deserved rest and Jack and I, skijoring behind the dogs with no baggage but lunch and a camera, covered the first 20 miles of the route toward the coast to make certain that at least the first part of the trip to Yakutat would be as passable as it had looked from the airplane.

It was not until April 8, when the base line had been measured and expanded, that the arrival of the first blizzard checked our progress. There always was work to



SO STEEP WAS THE ICEFALL THAT SLEDGES HAD TO BE BACK-PACKED.

Snow goggles protect the eyes from the glaring sun, and woolen ear muffs and big fur gauntlets prevent frost nip. Powder snow and a steep grade made sledging hopeless above the Cascade Camp.

be done computing the survey and always many willing hands. We even taught one of the men who had never known logarithms what they were and how to use them.

Then there was food to sort and pack in preparation for our expedition to the high survey station. This whole side trip must be completed before our dash to the coast, scheduled to start not later than May 10.

We had expected cloudy weather early in April as the frigid winter days were drawing to a close, but our expectations were far exceeded by the series of blizzards that lashed the camp almost continually from the 8th until the 21st.

As soon as the weather had cleared and the wind had stopped blowing, it was a day's work for four men to break trail again on snowshoes before the dogs could successfully navigate the tremendous powdery drifts with any kind of load on the sleigh.

Working only in the clear intervals between storms, we had made good progress on the map and a large cache of food and fuel had been established far up the glacier before the airplane arrived on the morning of April 22 for our last photographic flight.

Bob Bates, Andy, and Jack had sledged 20 miles down a narrow branch glacier two days before in search of fresh bear meat to feed the dogs, so that only four men were

in camp when the Fairchild swooped low over the tents with a friendly roar of welcome before it landed. Although we had many clear days in March, this was our first cloudless one since the plane had left three weeks before.

At 9 in the morning, only a few moments after the plane had touched the ground, Bob Randall and I were off again, bound to explore the last unknown wilderness in the maze of peaks and glaciers that stretched eastward from Mount Logan and Mount Lucania and almost to the waters of Kluane Lake.

Flying southward, very low over the sur-

face of the ice, we first made certain that no barrier to our progress lurked anywhere between our base camp and the coast.

For the present, however, our main problem was the final three-mile descent along the Nunatak Glacier before reaching the ocean. Its ice was clearly far too broken and crevassed to permit anyone to travel down the middle of the glacier. The valley walls rose on both sides in smooth, vertical cliffs several hundred feet above the shattered surface of the ice.

Either we must find a route in the chaos of smashed ice along the side of the valley at the very foot of these cliffs, or we should have to climb over still another high range of mountains before reaching tidewater.

Our flight next led us northward up the Hubbard Glacier along nearly the same route we had followed on March 8, but as we neared Mount Logan, instead of swinging westward over the Seward Glacier between it and Mount Saint Elias, we bore slightly to the east, passing to the right of the magnificent Jubilee peaks, King George and Queen Mary, and climbed higher and higher for enough altitude to cross the 12,000-foot pass between Mount Walsh and Mount Steele.

The flight over this divide, past the cliffs of Steele, Lucania, and Walsh, and down



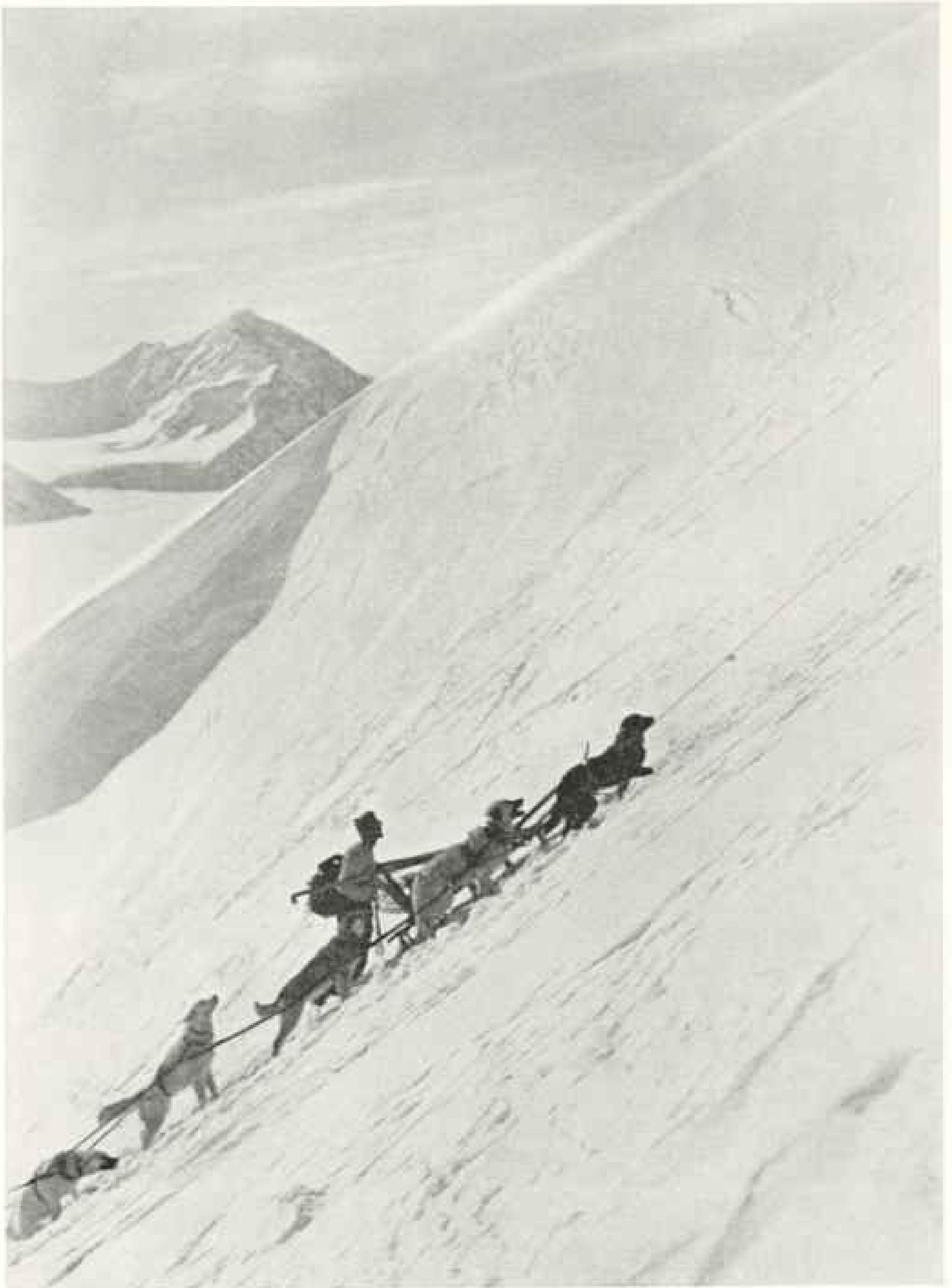
"CRACKER" STRIKES AN AMUSING POSE!

Stopping suddenly on a slope, he slipped into this position and held it until he was harnessed and photographed. In the background are the first crevasses of the great icefall rising from Cascade Camp to the upper valley of the Lowell Glacier (see map, pages 720, 721).

the unmapped glaciers that pour eastward from these peaks, disclosed a wilderness and desolation of rocks, ice, and snow.

On the cold, dry eastern slopes the glaciers turned out to be a mass of rolling hummocks and ridges of rough ice buried beneath a veneer of rocks and debris that had fallen on them in avalanches from the mountains. The area was too far north and east to benefit, as did ours, from the coastal winds and deep winter snowfalls that smoothed out the unevennesses.

Despite the comparative warmth of spring at the base camp for the last two weeks, the



DOGS WERE OF NO AVAIL HERE—MEN HAD TO PULL AND PUSH THE SLEDGE UP BY HAND

So steep was the slope and deep the fluffy snow that it was all the dogs could do to climb the trail alone. Six men pulled the rope leading to the right, while one pushed with a pack on his back. On reaching the top, the sledge was loaded with supplies, the dogs were harnessed, and the team set off for the advance camps. There was no fear of avalanches, but every night fresh falls or drifts of snow buried the track. It was broken out again by laboriously plowing waist deep along the trail markers.



LUNCH ON A SKIJORING JAUNT TO LOCATE NEW SURVEY STATIONS

One day Jack Haydon (seated) and the author covered on skis 35 miles with no fatigue, simply by holding onto long ropes attached to the dog harnesses. Here the dogs are staked out to a flag marker to prevent their becoming tangled. Thermos bottles kept coffee and bouillon hot for lunch every day.



"BURIED ALIVE" WERE THE EXPLORERS WHEN A BLIZZARD STRUCK THIS CAMP

Only objects showing above the surface after a 120-hour storm were the tips of a pair of skis. Snow was so deep and feathery that sledging was impossible until the warm May sun had settled the drift. The storm occurred only ten miles from Nunatak Fiord.



HIGH WINDS MADE SURVEYING FROM THIS EAGLE PERCH DIFFICULT

Carter records the angles as they are read from the theodolite at this station 6,000 feet above Cascade Camp on the glacier. Every major peak was named, altitudes and positions being figured later. The author (sighting) found his caribou-skin shirt "warm as a whole flying suit."

upper air was still bitterly cold. After we had photographed the desolation east of Mount Steele sufficiently to remove it from the realm of the unknown, we flew southwestward for an hour to obtain a few last close-up pictures of Logan and Saint Elias.

On the way homeward we circled several times about the head of our valley, first to determine the exact position of the cache that Jack and Harty had sledged forward from above Cascade Camp, and also to discover some feasible way to reach a lofty spur just north of Mount Hubbard and Mount Alverstone, on which we hoped to be able to locate our highest survey station.

At 1:45 we glided safely into camp for lunch after 4 hours and 25 minutes in the air.

An easy two-hour flight after lunch to photograph the terrain south of camp ended all our aerial work and we bade a last farewell to Bob Randall late that April afternoon.

Now reunited and working every day from dawn till dark, we pushed our tents up the glacier, first to Harty and Jack's cache, nine miles above the Cascade, and then ten miles farther on up a steep, crevassed tributary glacier to a site at 8,300 feet at the very base of the magnificent easterly cliffs of Mount Hubbard.

The time had been so short that it had been necessary to put the men as well as

the dogs to work pulling on the sledges.

Everyone was on the verge of exhaustion when we finally pitched the high camp after moving our whole outfit 20 miles in four days.

The next morning dawned cloudless. On such a gorgeous day, with such stunning surroundings, it was hard to believe that the weather could turn against us. But the barometer had kept dropping all night.

Our only hope was for the three of us to push through to the higher survey station at all costs, so that, if a storm came next day, we could fall back on our last

lower camp before the trail was snowed under again.

Jack Haydon and Harty Beardsley volunteered to make the survey trip, while the others were instructed to stay in camp and rest for any emergency.

Armed with crampons (ice creepers), ice axes and rope, as well as our theodolite, recording book, and emergency rations, Jack, Harty, and I set out from camp at seven in the morning against a fresh northerly breeze.

None of us had slept very much the night before—partly because we had doubled up in our sleeping bags to save weight in our dash to the upper camps, and partly because of a misplaced tent peg that spent the night poking me squarely in the middle of the back from underneath the floor of the tent.

The first 2,500 feet rose steeply in the form of a narrow, snow-covered shelf of ice about a mile behind the tents. To the right of the shelf a vertical wall of ice dropped to the glacier on which our camp was located. To the left an awe-inspiring and colossal cliff of granite towered some 6,000 feet to the summit of a huge unnamed peak 14,000 feet high.

This strip of ice served as the only conceivable approach to the eastern end of a smooth snow shelf stretching the length of the northern face of Mount Hubbard.



RARE MOSSES—THE ONLY LIVING THINGS IN "NO MAN'S LAND"

Tiny subarctic plants like these were found in nooks and crannies in exposed spots, usually the southern sides of rocky outcrops where the snow did not linger long in the sunlight. Valuable collections were sent to Norway for detailed study.

We wished to establish our survey station on a ledge protruding from the snow as near as possible to the far-western end of this shelf.

A "REST AND RUN" CROSSING

The ascent of the ramp of ice leading to the upper shelf was easy, but in one place exceedingly dangerous. At this point it passed directly beneath the lower end of a tremendous gully that frequently poured avalanches on to our lower glacier from an ice cliff nearly at the summit of the 14,000-foot peak. The crossing of this gully had to be made on the dead run, or



TRAIL MARKERS OFTEN BECOME A WELCOME LIFE LINE

To find one's way back to a tent when caught in a sudden blizzard is virtually impossible without such black maple "wands" to guide the way. Strong winds and driving snow soon hide a well-worn track. One hundred of the dowels, packed in a neat bundle, will weigh five pounds and mark four miles of trail.

we should be taking a terrific risk of being annihilated by falling ice from up above.

Before we crossed the cone of avalanche debris at the bottom of the gully, we had a long rest. Then we started off as fast as our legs could carry us till we were exhausted from dodging helter-skelter through an amazing mass of jumbled blocks of scattered ice. When we were thoroughly exhausted, we ran for five minutes more and finally reached the other side panting like race horses, our legs quivering as if they were twigs. We curled up comfortably in the snow on our knapsacks and rested

for a half hour till we had revived a bit, then we pushed on, slowly but steadily, up the long, easy snow slopes of the upper shelf.

The cliffs of our unnamed peak now towered behind us and the massive crags of Alverstone lay ahead and to our left. The summit of Mount Hubbard was out of sight behind Alverstone. Our little survey peak rose dead ahead, outlined sharply against the clear blue sky.

To reach the ledge took us more than two hours of steady climbing up a long, relentless grade. When we left our resting place we were certain that the ledge could not be more than 11,000 feet high; when we reached a sheltered notch beside it, our barometer read

well over 12,000 feet above the sea.

As we sat eating a lunch of frozen sardines, leathery figs, biscuits, and hot coffee from our thermos, the temperature began to fall and vast seas of fog started to roll up the Hubbard Glacier from the sea.

The magnificent and extensive view about us can never leave my memory.

Behind us rose Alverstone, 2,000 feet higher than our ledge, one wild, screaming tornado of wind and powder snow. Hubbard lay just behind it, out of sight. Across the Hubbard Glacier to the west towered Logan, huge and majestic, though

all of 50 miles away.

King George and Queen Mary, Lucania, Walsh, and Steele, even though two of them were more than 16,000 feet, seemed puny foothills ranged about this mighty monarch, second only in height to Mount McKinley in North America.

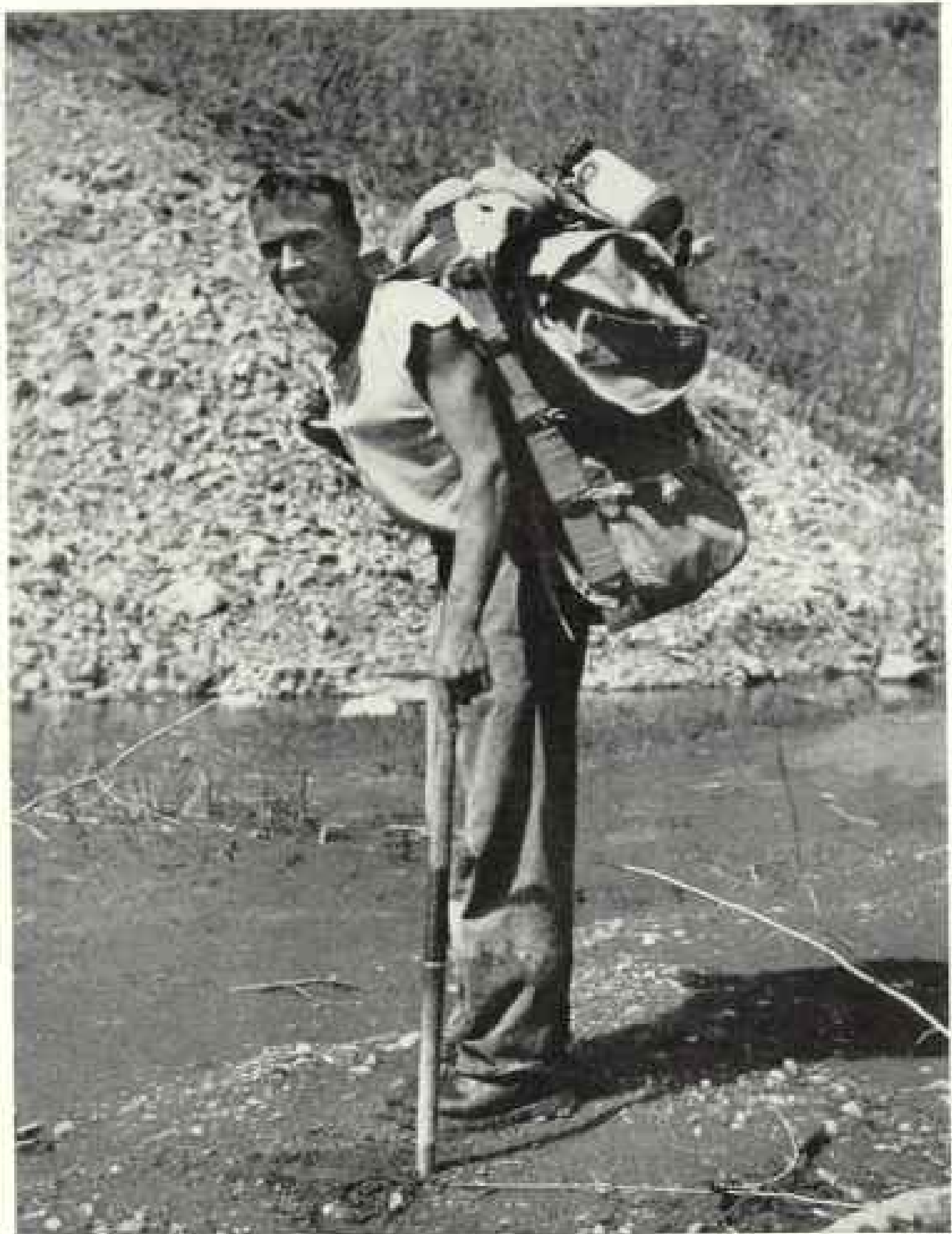
To the east, range after range of sharp rocky peaks stretched toward the horizon in the direction of Carcross. For the first time the distant mountains looked black instead of white; spring was approaching in the lowlands, for it was already May:

A MAY DAY AT
TEN BELOW
ZERO

What a grotesque May Day this had been for us!

After lunch we put on our crampons and scrambled from the shelter of our little notch onto the ledge which was to be our survey station. As we climbed the last 50 feet up the rocks, the wind struck us with a terrific blast, and then began what I am certain was one of the wildest survey jobs in history!

The temperature hovered close to ten below zero. Clouds were gathering behind Alverstone. By dark the storm would be upon us. Fearful that the gusty wind would move our instrument, we buried the legs of the theodolite tripod in heaps of rock. The work of recording was so cold that Jack and Harty worked in shifts, each writing with his back to the wind



HE CARRIES A BOAT ON HIS BACK!

A rubber raft was transported across the glaciers for the trip down Yakutat Bay (page 747). Once, coming to a lake three miles long, the party found it easier to blow up the boat, paddle across, and then roll the craft up again, rather than bushwhack through the dense brush along the shore.

until his fingers could steer the pencil no longer.

Reading and leveling the theodolite was a nightmare. After each blast of wind we had to return to our reading at Mount Logan to be sure that the tripod had not shifted. Often the gusts, coming from behind, would drive the end of the telescope right into my eye just as it was focused upon a distant mountain. The jolt would throw the instrument off level and back we would turn to Logan to set it right again.

At two o'clock, when we had accurately fixed the directions of about a dozen major peaks, ominous cloud-caps started to settle

down on Logan and Lucania. The wind redoubled its force, and twisters of glittering snow whirled and staggered in the sky above the crest of Alverstone. At 2:30 our job was done. We stowed the precious theodolite away in its aluminum case, bound the tripod to a packboard, and built a huge cairn of rocks to mark our lofty survey station.

The once interminable shelf seemed but a stroll on the way down. Looking at the avalanche gully from above it appeared even more awesome than from below, a tottering wall of ice clinging to the almost perpendicular face of granite an airy mile above our trail!

Halfway across I tripped and fell full length across a block of ice, tearing my snowshoe strap. Jack was ahead, running as if the devil were at his heels, and Harty followed. Every other step I went in to my knees till finally we reached the lower side of the chute puffing like porpoises.

All next morning while Harty and I surveyed from a station near camp and Bob and Ad skied five miles to make a series of valuable mapping photographs, Ome Daiber, Jack, and Andy broke camp and packed the sledges.

At noon, just as snow flurries began to fly, we set off down the glacier, bound for the lowest point we could reach by dark. Jack and Ad forged ahead on skis with the dogs. The rest of us pulled the hand sledge on snowshoes.

Ten miles down the valley, just as the storm was breaking in earnest, we heard a cheery bark ahead and Jack came flying over a little rise, skijoring behind the dogs at full speed. We hooked them onto our sledge, gave it a good push, and away they went to our old camp site, nine miles above Cascade Camp, where Jack had left his load.

That night it snowed hard and all the next day a thick nasty fog hung low over the glacier. Jack, Bob, and I broke trail through to the base camp in seven hours of heart-breaking sledgework and snowshoeing with the dogs. The others followed with the hand sledge two days later, breaking trail all over again through a terrific gale after the storm was over.

A CREVASSE SWALLOWS THREE DOGS

Early in the morning of May 6 Jack was climbing the steep slope which rose behind camp, skirting the edge of the ice cascade, on his way for a last sledge load that hard

pulling had made it impossible for the others to drag down the day before.

I was climbing slightly ahead of Jack, while Andy, Ome, Harty, and Ad followed close behind. Bob was still in camp. Five minutes' climb above the tents, the dogs were frolicking off the trail to our right, when suddenly one of them disappeared. Two of the others scampered to see where he had gone and vanished without a sound in the powdery snow.

Jack made a leap for two of the others who were running toward the tiny hole which had swallowed up their comrades. Harty grabbed the third and held him tightly. Then we called frantically to Bob for rope and axes. He fairly flew up the slope with all the rope he could find, and in no time we had rigged up a line running far into the depths of the glacier.

Jack called frantically downward into the icy darkness, but only the hollow echo of his own voice broke the silence in that tremendous snow-covered crevasse. There was no time to lose. It was so deep that the bottom was out of sight. Probably the dogs, Monkey, Fanny, and Brownie, were dead! It was as if three of our own men had suddenly been taken from us.

Tied to one rope and using the one which we had already fixed as a handline, I was lowered through the hole. At 40 feet down, I thought I saw something move. At 50 feet the rope ended and I was tethered from above while my handline was pulled up and tied to the end of the rope attached to my waist. Both sides of the crevasse sloped inward toward the top and I was swinging aimlessly to and fro like a minnow on a fish line.

They lowered me ten feet more and I lost sight of the daylight above as I descended beneath a shelf of jutting ice. A patch of blood on a sharp bit of ice made me shudder. There below in the dim light lay the dogs, huddled in a heap, too scared even to move. A massive block of ice was jammed in the crack just below me and I had to pause while the men rearranged my moorings far above so that I should not dislodge it on the dogs. Out went the rope—60, 65, 70 feet—and at last my toes touched the firm ice beside Monkey.

The dogs were petrified. Not one of them moved a hair as I slipped an extra line through the belly-straps of their harnesses. Monkey bled slowly from one eye as he looked pitifully up at me. Fanny



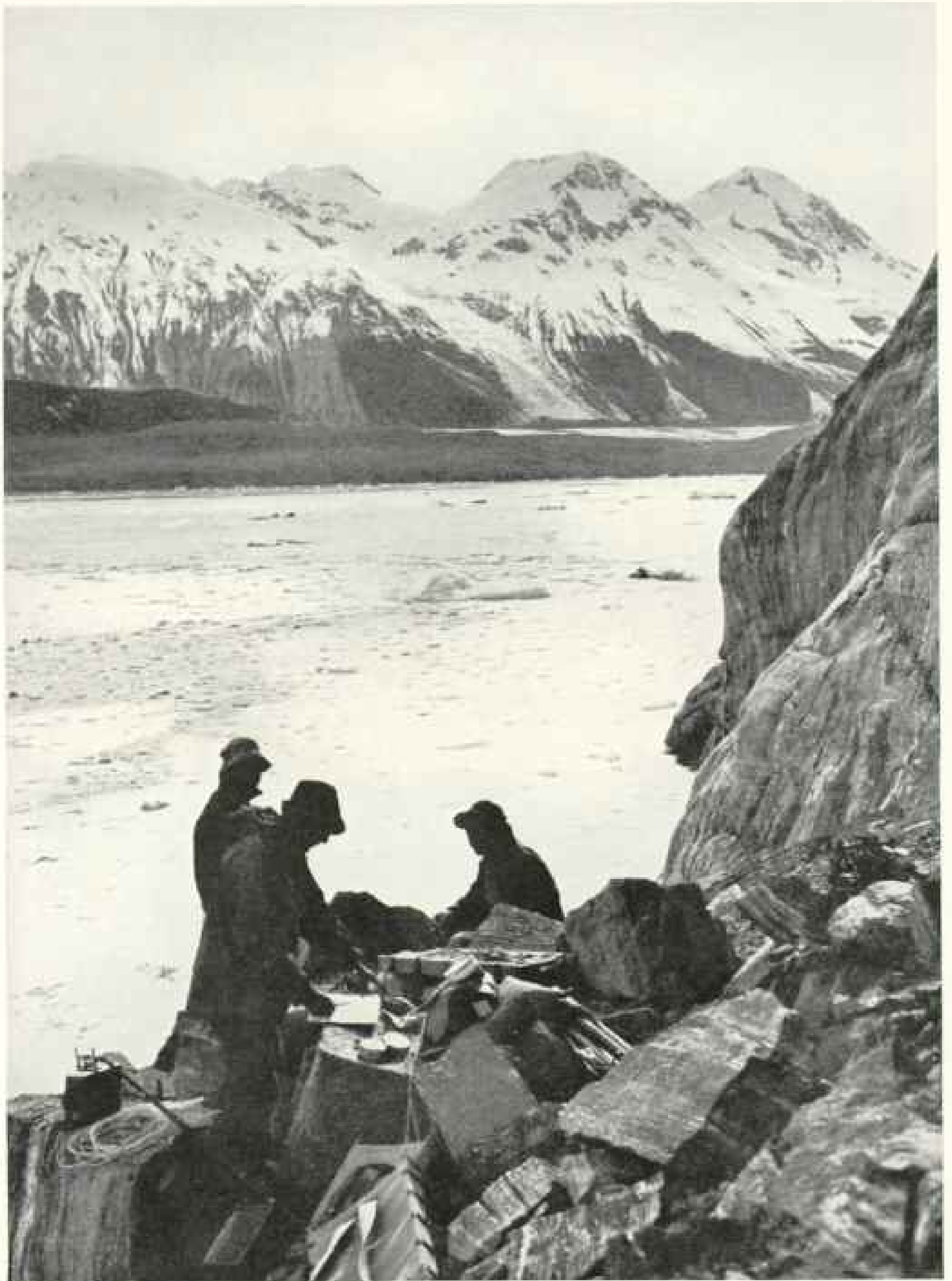
"MONKEY" IS RESCUED AFTER TWO FALLS TO THE BOTTOM OF A 70-FOOT CREVASSE

Three of the dogs got loose just above Cascade Camp and disappeared headlong down a snow-covered crack. Two men were let down on a rope and found the dogs stunned and whimpering at the bottom. While the animals were being hauled up, Monkey's harness broke just before he reached the top, and he fell back again. Surprisingly, the dogs were unharmed excepting for a few minor scratches.



AFTER THE BIG STORM, SLEEPING BAGS AND CLOTHES WERE AIRED ON THE SNOW

When the equipment had dried, the party descended three miles to tidewater, and launched the *Hesperus* (page 745). Then two of them paddled and portaged down to Yakutat and sent a fishing boat back for the others.



TWENTY-FIVE YEARS AGO THIS BREAKFAST NOOK WAS BURIED UNDER 2,000 FEET OF ICE

A massive glacier once choked Nunatak Fiord, but its face has receded six miles since a National Geographic Society expedition explored the region in 1909. Here the author's party slept on dry, though rocky, land, after living for nearly three months in ice-floored camps. Fresh water was near at hand again after weeks of melting snow for every need. The *Hesperus* was launched from here and navigated through floating ice 55 miles to the village of Yakutat on the Pacific coast (page 747).



THERE WAS NO WRECK OF THE "HESPERUS" ON THE VOYAGE DOWN
NUNATAK FIORD

When the air-inflated raft touched submerged chunks of ice or grounded on rocks, the rubber skin gave way, preventing puncture, but tickling the stockinged feet of the crew. The little 8-foot boat weighed only 35 pounds and rolled up tight into a pack, 36 inches by 12. It was carried by sledge and back-pack across the Yukon and launched on the ice-choked fiord. Though heavily loaded, it rode the seas like a cork (page 747).

whimpered from the bottom of the furry, snow-covered pile. At least all three were *alive*.

At my yell from below I was hauled quickly out like a sack of meal. Then came the dogs. Halfway up, a sudden slacking of the rope and a dull thud told us that a harness had broken. Which one was it? It seemed as if no living thing could survive that plunge twice. The other two soon came to the surface, blood-spattered and covered with snow. Monkey was missing!

A SECOND SEARCH FOR "MONKEY"

In a jiffy Ad Carter was off after him on my rope. Fifteen minutes later, first Ad and then Monkey were hauled to the surface (742). As soon as Monkey was untied from a veritable cat's cradle of knots, he sat up. Then he stood and trotted over to the other dogs, dragging at his collar as Jack led him away from the crevasse!

The only injuries we could discover on any of them were Monkey's scratched eye-

brow and a missing toenail. The blood on the others had come from Monkey's troubles. Fearing they might be suffering from internal injuries or shock, we gave the three a day off while Jack brought the last load down with Tex, Tip, and Cracker.

The next day when the first load started for the coast, Fanny and Brownie were back in their traces and Monkey howled all day because he was not allowed to work.

The dash for the coast was long and uneventful. The last pass had to be reached by the twentieth or we should be running dangerous risks with our food supply. Re-laying as little as possible and pulling heavy loads, we worked shoulder to shoulder with the dogs.

SEVEN MEN IN SEARCH OF SLEEP

Finally, on the morning of the 17th of May, we stood on the last divide. The peaks of the Alaskan boundary towered before us. A bend in the glacier 15 miles away showed us where it swung through the final range of mountains to the sea.



AFTER THE ICE BROKE UP IN THE SPRING, THE "ARK" ALIGHTED LIKE A DUCK ON BATES LAKE TO PICK UP THE SUPPORT PARTY

The white line in the distance is the ice pack coming down the lake. It closed in so rapidly that the plane could not take off fully loaded and was obliged to make three trips with the men and dogs. The seaplane, piloted by L. F. Barr, has just made the long flight from Carcross by way of Whitehorse.

We camped for the last time together on the flat below the divide, and, to provide additional excitement, one of our tents collapsed on the stove during supper and burned up everything I owned that wasn't on my back. Andy barely rescued his sleeping bag and air mattress; mine went up in flames, as well as all my socks and an extra pair of pants. Luckily for the others, they were living in the other tent.

Seven men in one nine-by-nine tent made our last night together a lively one, especially when it came to cooking breakfast amid a wild confusion of sleeping bags, clothes, and mattresses.

We bade good-bye to Bob Bates and Ome as they started their lonely trek on skis back up the glacier into the Yukon. Jack and the dogs were to follow them the next morning after helping us to the divide with one last load.

Thirty miles stretched to Cascade Camp, and more than 70 to Bates Lake. They had 15 days to make it; we had 14 to make the 80 miles to Yakutat.

The first half of their journey was over

our well-marked trail to Cascade Camp; the last half was an enigma. The last part of ours we knew was water; the first half was our problem, unless we struck a bad storm or got foiled by a hopeless portage twenty miles from Yakutat.

On May 18, in the cold dawn we wished Jack Godspeed and helped him harness the dogs. We patted each of the pups a fond farewell and they vanished down the hill at Jack's hoarse cry of "Mush!"

Scarcely had we reached a lurching place ten miles below the divide when the sledge smashed through the rotten morning crust.

Two hours later, only 10 miles from Nunatak Fiord and but 3,000 feet above sea level, the worst blizzard of the winter struck us. For 120 hours it snowed without stopping, burying all but the last 18 inches of our 8-foot tent!

A SIX-DAY WAIT NEAR JOURNEY'S END

Only a day's run from the fiord, we waited for six days before the sun had settled the snow so we could advance again.

One last time we were blessed with a

solid evening crust and, starting before dawn, we reached the snowline just at sun-up. As we rounded the corner of the valley—the corner beyond which lay the greatest mystery of the whole exploit—our hearts leaped with joy as the waters of Nunatak Fiord sparkled before us.

The first two miles which stretched below us were long, gently dropping slopes of rock, dotted with patches of melting snow. For the last mile, cliffs and glaciers seemed to meet in one final determined effort to thwart our descent to the fiord.

Hundreds of feet of polished rock to our right rose to the very sky, it seemed. To our left was a labyrinth of yawning cracks and tottering pinnacles of ice. Between the two wound a canyon, paved with debris fallen from above, often so narrow that we had to cut ice steps among the jumbled blocks to force our way past.

Fourteen hours after leaving camp, as the sun was dropping low among the mountains to the west, we threaded our way through the last twistings of that treacherous gorge, and at 4 o'clock in the afternoon the ice-jammed waters of Nunatak Fiord glittered at our feet (page 744).

Cheer after cheer resounded from the crags that rose above us. We stood on solid rock once more, for some of us the first time in almost 90 days.

Seated luxuriously amid a heap of jagged boulders on a tiny sheltered ledge, we munched a hasty supper of hash, tea, and biscuits. Then our party split once more. Harty and Ad started back for the camp we had abandoned that noon. They were to relay our equipment and survey records down "Hell's Highway" to the water.

Andy and I, with our miniature 8-foot rubber boat, the *Hesperus*, must paddle and portage our way the 55 remaining miles to the village of Yakutat.

Our voyage in the *Hesperus* was an adventurous finale to a magnificent expedition. Our extra tent had burned up, so we lived beneath the overturned boat and an outstretched tarpaulin.

The first two days we covered 30 miles and reached the beginning of the ten-mile portage across the peninsula dividing Russell Fiord from Yakutat Bay. We did not dare to paddle round the end of this lone headland, because of the heavy ocean swells on its westerly shore and the well-nigh impassable ice pack that usually blocks the fiord near the end of Hubbard Glacier.

For twelve hours on the first day we pushed ahead, first floundering through drifts of melting winter snow piled high in a veritable jungle of twisted alder bushes, then wading down a creek to a narrow lake. This we crossed by blowing up the boat, but twilight found us hopelessly lost in the middle of a huge swamp, still at least five miles from the end of the portage!

Early on the following morning we struck a trappers' trail through the dense virgin forest which led us easily to within a mile of tidewater, but there it disappeared completely where a deluge of mud and gravel had poured down across it.

That last downhill mile to Yakutat Bay through the jumble of roots, dead trees, and dripping moss took us seven hours.

Just at twilight on May 28, we burst through the last thicket and out into the open on a wide rocky beach.

The broad waters of the blue Pacific stretched before us to the horizon and there on a tiny island, scarcely a half mile from where we stood, a pretty white cottage peered cheerily out from among the trees.

That night we slept in a woodshed beneath the luxury of a galvanized iron roof. The next day passed quickly in a triumphant paddle down the 16 miles of bay which separated us from Yakutat.

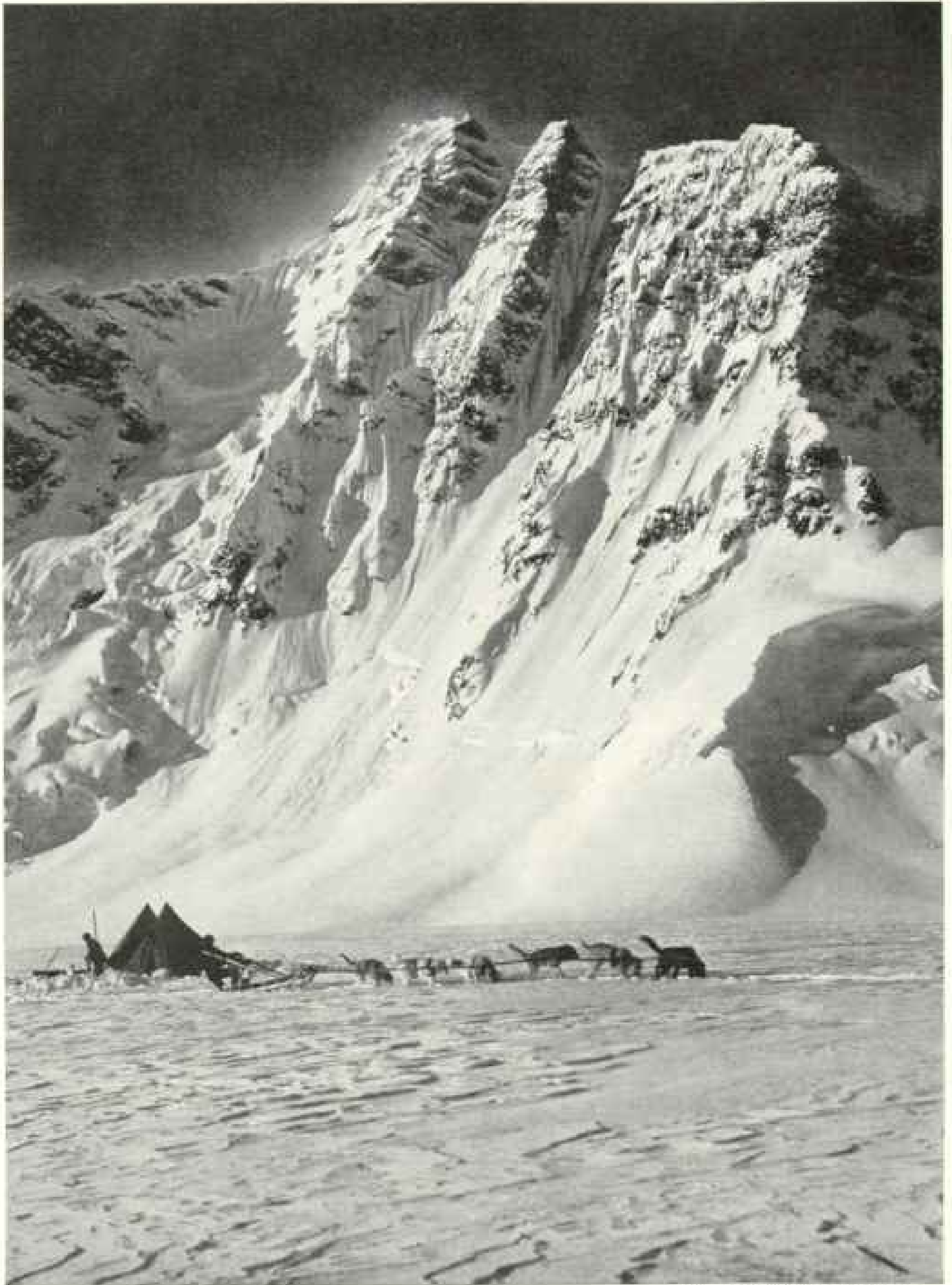
A FLIGHT TO MAROONED PARTY

But our troubles were not over. We learned that very night that Bob Bates' party was marooned in the Yukon where every lake was still frozen over solid after the latest spring in years.

Speeding back by airplane, by way of Juneau and Skagway, we made a short emergency flight across the mountains and dropped ten days' food, cartridges, fish-hooks, and line at their lonely camp on the shore of Bates Lake. On June 7 the ice broke and the last remnants of our scattered party were safely flown out.

As I write the closing words of this story of the Yukon Expedition, one experience stands out for me high above all the rest. It is the thrilling experience of being leader of these six companions. The magnificent faith and spirit of these fellows in the face of every conceivable difficulty and disappointment made it possible for our expedition to cross the Saint Elias Range.

Their leader and the National Geographic Society are united in deep appreciation of their splendid work.



Photograph by Bradford Washburn

A DOG SLEDGE LEAVES A CAMP SET BENEATH A TOWERING UNNAMED PEAK WHOSE BUTTRESSES ARE FRINGED WITH A HALO OF WIND-DRIVEN SNOW

A steady gale seems always to roar about the summits of all such mountains in the St. Elias Range. These tents of the National Geographic Society Yukon Expedition were pitched on the hard snow surface of Lowell Glacier, nine miles above Cascade Camp and halfway to Mount Hubbard (map, pages 770-771).

CANADA'S AWAKENING NORTH

BY LAWRENCE J. BURPEE

Secretary for Canada of the International Joint Commission

WITH the nose of our plane pointing north we were flying over the rich farm lands of northern Alberta. We had left Cooking Lake, Edmonton's seaplane base, half an hour before, and shortly afterwards had sailed over the dull gray ribbon that was the North Saskatchewan, mud-colored like most of the rivers of North America's vast interior plain.

We were flying at 5,000 feet, and the land below bore that curious resemblance to a checkerboard that one notices in farm country seen from the air. We were following for the moment a highway that runs north from the provincial capital.

The checkerboard broke up into isolated farms, and the highway degenerated into an old-fashioned dirt road. Patches of timber became more common, and the farms ever fewer and more humble. We were crossing the pioneer fringe of Alberta—and then we had left it behind.

Below were no farms, no roads, no signs of human habitation or occupation; nothing but interminable, primeval forest, broken by occasional outcrops of rock and half-hidden rivers and lakes.

A RAILWAY IN THE WILDERNESS

And then I looked down upon something reassuringly familiar. Through a gap in the forest ran two bright, parallel lines, and on these, directly underneath, puffed a ridiculous toy train.

That railway and its fellows represent the first step in Canada's opening up of the North Country.

Although there were trappers and fur traders and missionaries north of 54 long before the railways, they never were much more than tolerated by the North Country.

One should, however, make one exception. Fur traders did build posts in the Peace River Valley a century or more ago.* Around these posts gradually grew up infant farming communities. As news got abroad of the exceptional quality of the land, settlers drifted in from the south, by the rough wagon road from Edmonton, and settlement spread up and down the valley.

* See The National Geographic Society Map of Canada issued as a supplement with this number of the NATIONAL GEOGRAPHIC MAGAZINE.

As long ago as 1876 the first prize for wheat at the Philadelphia Centennial was won by a Peace River farmer; the Peace River country was again successful at Chicago in 1893; and the name of Herman Trelie, of Wembley, appears several times on the list of those who have won world wheat championships.

THEN CAME AIRPLANES

The Age of Steam dealt a staggering blow to the exclusive spirit of the North Country, but it remained for the Age of Air Communication to convince it that the white man had come to stay.

For those of us who live in modern communities it is extremely difficult to realize what the airplane and wireless have meant to northern Canada, a million and a half square miles.

Not long ago I spent an evening with a man who had been trapping in the North for half a century. As we sat smoking our pipes before a log fire, I asked him what the telephone, telegraph, electric lights and airplanes meant to him.

In the slow, measured tones of one who has spent much of his life alone, this veteran replied:

"When I came north, Edmonton was a trading post of the Hudson's Bay Company. Winnipeg was a muddy little settlement sprawling along the banks of the Assiniboine.

"I outfitted at Winnipeg and took the old water route to the Saskatchewan; paddled up from Cumberland House to the Churchill by Frog Portage; up the Churchill to La Loche Portage; down the Clearwater to the Athabaska; down the Athabaska and the Slave to the Mackenzie and Simpson. It took several months.

"There was some traffic up and down the Mackenzie, taking down supplies to the lower posts and bringing back furs, but it was little and far between. Mail went down with the brigade once a year. Tea, sugar, flour, bacon—that's about all the food that came from outside. If we wanted fruit, we could pick berries. We seldom did. We could live off the country pretty comfortably, what with moose and caribou and the rivers full of fish.



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NO SPOT BENEATH THE FAMILIAR FLAG IS TOO FAR NORTH FOR THE MOUNTIE

Detachments of the Royal Canadian Mounted Police make themselves at home wherever the jurisdiction of the Dominion reaches. They are respected by whites, Indians, and Eskimos, for even the humblest native knows he can count on them for help, guidance, and justice. This post, Lake Harbour, is on Baffin Island (page 768). Each summer a Government ship brings supplies, mail, and reliefs for the men stationed at these remote outposts. Nowadays members of this far-famed constabulary are often "mounted" on swift seaplanes or motorboats (page 766).



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HOW THE ARCTIC COAST KEEPS IN TOUCH WITH THE OUTSIDE WORLD

Constable Terrence G. Parsloe of the Royal Canadian Mounted Police is stationed at Bernard Harbour, on the extreme northern fringe of the continent, north of Coronation Gulf. Yet at any moment, through the miracle of wireless, he can communicate with headquarters at Ottawa and with the posts of the "Mounties" throughout immense northern Canada.



© Department of the Interior, Canada

CRACKS YAWN TO TRAP THE TRAVELER ON THE FROZEN ARCTIC SEA

In the spring, sledging over the ice is particularly difficult and dangerous. This party on Coronation Gulf has crossed a tide crack by using one of the sleds as a bridge for men and dogs.

"It took seven years to get the return on an investment in the Yukon. The first year trading goods were shipped from London to York Factory on Hudson Bay. The second year they were carried inland to Norway House, at the north of Lake Winnipeg. The third year they traveled down to the lower Mackenzie. The fourth year they reached Fort Yukon. The fifth year the furs got in exchange started east, and it took two more seasons to get them to the London market.

"Yes, times have changed. H. B. C. steamboats pick up tourists at McMurray and carry them down to the Arctic, and you can fly back from Aklavik to Edmonton, if you've the price. Or you can fly from Aklavik over the mountains to Dawson, and make the round trip to Vancouver.

"Out at the mouth of the Coppermine, on the Arctic coast, you're much nearer the eastern cities than Edmonton was fifty years ago. You can come south by air in a day if you have to, and you're in touch with the rest of the world by wireless all the time.

"We get letters and newspapers by air, and you can buy canned peaches from California or tinned biscuits from London, and fresh oranges and bananas, at any of the larger trading posts."

There are not many of the old-timers left. Their place is being taken by prospectors searching eagerly, with the help of seaplanes, for signs of precious minerals on that gigantic Canadian Shield which extends all the way from the gold fields of northern Ontario and Quebec to the Eldorado Mine of Great Bear Lake (p. 773).

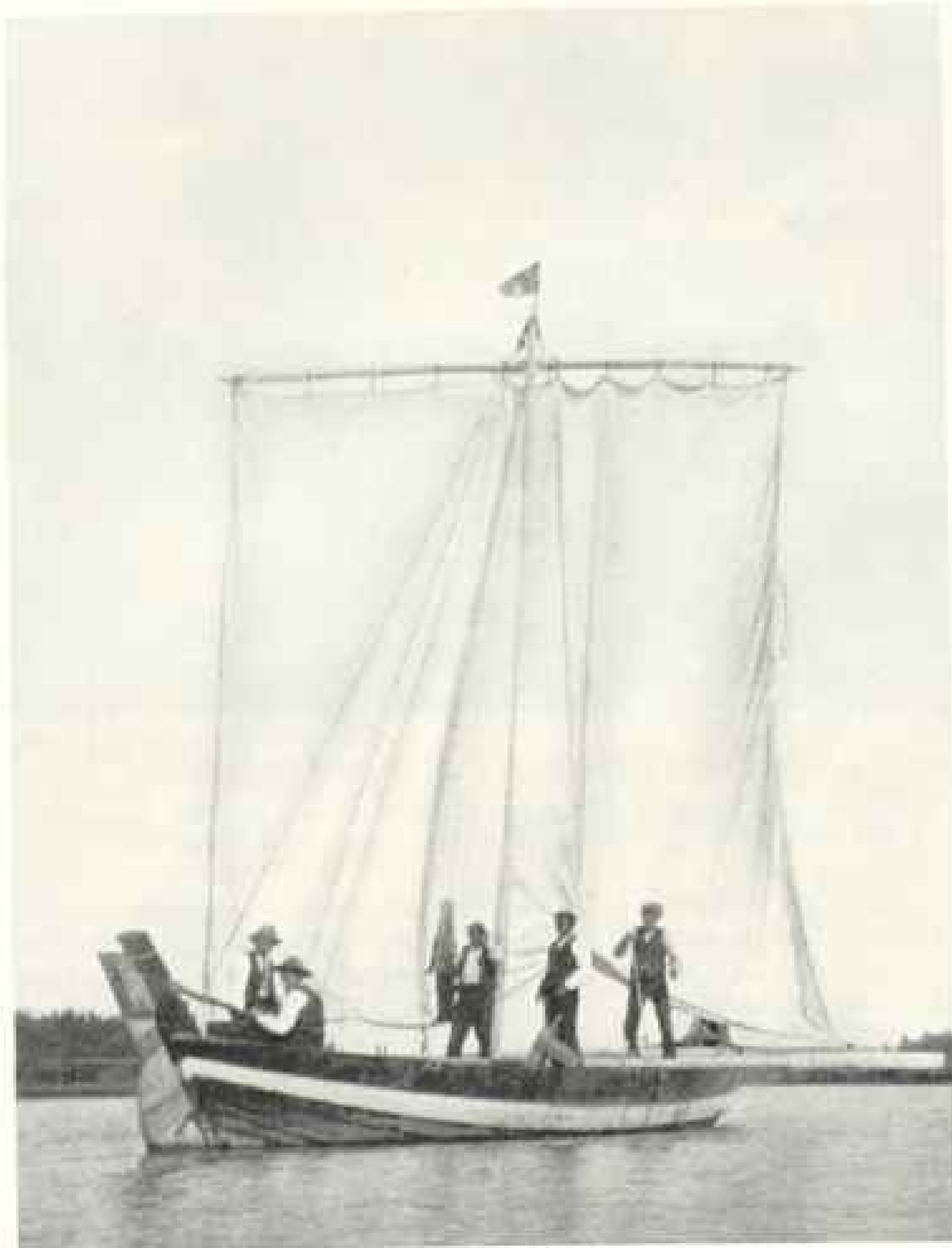
Government surveyors carry out reconnaissances in a few days over areas that formerly demanded months of arduous toil.

Doctors and missionaries, traveling by air, spread their physical and spiritual healing over so great an area that it would have seemed nothing but a fantastic dream a few years ago.

Mounted Police and fur traders in the remote fastnesses of the Arctic Archipelago, equipped with radio sets, receive through the Canadian Radio Broadcasting Commission not only symphony concerts from New York, Boston, or London, but summaries of the day's news and personal messages from their families.

TWO HOURS BY AIR; A DAY BY RAIL

Meanwhile, we have been flying north. We strike the Athabaska where it takes a big bend to the south, and follow it north to McMurray, landing on the cutoff, or "sny," that connects the Clearwater and



Photograph by J. Alden Mason

RARELY SEEN TODAY ARE THE ROMANTIC OLD YORK BOATS

Once they were as characteristic of the Hudson's Bay Company as the birch-bark canoe had been of the North West Company. They were propelled by oar and, under favorable conditions, by sail. Unlike the scows, they were not broken up at the end of a journey downstream, but were hauled laboriously back against the current (page 755).

the Athabaska. It took us two hours to make the trip by air. By rail it would have taken from 24 to 30 hours; by the old canoe route, about a week.

This is perhaps hardly a fair comparison between air and rail, as the railway from Edmonton to Waterways (a few miles from McMurray) is still in the pioneer stage.

You travel comfortably enough in a day coach or sleeper, and are given excellent meals, but the rest of the train consists of from 20 to 50 freight cars, and it is disconcerting to try to eat soup while a freight

car is being dropped or taken on at one of the infrequent stations.

Incidentally, you find yourself in excellent company, if you are interested in getting first-hand information about Canada's latest frontier from people who know—mining men and trappers, employees of the Dominion Government or of the Hudson's Bay Company, prospectors and missionaries and surveyors, Indians and half-breeds, with a sprinkling of women, white or red, or something of both.

McMurray, today, is the end-of-steel and the jumping-off place for the North; the meeting place of railway, steamer, and airplane. Yesterday it was a quiet little trading post of the Hudson's Bay Company.

The street is unpaved, although the hill behind the town is a solid mass of tar sand that has been used effectively to make roadways in Jasper National Park. Dust blows up and down the street in a way that seems characteristic of pioneer settlements.

On the street and in the hotels you meet men who have spent most of their lives out beyond the frontier, and others who are seeing the North for the first time.

Visitors who have arrived by train are waiting for the next H. B. C. steamer to take them on a river trip to the Arctic.

A famous London surgeon lands from a south-bound plane, on his way home from a holiday, and is commandeered by the local doctor to help him save a patient.

An airman saunters in, having just returned from a tour with mail to Great Slave Lake posts and camps. He breakfasted at McMurray, and is back for lunch.

A couple of dog sleds are parked for the summer in a neighboring yard, and their owner swaps yarns with an old-timer from the Mackenzie River country.

A group of mining men are collecting their belongings. Their seaplane is waiting down at the port to carry them to Cameron Bay, on Great Bear Lake (page 757).

Prospectors are discussing the relative merits of gold values on Athabaska and Great Slave Lakes, and the South Nahanni.

An Indian arrives from the river with a load of fish.

Shopkeepers dicker with squaws for embroidered moccasins.

A Mounted Policeman brings a prisoner in an automobile.

A party of children, white and Indian, are playing baseball in a field.

Three trappers, who have just unloaded their canoe, stop to listen to the voice of an announcer in far-off Chicago introducing the latest in jazz.

The history of the spot, if not of the town of McMurray, goes back to 1782, when the first white man, an eccentric trader named Peter Pond, a native of Connecticut, paddled by and built the first trading post on the Athabaska. The site was on the recognized water route from the south by way of La Loche (Methy) Portage, the carrying-place whose beauty aroused the enthusiasm of Sir John Franklin and inspired another famous Arctic explorer, Sir George Back, to paint it.

This way came Sir Alexander Mackenzie, Sir John Richardson, Peter Warren, Dease and Thomas Simpson, Dr. John Rae, and many another renowned explorer or less renowned fur trader.

THE ROMANCE OF "H. B. C."

From McMurray I flew north, in another plane, with Walter E. Gilbert, the modest but clever pilot who had carried Maj. L. T. Burwash, the explorer, to the North Magnetic Pole (p. 759). We circled over the airport and then took a beeline for Lake Athabaska, having the river sometimes on one side of us, sometimes on the other.

Gilbert handed me his glasses and pointed below to a steamer that was also traveling north. On the flag that floated from her mast I could just distinguish the letters "H. B. C.," symbol of the venerable Company that for more than two and a half centuries has traded for furs in America.

Today, while its posts are scattered across the continent from Labrador to the Pacific, it probably does a bigger business through its huge department stores in Winnipeg and other western Canadian cities, but there was a time when its flag was seen and respected, and its rule unquestioned, throughout an empire as large as Europe.

We flew over the site of Peter Pond's old fort of a century and a half ago, came within sight of the lake that now is named Athabaska, muddy gray here like most of the lakes and rivers until you come to Great Bear Lake, and crossed its western end to the long point on which stands Chipewyan.

This is still an important place, with missionary, mining, and other activities besides the fur trade, but its glory lies in the past.

THE MACKENZIE WAS "RIVER OF DIS-APPOINTMENT" TO EXPLORER

From here Alexander Mackenzie started out in 1789 on his journey down the river that afterwards bore his name. He called it "River of Disappointment" because it took him to the Arctic when he had hoped to reach the Pacific.

Here, also, three years later, he began his famous expedition to the Pacific, on the shores of which he left a characteristically modest record—"Alexander Mackenzie from Canada by land, the twenty-second of July, one thousand seven hundred and ninety-three."

Chipewyan had a famous library in its day, and was the meeting place of such men as David Thompson, Peter Fidler, and Philip Turnor, all of whom carried on important explorations and surveys for either the Hudson's Bay Company or the North West Company.

There was not much about the old fort at Chipewyan to remind one of its past glory, except a few worn books of travel. The ancient manuscript journals and other records of the fur trade that were once to be seen at Chipewyan have since been removed to Hudson's Bay House in London, where the archives of the venerable trad-



Photograph by Richard Finnie

KUMAIK, THE ESKIMO, SPEARS FISH AS DID HIS FOREFATHERS

For such a precarious, rock-walled place as this at Bloody Falls (page 776), near the mouth of the Coppermine, the native finds nothing more effective than his ancestral fish spear. He apparently knew nothing of fish nets until they were introduced by white men.

ing corporation are preserved and made accessible to history students.

THE BOURGEOIS CANOED IN STATE

It was difficult to conjure a picture of the days when brigades of canoes or York boats swept in to the landing, or set forth on their long journeys to the mouth of the Mackenzie or to York Factory on Hudson Bay (pages 752 and 755).

Browsing about among the dusty old books, I picked up a contemporary narrative of one of the early fur traders, a man of the rival company known as Nor'Westers,

He describes conditions as they were in the early part of the last century, and here is his lively account of how one of the principal officers, or Bourgeois, of the North West Company traveled:

"The Bourgeois is carried on board his canoe upon the back of some sturdy fellow. He seats himself on a convenient mattress, somewhat low in the centre of his canoe, his gun by his side, his faithful spaniel at his feet. No sooner is he at his ease than his pipe is presented to him by his attendant, and he begins smoking, while his silken banner undulates over the stern of his painted vessel.

"Then the bending paddles are plied, and the fragile craft speeds through the current with a degree of fleet-

ness not to be surpassed, yell upon yell from the hearty crew proclaiming their prowess and skill.

"A hundred miles performed, night arrives. The hands jump out quickly into the water, and the nabob and his companions are supported to terra firma. A roaring fire is kindled and supper is served. His honour then retires to enjoy his repose.

"At the hour of breakfast they put ashore on some green plot. The tea-kettle is boiling; a variegated mat is spread, and a cold collation set out. Twenty minutes later and they start anew. The dinner

hour arrives. They put ashore again. The liquor can accompanies the provision basket; the contents are quickly set forth in simple style; and twenty minutes later they are off again, until twilight checks their progress.

"When it is practicable to make way in the dark, four hours is the voyageur's allowance of rest; and at times, on boisterous lakes and bold shores, they keep for days and nights together on the water, without intermission and without repose. They sing to keep time to their paddles; they sing to keep off drowsiness caused by fatigue; and they sing because the bourgeois likes it.

"When about to arrive at their destination, they dress with neatness, put on their plumes, and a chosen song is raised. They push up against the beach as if they meant to dash the canoe into splinters; but most adroitly back their paddles at the right moment, whilst the foreman springs on shore and, seizing the prow, arrests the vessel in its course.

"On this joyful occasion, every person advances to the waterside, and guns are fired to announce the bourgeois's arrival. A general shaking of hands takes place, as it often happens that people have not met for years; even the bourgeois goes through this form of salutation with the meanest.



Photograph by J. Alden Mason

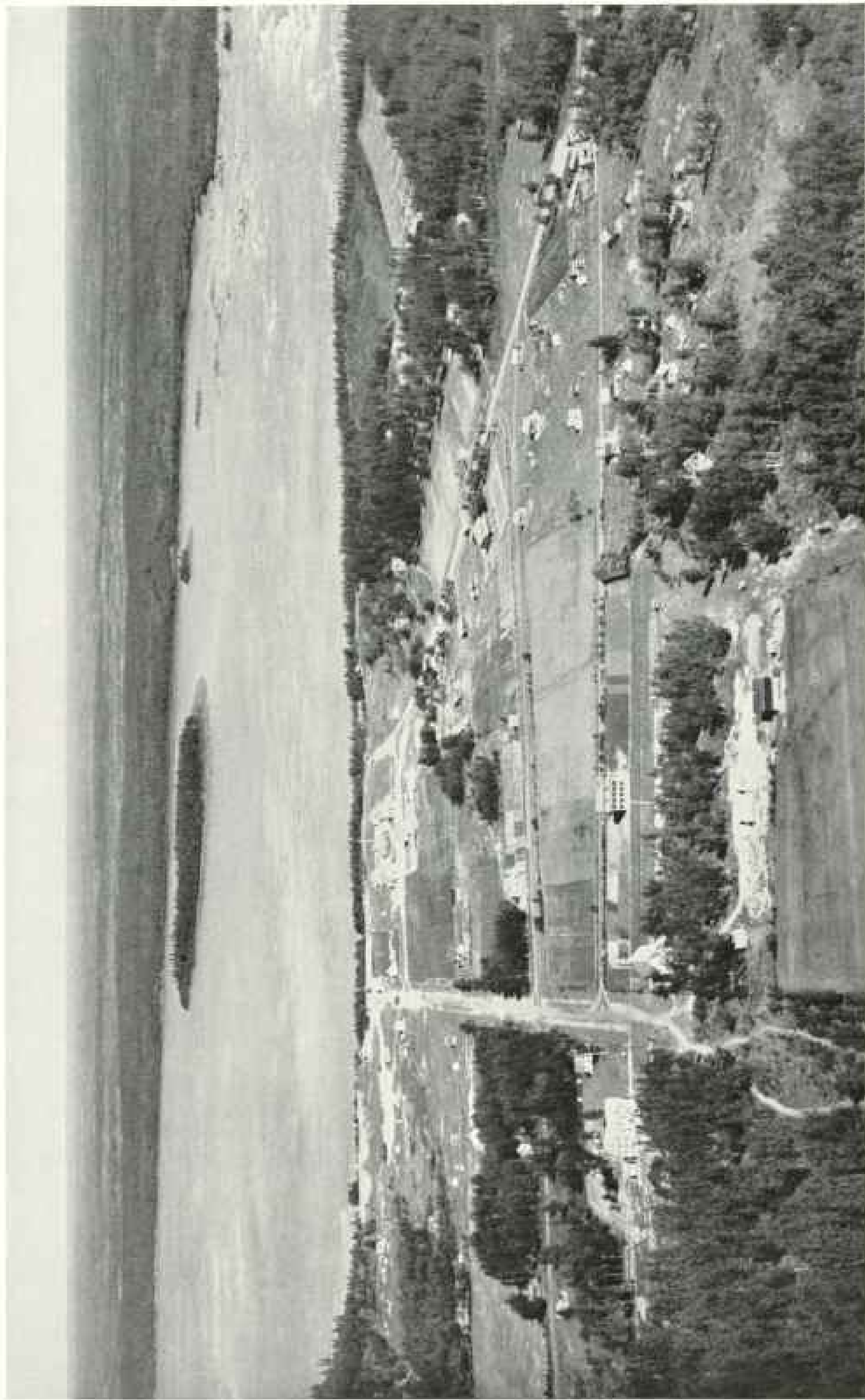
A YORK BOAT SHOOTS THE RAPIDS ON THE ATHABASKA

These 40-foot cargo boats, introduced by Sir George Simpson about 1820, were used mostly on the larger rivers. They usually traveled in brigades; in the earlier days, for safety from hostile Indians. To move a York boat over such a long portage as that on the Slave River was a difficult task. It was pulled over a series of smooth logs.

"There is, perhaps, no country where the ties of affection are more binding than here. Each addresses his comrades as his brothers; and all address themselves to the bourgeois with reverence, as if he were their father."

WHEAT GROWN WHERE DINOSAURS ROAMED

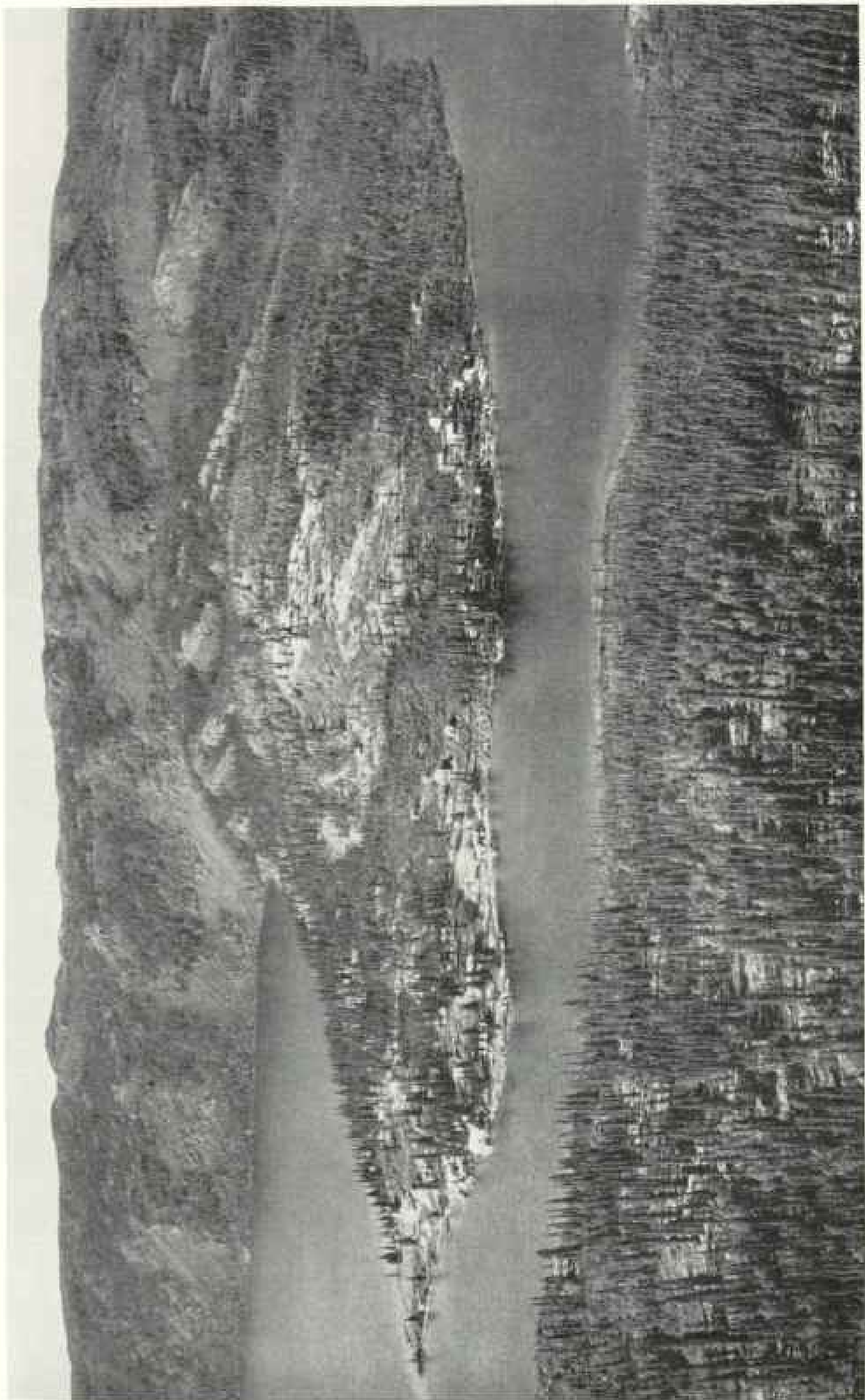
How the world has changed, I thought, as we climbed into the plane and roared away into the North. We followed the Slave River for a few miles, and came to the wide mouth of the Peace. This was where



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FORT SMITH, "CAPITAL OF THE NORTH COUNTRY," IS A TOWN OF MAGNIFICENT DISTANCES

Like Washington, D. C., in its infancy, the administrative center for the vast District of Mackenzie is a place of open spaces, ambitious streets, and few houses. Here lives the District Agent, who is also Superintendent of Wood-Buffalo Park and resident member of the Northwest Territories Council. The town overlooks the Slave River; and the last of the series of rapids between Fort Smith and Fitzgerald is seen at the extreme right (page 758).



© Royal Canadian Air Force

FROM REMOTE MINES IN THE FAR NORTH COME SILVER AND LIFE-SAVING RADIUM

Here at Cameron Bay on Great Bear Lake, about 900 miles north of Edmonton, prospectors arrived by airplane some seven years ago and discovered not only silver but a rich vein of a dark mineral with a pitchlike luster. It was pitchblende, source of that mysterious element, radium, fabulously valuable and used in combating cancer. To-day the settlement is the center of a mining field from which planes laden with pitchblende fly over the wilderness to the railroad at Waterways, and silver is shipped by the long water route up the Mackenzie (page 761).

Alexander Mackenzie turned west on his journey through the Rockies to the Pacific. The Indians who hunted in the valley of the Peace River were known for their independent spirit. They had been there for uncounted generations.

But ages before they came, strange four-footed creatures roamed among the vast swamps that then filled much of this wide valley. A few years ago a Canadian archeologist found in the flat rocky shore of the river the footprints of dinosaurs, running down into what is now the bed of the stream, as sharply defined as if they had been made yesterday.

Today Canadian farmers grow prize wheat where these huge reptiles fed and fought and died.

WHERE WILD BUFFALOES SURVIVE

The Slave River now followed a tortuous course, and most of the time we were cutting across one bend after another. Off to the left is Wood-Buffalo Park, where the last surviving herd of buffaloes in the wild state is found. These are slightly different from the buffalo of the prairies, as a result of their different environment, Wood-Buffalo Park being largely covered with timber.

Several years ago the Canadian Government shipped the surplus animals from the buffalo park at Wainwright, east of Edmonton, to this country west of the Slave River, in the hope that they would be accepted by the local animals and become merged in the herd. The experiment succeeded, and each year a large number are sent north and turned loose in Wood-Buffalo Park (page 760).

The Dominion has set apart a number of reserves and sanctuaries for wild animals in the North Country, under regulations that vary somewhat in stringency. In Wood-Buffalo Park the Chipewyan and Slave Indians, who claimed this as their ancestral hunting-ground, were guaranteed their hunting rights by the Indian Treaty of 1898, and this right has been maintained, of course under reasonable regulation, to prevent unnecessary destruction.

There are also four Preserves: Slave River, on the west side of the river near its mouth; Yellowknife, a very much larger area between Great Slave and Great Bear Lakes; Peel River, on the west side of the Mackenzie above the delta; and Arctic Islands, a gigantic region taking in all the Arctic Archipelago except the lower three-

quarters of Baffin Island, but including a large slice of the mainland from Bathurst Inlet to Foxe Channel. This last preserve is for the benefit of the Eskimos, the other three for different tribes of Indians.

In the various preserves, hunting under regulation is permitted to natives. In none of these protected areas, however, is the white man permitted to hunt.

The Thelon Game Sanctuary, northeast of Great Slave Lake, is a refuge for the few remaining musk oxen, and hunting is entirely forbidden (page 760).

The Reindeer Reserve, east of the Mackenzie delta, is the home of the herd of reindeer brought around from Alaska, after a long and eventful journey. Young Eskimos are being trained in their care, and it is hoped that eventually the animals will become as useful to Canada's northernmost natives as they are to the Eskimos of Alaska and the Lapps of northern Europe (page 762).

Between Fitzgerald and Fort Smith, about halfway down the Slave River, a long portage has to be made by those traveling by water, around a series of dangerous rapids. In the old days of the fur trade goods and furs were carried on the backs of men for 16 miles. Today motor trucks and a good road have substituted efficiency for picturesqueness.

We flew over Fitzgerald and came down at Fort Smith for a brief visit. This is the official headquarters of the Northwest Territories, a neat little town with R. C. M. Police barracks, trading posts of the H. B. C. and Northern Traders, mission schools, churches, and hospital (page 756).

The upper steamers of the Hudson's Bay Company come down only to Fitzgerald. Goods and passengers are transferred to Fort Smith, and loaded or embarked on another steamer for the long voyage down the Mackenzie. All these boats are stern-wheelers.

SAMUEL HEARNE, A DANIEL BOONE OF THE NORTH COUNTRY

As we flew on toward Great Slave Lake, my thoughts turned to that attractive and enterprising explorer, Samuel Hearne, the first white man to travel through the North Country. He was not much more than a youngster when he made his first attempt to reach the Coppermine from Fort Prince of Wales (now Churchill). That was in 1769.

His Indians deserted and he had to turn



© Department of the Interior, Canada

FORT PRINCE OF WALES TOOK 38 YEARS TO BUILD—AND THEN WAS CAPTURED

To protect its posts from the French, the Hudson's Bay Company in 1733 began constructing a fort on a point at the mouth of the Churchill River, on Hudson Bay, site of the modern grain-shipping port of Churchill (page 765). Made of massive blocks of masonry, it was not completed until 1771. It was undermanned, and 11 years later the French admiral, La Pérouse, captured it. At the extreme left is the Canadian explorer, Maj. L. T. Burwash (see page 753).

back. Off he went again, but happened to break his quadrant, and again returned to Fort Prince of Wales. The third time he took with him an experienced Indian chief named Matonabee. Hearne at the outset had a dispute with Matonabee about the composition of the party.

Matonabee wished to take women as well as men. Hearne, in his inexperience, thought this absurd. How could women stand the hardships of such a journey? They would be an impediment and a responsibility.

"Not so," retorted the shrewd Chipe-wyan, with a touch of caustic humor. "Women are indispensable on a long and difficult journey. They do all the work, carry all the burdens, and in times of food scarcity their presence makes little difference, as the mere licking of their fingers when they do the cooking is sufficient for their subsistence."

Hearne, after a difficult journey, finally reached the mouth of the Coppermine. He was disappointed in finding very little copper, and was bitterly distressed because his influence with the Indians was not sufficient to prevent them from a brutal massacre of defenseless Eskimo women and children at a place that has ever since been known as Bloody Falls. A century after Hearne's visit explorers were told the tragic story by Eskimos (page 776).

On his return journey Hearne traveled south from the Coppermine River to Great Slave Lake. Crossing the lake on the ice, he traveled some distance up the Slave River, and then turned to the east, through country that even today is almost entirely unexplored.

We had just flown over the place where he probably turned to the east. He arrived back at Fort Prince of Wales in June, 1772.



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TOWN BUFFALOES COME TO LIVE WITH THEIR COUNTRY COUSINS

Travelers by air or steamer see groups of bison on the west bank of the Slave River. In most cases these are not the shy native wood buffalo, but their sophisticated kinsfolk from the southern plains. The Canadian Government herd at Wainwright, Saskatchewan, increases rapidly, and most of the surplus is sent north to Wood-Buffalo Park (page 758).



© Department of the Interior, Canada

SHOULDER TO SHOULDER, MUSK OXEN FACE THE FOE

When danger threatens they form a circle, with their formidable horned heads toward the enemy and their young inside the ring. Though effective against wolves, this form of defense left them at the mercy of armed man. Indians and Eskimos shot down so many that few remained, and the Canadian Government made the killing of musk oxen a serious offense. Most of the survivors now are protected in the Thelon Game Sanctuary, northeast of Great Slave Lake.

He thus covered on foot, for the first time, an immense triangle, from Hudson Bay to the Coppermine, from the Coppermine to the Slave River, and from the Slave River back to Hudson Bay.

Having crossed the last loop of the Slave, we flew out over the big inland sea, Great Slave Lake, not far from Outpost Island where gold deposits are being developed.

We were flying fairly high, and the surface of the lake far below, disturbed by a slight breeze, looked like frosted silver.

None of the northern lakes, except Great Bear, impresses me so much by its magnitude. We picked up a point on the north shore, turned up the long North Arm, and finally came down beside a rocky little peninsula on which stood Rae, of the Hudson's Bay Company.

It was about as barren a place as you could find anywhere: a few scattered trees, the rest smooth rock. However, there was shelter and food here, and we were to spend the night at the fort.

In the morning we were off north again, to Great Bear Lake. The country was literally filled with lakes, of all sizes and shapes, in every direction, each in its rocky basin. They have a color and attractiveness lacking in lakes and waterways farther south (page 763).

After a time we came in sight of Camsell River, near Hottah Lake, and then dropped down to leave a box of beer at a mining camp. The mechanic got the box out of the cabin safely, but, as he let it down gently on one of the floats, he overbalanced and went backwards into the water.

That might be a mere joke farther south, but the humor evaporates when you plunge into water that never gets much more than a degree above freezing.

GREAT BEAR LAKE IS BIGGER THAN MASSACHUSETTS

Up we went again, sailed over a hill-top, and looked down evergreen slopes to the blue waters of Great Bear. Its coasts, deeply indented, stretched away north and west, and in between lay a limitless expanse of water, far out to the remote horizon.

Great Bear Lake has an area of nearly 12,000 square miles. If it were similarly shaped, Massachusetts could be dropped into the middle of it and still leave plenty of water on every side.

At the west end of Keith Arm are the ruins of Fort Franklin, where Sir John

Franklin wintered, with Back and Richardson, in 1825.

Great Bear Lake is now waking up from its long sleep. The change came in 1929, when the first plane rudely shattered the silence that had brooded over the lake since prehistoric times.

SOURCES OF PRECIOUS RADIUM

From the plane a miner, Gilbert LaBine, examined closely the rocky shore of McTavish Arm, looking for indications of silver. He and another prospector were landed and trudged patiently up and down the hills. Finally LaBine found not only silver but something much more precious, the pitchblende from which radium is extracted (page 757).

A short distance from the point where LaBine's mine, the Eldorado, is situated, a narrow entrance leads to a sheltered little bay. On its shores a town has been growing up, Cameron Bay. It is still a small place, but very much alive, being the center of an important mining district.

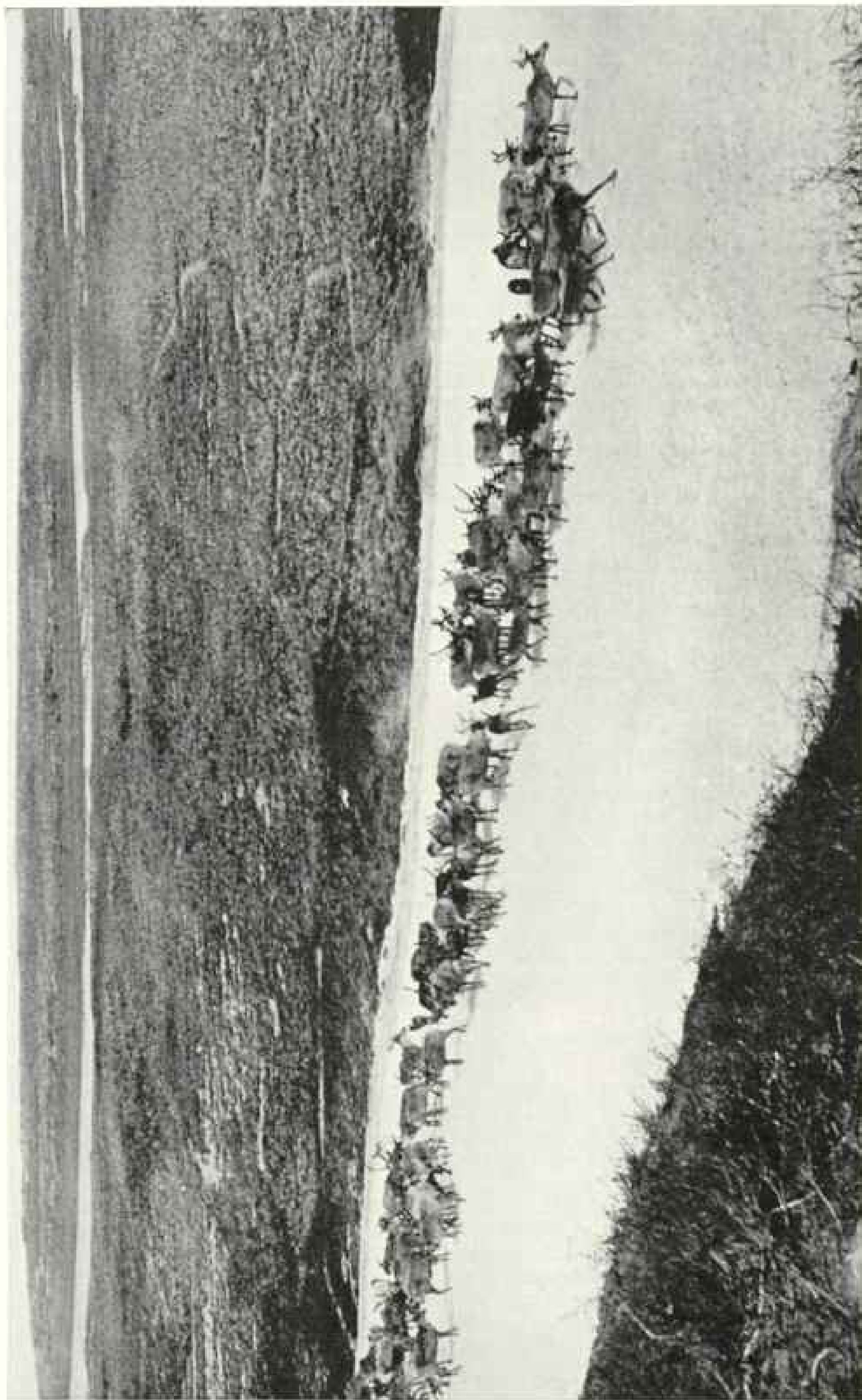
There is a small mill, and one of the first things that struck me when we landed was the size of the timber that was being cut from the surrounding hillsides, sawn into boards, and used to build the town.

One hardly expected to find anything growing on Great Bear Lake, remembering that the Arctic Circle cuts across it. As a matter of fact, the tree line runs diagonally from the southernmost part of Hudson Bay to Great Bear Lake. East of the lake are the Northern Plains, and you will find very few trees of any description between the lake and the shores of Hudson Bay.

As Cameron Bay and its circle of mining camps grow, the time is bound to arrive when it will no longer be possible to rely on wood. What then? Well, the oil wells at Norman, near the mouth of Great Bear River, are already providing gasoline for mine and boat engines on Great Bear Lake, and may later help to cook food and heat houses at Cameron Bay.

Also, a coal seam has been burning on the banks of the lower Mackenzie since it was first reported by Alexander Mackenzie in 1789, and there is a perfectly good waterway between the Mackenzie and Great Bear Lake.

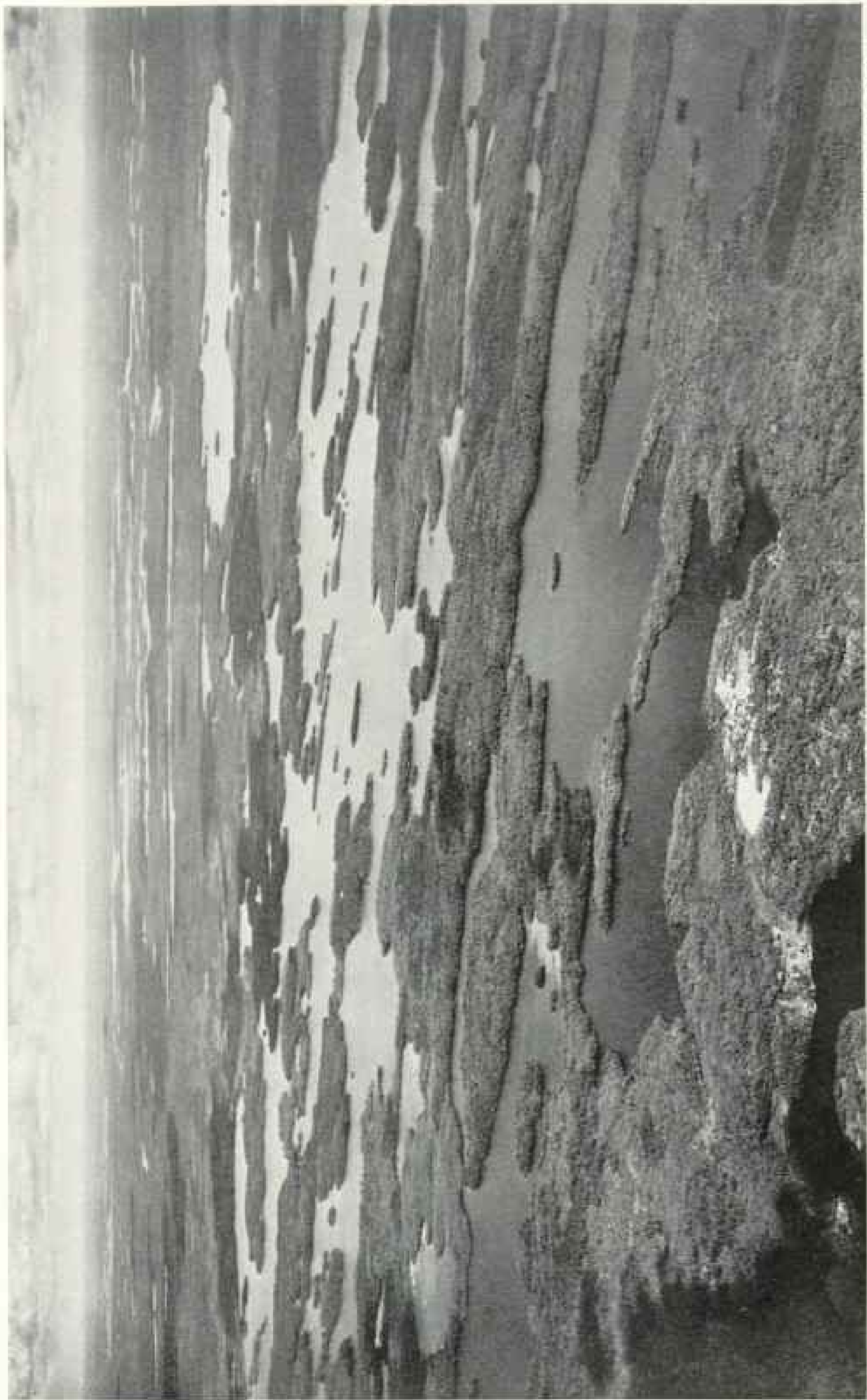
There appears to be silver all around the east and southeast coasts of Great Bear Lake; and there are copper deposits on Hunter Bay.



Photograph by A. E. Purcell

MEAT ON THE MARCH: PART OF A HUGE HERD OF REINDEER NEARING THE END OF A FOUR-YEAR TREK

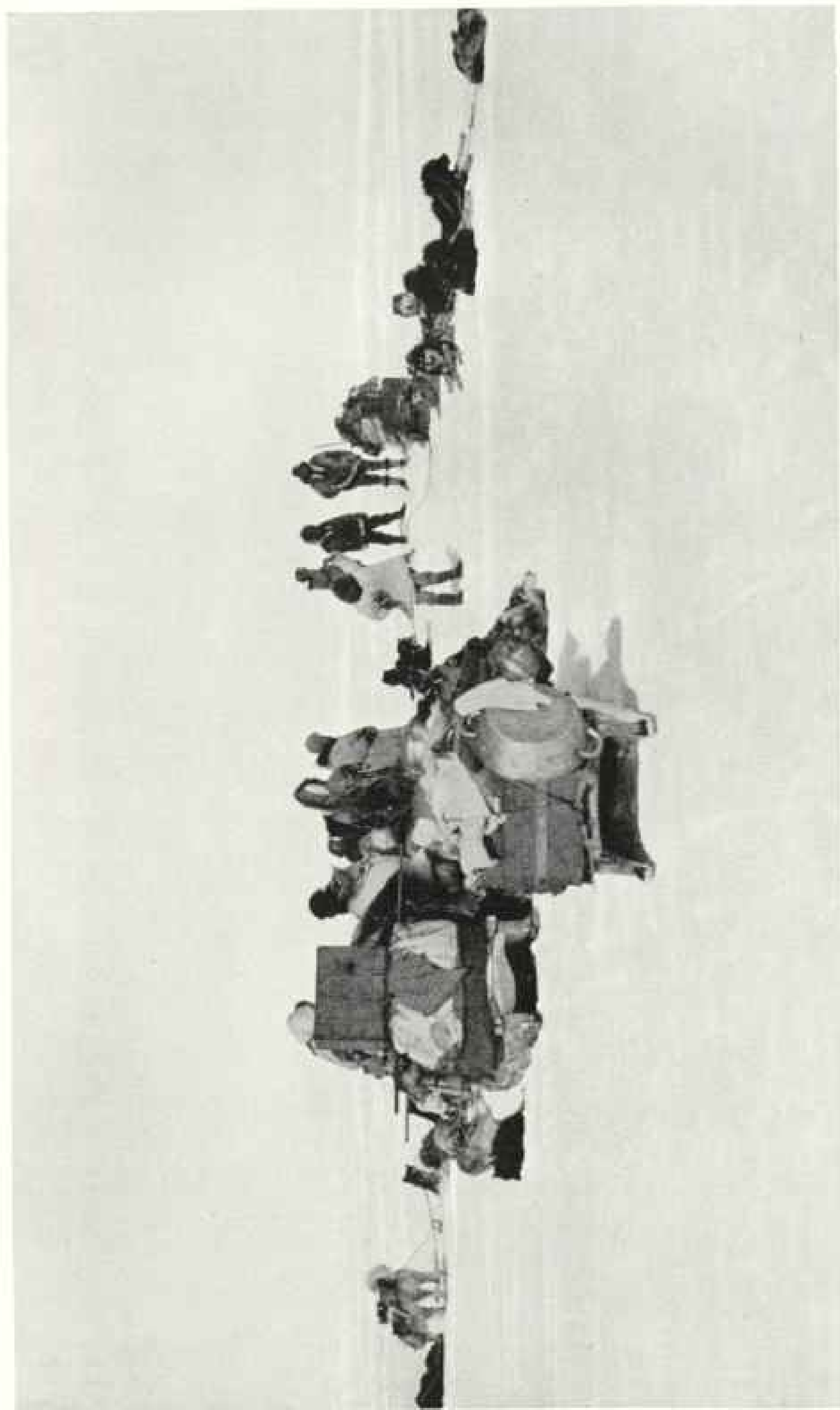
To keep the Eskimos of northern Canada from starving because of the scarcity of caribou, the Canadian Government bought a herd of 3,000 reindeer in Alaska and had them brought overland to a reserve stretching east from the mouth of the Mackenzie. The picture shows some of the animals near Shingle Point, before they crossed the delta of that river. The march of some 1,000 miles began just before Christmas in 1929 and ended in the winter of 1933-34.



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GLACIERS GOUGED THE EARTH AND LEFT A LAND OF COUNTLESS LAKES

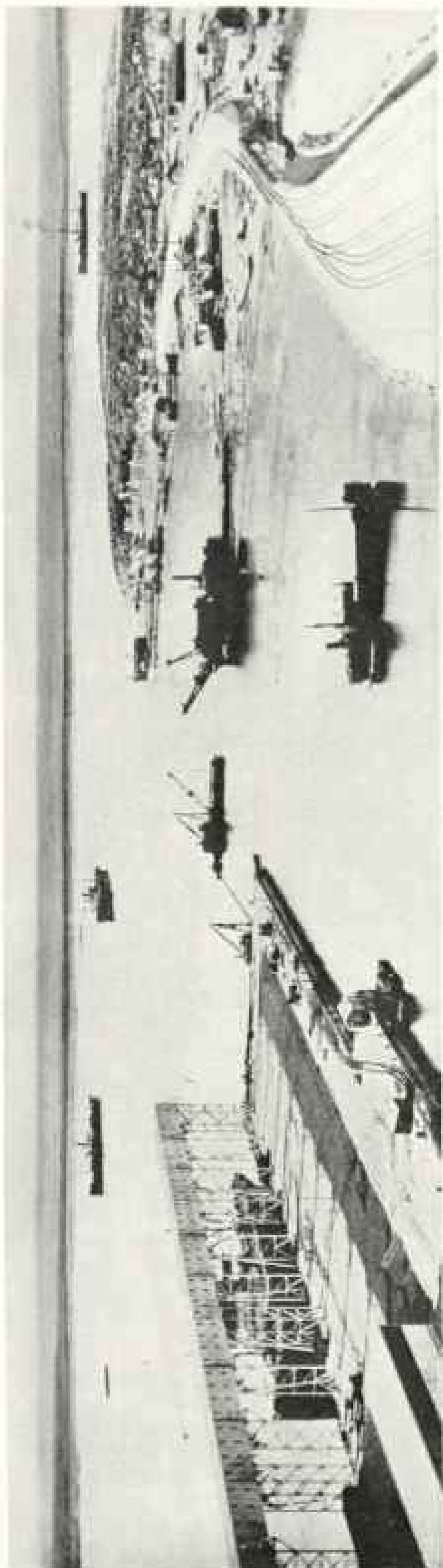
A Dominion Government aerial mapping plane made this oblique view of Sturgeon Lake, west of Lake Nipigon, which is characteristic of much of the country in the far-flung Canadian Shield (page 773). The waterways are clear and blue where they lie in a rocky basin. Great Bear Lake looks like the sea. But Lake Athabasca, fed by rivers that lie off the Shield, is dull gray, particularly at its western end. St. Anthony Gold Mine is in the middle foreground.



© Department of the Interior, Canada

SEA ICE STRETCHES FOR HUNDREDS OF MILES, YET TWO PARTIES OF TRAVELLERS MEET BY CHANCE

Fur-muffled whites and Eskimos greet each other on the frozen surface of Coronation Gull, while weary dogs lie down to rest. Sledges are piled with pots, pans, bedding, and supplies. The Dominion Government has introduced reindeer, but they do not supplant the dog as a means of travel in the Canadian North.



© Canadian Government Motion Picture Bureau

HENRY HUDSON'S DREAM OF RICH TRADE THROUGH THE ICY WATERS HE EXPLORED IS COMING TRUE

His bay serves not as the looked-for passage to the Indies, but as an outlet for Canadian grain. A railroad now runs north to this port of Churchill on Hudson Bay.



© Governor Hudson's Bay Company

AN INDIAN TRAPPER SETS OUT WITH HIS DOGS FROM MOOSE FACTORY, ON JAMES BAY

The period from November to June is the trapper's busy season; during the short summer he spends the profits, if any



Photograph by Anne Burg

ORIENTAL AND INDIAN SQUAW DICKER OVER A PAIR OF MOCCASINS

This enterprising Chinese from Canton runs a restaurant at Chipewyan where Indian women like to go and drink tea. The moccasins for which he is bargaining are made of the skins of moose or caribou.

So far, very little gold has been found on Great Bear Lake.

But what, after all, are copper or silver or even gold, compared with radium? Every circumstance—the minute quantity that is extracted from a ton of pitchblende, its sinister reputation to those who must handle it, its marvelous curative power—combine to lend a peculiar interest to radium, and I eagerly seized an opportunity to go out to the Eldorado Mine.

There is not much to distinguish it from other mines. The original discovery was made by LaBine (page 761) on the top of a bare, rocky point. The pitchblende vein

was traced for some distance, and a tunnel was afterwards driven in from the foot of the hill until it struck the vein.

It was interesting to walk along this tunnel and pick out with a torch the contrasting veins of pitchblende and silver, in a frame of glittering ice, for this rock is permanently frozen.

A concentrator has been built at Eldorado, for both silver and pitchblende. The latter is shipped out by air and rail to works at Port Hope, east of Toronto, which are already supplying radium to Canadian hospitals. The former has been put in a more favorable position by the decision of the United States Treasury to buy newly mined silver from Canada.

Returning to Cameron Bay, I sauntered over to the R. C. M. P. post, where the sergeant in charge was busily engaged putting down a floor in a new building. The Mounted Police are efficient and versatile. They are prepared to turn their hand to any job that needs doing.

"MOUNTIES" ON KAYAKS AND SEAPLANES

The word "Mounted" is becoming inappropriate. These police travel now by various means, from canoe and dog sled to motorboat and airplane. Except for ceremonial purposes, the horse is probably used less than any other type of transport.

When it was recently suggested that the adjective should be dropped, there was an avalanche of indignant protest.

I was reminded that evening, when a hunter came in with caribou meat, that we were not very far from the Northern Plains, and the route followed by immense herds on their seasonal treks. North they go to the coast and to the Arctic islands, and back again to the timber line.

Here at Cameron Bay we lived for the most part on meat laid down in icehouses the previous winter. Occasionally it was not all that it might have been, and I tried to discover why we must eat stale caribou when Great Bear Lake was teeming with trout and herring and whitefish.

No one seemed to know exactly, but a trapper remarked, "Oh, well, caribou's meat, but fish—why, that's only dog feed."

ALONG THE ARCTIC COAST

We roar over the bay, circle like a gigantic bird over the little settlement, and swing into a course a little east of north, bound for the mouth of the Coppermine, last lap of the journey. A range of hills stands across our path; we soar over their summits, and follow the valley of the river to Bloody Falls (p. 776) and on to the H. B. C. post at its mouth.

Franklin and Richardson and Back, Dease and Thomas Simpson, Rae, and other later explorers forced their way along this inhospitable coast until its many peninsulas and bays had been put on the map.

This broad channel before me that washes the northern shores of America saw the final scene in that long search for the Northwest Passage, when Amundsen, in his little *Gjøa*, sailed and drifted through from east to west in 1903-06.

More interesting, perhaps, than the Arctic coast are its human inhabitants. One is immediately struck with the difference between the Eskimo and the Indian tribes. There is a cheerful, smiling friendliness among the former that is in marked contrast to the reserve and gravity of the Indian.

Several Eskimo schooners were at Coppermine, and there are many others plying between here and Aklavik. The Eskimo has a taste for mechanics, and not only learns quickly how to run his gasoline engine, but reveals skill in making repairs.

What is to be the future of the North Country? In spite of the wonderful wheat fields of the Peace River Valley, and the

vegetable gardens one finds at even the far northern posts (I saw magnificent cauliflowers growing in the open at the Eldorado Mine on Great Bear Lake), agriculture can play no important part in that future.

The country will supply a good deal of pulpwood to the mills. Some day fish from Great Bear Lake and caribou from the Northern Plains will be served on Canadian and American tables. The fur trade will continue to prosper for many years.

However, the awakening of the North can come only from the development of its mineral resources. It would be idle to predict that development. We have, however, these facts: At the eastern end of the Canadian Shield have been found, scattered over a wide field, rich deposits of gold, silver, and other minerals. There can be little doubt that, as the country is more carefully examined, other mines will be discovered. It will be a long time before these mineral resources have been completely ascertained.

In the middle section, several promising mines have been located, although only the merest fragment of the immense area has been prospected.

In the western end—and it is to be remembered that most of the continental North Country between Hudson Bay and the Rockies lies on the Canadian Shield—deposits of precious metals have been found at scattered points all the way from Lake Athabaska to Great Bear Lake. If the history of the eastern end of the Shield is repeated in the west, no bounds need be set to the development of northern Canada.

And that development will both depend upon and stimulate air transportation and radio communication.

There is significance in the fact that of the 26,439,000 pounds of freight and express, 1,126,000 pounds of mail, and 177,000 passengers carried by air in the Dominion last year, almost double the 1934 figures, the overwhelming proportion was in northern Canada.

Also will come, following the precedent of northern Ontario, Quebec, and Manitoba, the harnessing of waterpower, of which there is an abundant supply. The first work of this kind will probably be on the Camsell River, to furnish power to various mines in the Great Bear region.

Taking it all in all, one need not be unduly optimistic to predict a notable future for the "Awakening North."



Photograph by Max Sauer, Jr.

TONS OF SUPPLIES GO ASHORE AT A LONELY POST ON BAFFIN ISLAND.

Lake Harbour, on the north side of Hudson Strait, is one of a number of stations maintained all year round in the Arctic Archipelago by the Dominion Government, the northernmost being Craig Harbour, on Ellesmere Island. From these posts the "Mounties" patrol the vast District of Franklin, looking after the welfare of the Eskimo, keeping law and order, and adding to knowledge of the geography, natural history, and resources of the Far North (page 750).

THE SOCIETY'S NEW MAP OF CANADA

THE million member families of the National Geographic Society this month are given opportunity to become better acquainted with Canada, vast next-door neighbor of the United States.*

With its more remote sections mapped more fully than ever before through aerial surveys, the Dominion of Canada, 1936 model, is revealed to members in a ten-color wall map prepared in The Society's Cartographic Section and distributed with the June number of their *GEOGRAPHIC MAGAZINE*.

The new map is the latest in a notable series which has included Europe, Asia, Africa, the World, the North and South Polar regions, the Caribbean area, and the United States. With the United States map and the Caribbean map (which included Mexico, Central America, and the West Indies), the Canada map completes the up-to-date picture of North America.

MILLIONS GO "NEXT DOOR" ON VACATION

Each year a mighty army of motorists from the United States, riding in more than three million automobiles, streams across the unfortified 3,986-mile International Boundary into friendly Canada on vacation. For these The Society's new map, on wall or desk or in a pocket of the car, will provide an accurate and comprehensive guide.

Sportsmen planning a hunting or fishing trip in the forests of Canada; statesmen pondering problems of a St. Lawrence waterway which would enable big Atlantic Ocean ships to steam into the Great Lakes and load in the middle of the continent; students of history, geography, foreign trade—all these and countless others will find innumerable uses for this map.

Among those to whom it should prove especially useful are the 40,656 National Geographic Society members who live in Canada.

The map contains many new details, including the peaks in the St. Elias Range near the Alaskan border, discovered by The Society's 1935 expedition led by Bradford

* Members wishing additional copies of the new Canada Map may obtain them, by writing The National Geographic Society, Washington, D. C., headquarters, at 50 cents, paper (unfolded); 75 cents, mounted on linen.

† See "Flying Around the North Atlantic," by Anne Morrow Lindbergh, *NATIONAL GEOGRAPHIC MAGAZINE*, September, 1934.

Washburn, and named for King George V and Queen Mary in honor of their Silver Jubilee (pages 715 and 733). Canadian Government officials have supplied much valuable information.

Changes in the outlines of northern lakes, Arctic islands, and parts of the Hudson Bay and Baffin Island regions, some already incorporated in The Society's World Map issued last December, are shown here on a larger scale.

These northlands are nesting grounds of many wild fowl often heard flying high and fast over American cities in spring or fall. For long the breeding grounds of the blue goose were a mystery. Then Mr. J. Dewey Soper discovered them on Baffin Island. The place is indicated on the new map by the name he has given it—Blue Goose Prairie.

On this single sheet, a little more than three feet long and two feet wide, are shown in clear, up-to-date detail not only Canada and Newfoundland but also a good-sized portion of Alaska and a broad strip across the United States as far south as Trenton, New Jersey; Chicago; and Fresno, California.

Three insets supplement the main map. The first shows the varied natural resources of northern America, the time zones from Iceland to Asia, and the routes or attainments of the chief northern explorers, from Davis in 1585 to Lindbergh in Greenland in 1933.† Two small insets, covering nearly all of the continent, picture the temperature range, precipitation, and main geological features of Canada, Alaska, and the United States.

BRITISH LION'S SHARE OF CONTINENT

With its 3,848,000 square miles, British North America is larger than the United States and Alaska, or the United States and Mexico combined.

But all this is not Canada. Newfoundland, where John Cabot made his landfall in 1497, is a separate colony of the British Empire, and to it belongs Labrador, a 110,000-square-mile slice of the mainland. As shown on old maps, Newfoundland's Labrador was just a narrow coastal strip, but the 1927 boundary decision defined the line as following the height of land between the Atlantic Ocean and Hudson Bay, thus giving Labrador an area about equal to that of the State of Nevada.



© Department of the Interior, Canada

A MONUMENT TO ARCTIC HEROES STANDS ON BARREN BEECHY ISLAND

The Franklin Cenotaph, erected by Captain (afterwards Sir) Francis Leopold McClintock in 1858, honors the ill-fated expedition led by Sir John Franklin nearly a century ago in quest of the Northwest Passage. After his ships were locked in the ice, he attempted to lead his men to the nearest trading post on the mainland, but all perished. Expedition after expedition was sent out in search of them, largely because Lady Franklin would not abandon hope.

"In all the north coast I did not see a cartload of good earth," wrote Jacques Cartier four hundred years ago in reporting on his Labrador explorations.

Even to-day that rocky land supports a permanent population of only a few thousand souls, many of them Eskimos, but off its rugged shores in summer hardy Newfoundlanders reap a harvest of cod. Because of the value of its fishing grounds and its furs they clung to Labrador from the first.

HOW CANADA GOT ITS NAME

Just south of Newfoundland are the small islands of Miquelon and St. Pierre, the only possessions of France that remain of her once huge holdings in northern America.

French explorers seeking furs and empire, and priests seeking converts, made their way up the St. Lawrence, through the Great Lakes, and down the Mississippi. By river and lake and portage traveled the voyageurs, song on lips and paddle swinging in calloused hands.

Many a place name on the Canadian map, particularly in the habitant country of Quebec, recalls the important part played by Frenchmen in settling this land; and the thousands of French-Canadian citizens form a valuable element in the life of the Dominion.

When Cartier sailed up the St. Lawrence and negotiated with the "wild men" on its banks, one of the first Huron words that he learned was "kanáda," meaning village or settlement. The explorer must have liked the sound of the word. He applied it to the region around the Indian village which stood on the site of present-day Quebec.

RICH IN RAW MATERIALS

Today this village or settlement, this "kanada" or Canada, has expanded into a Dominion of 3,695,000 square miles. With its feet on the Great Lakes and its head far up toward the North Pole, it covers an area larger than all the 48 States of the Union. If laid out on Europe, it would extend from Rome to Franz Josef Land and pretty well hide the entire Continent.



Photograph by Anna Burg

STEAMERS PLOW WHERE MACKENZIE'S INDIAN CANOES ONCE SKIMMED THE RIPPLES

A stern-wheeler pushing a freight barge churns away from Chipewyan on Lake Athabaska, whence the Scottish fur trader set out to explore the river that now bears his name (page 733). This steamer, flying the historic flag of the Hudson's Bay Company, is operated between McMurray on the Athabaska and Fitzgerald on the Slave.

"A patch of snow inhabited by barbarians, bears, and beavers"—this was Voltaire's unflattering definition of Canada two centuries ago. He should spend a day dodging the teeming traffic of Toronto, or watch the enormous grain elevators at Vancouver or Montreal pouring millions of bushels of wheat from western prairies into the holds of ocean steamers for shipment to the hungry harbors of the world.

Canada, a young country like the United States, has yet to discover and develop the full extent of her wealth. Yet the inset map showing natural resources reveals a remarkable variety of products, ranging from furs and fish—the magnets which drew the earliest adventurers to these shores—to the minerals so much in demand in this age of machines.

Particularly important are her nickel and asbestos, in both of which Canada stands first in world production; her gold and silver, and her extensive reserves of coal.

Most of the nickel comes from the Sudbury district in southeastern Ontario, where the ore-bearing rocks lie in the form of a huge ellipse 63 miles long.

Rich veins around Thetford Mines, a French-Canadian town on the main highway about 50 miles south of Quebec, yield a major share of the world's supply of asbestos, that miraculous mineral which looks like spun glass, feels smooth as silk, and can be woven into cloth that even a blowtorch will not burn. Nowadays it is in demand for automobile brake linings.

But perhaps the closest of all commercial links between Canada and the United States is paper.

TODAY'S NEWS AND CANADA'S TREES

To feed the insatiable presses of America and Europe, whole forests of Canadian trees are ground into pulp with the aid of the Dominion's abundant water power or reduced to the cellulose state by the use of chemicals, and then are transformed into the one-ton cylinders of newsprint that become your daily newspaper—today's news on the transmuted bodies of forest trees!

Within the borders of Canada are some of the busiest cities of the earth and some of its most productive farming land, as well as one of the world's most sparsely settled



Photograph by L. T. Burwash

BAKER LAKE'S CITIZENS TAKE A SUN BATH IN THE SNOW

They are standing on the snowy roof of the Hudson's Bay Company store at that out-of-the-way corner of the Dominion which Anne Morrow Lindbergh, in "North to the Orient," described as "three or four white houses" on the bleak shores of "a gray glassy lake."



© Department of the Interior, Canada

"PLENTY FISH," SAYS CHINNING KUMAIK, AND ALL'S WELL WITH THE WORLD

The Eskimo is a cheerful and ingenious soul. He makes effective use of the limited materials Nature provides and shows a talent for adapting to his needs the mechanical devices of the white man. Many Eskimos nowadays dash over the water with outboard motors on their boats.



Photograph from Publishers' Photo Service

NON-ESKIMO PIE PROMOTES GOOD HUMOR!

These beaming boys of Baffin Island leave no doubt of their enjoyment of the novel delicacy given them by an agent of the Hudson's Bay Company. From numerous trading posts in the Arctic, the historic company supplies the Eskimo with hunting equipment, clothing, gasoline for his boat, and food luxuries to supplement his native resources. These commodities are exchanged for furs, particularly those of the beautiful Arctic fox.

areas, the region "north of 56," where even Daniel Boone, who liked his neighbors at least twenty miles away, would find plenty of elbowroom.

What a contrast there is between southern Canada, sown with cities and netted with roads and railways, and the immense open spaces of the North!

Up there the red lines that indicate highways peter out. Gone are the thin black lines of the railways. The pulse of man's power over Nature beats but feebly in this northern land, blue-veined with countless rivers and lakes.

Canada's entire population of 10,376,786 is considerably less than the number of people in New York State alone.

Of this total nearly half live in the southern point of Ontario and Quebec below the 46-degree parallel; some 45 percent of Canada's total population is concentrated on about 2 percent of its area.

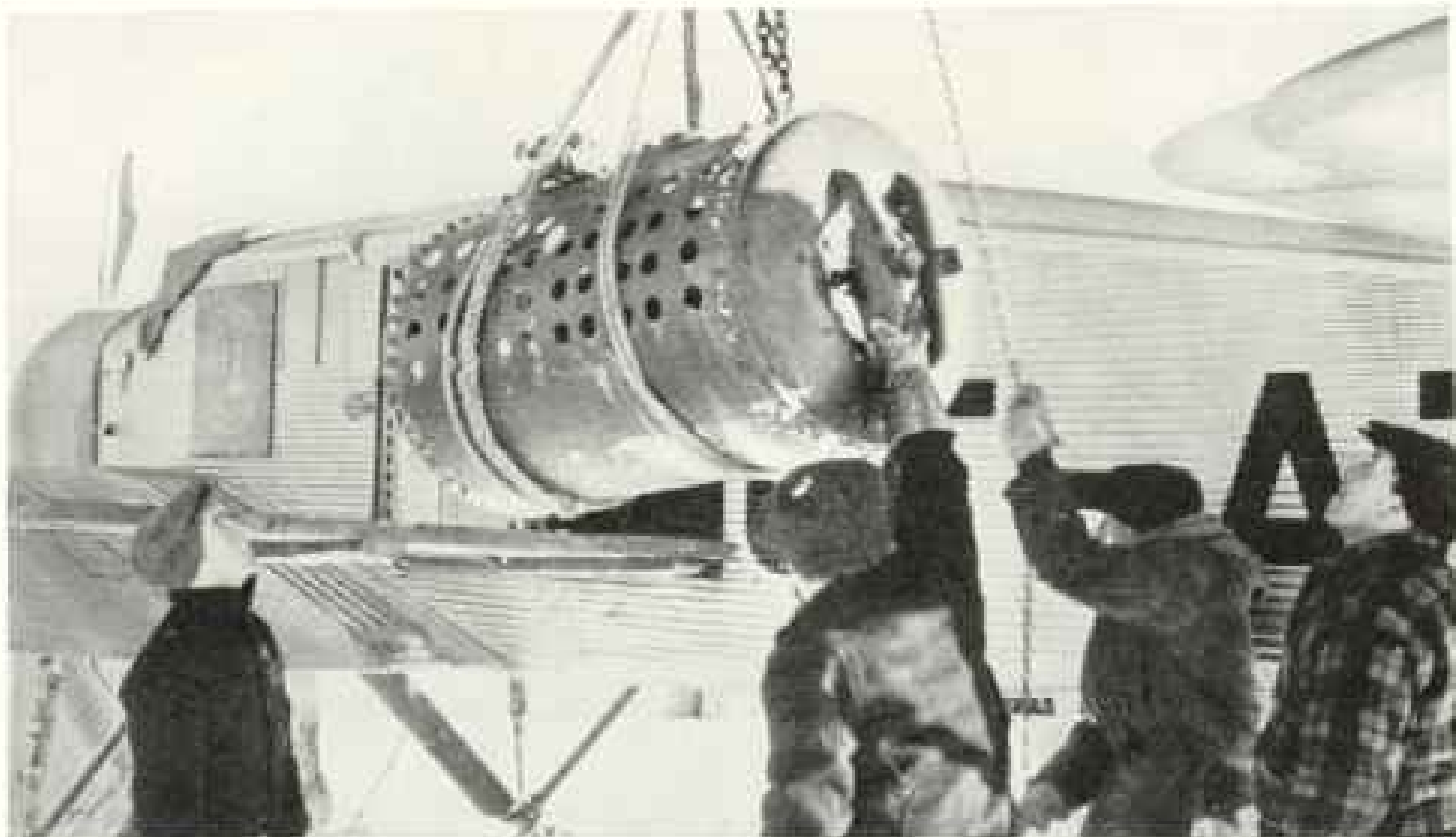
In the whole 1,517,000 square miles of the Yukon and Northwest Territories, by contrast, there are only 13,953 inhabitants, most of them Indians and Eskimos.

A glance at the small inset of Natural Regions on the new map shows that in many respects Canada and the United States are similar. The Appalachian Highland extends north, ending in the rocky hills of the Maritime Provinces. The Pacific Highland runs up through British Columbia, the Yukon, and on into Alaska. The Great Interior Plain, which supplies so much of the agricultural wealth of the United States, continues north across the boundary and on to the Arctic Ocean.

CANADIAN SHIELD LONG HELD MAN AT BAY

But there is one decided difference. In the shape of an enormous crescent almost two million square miles in area, the great Laurentian Upland, or Canadian Shield, swings down from the North and covers nearly half of Canada.

It seems to hold huge Hudson Bay in the hollow of its hand. Its outer curve, starting at Franklin Bay on the Arctic Ocean, runs south and east through Great Bear, Great Slave, and Winnipeg Lakes, and crosses the United States Border in



EVEN A 950-POUND BOILER TRAVELS BY AIR

In the roadless North, all manner of freight and express moves by plane. Six of these heavy units were flown to Chibougamau Lake, 250 miles northwest of Quebec. Mr. Burpee (page 749) traveled most of the way to Great Bear Lake sitting on a bag of onions. Canadian Airways and other transportation companies carry to and from the North everything from sledge dogs and white fox skins to tractors, pianos, radio sets, sausages, live pigs, and ice cream. More than twenty-six million pounds of freight and express were conveyed by air in Canada last year (page 767).



Photographs by Canadian Airways Limited

AIR TRANSPORT OFTEN SAVES LIVES IN THE NORTH

This man with a badly crushed foot was flown to the hospital at Noranda, a northern mining town, by aerial ambulance in a few minutes, instead of the weeks it would have taken to make the trip by old ways of land and water travel. The center figure is J. H. Lymburner, second pilot for the Lincoln Ellsworth Antarctic Expedition.

northern Wisconsin and Minnesota. It then skirts the northern shores of the Great Lakes and the St. Lawrence Lowlands and swings northward again beyond the Gulf of St. Lawrence.

All of Labrador falls under its domain, and all of Quebec, Ontario, and the District of Keewatin, except the narrow plains along the St. Lawrence River and around the southwestern shore of Hudson Bay. It takes up over half of Manitoba, about one-third of Saskatchewan, the northeast corner of Alberta, and three-fifths of the District of Mackenzie.

The Canadian Shield, formed of very old and resistant granite and gneiss, might be called the breastbone of the continent. Its ancient rocks have been swept clean of soil and newer rock deposits by the scouring of the glaciers which covered it only a few thousand years ago.

The region as a whole is comparatively level and about 1,500 feet above the sea, but it is scattered with piles of rocky deposit which rise to one or two hundred feet above the general plain. Along the Atlantic coast, in Labrador and Baffin Island, the Shield has been tilted up and sheer cliffs of one or two thousand feet tower above the sea. Some peaks in this ridge ascend to five or six thousand feet.



Photograph by Bradford Washburn

CANADA'S MANY LAKES AFFORD IDEAL LANDING "FIELDS"

Dogs, as well as the men, sledges, and supplies, were crowded into this plane for the trips to and from the areas explored by the National Geographic Society Yukon Expedition (page 715). The plane floats on Bates Lake, in the St. Elias region.

In places the glaciers have left strips of finely ground rock flour. These clay belts are extremely fertile, but it is estimated that only about five percent of the Shield is suitable for agriculture.

Canadians long were baffled by this spacious tract of rocky forest which barred their way to the fertile western plains. But by 1885 the Canadian Pacific had spanned all barriers, and eastern and western Canada were finally connected.

Now the Canadian people are looking on the Shield with a far different feeling. The Natural Resources inset shows that gold,



© Royal Canadian Air Force

BLOODY FALLS OWES ITS NAME TO A MASSACRE

Here in July, 1771, the explorer, Samuel Hearne—lone white man in a party of Indians—watched helplessly the slaughter of Eskimo women and children by the Chipewyans who accompanied him (page 739). One hundred and thirty years afterward, when David T. Hanbury visited the mouth of the Coppermine, the story still was told by the Eskimos.

silver, copper, lead, tin, nickel, iron, and many other valuable minerals are being extensively mined among its rocks.

Glacial action has served to expose the hidden stores of mineral wealth by planing down the ancient rocks. Mines in the Shield in northern Ontario produce the bulk of the Dominion's gold, having long ago surpassed the placer fields on the Klondike and Yukon which drew frenzied thousands at the turn of the century.

Most of the Shield is covered with valuable forests, which supply much of Canada's annual wood harvest.

Glaciation left its surface pockmarked with innumerable lakes, which, in overflowing from one to another and feeding the many rivers, supply a tremendous amount of Canada's water power—estimated at about 43,700,000 horsepower—of which at present only a very small percentage is in use.

Notice of change of address of your NATIONAL GEOGRAPHIC MAGAZINE should be received in the offices of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your August number, The Society should be notified of your new address not later than July first.

WEST POINT AND THE GRAY-CLAD CORPS

BY LIEUT. COL. HERMAN BEUKEMA, U. S. A.

“THE importance of this post is so great as justly to have been considered the key of America.”

So wrote George Washington about West Point 153 years ago. He referred, of course, to its strategic value as the Gibraltar of the Hudson, the fortress which prevented the British from splitting the Colonies in two along the line of the river and then destroying the halves, one at a time.

Gone today is West Point's high strategic importance. Other posts have displaced it as military “keys of America.”

Yet in another sense West Point still is vital to the Nation, for from the halls of the United States Military Academy there come the men who direct the Army in peace and war.

Lay a straightedge on your map, passing through Albany and New York City, and you will have marked the general course of the Hudson River. Yet, about fifty miles north of New York, there is a small double bend, a scant quarter-mile diversion from the north-south line. On the inner or western side of that bend lies the town of West Point.

The visitor today sees relics of the Revolutionary defenses all about him. From water-line to the craggy summits of guardian peaks, the crumbling parapets of earth and moss-covered stone tell their story.

At Trophy Point on the grounds of the Academy hangs a part of the huge chain, with links more than two feet long, which was stretched across the river to trap British men-o'-war under the guns of the forts (Color Plate VI).

WASHINGTON SAW NEED FOR ACADEMY

But Washington saw in West Point something more than a fortress. He knew that America's future armies must be built around a nucleus of trained officers. On his recommendation in 1793 Congress created the grade of cadet and assigned the new men to an engineer unit stationed at West Point.

Here was the germ of the present United States Military Academy, but no more than that. The real birth of the Academy came in 1802 when Congress instituted the Corps of Engineers and made its chief the Superintendent of the Military Academy.

Later the Academy was allowed to lan-

guish, but in the disasters of the War of 1812 the Nation learned one lesson it has not forgotten. Congress made atonement in 1816 by reopening the Academy on a greatly increased scale.

To the West Pointer, Major Sylvanus Thayer will always be the “Father of the Military Academy.”

As Superintendent from 1817 to 1833, Major—later General—Thayer established a program based on stern discipline and a rigid code of personal and group integrity—the Corps honor system of today.

The honor system could be established and can be maintained only because of the full acceptance of a high ideal by the Corps of Cadets. Discipline can be enforced by a superior upon his subordinates; integrity is a bond uniting equals.

In the century since Major Thayer's régime, wars have caused their flurries from time to time. During the World War, classes were graduated so rapidly that at one time the four-year course had been reduced to a year or less.

WEST POINT ON PAGE AND SCREEN

The United States Military Academy is better known to the American public now than at any previous time in its history. The motion-picture camera, the writers of history and fiction, all play their part in telling its story, sometimes with rather amusing results.

Flirtation Walk, the mile and a half of romantic pathway winding down the cliffs to the river, was to figure importantly in one picture largely filmed on the Academy grounds, and an officer asked when the cameramen were going to shoot those scenes.

“Oh, we're not going to use your Flirtation Walk,” was the reply. “We can build a much better one in Hollywood.”

A youth may obtain appointment to West Point through his Senator or Representative, many of whom hold competitive examinations; or he may enlist in the Regular Army or National Guard, and after one year's service qualify by high standing in a stringent examination.

There are special quotas of appointments for Puerto Rico, the District of Columbia, the Territories, the President and the Vice President; also a quota for honor graduates of picked military schools.

Last year Congress authorized additional appointments which will increase the total potential enrollment from 1,374 to 1,960.

The cadet gets his education at the expense of the Government. His pay is \$780 per year and one ration per day, equivalent to 80 cents. From that income he purchases his uniform, books, and supplies, pays his board, and meets all other expenses. Actually, he sees no money except when he goes on leave; the Treasurer keeps his accounts and sets aside \$14 per month for purchase of an officer's uniform and equipment on graduation.

"YOU'RE IN THE ARMY NOW"

The first day in a new cadet's life is an experience never to be forgotten. The plebe has scarcely dropped his luggage in his room in barracks when an upper-classman confronts him.

"Mister, you came here to be a soldier. Your slouching days are over."

And in five busy minutes he learns the "position of the soldier at attention."

In 1935 one late arrival, a 210-pound athlete, was greeted in the usual manner by a "runt" corporal. Goliath took the corrections for a moment, then dropped his shoulders and remarked:

"Let's get this straight. Is there anything personal about all this? If there is, I'm going to take you to a quiet spot and spank you."

Somewhat perturbed, the little corporal hastened to say that all this was merely the system. "Lee and Grant and Pershing took it; so can you."

"All right, let's go," rejoined the plebe, throwing his shoulders back.

Whatever the mental turmoil of the neophyte in these first strenuous hours, he gets a grip on himself when, assembled in formation with his classmates late that afternoon, he raises his right hand and takes his oath of allegiance to flag and country. That moment he belongs. He is one of the long gray line of men united by a common faith and ideal.

His first Sunday in chapel brings him nearer to the substance and core of that ideal. He finds it in the words of the Cadet Prayer:

" . . . Make us to choose the harder right instead of the easier wrong, and never to be content with a half truth when the whole can be won. Endow us with courage that is born of loyalty to all that is noble

and worthy, that scorns to compromise vice and injustice and knows no fear when right and truth are in jeopardy. . . ."

"Help us, in our work and in our play, to keep ourselves physically strong, mentally awake, and morally straight, that we may the better maintain the honor of the Corps untarnished and unsullied, and acquit ourselves like men in our effort to realize the ideals of West Point in doing our duty to Thee and to our Country. . . ."

He finds it, too, when hundreds of gray-clad cadets rise to sing the words of "The Corps," which begins:

The Corps! Bareheaded salute it,
With eyes up, thanking our God
That we of the Corps are treading—
Where they of the Corps have trod—
They are here in ghostly assemblage,
The men of the Corps long dead,
And our hearts are standing attention
While we wait for their passing tread.

It is this new-born pride in a common ideal which carries the fourth-classman through the long first summer of practical work and drills. He tells himself, "I'm as good a man as this upper-classman who is always riding me about my slouch, and I'll prove it." And he does.

PRIDE BUT NO EGO ALLOWED

But never is his ego allowed to get out of bounds. Any moment an upper-classman may stop him, order him to attention, and inquire, "What do plebes rank?" And woe to the plebe who does not know the answer:

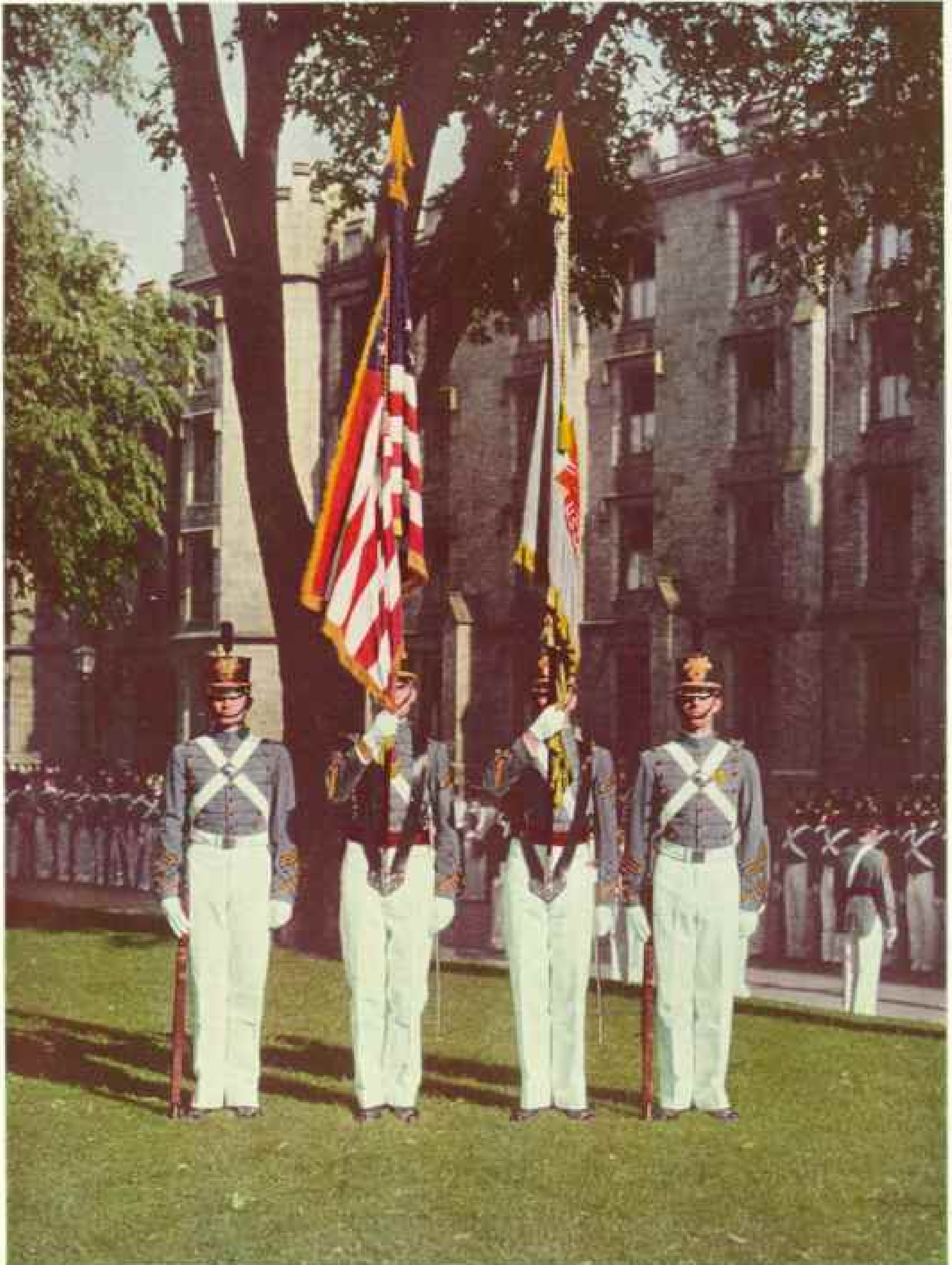
"Sir, the Superintendent's dog, the Commandant's cat, the waiters in the Mess Hall, the hell cats, and all the Admirals in the whole blamed Navy."

The plebe finds he is learning an entirely new language—West Point slang.

A cigarette is a "skag" (and cadets may not smoke in public). A dance, of course, is a "hop." A young lady is a "femme" or "fem," or, if escorted by a cadet, a "drag," (though he is not allowed to walk arm in arm with a girl). Or she may be the OAO—the One and Only.

A "fried egg" is the U. S. Military Academy insignia worn on the full-dress hat equipped with "feather-duster" (Color Plate I). The "F. D. coat" is the full-dress coat "sporting 44 brass buttons and an iron collar." Cake, candy, ice cream, and other illicit eatables are "boodle." "Hell cats" are the enlisted buglers and drummers whose noise awakens the Corps at 5:50 a. m., long before the wintry dawn.

WEST POINT, MOTHER OF ARMY MEN



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Finlay Photograph by Edwin L. Wisberg

WEST POINTERS HOIST THE COLORS SMARTLY TO THE CARRY

Old Glory marches side by side with the Academy banner. At the command "Order Colors," each bearer removes the staff butt from the belt socket and rests it on the ground near the right toe. These men won positions in the Color Guard because of their height, neatness, and military bearing. In gusty winds they find the flags hard to manage. The same group officiates throughout the academic year. Cadets in full dress line up beyond, before Central Barracks, for Sunday parade.



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THIS BOY IN BRONZE CAME FROM FRANCE

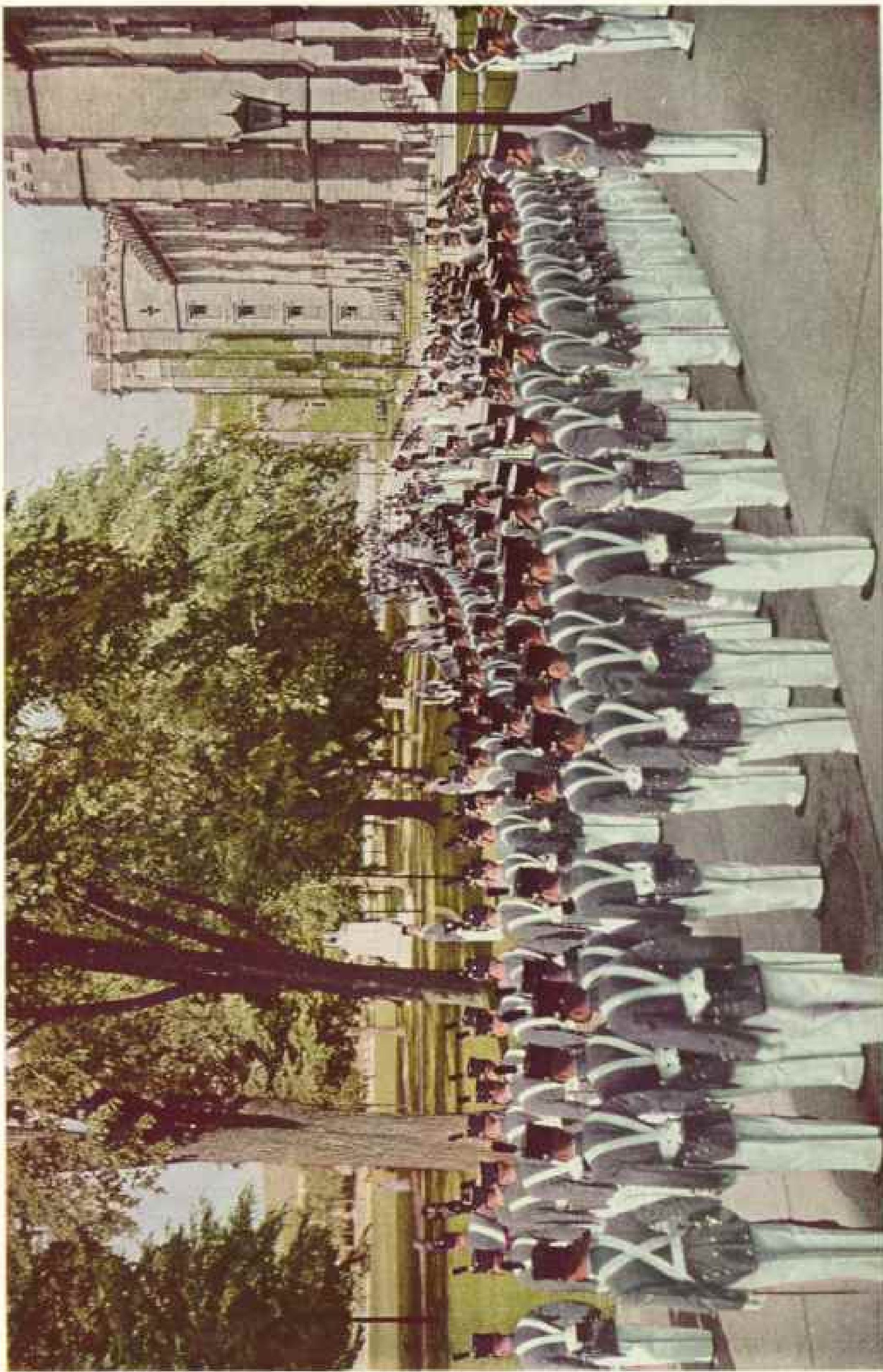
Cadets of L'Ecole Polytechnique, Paris, gave the copy of the statue at their school to the Academy. West Pointers sometimes bombard it with French textbooks after completing the two-year language study.



Finlay Photographs by Edwin L. Wisberd

"LOOK, HE WEARS A RED SASH AND A PLUME!"

Only commissioned officers carry plumes; all other cadets have a pompon (right). Three chevrons on the arm indicate the wearer is a lieutenant. Dress Parade will soon begin on the grassy grounds beyond.

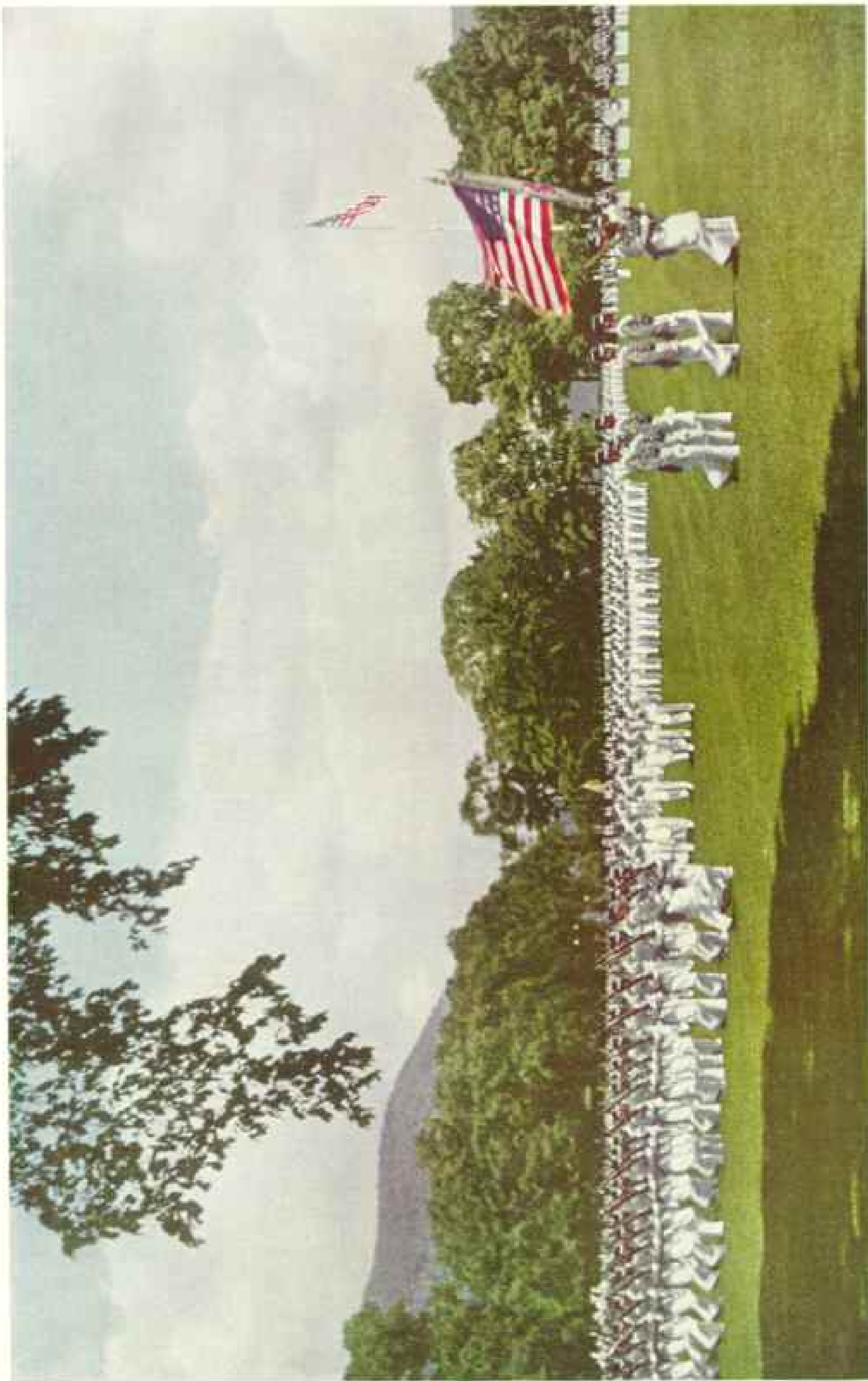


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"FALL, IN!" SHOUT THE FIRST SERGEANTS, AND THE CADETS QUICKLY LINE UP FOR PARADE

Finlay Photograph by Edwin L. Wisberd

They drill every day in summer, but follow a less rigid program in winter. Handed down from Revolutionary days, the cadet uniform has changed little since the Academy was organized in 1802. Gleaming crossbelts hold cartridge boxes, and waistbelts support bayonets. During Dress Parade, men in the ranks carry rifles and bayonets. Cadet officers and sergeants carry swords. Leafy elms half hide the French monument beyond (see Plate II).



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Friday Photograph by Edwin L. Wisbird

THE "PLAIN" BRISTLES WITH MARCHING MEN AS THE CORPS OF CADETS PASSES IN REVIEW

Row on row, nearly 1,300 strong they come. The twelve companies first assemble in front of their barracks, and when "Adjutants' Call" sounds, they march to the field. At the conclusion of the parade, the band plays "To the Colors," and the retreat gun booms out. Then the musicians strike up in last tempo "The Star-Spangled Banner" while the Stars and Stripes are being lowered. The sloping hill beyond has been called "Crow's Nest" since Revolutionary times.

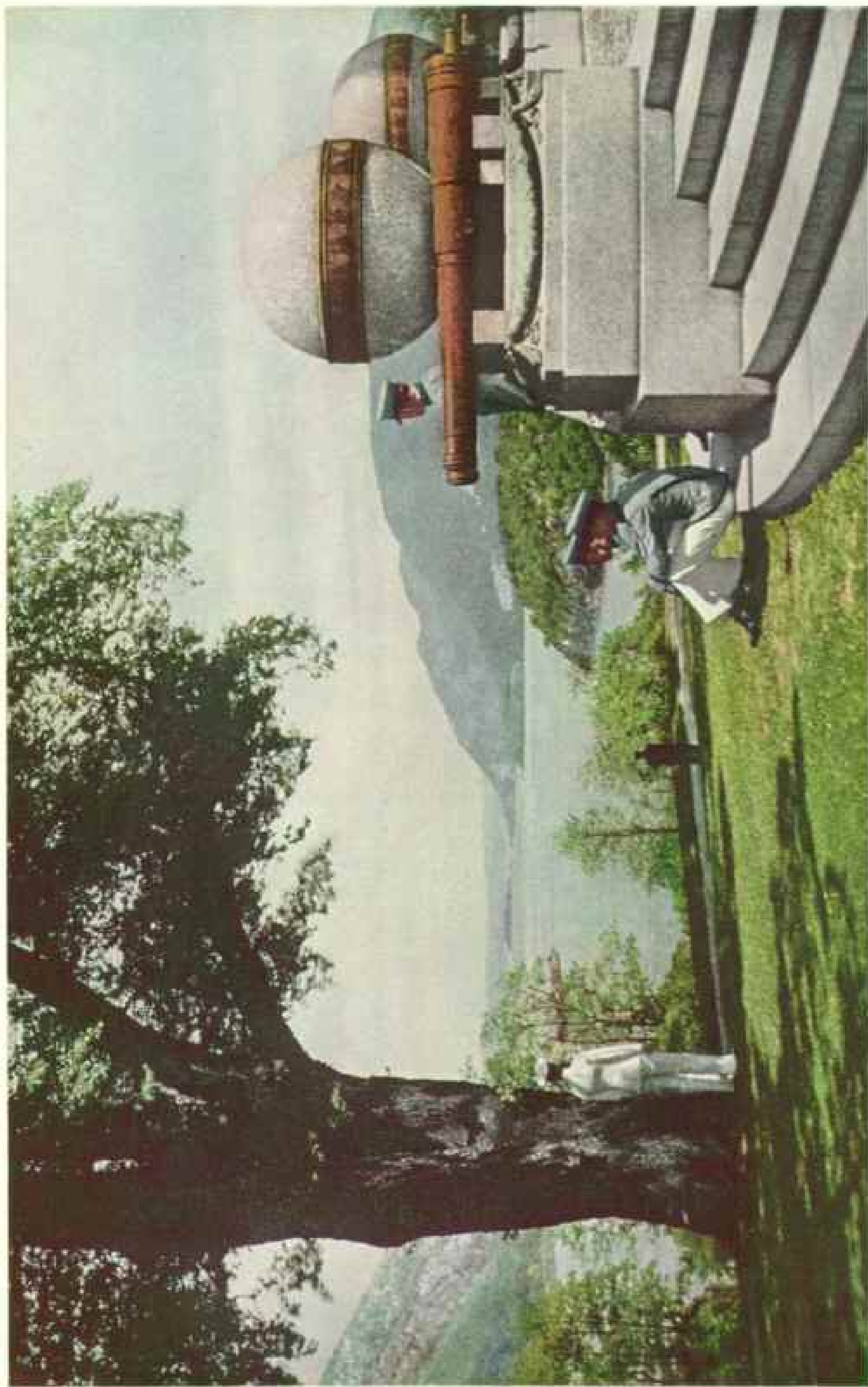


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Finlay Photograph by Edwin L. Wisheart

AT BATTLE MONUMENT, PRESIDENT WILSON'S SECRETARY OF WAR, NEWTON D. BAKER, AWARDS DIPLOMAS TO THE GRADUATING CLASS

Cadets receive their sheepskins in the order of their four-year scholastic records, but the last man invariably gets the liveliest applause. Some return to civil life, but most of them follow careers in the seven branches of the Army Service. Arranged crisscross atop the shelter are the scarlet colors of the Secretary of War and the gray flag of the Corps of Cadets. Beyond the monument is Trophy Point, a corner of the parade ground where war relics are preserved.



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Enslay Photograph by Edwin L. Wieberd

PERCHED ON A ROCKY PROMONTORY 50 MILES ABOVE NEW YORK, WEST POINT WAS ONCE A WATCHDOG FOR THE HUDSON

Its need was apparent in 1777 when British forces pushed north from New York City and seized Fort Clinton, near West Point, and Fort Montgomery, five miles down the river. To block hostile ships, Americans stretched a mighty chain, each link weighing 100 to 130 pounds, across the channel to Constitution Island, beyond the seated cadets. Had the British broken through and united with their troops coming down from the St. Lawrence, they would have split the Colonies in two. The man beneath the elm tree wears the white summer uniform.

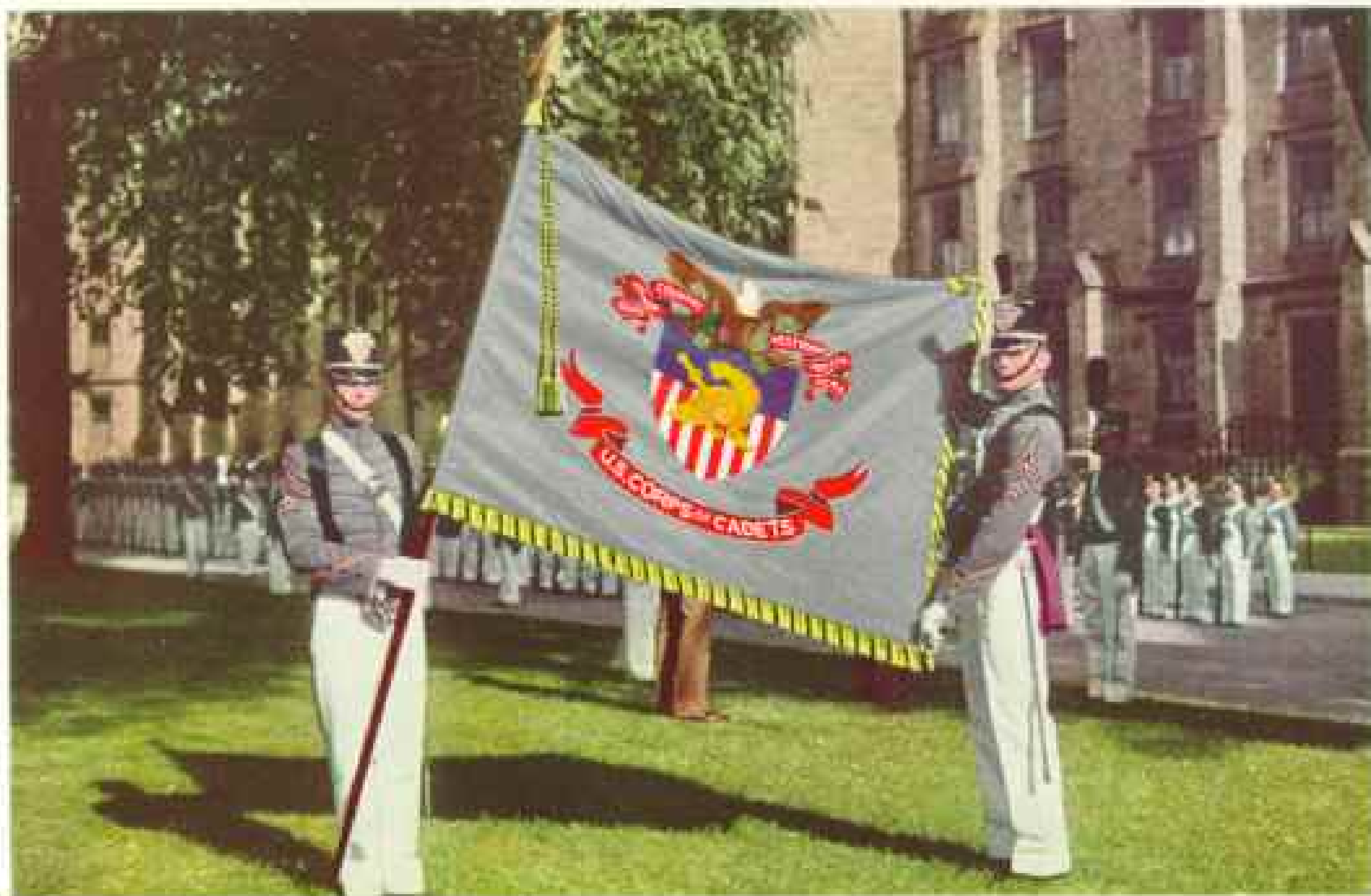


Friday Photograph by Edwin L. Withard

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OFFICERS, CADETS, AND WOMEN FRIENDS BASK ON THE "BEACH" OF DELAFIELD SWIMMING POND ON SUMMER AFTERNOONS

Swimming is compulsory at the Academy, and each cadet must qualify in difficult tests. During the summer, the First, or Senior Class, usually makes a tour of two or three regular Army posts to observe peace-time activities, and the Second, or Junior Class, goes home for a ten-week furlough. The two lower classes remain at "the Point" and follow a rigid training schedule. During recreation hours they may swim, hike, canoe, play golf or tennis.



"DUTY, HONOR, COUNTRY" IS THE MOTTO ON THE COLORS OF THE CORPS

Superimposed upon the gray field are the Academy arms—the red, white, and blue shield of the United States, a golden helmet of Pallas Athena, symbol of wisdom and learning, and a spread-winged bald eagle.



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Finlay Photographs by Edwin L. Wisner

THE DAY AFTER GRADUATION, AND THE LONG WAIT IS OVER!

Since no cadet may marry during the four-year course at West Point, the chapel is a busy place the day after diplomas are distributed. As the smiling bride and groom emerge from the door, new lieutenants in khaki and cadets in gray make an overhead arch with upraised swords.

Your "wife" has been defined as "the cadet who smokes your skags, eats your boodle, borrows your clothes, and uses your last postage stamp—your roommate." (You may never refuse him a dance with your drag when he comes to a hop as a stag.)

Woe betide the untidy! The daily "skin-list" records his shortcomings:

"Dust on dress hat at A. M. inspection."

"Shoes in laundry bag."

"Floor not properly swept under washstand."

It is usually unwise for the cadet reported to let his sense of humor get the better of him, as did the cadet who was reported above for inefficient sweeping, and wrote in explanation:

"The report is a mistake. I swept everything under the washstand."

"NO HORSE, NO WIFE, NO MUSTACHE"

There are many things that a cadet may not have or do. "No horse, no wife, no mustache," is literally true. He may not ride in an automobile after 10:30 p. m., sit in a parked car, or carry a red comforter or blanket on his arm—to name some at random.

Delinquencies bring demerits, and any excess above the stipulated monthly limit must be liquidated with punishment tours, one hour per demerit, marching under arms. A bored cadet who was discovered enjoying himself in Newburgh, eight miles north of West Point, estimated his mileage of atonement, in terms of punishment tours, as the distance from West Point to Columbus, Ohio, and back.

Should a cadet marry he would automatically cease to be a member of the Corps.

Most serious of all offenses is a violation of the honor code. Proven guilt in such a case can result only in dismissal.

To come back to our fourth-classman in barracks, we find him and his classmates formally inducted into the Corps on August 1, when his new class is marched to the Cadet Camp. Shortly his training advances to the point of frequent practice marches and maneuvers.

At meal times he is ravenous. For a few weeks the food consumption of a plebe is roughly twice that of an upper-classman. Fortunately, sanity returns.

The camp is surrounded by sentry posts, only two of which may be crossed by individual cadets on entering or leaving. Such

crossings are covered by the "All right, sir" of the cadet to the sentry, meaning: "I have proper authority for crossing this post." The "All right" is never questioned; its use is rigidly covered by the honor code.

The end of plebe summer is an important milestone. Erect, bronzed, and hard from two months of work, the fourth-classmen are assigned permanently to one of the twelve companies of the Corps. A cadet's height determines his assignment, the tall men going to the "flanker" companies, A and M, the "runts" to Companies F and G in the center.

September 1 marks the beginning of the academic year, a 38-week grind. Deficiency in one subject constitutes deficiency in the year's work. It usually results in discharge from the Academy. Yet two-thirds of those who enter survive to graduate.

The course is comparable to that at many engineering schools. It leads to the B. S. degree. Emphasizing the sciences, it begins with two years of mathematics and includes physics, chemistry, electricity, natural and experimental philosophy, engineering (civil, mechanical, automotive, military), and ordnance and gunnery.

In the cultural field we find two years each of English, French, and drawing, with surveying; one each of history, Spanish, economics and government, and law. The study of tactics runs through the four years.

EVERY CADET AN ATHLETE

But the Academy is not "all work and no play." Above all, athletics help the cadet to get rid of his surplus energy. On the average, 75 per cent of the Corps make one or more of the athletic squads in the 18 intercollegiate sports. There is also a year-round intramural program for all cadets.

Gala occasions are the four times each year when the entire Corps accompanies the team to the more important football games. Plebes are given "At Ease" (may throw back their capes and forget the ultra-stiff shoulder-back "brace" in ranks). If the Army wins, this easing of their lot lasts until the team returns.

To West Pointers, Dress Parade (Color Plate IV) is not only a fact but a symbol. It typifies instant and exact obedience to military command. It is a test of the thoroughness of the drills which begin within

five minutes after a plebe reports for duty and continue until the day of his graduation.

When a scion of a European royal family, a soldier, visited West Point on short notice a few years ago, all the upper-classmen were away from the Post on summer duties, except a handful retained for instruction of the new cadets who had entered but three weeks before. And when royalty appears it must be honored with a military review.

Could these new plebes, still in the throes of basic instruction, meet the emergency? They had to and they did, so effectively that the royal visitor, when told the truth after the last company had filed by, refused to believe it until he had questioned the cadets themselves.

Does so strenuous a life hurt a youngster's health? On the contrary, a cadet, during his first ten months at the Military Academy, gains on the average nine and a half pounds in weight and nearly two inches in chest measurement.

Nor is a youth's initiative destroyed, if cadet pranks are any criterion. An innocent-looking dictionary may be cut out inside to hide a radio set. Recently, one cadet with an eye to profits took advantage of high laundry prices to smuggle in machinery and set up a laundry business in a forgotten basement storeroom. Months later the slump in the regular Cadet Laundry's intake led to a search which disclosed "Cadet Washings, Inc."

THE CADETS' THREE BIG MOMENTS

Perhaps the three highest moments in the career of a cadet are recognition, furlough, and graduation. The first comes at the end of the arduous plebe year.

As each of the twelve companies, marching from the parade ground at the conclusion of graduation parade, halts at its dismissal point, the company commander gives the command, "Front rank, about face!" The next moment "Mr. Ducrot," "Mr. Dumbguard," and similar titles denoting the hapless plebe die in the general happy handshaking.

Plebe life is over, yearling days have begun. In less than 24 hours many of these new-born yearlings will be sporting a corporal's chevrons. Yet another day, and they will begin a twelve-month campaign of howling on every possible provocation, "Yea, furlo-o-o-ough!"

To realize how much that ten-week furlough at the end of the third-class year

means to them, one has to witness their pell-mell dash from ranks after the last graduation-day formation.

There is a gayety, too, for the graduating class, but one sees under it a serious note. For months the first-classmen have been assembling equipment for their career as officers and struggling to attain a standing high enough to enter the branch of service they covet. Choice of branch and station are based strictly on graduation standing.

Not a few, heedless of the practical advice they have had on the matter of the Army officer's budget, plan to be married shortly after graduation (Color Plate VIII). They have need for serious thought.

And for all of them there is a sobering touch in the realization that the close associations of four years are at an end.

Even the class scapegrace, calloused of foot from his steady round of punishment tours, wishes now that his spirit had a like protective armor.

Like the rest, he discovers his vulnerability in those closing hours: Alumni Day with its assembly of Corps and graduates at the foot of Thayer Monument and the roll call of the honored dead; Graduation Parade, when he stands with his classmates in the reviewing line as the Corps marches by. He has marched in those ranks for the last time!

Company after company files by, saluting him with its "Eyes Right." But he cannot see it clearly. There is a mist before his eyes. In the long gray line no longer, he is still of it, and always will be.

Sunrise next morning brings an even greater day. It is ushered in with a ceremony which the Corps alone witnesses—a reveille bouffe at which the graduating class appears in a wild medley of costumes, too bizarre for adequate description.

A few hours later solemnity replaces gayety as graduates receive their diplomas (Color Plate V), and at last, standing at attention at the foot of Battle Monument, take the oath of office which carries with it their commissions as second lieutenants in the Regular Army.

With their country's blessing, yet another West Point class goes forward to duties which will scatter its members to many corners of the earth. Peace or war, the country knows that it can count on them to live up to the fullest implication of the West Point tradition—"Duty, Honor, Country."

ANNAPOLIS, CRADLE OF THE NAVY

BY LIEUTENANT ARTHUR A. AGETON, U. S. N.

TO BE a midshipman at the United States Naval Academy is the ambition of many an American youth. But it takes dogged persistence to become one.

I remember vividly my excitement as I stood looking through the grilled iron bars of the Main Gate at the enticing greenness of the clipped lawns and the tall trees of the Yard. For even though I had my midshipman appointment from my Congressman and had passed a searching mental examination, I was not sure that I could weather the storm of the "Physicals."

Behind me was colonial Annapolis and some 3,000 miles of travel from my home in Pullman, Washington. I had passed the previous day in the lovely Anne Arundel city, absorbing something of its fascinating atmosphere—narrow streets radiating spokelike from the tree-shaded circles where Washington, Jefferson, Lafayette, and other Revolutionary figures once roamed; Peggy Stewart House, where was conceived Annapolis' own "Tea Party"; the Maryland Statehouse, where Washington resigned his commission as Commander in Chief of the Revolutionary Armies and where the peace treaty with England was ratified; and St. John's College, one of the oldest in this country.

From every State and territory of the United States come the young men who aspire to commissions as naval officers. As I waited, a number of my future classmates joined me—lads from Massachusetts, Arkansas, Hawaii, and even one from the Philippine Islands.

After a thorough examination by Navy medical officers, we reported to the Executive Officer of Bancroft Hall.

"Fall in, gentlemen!" And we made a feeble attempt to form a line.

He directed us to raise our right hands and repeat after him the solemn oath of allegiance. "I, Arthur A. Ageton, do solemnly swear that I will support and defend the Constitution of the United States against all enemies . . ."

It was a simple, impressive ceremony.

"Now I'll assign you to companies."

"French or Spanish, mister?" he asked the new-born midshipmen in turn. As each made his choice of one of the two foreign languages then taught at the Academy, the officer assigned company numbers—even

for Spanish, odd for French. When he came to me, I answered quite jauntily, "Spanish."

He glanced at me and said, "Well, my lad, I'm sorry, but we just filled the last Spanish company. You'll have to struggle along with French."

"And another thing," he continued sternly. "You might just as well begin to learn now. Stand up when an officer addresses you. And tack a 'sir' onto what you have to say. Savvy?"

"Yes, sir," I answered meekly, and I assumed what I considered to be a position of attention.

It was my first encounter with Naval Academy discipline. But as I stood in my Spartanlike room a few moments later, I felt elated that at last I was a midshipman and a small unit in our Navy.

BIRTH OF THE NAVAL ACADEMY

Before 1845, midshipmen were educated solely by experience at sea and by such "book learning" as the individual chose to acquire, with the aid of ship "school masters." George Bancroft, Secretary of the Navy under President Polk, early recognized the desirability of establishing a naval school ashore, but opposition within and without the Service was strong.

Eventually Secretary Bancroft obtained transfer to the Navy Department of Fort Severn, an outmoded Army fort near Annapolis, and founded there the Naval School. Commander Franklin Buchanan, the first Superintendent, had about forty students and seven instructors in his charge.

From this slender beginning, the Naval Academy has gone splendidly forward, training officers for the Naval Service. The original Naval School has disappeared, but the present group of sixteen imposing buildings, begun in 1898, has risen on the foundations of the old. Now there are nearly 2,000 midshipmen at the Academy, and about 260 will receive commissions and shiny new shoulder marks this June.

I had hardly stowed the mass of gear issued to me at the midshipmen's store, and shifted to my new white uniform, when I prevailed upon my roommate to guide me around the Yard. From his vast experience of three weeks at the Academy he could explain everything!

We strolled across Farragut Field to the

seawall and looked out over the Bay. A Chesapeake bugeye, with raking masts and sails glistening in the fading sunlight, came flying into the harbor on the last of the sea breeze. She was loaded to the gunwales with fresh oysters. Across the Bay, Kent Island was a thin line against the horizon. Suggestive of Marblehead, Massachusetts, during "Race Week," white wings of numerous sailboats fluttered here and there across the blue waters. "It is the midshipmen having seamanship drill," my roommate explained.

Facing about, Bancroft Hall towered above us in massive solidity. My roommate pointed out the Armory, Dahlgren Hall, where midshipmen keep their rifles and drill in foul weather, and Macdonough Hall, the Gymnasium, where the future admirals do "stoop falls" and "knee bends." At the far end of the group, I saw Luce Hall, the seamanship building, where I would be taught to tie knots, splice rope and wire cable, signal and semaphore, use a sextant, and navigate a ship.

We strolled through Thompson Stadium, scene of many a gridiron battle, and passed under the terrace to Stribling Walk. There the Indian chieftain intrigued me (Color Plate VI).

"Who's the old gent?" I inquired.

"Ssh!" He put his finger to his lips in mock fear. "Don't let him hear you. That's Tecumseh, god of the 2.5. Don't get him down on you, or you won't be long around these parts."

He explained how midshipmen are marked in class and at examination on a basis of 4 for perfect (equivalent to 100 percent), and that 2.5 is the passing mark. Any score below that minimum, he said, was "bilging," in Naval Academy parlance.

We moved down Stribling Walk from Bancroft Hall past the Mexican Monument to the academic group (Sampson, Maury, Isherwood, and Mahan Halls). This path midshipmen tread thrice daily, always in military formation, to their studies.

Returning, we passed the Administration Building, the domed white Chapel, and the Superintendent's Quarters. The band was playing a stirring march in the bandstand beneath the elms.

As we strolled back across the terrace to our room, a bugle sounded formation and a gong clattered in the Hall. "Better step out to formation," my roommate said, and he ran toward our company parade.

Bancroft's broad corridors rang to our voices during that all too short summer, while we new plebes became acquainted with the rudiments of military drill, seamanship, small arms target practice, and physical training. Yet in those carefree days we dreaded the return of the upper-classmen away on their summer cruise.

EDUCATION OF THE PLEBE

Quite naturally, a plebe comes to the Academy somewhat overimpressed with his own importance. The inevitable deflation is sometimes abrupt.

Even yet, I cannot recall without a shudder that first day of Academic Year. I was "steering a proper course" down the middle of a corridor when a voice behind me spoke:

"Where headed for, mister?"

"The midshipmen's store, sir."

"Sound off."

I was silent for a moment. A first classman moved around into my field of vision.

"Good Lord!" the stern voice cried. "Don't you know 'Sound off' means to tell me your name and State? Well then, what did Lawrence say?"

I remembered Perry's battle flag, the Navy's most historic banner, preserved in Memorial Hall. Rough white letters on a faded blue background spell Captain Lawrence's last words as he lay dying on the deck of the *Chesapeake*. "'Don't give up the ship,' sir," I blurted out.

"Well now, that's better." The voice was more kindly. "What did Dewey do?"

"Sir?"

"See here, mister, you're terribly ignorant of naval history and tradition. Report to my room at 9:30 tonight for instruction. Savvy?"

"Yes, sir."

"Shove off." Such was my first encounter with an upper-classman.

At dinner formation, standing stiffly erect in the rear rank, eyes riveted on the back of the midshipman's neck in front, I believed I cut a perfect military figure. But someone growled behind me, "Pull yourself together, mister. Your 'brace' is terrible."

I stiffened to a more rigid position. Presently we marched off to music played by the "hell cats," as the midshipmen drum and bugle corps is called by the Regiment. From the regimental commander came the order, "SE-ATS!" Two thousand chairs scraped in unison and a roar echoed through the huge white mess hall.

JUNE WEEK AT ANNAPOLIS, CRADLE OF THE NAVY



SUNDAYS MIDSHIPMEN IN FULL DRESS SWING ALONG THIS BRICK WALK TO CHAPEL. Midshipmen must attend divine service, but they may go to church in Annapolis instead of the Naval Academy Chapel. The sarcophagus of the Navy's hero, John Paul Jones, rests in the crypt.

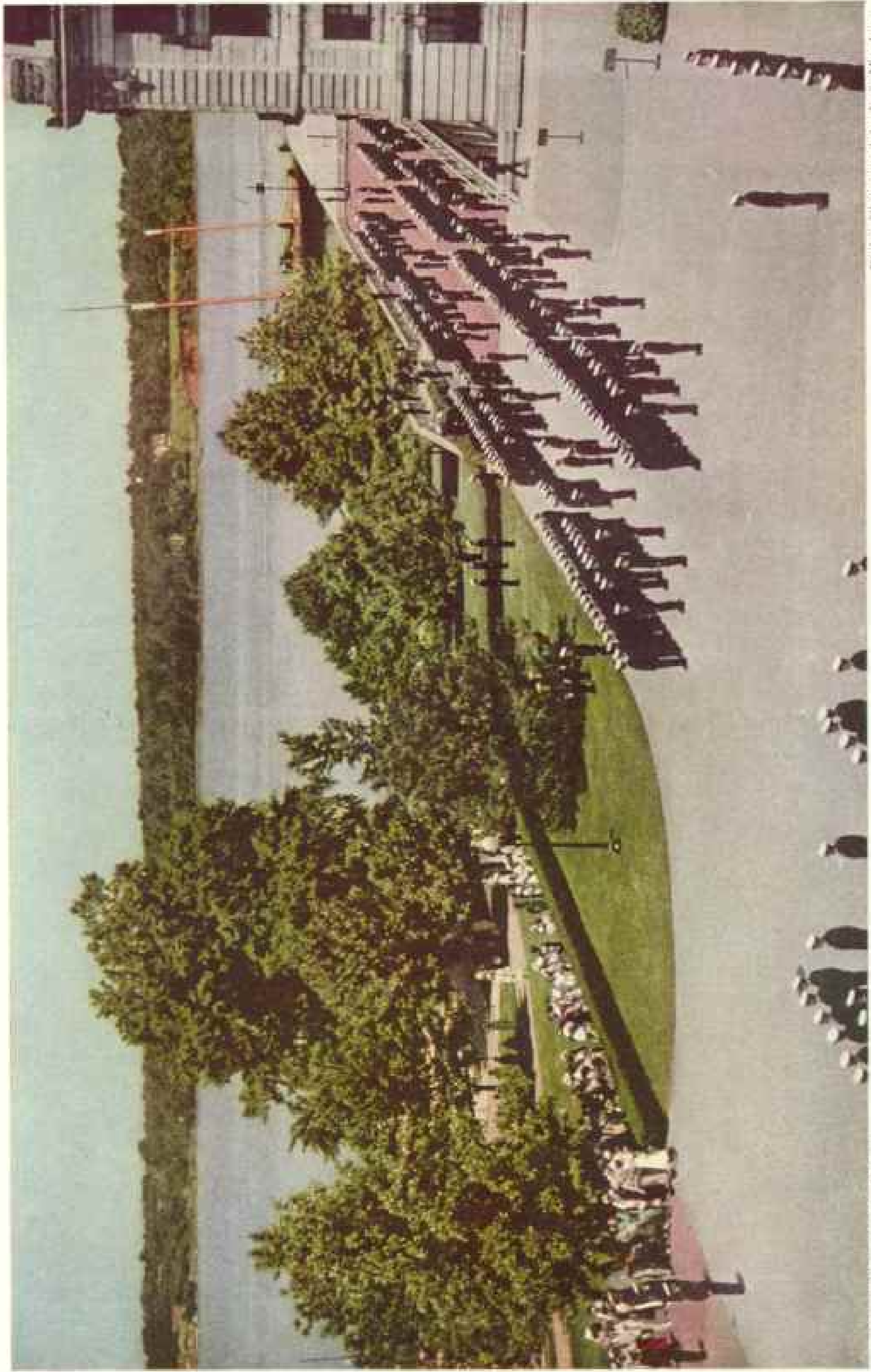


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Finlay Photographs by B. Anthony Stewart

LOVER'S LANE, MECCA OF ALL PLEBES AND FIRST CLASSMEN

This gravelly walk winding through the elm-shaded campus is tabu to plebes (freshmen). After the graduation ceremonies newly born "youngsters," or sophomores, singing "T'aint no mo' plebes," rush from the Armory to tread the path. Also the graduating class snake-dances here (Plate V). On holidays, upper-class midshipmen stroll along the lane with their mothers, sisters, and sweethearts.



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NINE TIMES IN ONE DAY: THE FIRST BATTALION MAY REPEAT THIS FORMATION

For every academic activity, from assembling for meals to attending class or drills, midshipmen fall in for roll call and inspection. As soon as the bugle sounds "Assembly," plebes must start double-timing to their customary places. Bancroft Hall (right), the huge dormitory in which all midshipmen live, rises beside the Severn where the river joins Chesapeake Bay. In the distance is the famous yacht *America* (Color Plate VIII)

Finlay Photograph by Lulu Murlin



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Fiday Photograph by Luis Marden

JUNE WEEK VISITORS INSPECT A PRACTICE SHIP

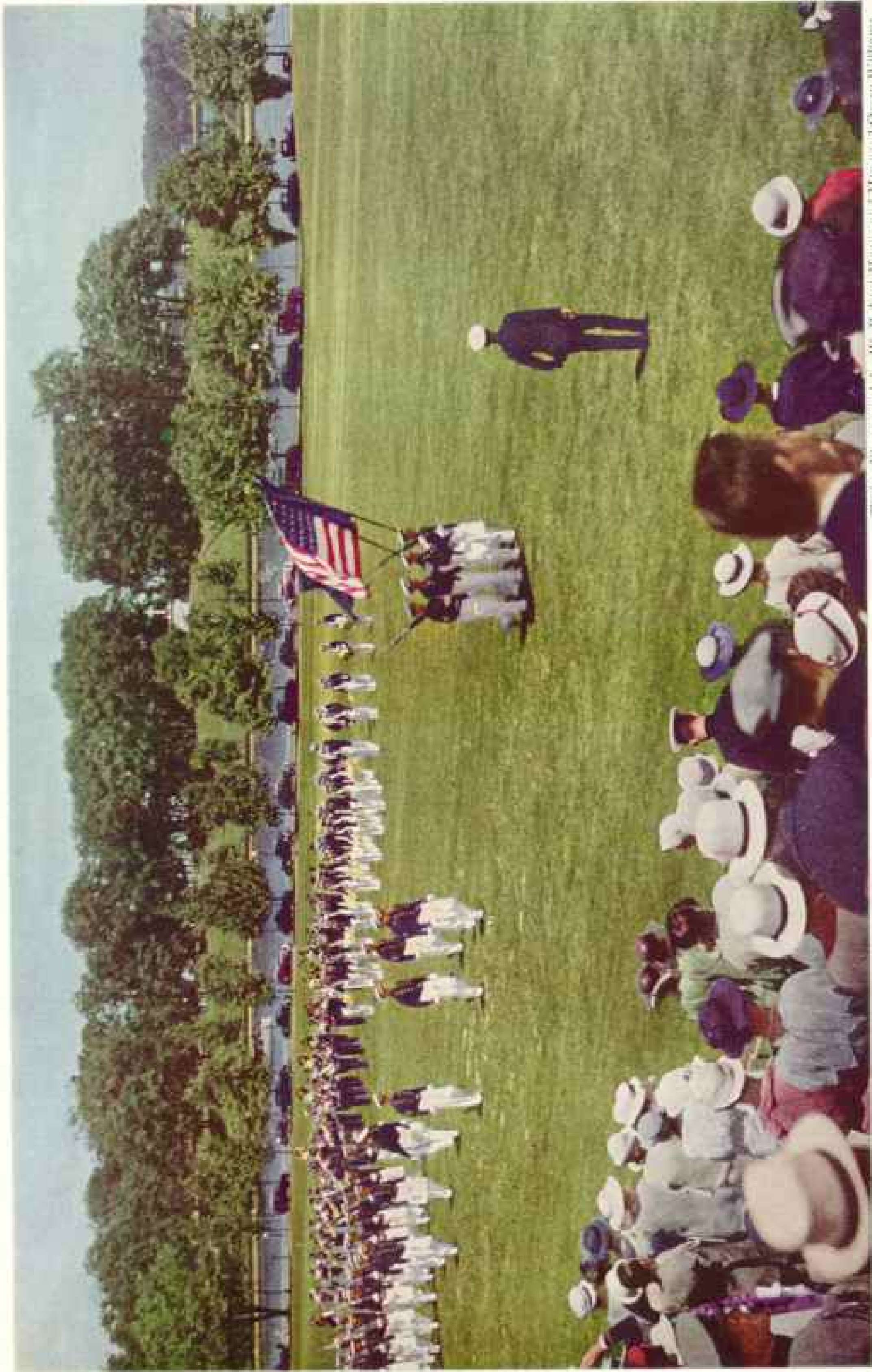
At seamanship drills, midshipmen, enacting all roles of the crew from engineer to "skipper," take this destroyer for a cruise on Chesapeake Bay and bring her back to dock. Officers and enlisted men serve as instructors.



Fiday Photograph by E. Anthony Stewart

AN O. A. O. FASTENS ON A NEW ENSIGN'S SHOULDER MARKS

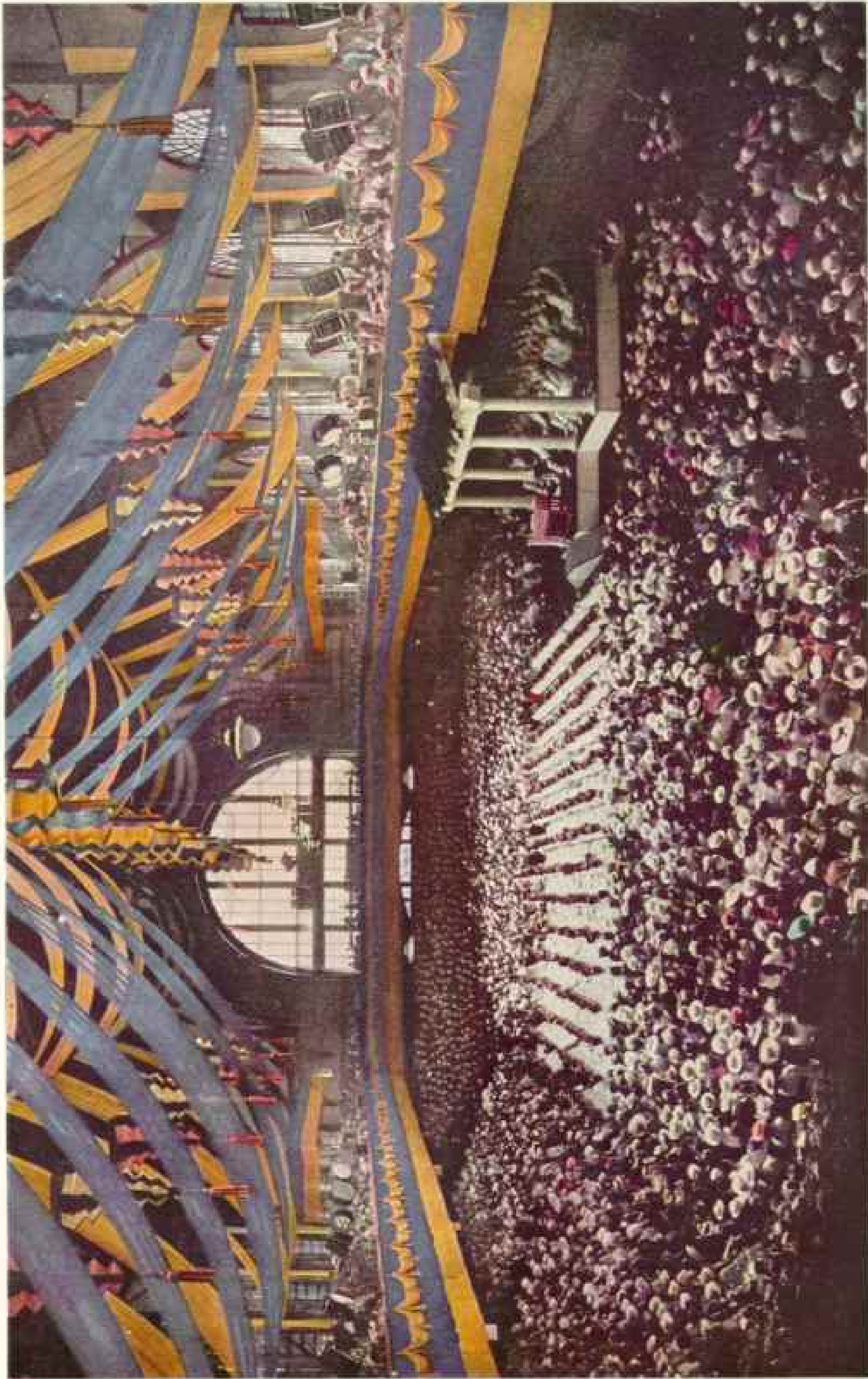
A graduate's first act after the snake dance to Lover's Lane is to seek out his "one and only" girl and ask her to perform this favor. Sometimes the ceremony is repeated several times by an ensign, with different partners!



Findlay Photograph by W. Robert Moore and Maxine and Queen Williams

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 "STAND NAVY DOWN THE FIELD" THUNDERS THE ACADEMY BAND AS WHITE- AND BLUE-CLAD MIDSHIPMEN PASS IN REVIEW

Favorite spectacles for visitors are the dress parades that feature June Week. This field is named in honor of Rear Admiral John Lorimer Worden, once Superintendent of the Naval Academy, who commanded the *Monitor* in the famous battle with the *Merrimack* at Hampton Roads on March 9, 1862. The uniform for the paraders is "monkey jackets" (tight-fitting, full-dress coats) and white trousers, uncomfortable clothing for the hot weather that usually prevails. On this parade ground the midshipmen drill during their four years at the Academy.



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READY TO BE LAUNCHED ON THEIR NAVAL CAREERS, MIDSHIPMEN LISTEN TO A FAREWELL ADDRESS AT THEIR GRADUATION EXERCISES

The graduates, in white service uniform, sit in a block and then march up, one by one, to receive their diplomas, frequently from the hands of the President of the United States. When all have passed in single file across the rostrum, they hurl their caps to the blue and gold streamers and give a cheer "for those we leave behind." Then they snake-dance out of Dahlgren Hall to Lover's Lane, and sing "No More Rivers to Cross." Naval Academy classes disperse to ships and stations throughout the world, and therefore seldom gather in reunion.

Finlay Photograph by H. Anthony Stewart



A BRONZE DUPLICATE OF OLD TECUMSEH NOW SERVES AS THE "GOD OF 2.5"

The wooden original that stood on this pedestal for many years was formerly the figurehead of the U. S. S. *Delaware*. Midshipmen are graded on a basis of 4.0 for a perfect mark and 2.5 for a passing one. Marching to examinations or Army-Navy games, they salute and hurl pennies at the statue.



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Friday Photographs by Luis Marden

OLD BRONZE CANNONS TAKEN FROM HISTORIC SHIPS AND FORTS ORNAMENT THE GROUNDS

On evenings when hops or balls are held and the moon is high, the guns make convenient seats for the midshipmen and their ladies. The Naval Academy grounds are called the Yard and daughters of officers living on the reservation are known as "Yard engines."

JUNE WEEK AT ANNAPOLIS, CRADLE OF THE NAVY



Finlay Photograph by W. Robert Moore and Maynard Owen Williams

PRESENTATION OF COLORS THRILLS THE REGIMENT AND THE LUCKY "FEMME"

Every year the eight companies of the Regiment vie in sports, seamanship, and drill for the coveted honor of being "color company." Here, with the aid of the Superintendent, the sweetheart of the midshipman company commander presents the Stars and Stripes and Regimental Colors to the winner.



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Finlay Photograph by Luis Marden

THE JAPANESE BELL SEEMS WORN SMOOTH WITH POUNDINGS AFTER VICTORIES OVER ARMY

When Commodore Matthew Calbraith Perry returned from his famous expedition to Japan in 1854, he brought home this ancient bell, now a landmark near Lover's Lane. It is rung only in celebration of a Navy victory in football, first by the captain of the team and then by all who can crowd around it.



Finlay Photograph by H. Anthony Stewart

THE SUPERINTENDENT PRESENTS THE ATHLETICS SWORD TO "BUZZ" BORRIES

At the ceremony held in June, 1935, Rear Admiral David Foote Sellers gave the coveted trophy to Midshipman Fred Borries, now an ensign on the U. S. S. *Arzoma*. Besides being an All-America football choice, the athlete was captain of the team, a stellar basketball player, and a star at track.



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Finlay Photograph by Lois Marden

A SALTY FIRST CLASSMAN SPINS A YARN ABOUT THE OLD "AMERICA"

The historic craft was the first to win the "America's Cup" at Cowes, England, in 1851. She has successively been yacht, merchantman, blockade runner for the Confederacy, a blockader in the Northern Navy, and private yacht again. In 1921 yachtsmen presented the ship to the Naval Academy.

"What's a gadget, mister?" a first classman called down from the head of the table.

"The appropriate name for any object or article for which you do not happen to recall the exact designation, sir," I replied rapidly and parrotlike.

"What is ground tackle, Mr. Ageton?"

"The gear with which a ship is anchored or moored, sir," I answered promptly.

In this manner, from reveille until taps, day after day, naval traditions and sea-going phraseology are instilled into a plebe's mind. Much of this "running," or badgering, is in the spirit of fun, and, if so received, is easy to bear. But woe betide the plebe who is "ratey."

It is a busy life. During a normal day, a midshipman attends seven military formations, recites three times, and drills once. He is inspected frequently, both for personal appearance and for cleanliness of his room, for which he and his "wife," or roommate, are jointly responsible.

If a midshipman fails to carry out the requirements of the little tan book called "Naval Academy Regulations," he is "put on the pap" (reported). As punishment the culprit is assigned "extra duty"—several hours of infantry drill during a "play" period.

A MIDSHIPMAN'S STUDIES

I early learned that "academics" were not to be taken lightly. The system of instruction is really a survival of the scholastically fit. For classroom recitation midshipmen are divided into "sections" of 12 or 15 to each instructor, usually a young officer.

In recent years the Naval Academy curriculum has been broadened to include economics, government of important nations, and an excellent course in European history. Now German and Italian are also taught.

Besides chemistry, mathematics, and "skinny" (physics), the future naval officers are well grounded in such essential naval sciences as gunnery, navigation, "juice" and "steam" (electrical and steam engineering), and seamanship, which includes instruction on how to row cutters, handle small boats, and maneuver, sometimes in formation, such craft as subchasers and motor launches. During his second-class (junior) summer, the midshipman's training is devoted to aviation.

Important are military and international law, for many a naval officer has had to decide delicate questions of diplomacy.

New ensigns are placed on the Navy list in the order of their scholastic standing at graduation.

Everyone must indulge in some form of athletics at the Academy, I knew, but I was surprised when my company commander burst into my room one evening and the following conversation ensued:

"Carry on, mister. Ever play football?"

"A little in high school, sir."

The three-striper looked me up and down. "Well, you would make a good substitute quarterback. Report to Worden Field tomorrow afternoon after drill."

"Sir?" I asked incredulously.

"Yes," he said, nodding his head. "Our company team. We need you to help win the Academy championship this year."

In football, baseball, lacrosse, basketball, and other sports there is an "A" squad, composed of the best athletes, from which the varsity team is chosen, and a "B" squad of younger or less experienced men who form the grinding stone upon which the first team is polished. Having some success on my company teams, I progressed the next year to my class squads in football and track.

Appropriately, Navy crews have been famous for years. A Naval Academy eight-oared shell won the Olympic championship in 1920. And football? Who can ever forget an Army-Navy game, win, lose, or draw?

The system provides healthy exercise for every midshipman and helps to instill in him "the will to win"; also, an ability to "take it" when one's best efforts prove of no avail.

THE LIGHTER SIDE OF A "MID'S" LIFE

It amused me, as a midshipman, to see my roommate, normally so masculine in appearance, take the role of a blushing maid in one of the annual productions of the Masqueraders.

The musical clubs this year presented a musical comedy, "Her Highness Regrets," written, scored, acted, sung, and directed by midshipmen. The week preceding the show, those fond of experimenting with electricity erected bright lights on the façade of dignified Mahan Hall. Stribling Walk became a miniature Great White Way!

An Academy "hop" is a spectacle of color. From "plebe heaven" in the balcony of Dahlgren Hall, the bright dresses of the "drags," or partners, of upper-classmen,

merging with the blue and gold of dress uniforms, make a striking panorama. On moonlit nights couples stroll across Farragut Field to the Bay sea wall, there to sit and gaze down the moonpath on the water and watch the yachts and ferries.

Sunday is a quiet day. Chapel in the morning. After lunch picnics in canoes on Spa Creek, sails in half-raters and star boats on the Bay, or perhaps a dance in one of the pleasant homes of Annapolis. Then evening meal formation and farewell to the lovely guests.

A PRACTICE CRUISE IS A COURSE IN GEOGRAPHY

An enjoyable feature of Navy life is the constant change of scene. A midshipman studies geography in a delightful fashion, watching the capes and points and bays pass by his cruise ship.

Aboard ship, midshipmen enact all the roles of enlisted men. On the first, or Youngster Cruise, they scrub decks, chip paint, and act as oilers in the engine room; on the last, their duties correspond to those of petty officers or commissioned officers. Thus, on graduation, the fledgling ensign is familiar with all the duties of the crew, from coal passer to captain.

It was raining the first night I put to sea. My station was in the starboard chains with a second-classman taking soundings. He earned my admiration, because he could accomplish a complete vertical swing above his head with the heavy lead and cast it far out without bashing in his skull or mine. All during our watch he kept singing out to the bridge the depth of the water beneath the keel.

After my four-hour watch, I passed the rest of the night trying to stay "top side" of a hammock in a gun compartment. When I turned out the next morning, the deck rolled under my feet and I knew we had passed the Virginia Capes and were at sea.

This first cruise took me through the Panama Canal and across the torrid stretch of water from the Isthmus to the Hawaiian Islands. Midshipmen of to-day know not those long, hot watches, passing coal from the bunkers to the boilers in a miniature imitation of Hell! In modern firerooms, the "black gang" stands watch on gleaming floor plates, and oil burners do the work.

For ten marvelous days we explored the island paradise and tried surfboarding at Waikiki Beach.

From Honolulu we steamed northeasterly to Puget Sound and Seattle; thence down the coast to San Francisco, and back through the Canal to "Crabtown," as midshipmen call Annapolis.

Another summer we were welcomed in Oslo, Norway, where we marveled at the trim Viking ship preserved there. Down the European coast our squadron visited Lisbon and Gibraltar. At each port officers arranged side trips for the midshipmen to places of interest.

From Annapolis many sons of the Naval Academy have gone out to bring honor to their *Alma Mater*—Dewey at Manila, Sampson at Santiago, and Mahan, whose writings on naval history and strategy have earned him international recognition.

Among noted geographers are Rear Admiral Charles D. Sigsbee, class of 1863, who discovered Sigsbee Deep in the Gulf of Mexico, and Rear Admiral John Elliott Pillsbury, class of 1867, who made valuable studies of the Gulf Stream and was once President of the National Geographic Society.

Reminiscent of Captain Bligh's voyage in his whaleboat, after the mutiny on the *Bounty*, was the thrilling exploit of Lieut. John G. Talbot, class of 1866. With four bluejackets, he sailed the gig of the wrecked *Saginaw* 1,250 miles from Ocean Island to Kauai Island (Hawaii). There the officer and three of his men were drowned landing in the surf. The sole survivor delivered the message, and the crew of the *Saginaw* was rescued. This tiny gig rests to-day in the Naval Academy Museum.

Rear Admiral Richard E. Byrd has twice gone to the Arctic and the Antarctic, and has flown over each pole. His transatlantic flight in the *America* was a model of scientific planning.

Thus, the study of geography carries down to our modern Navy.

The goal to which every midshipman looks forward during his four years' training is his last June Week, when he stands at the threshold of his life as an officer in the Fleet.

One day, feeling happy and "looking like white angels," as one paper said, we marched up to the rostrum to receive our diplomas from the President of the United States (Color Plate V). The long voyage was safely done; the many rocks and shoals which had endangered the passage could frighten no more.

PARROTS, KINGFISHERS, AND FLYCATCHERS*

Strange Trogons and Curious Cuckoos are Pictured with these Other Birds of Color, Dash, and Courage

BY ALEXANDER WETMORE

Assistant Secretary, Smithsonian Institution

THE place was the Gran Chaco in South America, a vast terrain of marsh-dotted savanna and thorny jungle on the western border of the Paraguay River. The time was September, early spring in the Southern Hemisphere.

As I awakened at dawn in a little grove beside a lagoon, the morning air was so chill that I welcomed the first warm rays of the sun, though I knew that later the heat would be intense.

Purple-flowered trees made masses of color at the edge of the forest, and from all sides came the calls and songs of strange birds.

A group of Lengua Indians, employed in cutting trails, squatted before a fire on which something was boiling.

In passing I was careful not to look into the pot, as they might throw out the food for fear my glance had cast a spell on it that would make them ill.

Suddenly I heard a succession of strident calls from behind the trees and stepped out into the open to watch a flock of parrots crossing the sky. They flew with steady wing beats, shrieking in constant raucous chorus.

Though in close flock formation, they were grouped in pairs, male and female flying side by side. Their harsh calls came to my ears long after they were out of sight.

Later in the day I found little flocks of long-tailed parakeets feeding on the hard, insipid fruits of a forest tree, while they clambered through the branches by aid of feet and bill. The ground was strewn with husks, and there was a steady rasping sound as they cut the fruits and cast away the hulls.

As I sat against a tree trunk that afternoon, preparing notes and specimens, hid-

den parrots called at intervals among the trees. Before sunset small flocks streamed across the sky to some distant roost.

WILD PARROTS IN THE UNITED STATES

In pioneer days these scenes might have been duplicated in many sections of the eastern United States, as then a bird of this family, the Carolina parakeet, ranged widely from the Gulf coast northward (Color Plate I and page 808). On frosty mornings flocks of them gathered to feed on cockleburs and other seeds. In summer they penetrated far north into Wisconsin and Ontario.

Subsequently this parakeet became restricted mainly to Florida and it now is nearly extinct.

Another native member of the parrot family is found wild in the United States on those rare occasions when the thick-billed parrot comes from northern Mexico into the mountain ranges of southeastern Arizona (Color Plate I and page 809).

Throughout the world there are nearly 800 different species and subspecies of parrots (family Psittacidae.) Although some range into Patagonia, even to frigid Tierra del Fuego, and the kea of New Zealand lives in the interior mountains where winter snows are deep, the large majority inhabit warm parts of the earth.

There are no parrots native in Europe, nor in northern Asia. Their metropolis is found in tropical America, Australia (page 826), and the East Indian region.

Though the size and color of the many forms of parrots are diverse, all have a certain family resemblance. The strongly hooked bill, rather heavy body, relatively large head, and peculiar feet, with two toes directed forward and two to the rear, combine to identify these birds at a glance.

In most members of the family the head is round, but the cockatoos have large crests in which a spot of color shows when the feathers are thrown forward in display.

Cockatoos, Amazon parrots, and many other kinds have a square-cut tail. In

* This is the fourteenth article, illustrated by paintings by Maj. Allan Brooks, in the important GEOGRAPHIC series describing the bird families of the United States and Canada. The fifteenth article, with color plates from paintings by Major Brooks, will appear in an early number.



Photograph by A. A. Allen

AN AVIAN POACHER GETS A CHANCE WHEN "KINGFISH" HAS A SUCKER IN ITS BILL.

The belted kingfisher is notoriously jealous of its "fishing rights" along a favorite river. Some call this frequenter of lonely streams an enemy of young trout, but its diet is largely restricted to chubs, minnows, and other shallow-water fish of no value to anglers. An expert high diver, this bird may plunge 50 feet to snap up its prey from the water. The red-brown band across the lower breast identifies this one as a female (Color Plate IV).

macaws and parakeets the tail is long and graduated.

Green is a common color in the plumage, and is often variegated with yellow, orange, and red. Although there are a few exceptions, bright coloration is the rule.

The most brilliant members of all the parrot group are found among the lorries of Australia and adjacent islands. Red, orange, yellow, blue, and green are mingled in their plumage in bizarre and striking patterns.

In most parrots the tongue is soft and flexible at the tip and is used to hold food while it is cut up by the bill. The tongue in lorries has a brushlike fringe at the end that is supposed to assist in extracting nectar from blossoms.

SOME PARROTS THREE FEET LONG, OTHERS
THREE INCHES

Members of the parrot family range in size from giants to midgets. The great all-blue hyacinthine macaw of Brazil is nearly three feet in length, with a long, pointed tail. The black cockatoo of north-

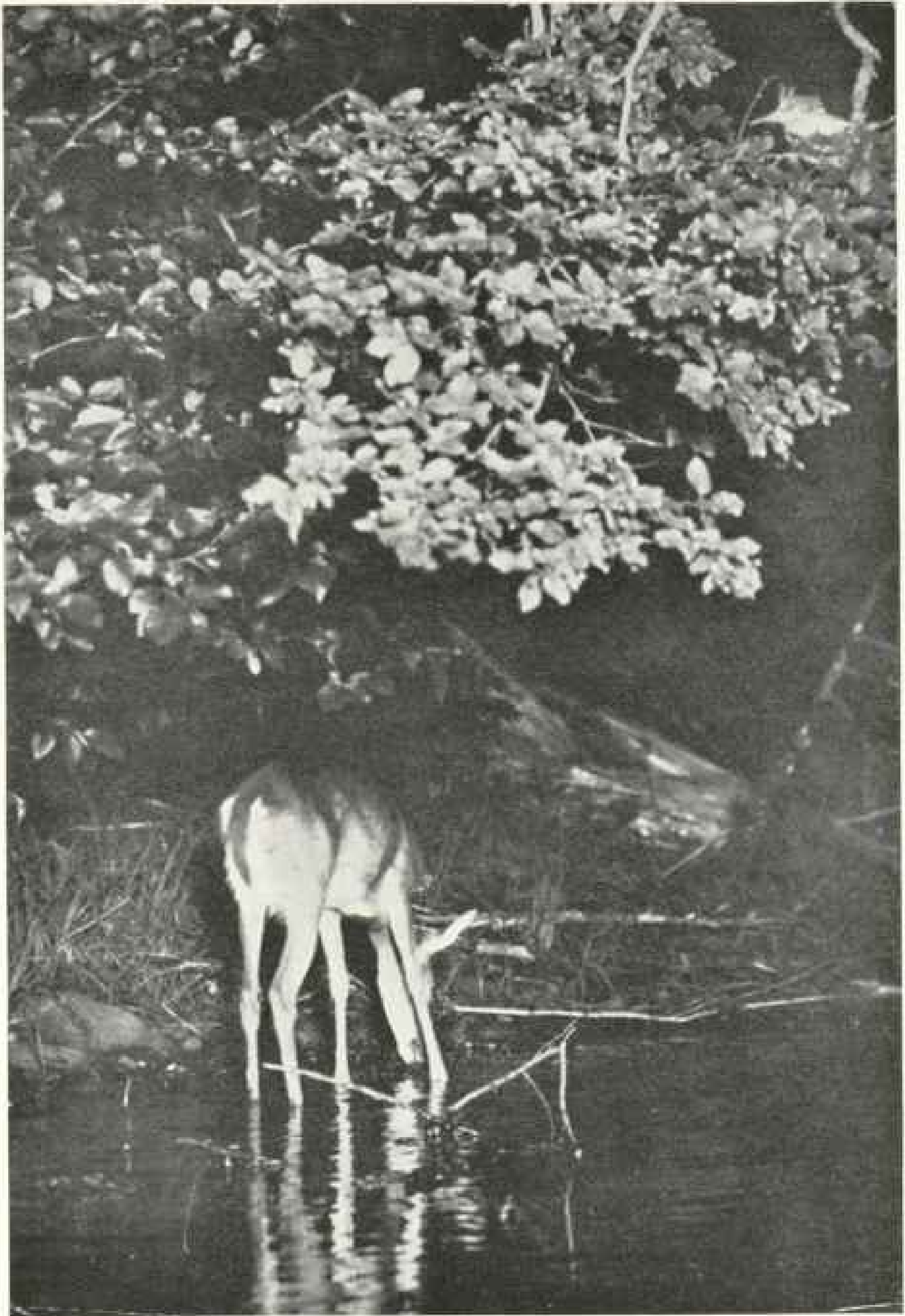
ern Australia and adjacent islands is perhaps even a larger and heavier bird in body, as it is 32 inches long despite its short, square tail.

What a contrast there is between these huge-billed giants and the tiny pygmy parrots of New Guinea and near-by islands, the smallest of which is barely three inches long!

Probably the best-known members of the family are the Amazon parrots of the New World. Small to medium in size, they have square tails and are green in general color, more or less marked with yellow or red. There are many kinds, of which several are regularly kept in captivity.

My first experience with these birds in their native haunts came years ago in Puerto Rico. A flock of them feeding in tall trees flew to a near-by hill where I looked for them for some time without result, amazed that such large birds could remain so inconspicuous.

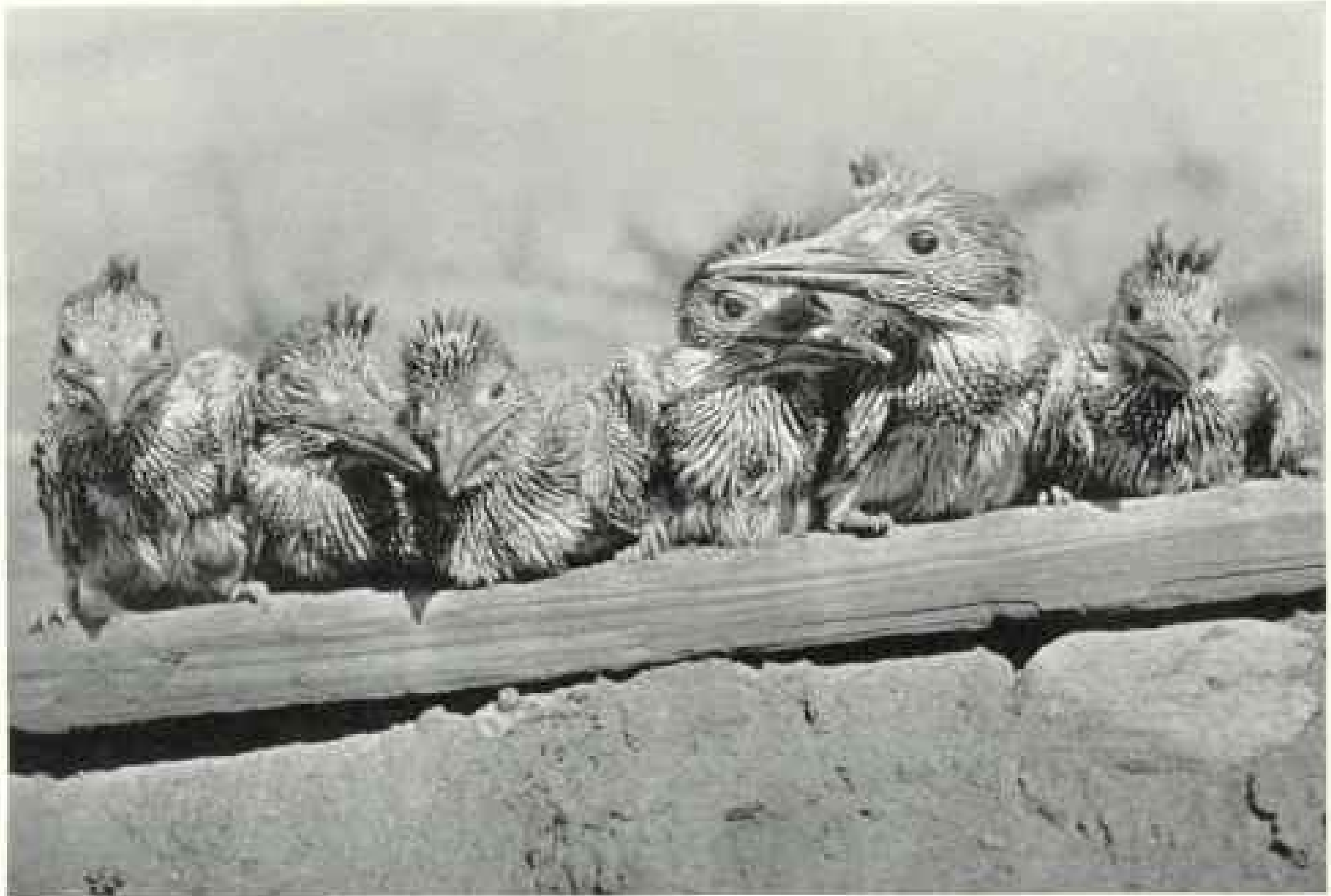
When I finally located one it was only ten feet away, its green color matching the leaves among which it perched. Later, on



Photograph by George Shiras, Jr.

A DOE TAKING A DRINK FAILS TO DISTURB A SLEEPING KINGFISHER

Until his flashlight negative was developed, the photographer was unaware of the bird's presence (see page 63, Volume I, "Hunting Wild Life With a Camera and Flashlight," by George Shiras, Jr., published by the National Geographic Society). This winged fisherman's streaking flight and rattling cry are familiar to canoeist and angler in Michigan, near Lake Superior. The "halcyon bird," with bristling tuft, is seen in the upper right-hand corner.



Photograph by L. W. Brownell

SCRAGGLY BABY KINGFISHERS LINED UP FOR A SUN BATH

Usually hatched on a mass of regurgitated fish bones, these pinfeathered youngsters pass the first days of their lives in a burrow underground. The kingfisher digs a home in a bank, most commonly beside stream or lake.

the slopes of the mountain El Yunque, I found them resting in dead tree tops after rain to dry their feathers in the sun.

MAY LIVE TO BE EIGHTY

The African gray parrot has been known in captivity for hundreds of years, and is the most famous of those species that imitate human speech and other sounds. Some of the Amazon parrots also are excellent mimics and in America are more familiar than the African species. Certain cockatoos also learn to "speak."

Ability in this direction varies with different individuals, some being gifted and some extremely stupid. Parrots learn by hearing often repeated sounds or phrases.

It is not unusual to see one that whistles, barks like a dog, mews like a cat, and repeats various sentences, sometimes so aptly as to make the bird appear more intelligent than it really is.

Curiously enough, this mimicry seems to be developed only in captivity. I have known various species of Amazon parrots in the wild state, where they are noisy and vociferous, but have never found one with

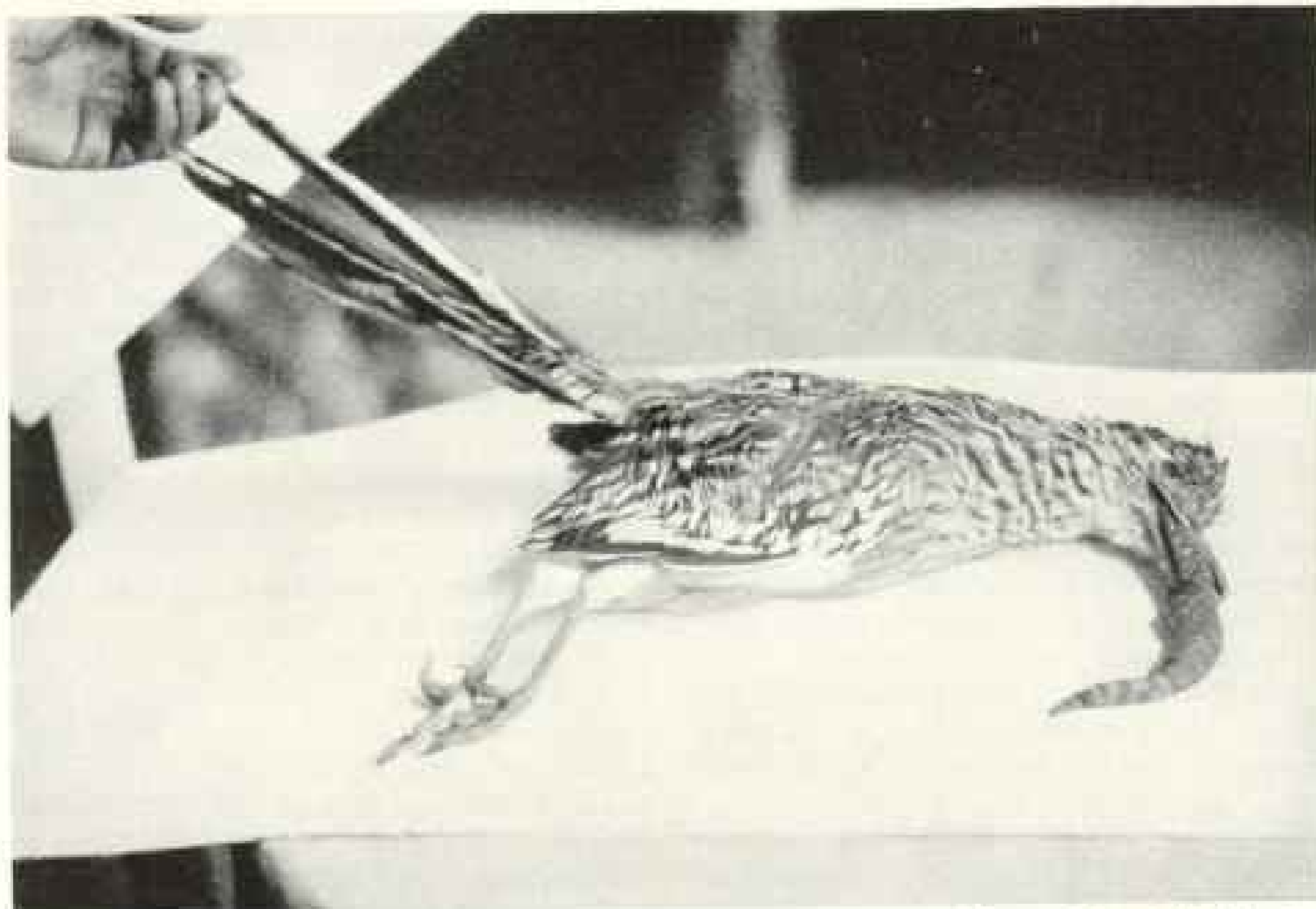
the slightest tendency to imitate familiar forest sounds.

The longevity of parrots is proverbial, and, while sometimes it may be exaggerated, there is no question but that some individuals live for many years.

In the National Zoological Park in Washington, D. C., is a sulphur-crested cockatoo called "Dick." He is the only living individual of the animal stock brought to the park from the Smithsonian grounds when the zoo was established in its present location in 1890. At that time this bird was fifteen or twenty years old. Dick in 1936 is in fine feather, and I have been able to see no difference in him during the more than twenty years I have known him.

There are various records of parrots that lived to be eighty and a few accounts, less definitely proved, of birds that reached one hundred years.

On a pleasant May morning in the Cantabrian Mountains of northern Spain I followed a woodland path that led me beneath the opening leaves of oaks and chestnuts. Strange notes of unseen birds came from every hand and I strained ears and



Photograph from F. W. Hoepfner

EVIDENCE THAT A ROAD-RUNNER MAY EAT A BATTLE!

Early one spring a farmer, J. C. Carraway, of Robstown, Texas, was walking in the mesquite brush with some of his dogs when he came upon this bird devouring a snake. His dogs killed the road-runner, which, being encumbered, was unable to run or fly away. The reptile was about fifteen inches long (page 812).

eyes to identify songsters known previously only from books and voiceless museum specimens.

Through all these enticing sounds there came one that I recognized without the slightest difficulty, a steady *koo-koo, koo-koo* that announced the European cuckoo.

Long years of familiarity with the striking of cuckoo clocks in my native land left not the slightest doubt of the identity of this note, and I laughed at the exactness of the imitation as I searched for the singer.

Suddenly I saw a bird with long, broad tail flying with rapidly beating wings across a little valley, and the search was ended.

PARROTS AND CUCKOOS ARE RELATIVES

Ornithologists consider the cuckoos close relatives of the parrots in spite of their entirely different appearance. More than two hundred forms of cuckoos (family Cuculidae) are known, all being birds of slender form and small or medium size, often with long tails. Though widely distributed throughout the world, they are commonest in tropical areas.

While most cuckoos live among the branches of trees, some, such as the ani, feed regularly on the ground, forming a transition to those species like the road-runner that are entirely terrestrial and seldom fly (Color Plate II and pages 809-812).

The family activities of many of this group are strange and interesting, as among them parasitism in breeding is more widespread than in any other group of birds. The best-known example is the European cuckoo, a species that always places its egg in the nest of some small bird. About fifteen inches in length, this cuckoo has the size and color of a small hawk.

In the mating season each female cuckoo has a definite range in which it seeks out the nests of small bird neighbors.

Each cuckoo is believed to parasitize nests of one kind of bird to the exclusion of others, one selecting the meadow pipit, another the hedge sparrow, another one of the wagtails, and so on.

Often the cuckoo removes one egg of the rightful owner to make room for her own, and in all events the young cuckoo when

hatched soon gets rid of its other nest companions.

FIRST ACT IS TO KILL

With an instinct that is almost gruesome, the parasite, still too young to have its eyes open or to hold itself erect, works and squirms its body beneath those of its companions, gets them on its back, and then with awkward but certain movements heaves them over the edge of the nest.

One by one the rightful babies are thrown out until the cuckoo remains in solitary possession, so that it may profit by all the food brought by small but attentive foster parents, who through all this ghastly procedure never seem to understand that they are being duped.

The young cuckoo grows apace, until beside its small attendants it appears truly monstrous before it finally leaves their care.

While the cuckoo is larger than the species that it ordinarily chooses to parasitize, its egg is small. Thus it may not offer too great a contrast to those of the foster parent and so cause sufficient alarm to bring about desertion of the nest. Furthermore, individual cuckoos become specialized for the parasitism of particular kinds of birds, and have developed a modified color in their eggs to agree with those of the host.

In England the common cuckoo has an egg that matches fairly well in color those of the wagtails and pipits. In other parts of Europe some cuckoos produce bluish eggs like those of the European redstart. Even more striking color resemblances are found among the eggs of cuckoos in India.

Naturalists have argued for scores of years over the method used by the cuckoo in placing eggs in the nest, and today opinion in the matter varies.

Where the nest is open it appears that the egg may be laid directly into it. But where the nest is built in a hole or crevice into which the cuckoo's body cannot possibly enter, many claim that the cuckoo lays on the ground and brings the egg to the nest in her mouth. Others hold that the egg is laid in the entrance of the nest and so put into place.

In contrast to this bizarre parasitism, many species of cuckoos build nests and care for their own young attentively. This is the case with the familiar yellow-billed and black-billed cuckoos of the United States (Color Plate III and page 813).

Some observers say that these two are occasionally parasitic on each other, but this is not their regular custom.

It may be added that many birds place eggs occasionally in nests other than their own. Ordinarily this is a casual circumstance, owing perhaps to necessity arising when a nest has been destroyed and an egg has developed, or to mere carelessness on the part of a young bird. Such may be the explanation of apparent parasitism among our North American cuckoos.

One hot April day in Haiti I came slowly down the slopes of a mountain, interested in the abundant gray robins, lizard-cuckoos, strange flycatchers, and other birds that were seen at every turn.

As I paused to admire a view of the valley below, I heard a curious cooing call coming from a group of tall trees. With nasal cadence it came again, and I walked forward, watching intently in expectation of finding some peculiar pigeon.

Suddenly a brilliant green bird marked with red beneath alighted on a branch in front of me to utter the strange call, which I now knew was the note of a trogon. An instant later it had retreated to the tree tops where I saw only its silhouette, dark against the sky, with no hint of its wonderful colors.

The trogons (family Trogonidae) include more than sixty forms. Three species inhabit Africa, and sixteen are found in India and adjacent regions. The remainder live in the warmer parts of the New World, one coming as far north as southern Arizona (page 813).

Nearly all are birds of lovely plumage, the most resplendent being the quetzal (*Pharomacrus mocinno*) of Central America. One of the largest of its family, this handsome bird has metallic-green plumage above, red underparts, a compressed crest, and long, flowing upper tail coverts that fall in a sweeping curve more than two feet below the tail.

STRANGE HABITS OF SOME KINGFISHERS

The quetzal to the Aztecs was the emblem of Quetzalcoatl, God of the Air, and as such was sacred, its plumes being reserved for the chiefs. It is today the national bird of Guatemala, being shown on the coat of arms of the country and also on stamps.

Our common belted kingfisher (Color Plate IV) is so associated with water and a



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FLOCKS OF BRILLIANT PARAKEETS ONCE ROAMED THE SOUTH

The green-yellow-and-orange CAROLINA PARAKEET (upper) ranged from Florida to Virginia and westward in the early years of the Nation; some even wandered north to New York and Wisconsin. Many were shot because they ate fruit, and now they are nearly extinct, but a few may remain in remote southern swamps. The bird uses one strong foot in the manner of a hand for grasping food, while it clings to a branch with the other. The larger THICK-BILLED PARROT (lower) sometimes appears in southeastern Arizona in quest of pine seeds, which it digs from tough cones with its powerful beak.

diet of fish that it is startling to learn that many of the family have other habits. I recall distinctly my own surprise in northern Argentina when a tiny green-backed kingfisher, no larger than a sparrow, flew out to seize a passing insect on the wing.

True enough, this mite of a bird came later to fish for minnows in a lagoon, but wherever I encountered it afterward I had the feeling that it was always likely to do some strange and unusual thing.

The kingfishers (family Alcedinidae) have almost world-wide distribution and number more than 200 forms.

The kingfisher of Europe (*Alcedo atthis*), whose flashing colors I have seen along the Thames in England, is only seven inches long. Above it is bright blue, and below it is colored rusty red.

The kookaburra, or laughing jackass, of Australia is a large kingfisher that lives on dry land far from water. At intervals it opens its huge bill to utter a loud, rolling call from which it derives its common name. It is one of the famous birds of the island continent, widely known, and often displayed in zoos (page 828).

Many other kinds of kingfishers live in forests or on dry land, where they feed on insects, lizards, and other animal foods.

FLYCATCHER CLAN 600 STRONG

The pampas of South America offer many anomalies in their birds. On my first day afield near the great Rio de la Plata of Argentina I saw a small, jet-black bird the size of a phoebe running like a robin on the ground. About the eye there was a curious wattled circle, like a little comb, of yellow, and when the bird flew there was a brilliant flash of white from the center of each wing. This was the *pico plata*, or silver bill, a curious flycatcher.

Later I found a number of related species, all as much at home on the ground as so many sandpipers. The majority of the flycatcher family, however, are birds of thickets and woodlands (Color Plates V-VIII).

The flycatchers (family Tyrannidae) are one of the few families of birds confined entirely to the New World. More than six hundred kinds are known to science, some of them of beautiful color and striking form, but many so obscure that they are known to few ornithologists. They are most abundant in the Tropics, but range widely, except in regions of extreme cold.

The majority are small birds and feed on insects which they capture expertly on the wing. They have developed broad flat bills and a fringe of hairlike bristles about the sides of the mouth that assist in entrapping their moving food. Their bodies are slender, and their feet small.

A number have greatly elongated tails, and many sport concealed spots of color in the feathers of the crown which they display at times with a surprise effect that is highly pleasing.

The most ornamental in this respect are the royal flycatchers of tropical America which have a conspicuous crest of red, tipped with steely blue, that is spread like a fan, much larger than the head, to form a truly resplendent ornament.

Carolina Parakeet

(*Conuropsis carolinensis*)

The Carolina parakeet, like the vanished passenger pigeon and great auk, has disappeared with increasing settlement in our country, until now it is nearly extinct (Plate I).

When the southeastern and central United States was first explored, the parakeet was abundant in many localities. Travelers, attracted by its flocking habit and brilliant colors, made frequent mention of "parrots" in their writings. But none recorded the habits of this bird in detail, so that now what information we have must be pieced together from scattered sources.

Although most common apparently in the Gulf States, the parakeet ranged widely toward the north even during seasons of cold. Captain John Smith wrote of Virginia that "in winter there are great plenty of Parrats," and the birds were also recorded from Maryland at that season.

Their decrease began early. Audubon in 1832 said the parakeet was lessening in numbers, and by 1900 few remained in Florida, where they were once abundant. Dr. Frank M. Chapman saw two small flocks in April, 1904, near Lake Okeechobee, and casual report of them came from residents in that area until 1920.

For years the bird was considered extinct, but recently there has been persistent claim that a few remain in certain remote swamps of South Carolina. At this writing (April, 1936) the number left is not known, but we may hope that this interesting species may not be lost to us as a living bird.

According to available accounts, this parakeet in earlier years ranged in noisy flocks wherever food was plentiful. Normally the birds fed on seeds of cypress, pine, and thistle, and also on cockleburs and sandburs whose rough hulls were shelled easily by strong bills. At night the flocks gathered in hollow trees where they clung suspended by feet and bills.

The parakeet was hunted for food and sport at an early day. Indians used its plumes for ornament, and early white settlers found its flesh good to eat.

With the planting of grain and orchards the birds became destructive to crops, and thousands were killed by farmers. Parakeets were said to be especially bad in apple orchards, as they cut up the fruit to get the seeds, sometimes stripping the trees completely. In Florida hundreds were trapped to become cage birds and thousands more were killed. Under these circumstances the birds rapidly decreased.

The Carolina parakeet nested in hollow trees, where it deposited pure-white eggs on whatever rubbish was accumulated in the cavity. Somewhat uncertain reports indicate that from three to five eggs constituted a set. It has been recorded on hearsay that the birds made nests on the horizontal limbs of cypress trees, but this statement seems to be erroneous.

The Carolina parakeet proper (*Conuropsis carolinensis carolinensis*) formerly ranged from Florida and Alabama north to Maryland, and was found casually in Pennsylvania and New York. A western race, slightly duller in color, the Louisiana parakeet (*Conuropsis carolinensis ludovicianus*), was found from Louisiana and Mississippi to Ohio, Wisconsin, and Nebraska.

Thick-billed Parrot

(*Rhynchopsitta pachyrhyncha*)

In the Chiricahua Mountains of southeastern Arizona, at intervals of several years, flocks of large parrots come to feed on the seeds concealed in pine cones (Color Plate I).

Bills and feathers become smeared with pitch, but the food is rich and attractive and the birds linger in the pines until all this food is gone. Cold does not trouble them, and they may remain through the ice and snow of winter, feeding on acorns when the crop of pine cones has been harvested.

The birds are found in flocks and range widely, passing at times to other near-by mountains. After a few months they disappear.

The proper home of this fine bird is in the mountain ranges bordering the Mexican tableland, where it lives in large flocks among the pines. The huge imperial woodpecker of that area is a friendly neighbor, as its old nesting holes, cut in dead or living pines to a depth of one and one-half to two feet, furnish the parrots with shelters in which to rear their families.

From one to three eggs are deposited on the fine bits of wood in the bottom of these cavities, often late in the season, as small young have been found in October. Since the parrots range from 4,000 to 10,000 feet altitude, the nights then are cold and the young parrots must undergo some hardship.

The last large invasion of these parrots in the United States came in July, 1917, the birds remaining until the following March. Their occasional appearance is believed to be due to some lack in the food supply in their proper home.

The thick-billed parrot is found normally in the mountains of northern and central Mexico. In the United States, in addition to the Chiricahua Mountains, it has been found in the Dragoon, Galiuro, and Graham mountains in Arizona.

Smooth-billed Ani

(*Crotophaga ani*)

The curious ani is of only casual occurrence within the United States, but in the larger West Indian islands it is common (Color Plate II).

In a Puerto Rican pasture I first saw these black, long-tailed birds on the ground, feeding on insects disturbed by cattle.

As I drew near, the anis began to call querulously and then flew in straggling procession across the field to perch in a tree. There they crowded so closely that they touched one another, their long tails and narrow, high-arched beaks giving them an odd appearance.

Always sociable, anis often build a bulky community nest of sticks in a tree. In this several females lay, and as many as twenty eggs may be found together. The habit is not universal, however, as I have found one pair building apart from the others. The eggs are clear blue, covered with raised white lines of a chalky deposit.

The smooth-billed ani is resident from



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STRANGE ANIS AND SWIFT ROAD-RUNNER ARE CLOSE COUSINS

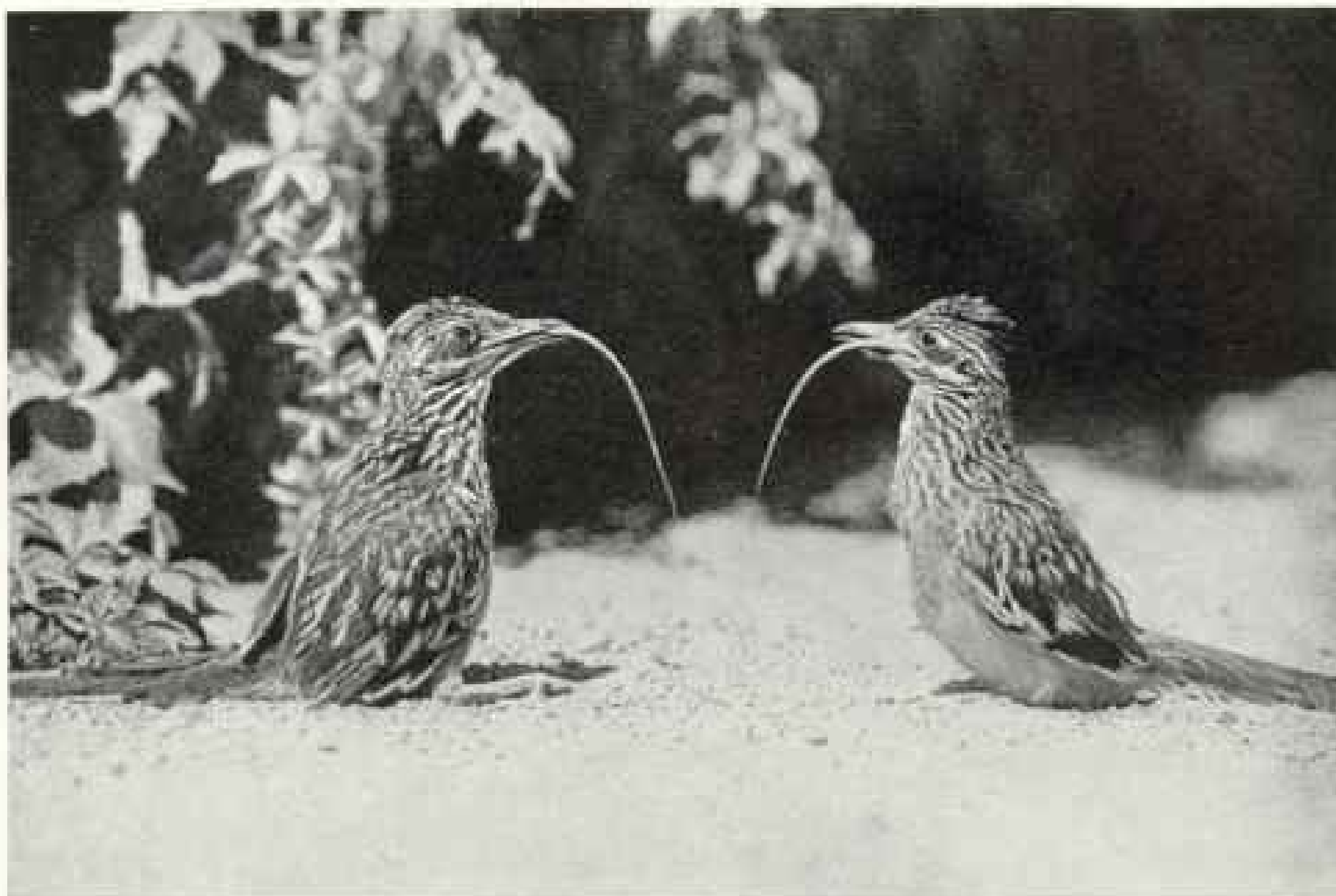
All are members of the cuckoo clan, although they bear little resemblance to their relatives except for the long tail (see opposite Plate). The SMOOTH-BILLED ANI (upper left) and the GROOVE-BILLED ANI (right) are subtropical birds which barely come within the borders of the United States. Like cowbirds, they are often seen around cattle and feed on parasitic insects. The ROAD-RUNNER, swallowing a lizard, is a ground cuckoo which rivals a horse in fleetness.



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AMERICAN CUCKOOS ARE WHOLLY UNLIKE THE BIRD OF THE CUCKOO CLOCK.

Instead of a cheery *cuckoo*, their "song" is an unmusical succession of chucks and clucks. Here the BLACK-BILLED eats tent caterpillars while the YELLOW-BILLED utters a guttural note. In contrast to the European cuckoo, which habitually lays its eggs in the nests of other birds, they normally hatch and rear their own young. The COPPERY-TAILED TROGON, of red breast, lives along the Mexican border, and is a relative of the gorgeous quetzal, worshiped by the Maya and Aztecs.



Photograph by William L. Finley

LIZARDS, HALF SWALLOWED, STIFLE CONVERSATION BETWEEN TWO YOUNG
ROAD-RUNNERS

Such a reptilian dinner may be 10 or 12 inches long and disappears at the rate of about an inch every two minutes. The creatures are eaten head first, so that they slip down easily, and their scales prevent them from backing out. A well-balanced diet for a road-runner may include, in addition to lizards, crickets, beetles, caterpillars, and even small snakes (page 805).

the West Indies and Yucatán south into central South America. It has been found rarely in Louisiana and Florida and casually elsewhere.

Groove-billed Ani
(*Crotophaga sulcirostris*)

Except for the smaller bill with distinctly impressed lines or grooves along its sides, this bird is almost the exact double of the smooth-billed ani (Color Plate II).

It has been widely believed for centuries that anis extract many ticks from the skins of the domestic animals around which they feed in small flocks. But actually much of the credit for this belongs to the equally black grackles that range with them.

Long and slender, anis are slow and direct in flight, alternately beating their small wings and sailing. In a strong wind they are almost helpless.

The groove-billed ani's eggs and gregarious nesting habits are similar to those of its smooth-billed relative (page 809). It is resident from the lower Rio Grande Valley in Texas to Peru and British

Guiana. The San Lucas ani (*Crotophaga s. pallidula*), a paler race, is found in the southern region of Baja California.

Road-runner
(*Geococcyx californianus*)

Walking along a sandy trail in southern Arizona, I noticed a curious track shaped like a crude X, made obviously by a foot with two toes that pointed forward and two backward. The imprints were spaced in long strides that indicated a creature of fair size, and were so balanced that it was difficult to say which way the animal was traveling until I noticed that the forward-pointing toes were more deeply impressed in the loose soil.

A slight movement under a bush some distance ahead announced the maker of the curious marks, as I saw the long bill, the crested head with a spot of brilliant red on the side, and the elongated tail of a road-runner (Plate II).

Finding that it was discovered, the bird started off at a rapid run and almost at once was out of sight.

This strange cuckoo is so entirely terrestrial that ordinarily it prefers to run and hide rather than take to its wings, though when under the necessity it flies with ease. In the days of horse travel, road-runners delighted in appearing in the trail ahead to run easily with head low and tail straight behind, readily keeping in front. Finally, tired of the game, they would dash aside and suddenly elevate tail and crest. The light eyes and strange attitude at such times gave the bird a grotesque appearance.

The road-runner is primarily an animal feeder, preferring lizards and large insects, which it seizes with its strong bill most expertly. It is not above taking an occasional young bird from the families of its neighbors, but the damage that it does in this direction is considered slight.

Many tales are current of the enmity of the road-runner for the rattlesnake. According to these stories, the astute bird builds a hedge of thorn-covered cactus pads about coiled rattlesnakes, even those of the largest size, to preclude all possibility of escape, and teases the reptile until it leaves the security of its coils; the snake is then dispatched by blows from the sharp bill.

It is to be feared that these stories are more intriguing than true, though it is certain that the road-runner will kill and eat small snakes of any kind (page 805).

The nest of the road-runner is built of sticks with a lining of feathers, snakeskin, bark, and other soft materials. It is placed in bushes or low trees, sometimes in cactus plants. It holds usually from four to nine white or buffy-white eggs, but as many as twelve have been found in one nest.

The road-runner is found from northern California and western Kansas south into central Mexico.

Coppery-tailed Trogon

(*Trogon ambiguus ambiguus*)

An exotic species that comes across the southwestern border of the United States, the coppery-tailed trogon, though discovered within our limits fifty years ago, still remains little known (Color Plate III).

It has been found most often in the Huachuca and Santa Catalina Mountains of Arizona, where it lives among the pines and oaks of remote canyons, and is known also from the San Luis Mountains, New Mexico, and the lower Rio Grande Valley in Texas. On the wing the birds resemble pigeons.

Trogons are usually solitary. It is unusual to find more than a pair together. The bird illustrated on the accompanying plate is a male. In the female the head and back are brown and the red of the underparts is much reduced.

It nests in cavities of trees. The three or four eggs are dull white in color.

Black-billed Cuckoo

(*Coccyzus erythrophthalmus*)

On a warm September day, as I crossed a field on the slopes of Whitetop Mountain in the Blue Ridge Mountains of Virginia, a black-billed cuckoo flew from a thicket to a solitary tree (Color Plate III and page 805).

Walking up slowly, I had to look for several minutes before I made out the bird's slender form as it perched motionless, concealed by branches and leaves. With its slim body and long tail it seemed a part of the branches.

The clucking notes of others came from near-by slopes and a little farther on we saw one feeding a young bird just from the nest, though the summer season was ended and most birds had long ago completed their nesting.

The nest is built of sticks and rootlets lined with softer materials, usually at an elevation of less than ten feet and, rarely, on the ground itself. The eggs are plain blue and number from two to six, or, rarely, as many as eight.

The black-billed cuckoo nests from southeastern Alberta and Nova Scotia to Kansas, and in the mountains to northern Georgia. It winters in South America from Colombia to Peru.

Yellow-billed Cuckoo

(*Coccyzus americanus*)

A series of grating notes, half harsh and half resonant, following one another in definite arrangement—to most persons that is the yellow-billed cuckoo (Color Plate III and page 805).

Watch closely among the leaves and presently you may see a slender bird with long, white-spotted tail, and, as it turns its head, a distinct flash of orange yellow from the lower half of the bill. More often the bird is merely a somewhat ghostly voice, without definite substance, in the tree tops.

Any farmer will tell you that the voice of the "rain crow" prophesies a downpour, particularly when the bird is loudly vociferous.

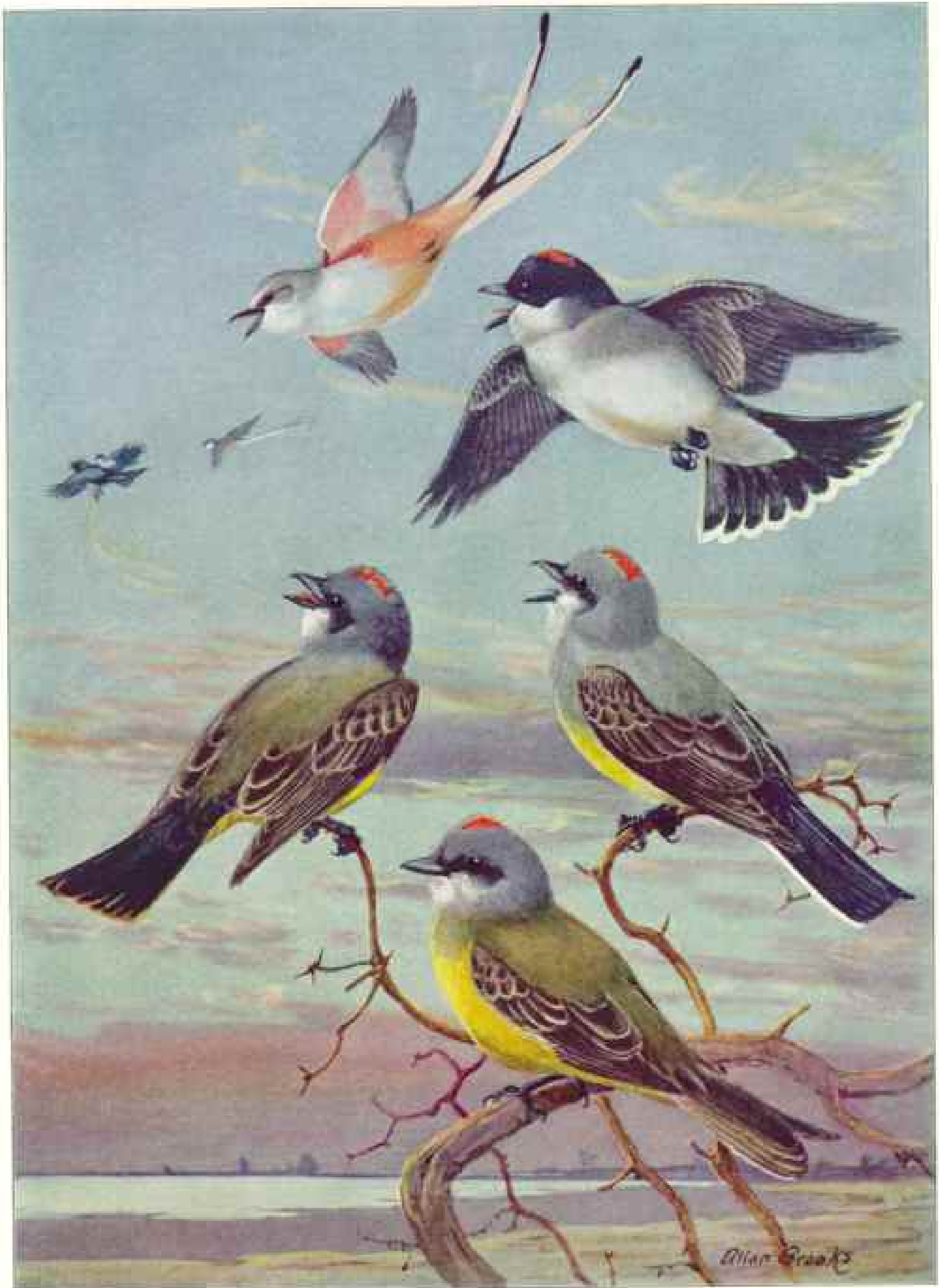


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KINGFISHERS CAN PLUNGE 50 FEET OR MORE AND SNATCH A SWIMMING MINNOW

Familiar citizens of most of the United States are the BELTED KINGFISHERS (lower), which jealously guard their fishing preserves against poaching rivals. Poised on beating wings, the male is about to dive and seize a small fish in his long, sharp bill, while the perched female sounds the characteristic rattling call. Among the small TEXAS KINGFISHERS (upper) styles are reversed, and the male, not his mate, wears the rufous breast adornment. Both kinds nest in burrows in banks, usually not far from a pond or stream.

FLYCATCHERS AND OTHER FRIENDS IN FEATHERS



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SWIFT, COURAGEOUS KINGBIRDS ROUT HAWKS AND LUMBERING CROWS

In the distance a doughty little warrior is winning such an aerial battle, pursuing closely and sometimes actually riding on its much larger foeman's back. All four of the birds with the orange-red crowns are KINGBIRDS—the EASTERN in flight, the ARKANSAS, or WESTERN, just below it, CASSIN'S (left), a far westerner, and COUCH'S (bottom), which nests in southern Texas. Like the Southwest's aptly named SCISSOR-TAILED FLYCATCHER (top), which shares their courage, they all live mainly on insects caught on the wing.



© Wright M. Pierce

BIRDLAND GANGSTERS FLEE WHEN THIS POLICEMAN OF THE AIR IS ON PATROL

The Arkansas, or western, kingbird, like its eastern cousin, fearlessly attacks marauding crows that destroy birds' eggs and pull up young corn, and hawks that sometimes eat young birds. If it nests near a poultry yard, it affords protection to the farmer's chickens (page 820).

This belief I do not care to challenge, since the cuckoo calls most frequently at seasons when rain is common!

Like its black-billed cousin, this cuckoo feeds on the hairy caterpillars that live in webs in shade and fruit trees and strip adjacent branches of fresh-grown leaves.

I have often opened the stomachs of this and other cuckoos with similar habits and found the inner walls so filled with spiny hairs from caterpillars that the stomach seemed to be lined with fur. No harm comes from this and at intervals the stomach lining is shed in pieces, leaving the cavity smooth and clean.

The yellow-billed cuckoo builds a loosely constructed nest of twigs with a small cavity in which it places from two to six (rarely eight) pale-blue eggs. These are larger and lighter in color than those of the black-billed cuckoo.

Although the eggs of black-billed and yellow-billed cuckoos have been reported occasionally in the nests of other birds, I believe that this is a casual circumstance and that neither can be considered parasitic.

The yellow-billed cuckoo (*Coccyzus*

americanus americanus) nests from North Dakota and New Brunswick to northeastern Mexico and Florida. In winter it is found from Venezuela to Uruguay.

The California cuckoo (*Coccyzus a. occidentalis*), which is slightly larger and paler, is found from British Columbia and Colorado to Baja California and western Texas. It is supposed to winter in South America.

Texas Kingfisher

(*Chloroceryle americana septentrionalis*)

Along any small stream in southern Texas one may encounter a bird that is obviously a kingfisher and yet is no larger in body than a bluebird (Color Plate IV).

Its strong, heavy bill, its position as it rests on a perch, and its mannerisms are unmistakably those of its larger, more common cousin. But its small size gives the bird certain liberties, as it may dart out at any moment, like a flycatcher, to snap at some flying insect. In the next instant the bird is intent on minnows and other small creatures in the water. It prefers small clear streams to the larger rivers with silt-laden currents.

The Texas kingfisher burrows in a perpendicular sand bank, sometimes in company with bank swallows, to make a nest chamber two feet or so from the entrance. In this it places five or six clear-white eggs. Many of its nests are destroyed by floods.

The call is a low clicking note, given with a twitch of the tail and a jerk of the body.

This kingfisher ranges from southern Texas south into Mexico as far as Yucatán. It is also found in southern Arizona. Several closely allied forms are spread through tropical America as far as northern Argentina.

Belted Kingfisher

(*Megaceryle alcyon*)

While a land bird in the sense that it is not truly aquatic, the kingfisher finds water essential for its life, as from ponds and streams it obtains most of its food. Though more common on fresh water, it ranges also along the ocean and brackish inlets in both summer and winter.

A high-pitched rattling call and a flash of gray-blue and white announce the presence of this bird, flying ahead as we follow any winding stream in summer. At intervals it perches on posts or limbs, usually over the water, when its crest of feathers and heavy bill make its head seem so large as to be almost unwieldy (Plate IV).

The kingfisher watches intently as small fish swim below it, and then plunges suddenly, head foremost, into the water, where its heavy bill serves as an efficient instrument to seize its slippery prey. Often it hovers in the air, remaining stationary with rapidly beating wings, until fish break below; then it darts down to capture them.

In Haiti and Puerto Rico, and elsewhere in the West Indies, I have seen the kingfisher in its winter home not only feeding on fishes but also watching for small crabs that walked on the mud at the edge of mangrove swamps.

A kingfisher's home consists of a tunnel driven into the perpendicular face of an earthen bank. Cut banks above streams and lakes are natural locations, but kingfishers are progressive and use the walls of railroad cuts and other excavations, sometimes those distant from water.

The burrow extends from 4 to 15 feet or more, with an enlargement at the end. Here, on a mass of regurgitated fish bones, rest from five to eight pure-white eggs.

The eastern belted kingfisher (*Mega-*

ceryle alcyon alcyon) breeds from Mackenzie and southern Labrador to the southern border of the United States and west to the Rocky Mountains. In winter it goes into the West Indies and northern South America. The western belted kingfisher (*Megaceryle a. caurina*), somewhat larger, is found from northern Alaska through the Rocky Mountain region, in winter going into northern Mexico.

Scissor-tailed Flycatcher

(*Muscivora forficata*)

A view of this flycatcher against the clear green of a spring landscape entirely justifies the local name, "bird of paradise," by which it is often known. Though small in body, it seems of good size because of the long, forked tail (Color Plate V).

As a distant silhouette against the sky, the scissor-tail is remarkable mainly for its slender outline. But near at hand its soft, beautiful colors arouse admiration. It is a bird of the open prairies, where bushes and scattered trees afford observation perches from which to watch for its insect food. With the kingbirds it assumes police duties in harrying crows, hawks, and other larger birds.

In spring the scissor-tail darts across the sky excitedly in a zigzag, aerial dance accompanied by harsh, chattering notes, a veritable explosion of color and sound combined. Its nest is a compact cup of twigs, weeds, and grass, lined with softer materials, placed in small trees, often in mesquites. It contains from four to six white or creamy eggs, spotted boldly with brown and lavender.

The scissor-tail nests from southern Nebraska to Texas and spends the winter from southern Mexico to Panama. Individuals have been found casually, probably storm-driven, at many points outside this range.

Eastern Kingbird

(*Tyrannus tyrannus*)

The kingbird always arouses admiration for its alert bearing and fearless harrying of birds much larger than itself (Plate V).

Let a crow pass near its chosen territory and the kingbird circles out at once with incisive cries and quickly beating wings to rise above the black intruder and dart at it savagely. The swooping and diving with which the crow attempts to elude its small tormentor show that these attacks are not play.



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FLYCATCHERS ARE VALUABLE ALLIES IN THE ETERNAL WAR AGAINST INSECTS

Fortunate is the farmer whose orchards or groves shelter the GREAT CRESTED FLYCATCHER (upper left), as it eats prodigious numbers of weevils, beetles, and other crop destroyers. This bird has the mystifying habit of weaving a snake's skin into its nest. Its four companions are westerners. The ASH-THOATED FLYCATCHER (upper right) lives in the Far West, the OLIVACEOUS and SULPHUR-BELLIED (center, left and right) in the mountains of Arizona, and the large DERBY FLYCATCHER (bottom) in the lower Rio Grande Valley.

FLYCATCHERS AND OTHER FRIENDS IN FEATHERS



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MILLIONS OF PESTS ARE DESTROYED BY THESE WINGED FLYTRAPS

Small, pert, and energetic, the LEAST FLYCATCHER (upper left) often dashes down to the grass in pursuit of its insect prey. Less well known are the ALDER FLYCATCHER (upper right) of similar color but different note, the BUFF-BREASTED (center left) of southwestern mountains, and the shy, retiring YELLOW-BELLIED (center right). The EASTERN PHOENIX (lower right), a near neighbor of man, catches insects with an audible snap of its bill and animatedly speaks its name. SAY'S PHOENIX (lower left) and the handsome BLACK PHOENIX (lower center) are western kinsmen,

Frequently I have seen a kingbird alight on the larger bird's back while it pecked and pulled at its feathers.

With the crow driven beyond the bounds of the kingbird's territory, the little warrior returns with widely spread, vibrating wings to circle down to its perch. Hawks and other birds are fair game and are driven across the sky with excited calls.

Kingbirds often build their compact, softly lined nests above water, placing them openly, without concealment, on overhanging branches. They nest frequently in orchards and in roadside trees, always with fearless disregard for the protection ordinarily sought by birds of their size, since as audacious warriors they have every confidence in their prowess in protecting their homes. The nest contains three or four eggs, rarely five, white or creamy, spotted boldly with brown and bluish gray.

Kingbirds feed mainly on insects; in late summer eating such small wild fruits as chokecherries. They are entirely beneficial, being favorites with most farmers because of their services in harrying crows and hawks from chicken yards.

This species nests from southern British Columbia and Nova Scotia to Texas and Florida. It winters from Mexico to northern South America.

Cassin's Kingbird

(*Tyrannus vociferans*)

Burford Lake, the largest natural lake in New Mexico, lies in a great irregular trough near the Continental Divide at an elevation of 7,094 feet above sea level. As the sun was setting after a warm day in June, I walked out from camp in a little dobe cabin to the spring that supplied us with water. The air was cool and birds everywhere were active.

Amid the songs of rock wrens, the scolding notes of a mockingbird, and the cheerful calls of western robins, I heard suddenly an excited medley of odd calls and saw a Cassin's kingbird dart out from the top of a dead tree in an erratic sky dance. It made sudden, quick side darts, abrupt turns and zigzags. The air was filled with the explosive sound of its notes. From high yellow pines others of its kind called in stirring accompaniment (Plate V).

Both here and later in the Chiricahua Mountains of southeastern Arizona, I found the Cassin's kingbirds nesting, sometimes in trees on open hillsides and sometimes in

oaks standing beside ranchhouses. The nests are bulky and the eggs like those of the eastern kingbird, though often less heavily spotted.

Cassin's kingbird nests from central California and central Montana south into Mexico. In winter it ranges to Guatemala.

Arkansas Kingbird

(*Tyrannus verticalis*)

In summer travel on western highways, one sees on wires, bush tops, and other commanding perches a flycatcher that is certainly a kingbird, but that has a light-gray back and yellow underparts. As it flies out to seize an insect with a loud snap of its bill, the black tail is conspicuous. This is the Arkansas, or western, kingbird (Color Plate V).

Like others of its clan, this kingbird is active and aggressive (page 816).

Its nest in bushes or trees is made of weed stems and twigs, lined with softer fibers and feathers. The three to five eggs resemble those of the eastern kingbird.

During the past sixty years the Arkansas kingbird has extended its range steadily eastward until now it occupies wide areas from Minnesota southward where in earlier days it was not known. In the Great Plains area it is found with the eastern bird and it replaces that species in the Far West.

The nesting grounds extend from southern British Columbia and Manitoba to northern Baja California and Texas and thence eastward, the birds having been found recently as far as northern Ohio. They winter from western Mexico to Nicaragua and occur casually in the East.

Couch's Kingbird

(*Tyrannus melancholicus couchi*)

In the lower Rio Grande Valley is found this kingbird, distinguished from others of similar pattern by somewhat darker color (Plate V).

The nest often contains Spanish moss. The three or four eggs are marked by a creamy pink ground color, though the spottings are similar to those of other kingbird eggs.

Couch's kingbird ranges from southern Texas into Mexico, while related forms are distributed widely in tropical America. The gray kingbird (*Tyrannus dominicensis dominicensis*), another distinct species, is regularly seen along the southeastern coast from southern South Carolina into Florida

in summer. It ranges through the West Indies and along the shores of the Caribbean Sea.

Great Crested Flycatcher

(*Myiarchus crinitus*)

Enter any woodland in the eastern United States in summer, walk quietly, and listen to the low sounds that come from ground and tree-top. Soon you are certain to hear the note of the great crested flycatcher, a clear, stirring call of curious tone and cadence.

On dead limbs pointing skyward, half hidden by green foliage, soon there will appear a slender figure with reddish-brown tail, yellow underparts, and gray breast, the bird that you seek (Color Plate VI).

With crest raised the bird rests, darting out at intervals for passing insects and on occasion giving his ringing call.

In a hollow in a near-by tree trunk this interesting bird has placed its nest, lining the cavity with soft materials to receive from four to eight eggs. These are creamy white, most strikingly marked with lines and blotches of brown and lavender, many of the markings running lengthwise and as firmly scrawled as if laid on with a pen. In these modern times the great crest sometimes nests in birdhouses.

As a decorative feature, almost invariably the shed skin of a snake is woven into the nest material, or an entire skin, taken from where the snake had left it on tree trunk or ground, is wound about the upper part of the nest. The practical reason for this, whether to frighten intruders or to decorate, must be left to the reader's decision. Few nests of the great crest are found without it.

True to the habits of its family, the great crest is a pugnacious enemy of all birds that trespass or intrude on what it considers its personal rights. Often in the nesting season it may be seen or heard hustling marauding jays through the tree-tops with loudly snapping bill and sharp outcries. And in protection of its nesting cavities it has been known even to whip completely the aggressive starling that ordinarily is the victor in similar encounters with other hole-nesting birds.

The northern crested flycatcher (*Myiarchus crinitus boreus*) nests from Manitoba and Nova Scotia to Texas and South Carolina, and winters from Mexico to Colombia. The southern crested flycatcher

(*Myiarchus crinitus crinitus*), with larger bill and more greenish back, is found from southern South Carolina through the peninsula of Florida.

Ash-throated Flycatcher

(*Myiarchus cinerascens*)

In the arid Southwest this bird replaces the great crested flycatcher of the East. Heat and sun are so much a part of its life that even in desert areas where there is little shade it seems as much at home as among the oaks and other trees of the lower slopes of the mountains (Plate VI).

Like its eastern cousin, this bird nests in holes, occasionally occupying the domed nests of the cactus wren. In the desert it has been found using hollow iron pipes standing in the sun where it seemed incredible that the incubating bird could endure the heat.

Fragments of snake and lizard skin are sometimes used for nest decoration, but this is not so universal a custom as with the eastern bird. The eggs, which number from three to six, are similar to those of the great crest, but ordinarily have the markings more finely delineated.

The typical ash-throated flycatcher (*Myiarchus cinerascens cinerascens*) is found from Washington and Colorado to northern Baja California and Tamaulipas.

Olivaceous Flycatcher

(*Myiarchus tuberculifer olivascens*)

In the brush-grown canyons of the mountains of southern New Mexico and Arizona this small cousin of the great crested flycatcher is fairly common (Color Plate VI).

Sulphur-bellied Flycatcher

(*Myiodynastes luteiventris swarthi*)

In the middle reaches of Pinery Canyon in the Chiricahua Mountains, Arizona, the white trunks and light-green leaves of a line of sycamores trace in pleasantly contrasting color the winding course of the stream in the canyon bottom against the duller background of the scrub oaks that clothe the hillsides.

As I admired the gnarled and contorted trunks of the trees that shaded our tents, I heard an emphatic note that drew my eyes to the yellow breast of a sulphur-bellied flycatcher perched on a dead limb where its colors were prominently displayed in the sun (Color Plate VI).



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MOST FLYCATCHERS ARE NEAT IN APPEARANCE, BUT ONE IS GAUDY

Compared to his relatives, the vivid VERMILION FLYCATCHER of the Mexican borderland (upper right with his mate) is like a scarlet tanager in a flock of sparrows. His flaming color flashes over a flooded river as he darts after insects, but his lady, perched beneath, is somberly clad. Two other southwesterners are the BEARDLESS (upper left) and COOPER'S FLYCATCHERS (lower right). The OLIVE-SIDED FLYCATCHER (lower left) breeds in northern forests and winters in South America. The EASTERN and WESTERN WOOD PEWEES (left center) likewise migrate to tropic jungles.

As this species remains in the tops of the trees, it would be noticed seldom except for its notes.

The friend whose camp I was visiting pointed out the nest of the flycatcher in a hollow limb. For days I spent much time watching this interesting bird.

For a nest it lines a small cavity in a tree trunk with leaves and other soft materials, on which it places three or four cream-colored eggs, handsomely marked with brown and purple.

The sulphur-bellied flycatcher nests in the mountains of southern Arizona. It migrates through Central America, probably to South America.

Derby Flycatcher

(*Pitangus sulphuratus derbianus*)

Though the Derby flycatcher comes into the lower Rio Grande Valley, it is essentially a bird of Latin America. There, in a variety of races differing only slightly in color and size, it has wide distribution. Among travelers in the American Tropics, it is one of the best known of the small birds (Color Plate VI).

My first view of this species was in the hills above Rio de Janeiro where I saw it against a soul-satisfying background of mountain, harbor, and city. It was one of the first of the many birds I have come to know in South America.

A few days later I heard its querulous calls from the eucalyptus trees in a public park in Montevideo, and still later found it common on the pampas near Buenos Aires and northward into Paraguay.

Its notes give it its local names, rendered as *bemteveo* in Portuguese, *bientveo* in Spanish, and *pit-o-güe* in Guarani, an Indian tongue spoken widely among country people of diverse languages in Paraguay and Argentina. Elsewhere it is called the *kis-kadee*.

In mating display I saw these birds stand erect and bend the bill down to expose the flaring, colored crest, while the partly extended wings fluttered rapidly and loud cracking sounds were made by snapping the bill. The nests are large structures of twigs, with domed top and an entrance in one side. The eggs are cream-colored, spotted with brown.

These flycatchers eat not only insects, but also small lizards, little frogs, and on occasion fish or minnows.

The true Derby flycatcher occurs from the lower Rio Grande Valley in Texas to

Panama. Allied races are widely distributed in Central and South America.

Least Flycatcher

(*Empidonax minimus*)

The smaller flycatchers are the despair of bird lovers, as the various species seem almost exactly alike. It is a relief to encounter among them the least flycatcher, which, in summer, calls *che-bee* steadily and by this homely note may be told with ease from all its fellows (Plate VII).

In many localities the characteristic call gives this bird its common name of "chebec."

The least flycatcher is found in orchards, at the edges of woodlands, and in thickets, where it sits quietly, jerking its tail at intervals and occasionally uttering its explosive call. It often comes to dooryards where there is proper cover for it.

The nest is a compact cup of shredded bark, plant fibers, down, and spiderweb placed in a fork of a bush or tree from eight to thirty feet from the ground. From three to six eggs are laid, pale creamy white without spots.

Least flycatchers nest from Mackenzie and Quebec to Oklahoma and the mountains of North Carolina, and winter from northeastern Mexico to Panama.

The Acadian flycatcher (*Empidonax virens*), found in summer from Massachusetts and Nebraska to the Gulf States, is larger and broader billed.

Alder Flycatcher

(*Empidonax trailli*)

The alder flycatcher comes late in spring when leaves are grown and summer is at hand. Ordinarily it is observed merely as an elusive gray form that darts up out of low, dense cover to seize an insect in the air and then disappears behind the leaves (Color Plate VII).

Usually the compact nest is placed from two to four feet from the ground in a thicket. It contains two to four creamy or pinkish eggs spotted with brown.

These flycatchers are found from Alaska and Newfoundland southward. In August, as soon as the young are grown, they head for the South again.

Buff-breasted Flycatcher

(*Empidonax fulvifrons pygmaeus*)

Among pines and oaks of the southwestern mountains this little flycatcher is



Photograph by Raymond S. Deck

WHAT! NOT ENOUGH YET?

A nesting place near human habitation gives the phoebe some protection from its natural enemies—hawks and owls, skunks, squirrels, and weasels. The nest of green moss and mud is a carry-over from the days when this trusting flycatcher dwelt in a niche under a shelving cliff, as many of its kind still do.

found in summer, the warm brown of its breast identifying it instantly from others of its kind. It is among the least known of its group, as its limited range, from southern Arizona and New Mexico into Mexico, is visited by few who study birds (Plate VII).

The nest of this dainty creature is composed of soft materials fastened, often insecurely, to a branch by filaments of cobweb. The three or four buffy-white eggs are without spots.

Yellow-bellied Flycatcher

(*Empidonax flaviventris*)

Among eastern flycatchers of its group this species is the easiest to identify, since its yellow breast marks it instantly from any of its relatives (Color Plate VII).

In spring it is one of the last of the migrants, not arriving until leaves are grown. In their cover it is often overlooked. Though it is considered rare, I recall a few times when at the end of May I have found it actually common. Low perches in heavily shaded woodlands are its favorite haunts.

This flycatcher ordinarily conceals its nest in heavy moss on the ground, or against a bank or stump. The four or five eggs are white, spotted with brown.

In fall the yellow-bellied flycatcher is even more richly colored than in spring. It nests in the north from northern British Columbia and Newfoundland to central Alberta and northern Pennsylvania, and winters from southern Mexico to Panama.

The western flycatcher (*Empidonax difficilis difficilis*), which resembles the yellow-bellied but is grayer above and duller yellow below, ranges from Alaska and South Dakota to California and western Texas, with a related race, the San Lucas flycatcher (*E. d. cineritius*), in Baja California.

Say's Phoebe

(*Sayornis saya*)

Time after time in the arid regions of the West, as I have approached an abandoned cabin, a gray-brown bird with black tail has appeared on some wire or weather-beaten post. At intervals it twitches its

tail, and rarely may call plaintively. This is Say's phoebe (Color Plate VII).

Often the solitude of its haunts has seemed to me impressed on the bird both in its plain coloration and in its tendency to slip away aloofly until its haunts were once more undisturbed. In contrast to this habit, these birds may come at times to nest under porches or over busy doorways as nonchalantly as the phoebe of the East.

The nest, placed under a bridge, against a building, in a cave, tunnel, or against the side of an arroyo, is made of vegetable fibers and hair, held together with spiderwebs. It holds four or five white eggs, sometimes with a few flecks of brown.

Say's phoebe (*Sayornis saya saya*) is found from central Alaska to southern California and central Kansas.

Black Phoebe (*Sayornis nigricans*)

With its twitching tail and wing tips and its alert air, to eastern bird lovers the black phoebe is at once suggestive of the well-known bird from home (Plate VII).

In California I have found black phoebes about bridges and along irrigation ditches, as well as in city parks and about ranch-houses. Where there is water and shrubbery they may come into city yards. Like the eastern phoebe they are hardy and may remain through the winter in sheltered localities even when frosts are severe.

In spring the male rises with tremulous wings forty or fifty feet in the air to sing, an effort more praiseworthy for its sincerity than for its music.

A little later there will be a nest made of pellets of mud, mixed with fine fibers, lined with wool and feathers, placed under the eaves of a building, against a bank, or at the mouth of an abandoned mine tunnel. This holds from three to six white eggs, sometimes plain and sometimes slightly dotted with reddish brown. Invariably the nest is located near water.

The black phoebe (*Sayornis nigricans nigricans*) is found from southwestern Oregon and southern Utah to southern California and Chiapas in Mexico.

Eastern Phoebe (*Sayornis phoebe*)

When I was a small boy the "pewee" that nested under the bridge was one of the first birds that I came to know. Later I dutifully learned to call it the phoebe in ac-

cordance with the dictum of my first bird book (Color Plate VII).

But listening long and carefully to the constantly repeated call from which the bird takes its name, I never was entirely sure that the nickname was not the better imitation of its note.

In spring the phoebe comes to the borders of little watercourses soon after the ice disappears, and on sunny days calls cheerfully as with twitching tail it watches for dancing gnats and other early insects. During cold storms it retires to willows and other shelter, but comes into the open again as the weather moderates.

It is among the earliest of our smaller birds to nest, making a bulky cup of moss and other vegetable fibers mixed with mud, with a lining of soft materials. This is placed under a porch, against a rock ledge, or in the erect root base of a fallen tree. The three to six eggs are white, rarely with a few small spots of brown. The birds are tame and often nest above a doorway.

During the nesting season the phoebe sometimes rises in the air to sing excitedly for a minute or two. Such a sky dance is usually seen in morning and evening.

This species is found from Mackenzie and Nova Scotia to eastern New Mexico and Georgia. In winter it ranges from Virginia south to the Gulf States and Mexico.

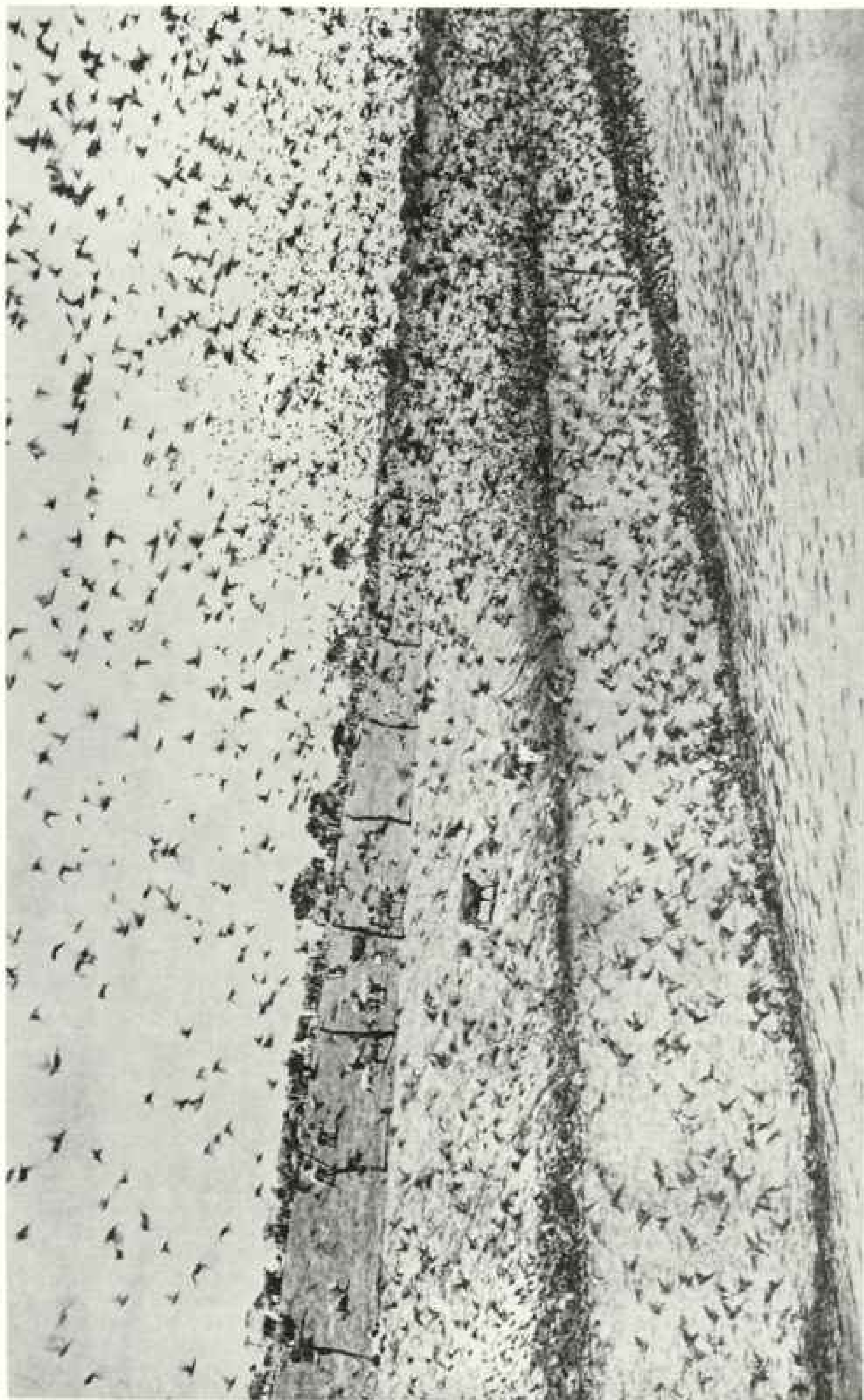
Beardless Flycatcher (*Camptostoma imberbe*)

In a family of birds of fairly orthodox habits, so far as North America is concerned, the beardless flycatcher is truly an anomaly (Color Plate VIII).

First, it lacks the long bristles about the base of the bill that assist the ordinary flycatchers in capturing prey. Also, it hops about among the smaller twigs of the trees and bushes that it frequents, sometimes actively like a warbler and sometimes slowly and deliberately like a vireo.

Add to this a cheerful, twittering song and there is complete a picture of one of the most curious of the smaller species of its family.

This tiny flycatcher often ranges in little flocks that travel rather swiftly through the trees, or move more quietly through the tops of bushes. The nest is a ball of fibers placed at the base of a palm leaf, often near the ground. Two eggs are recorded as a set; they are white in color, spotted with brown in a circle about the larger end.



© The London Times

GREEN PARROTS, SETTLING IN MYRIADS, MADE THIS ARID AUSTRALIAN LANDSCAPE APPEAR VERDANT AND ALIVE

So dense was the flight of the birds that farmers in the sheep and cattle country along the border of South and Western Australia feared that they would pollute the water supply for the homesteads and stock. Before the "plague" of parrots arrived, swarms of grasshoppers had already decimated the fruit and grain crops.

The beardless flycatcher enters the United States in southern Arizona and in the lower Rio Grande Valley, Texas. Southward it is found to Guatemala and Costa Rica.

Vermilion Flycatcher

(*Pyrocephalus rubinus mexicanus*)

It was summer in southern Arizona, and as I pondered plans for the day, waves of heat from the first rays of the morning sun came to me across mesquite-grown flats leading toward distant brown mountains. With a sudden flash of color a vermilion flycatcher rose above the bushes with slowly flapping wings that held it suspended in the air as if on an invisible wire (Plate VIII).

Its brilliant colors seemed to reflect the coming heat of the day as it hung like a giant moth fifty feet above the ground, a burning spot of color in an otherwise barren landscape. Truly, this lovely creature merits its Spanish name of *brasita de fuego*, "little coal of fire."

The effect was the more singular, as on this occasion the bird was entirely silent. Often the display is accompanied by a thin, steely note that carries only a short distance.

This beautiful bird is found in arid regions, often along dry watercourses, where it has the general habits of ordinary flycatchers. The nest is a frail cup of twigs and plant fibers lined with feathers, wool, and down, placed in trees. The two or three eggs are buff, boldly marked with brown and lavender.

Vermilion flycatchers are found from southeastern California, southwestern Utah, and southern Texas to Baja California and southern Mexico.

Eastern Wood Pewee

(*Myiochanes virens*)

A bird of the woods, the wood pewee is often a disembodied voice that comes from a singer unseen. Its note is pleasing, if plaintive, a soft *pee-a-wee* repeated gently without particular emphasis, that often passes our ears without attracting notice. It rests quietly on a dead branch, usually in shade, where its dull colors make it inconspicuous (Plate VIII).

Passing insects provide it with food that it takes expertly from the air, and at times it comes out to rest in the sun on a fence or other open perch.

The nest is a felted cup so covered with lichens that it seems a part of the limb, being distinguished only when the bird flies to it. The three or four eggs are creamy white, with brown spots forming a wreath around the large end.

This bird is found from southern Manitoba and Nova Scotia to Texas and Florida. It winters from Nicaragua to Peru.

Western Wood Pewee

(*Myiochanes richardsoni*)

A counterpart of the eastern bird in size and appearance, except for a slightly darker breast and duller lower mandible, the western wood pewee is chiefly distinguished by its voice. This is a low, double-noted *pee-er*, a whistled call given more quickly and without the cadence of the longer song of its eastern kinsman (Color Plate VIII).

The western wood pewee is a bird of groves along streams and hillsides, of mountain canyons, and of open mountain forests. It is widely distributed and at times is common. In Rucker Canyon in the Chiricahua Mountains of Arizona the songs of this species at the beginning of July made up the greater part of the dawn chorus of birds that awakened me.

As its haunts in part are more arid, this is less a bird of the shadows than the other wood pewee. In late summer in the mountain parks of Colorado I have found it with little flocks of mountain bluebirds in open stands of pine.

The nest is located on a tree limb, and is deeper and more strongly built than that of the eastern bird. The eggs are similar to those of the related species.

The western wood pewee (*Myiochanes richardsoni richardsoni*) breeds from central Alaska and Manitoba to northern Baja California and Tamaulipas. A related race is found in lower Baja California.

Coues's Flycatcher

(*Myiochanes pertinax pallidiventris*)

Among the pines that cover the summit of the Chiricahua Mountains of Arizona, I saw these flycatchers perched on dead branches in the tops of the tallest trees, from which they made sallies to capture passing insects. In form and color they suggest the western wood pewee but are much larger (Color Plate VIII).

The notes are simple, but have a cadence suggestive of wilderness and mountains



Photograph by W. Robert Moore

THE KOOKABURRA'S MOCKING, FIENDISH LAUGHTER MIGHT BE DIRECTED AT ITSELF

"Laughing jackass" the absurdly shaped bird is called by residents and travelers in its native Australian bush. This forest-dwelling kingfisher, like its water-loving relatives, "fishes" from a stump or tree limb. Unfishlike, however, is its "catch," which consists of snakes and insects, mice, rats, and sometimes small birds (page 808).

that rings in my imagination as I write these lines, though it has been fifteen years since I have heard these calls.

The nest is a compact cup placed on a tree limb, often at some height from the ground. The eggs usually number three, and are creamy buff spotted with brown and lilac, often in a wreath about the larger end.

Coues's flycatcher ranges in the mountains from central Arizona and southwestern New Mexico south into Nayarit, Mexico,

Olive-sided Flycatcher

(*Nuttallornis mesoleucus*)

This is a solitary bird, ordinarily found perched in the top of some tall tree, often on a dead limb where it has a clear and unobstructed view. On its breeding grounds in the north and in the western mountains it frequents pine and spruce forests where its loud calls attract instant attention (Color Plate VIII).

In migration I have seen it in orchards, or in roadside trees, but always on a commanding perch. Larger than our other flycatchers excepting the kingbirds, it is

known instantly by the heavy gray band on either side and by the cottony fluff of white feathers that shows above the wing on the lower back.

In middle latitudes of our country I have watched long and eagerly for it, and the rare times I have found a solitary bird have been marked days indeed. In some parts of the western mountains it is common.

The nest is a shallow cup of moss, pine needles, or other vegetable fibers, sometimes low, and sometimes far from the ground. The three or four pinkish or cream-colored eggs are heavily blotched with brown. The old birds are pugnacious in defense of their nests, and dart with loudly snapping bills at the head of any intruder.

The food consists mainly of insects taken while flying. In summer these birds sometimes eat small wild fruits.

The olive-sided flycatcher nests in the great coniferous forests of the north, from central Alaska across to Quebec, ranging south in the mountains to northern Baja California, western Texas, and North Carolina. It winters from Colombia to Peru.

COLOGNE, KEY CITY OF THE RHINELAND

BY FRANCIS WOODWORTH

"COLOGNE? You mean Köln," corrected a Berlin travel agent when I asked for a ticket. He added, smiling, "It has always been a German city with a German name."

Eau de Cologne, the Cathedral, the Rhine (Rhein)—these are familiar aspects of the strategic bridgehead where, in March, 1936, Nazi battalions crossed the Rhine after their spectacular entry into the demilitarized buffer zone between the Reich and France (see map, page 832).

As I left Berlin I watched suburbs merge into flat, treeless farming country, with fields of grain ready for the harvest. In another August, years before, carloads of the Kaiser's troops had rolled along this same road, the direct route to Paris.

West Germany is the Nation's workshop. Every mile nearer the Rhine brings fewer farms and more factories. Thick black webs of railways and forests of smokestacks mark the approach to Köln, chief emporium of the Prussian Rheinland—a region comparable to that of Pittsburgh.

TWO SPIRES LIKE GIANT PINES

The twin spires of the Cathedral, bristling on the horizon like a solitary pair of giant pines, loomed before me exactly eight hours after I had left Berlin. The Gothic pinnacles held all eyes through the car windows long before the low-lying city emerged from the summer haze (page 835).

Then, Father Rhine! A broad, graceful bend gleaming in the afternoon sun, it—or he—greeted me. For ages German minstrels have personified their beloved river. People of Köln honor *Vater Rhein* with a monument, as they would a national hero.

As the train rumbled across the Hohenzollern Bridge to Köln, on the river's left bank, I saw Wilhelm II and three of his royal forbears still sitting majestically astride their sculptured chargers, as if keeping the watch on the Rhine despite their dynasty's fall.

At the main railway station, where there used to be a private waiting room for the Emperor, I was besieged by venders of eau de Cologne. Travelers buy it as they buy Peiping's jade or Honolulu's leis. Half the shop windows, it seemed, displayed neat rows of brightly labeled bottles, many bearing the name of Johann Maria Farina, who,

tradition says, founded the business more than 200 years ago. Farina's descendants still manufacture the perfume in the old family establishment in the Jülichsplatz, competing with scores of other makers all over the world.

"What is the secret of eau de Cologne?" I asked a shopkeeper.

"Expert blending," he replied. "In the original Farina process, flowers, herbs, spices, and drugs are steeped in alcohol, then distilled and mixed with vegetable essences in just the right proportions."

"Is it still made this way?"

"Yes, but many firms use an artificial method. They dissolve several aromatic oils like lemon and orange in alcohol, distill, and add rosewater."

CATHEDRAL LOOMS AT STATION EXIT

Just outside the station I came face to face with the Cathedral, or Dom. Automatically my head tilted back. Up went my eyes, up and up, past tier after tier of sharp, slender arches to the tips of the pinnacles, 515 feet high. It was as unexpected and thrilling as the sudden view of the Capitol when you emerge from the Union Station at Washington, D. C. The Cathedral is so near the railroad that passengers on through trains can jump off for a hasty close-up, snatching a bottle of cologne water on the way.

Sight-seeing busses, streetcars, and taxis were lined up in the Dombhof, a spacious square round which clustered hotels, restaurants, and shops. One of these hotels served as headquarters for the British Army of the Rhine, which occupied Köln for more than seven years after the Armistice. American troops were here, too, but our main concentration was at Koblenz, about 56 miles up the river (page 839).

Carpeting one end of the Dombhof was a pavement of tiny stone blocks, red, brown, and black, their intricate curving designs polished by the feet of generations. Here on the square, almost in the shadow of the Cathedral's spires, I found an ideal observation post, an open-air cafe in a little grassy park. It was crowded with sight-seers, some drinking tea and others sipping beer or white Rhenish wine. Luckily I spied a German train acquaintance who was taking his family to Paris on a vacation jaunt.



Photograph from European Picture Service

ATOP COLOGNE'S CATHEDRAL, ONE LOOKS STRAIGHT DOWN NEARLY A TENTH OF A MILE

Big white umbrellas cluster like mushrooms in the park at this intersection of two main avenues. They shade the tables of an outdoor cafe, where visitors sit and gaze at the towering pinnacles (page 829). Farther along the narrow thoroughfare, beyond the parked sight-seeing busses, an old circular house with a conical roof bulges into the street.



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SPELLBOUND, RHINELAND YOUNGSTERS STARE AT THEIR FIRST GERMAN SOLDIER

The steel-helmeted sentry is one of about 20,000 men who, in March, 1936, reoccupied this area, which was demilitarized following the World War. Most of these Koblenz boys wear typical German school caps.

"Sit down with us," he invited, "and look at Germany's finest church."

If Gothic architecture is "frozen music," then the Cathedral is a stately and moving symphony. What struck me most was the combination of delicate grace and enormous proportions. The west façade was a sheer towering precipice, chiseled like fine lace.

The architect who designed it tricked the Devil, legend says, into giving him the plans. Satan warned him, however, that the Cathedral would never be completed, and, surprisingly, the prophecy held good for nearly six and a half centuries.

Not until 1880 were the original designs carried out on foundations which had been laid in the Middle Ages; and part of the money for the finishing touches had to be raised by a government lottery.

To me the Cathedral's interior was even mightier than the façade. It was not half as high as the spires, yet the very fact that it was all enclosed seemed to heighten the impression of size. Gazing upwards along ascending columns to the ceiling, so lofty that it appeared to be poised in space, I wondered, "How could human beings conceive of such a building, let alone erect it!"

Like doll seats, rows of pews huddled in the broad center aisle. I sat and watched the sun streaming in through one of the gorgeous colored windows, lighting up stone saints here and there on the pillars or illuminating the bowed head of a worshiper. The din and bustle of Köln seemed centuries away.

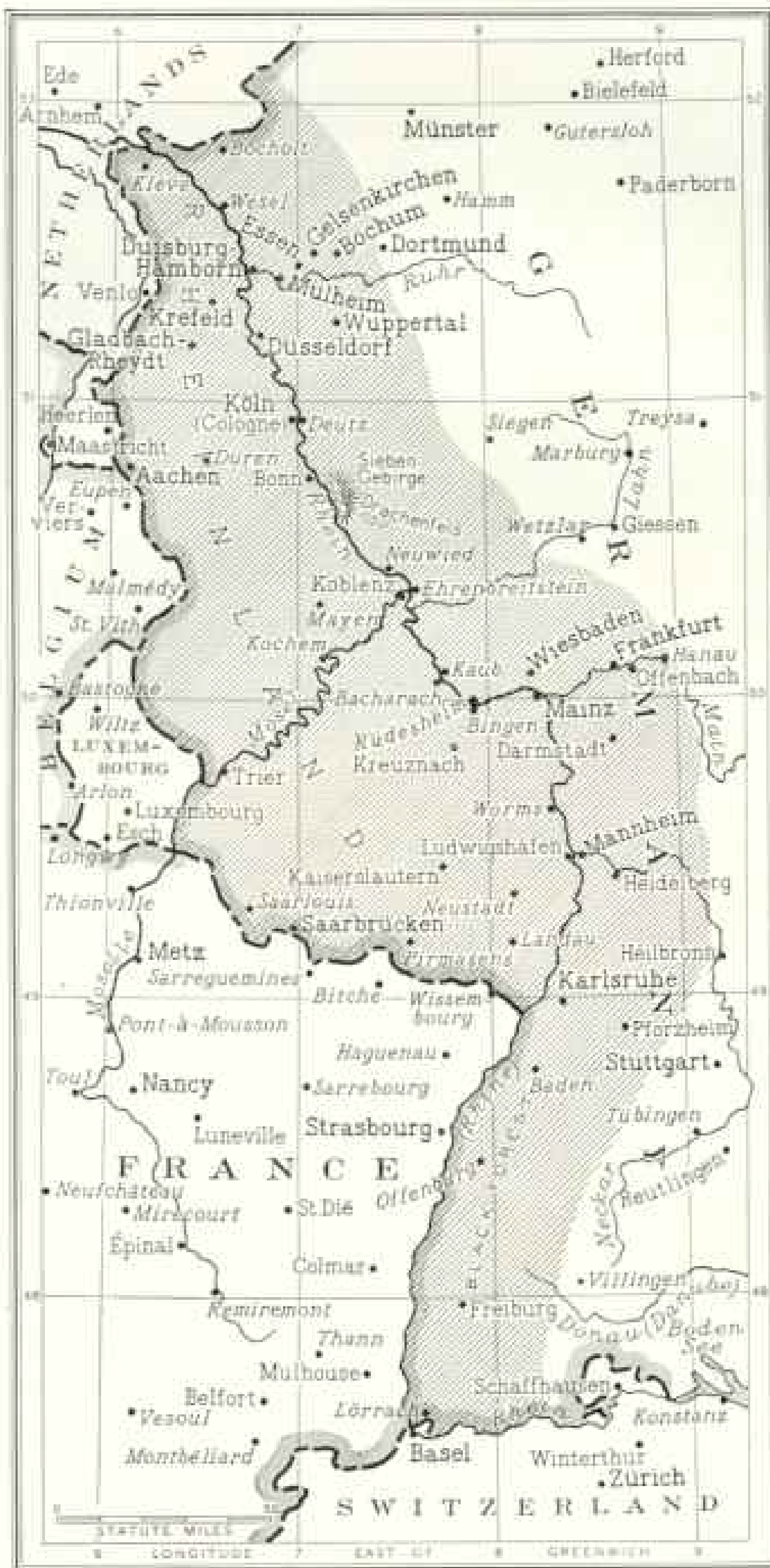
THE RHINELAND LEGEND OF THE THREE WISE MEN

I had read that the Cathedral's most prized possession was the reliquary said to contain the skulls of the Three Wise Men (the Three Kings, they call them in Köln) who followed the star to Bethlehem with gifts for the infant Jesus.

A priest wearing brilliant scarlet vestments led the way to the Cathedral Treasury.

"Pure gold," he said, indicating the reliquary.

It was shaped like a miniature temple, encrusted with jewels and adorned with figures of the three Magi, whose names—Gaspar, Melchior, and Balthasar—were studded on the front. The skulls themselves were not shown.



Drawn by Arthur J. Hayes

"FATHER RHINE" SERVES EUROPE'S MOST POPULOUS AREA

The shaded region, formerly the demilitarized zone between Germany and France, was recently reoccupied by the Reich. The Rhine is navigable continuously from Basel to its mouth in the North Sea opposite the Thames estuary. Ocean-going ships sail upstream as far as Cologne.

"How did the relics happen to come to Köln?" I asked the priest.

"Empress Helena took them from Palestine to Istanbul. They were later removed to Milano, where Frederick Barbarossa discovered them. He presented them to the Archbishop of Köln in 1164. Soon they attracted so many pilgrims that this city became known as the 'German Rome.'

"To this day," he added, "the crowns of the Three Kings are part of Köln's coat of arms."

I paid one mark to climb the Cathedral's south tower. A party of excited German school-boys started at the same time, bounding like goats up the steep stairs. I was winded when we reached the base of the spire.

"These towers used to be the tallest stone structures in the world," chanted the Cathedral guide.

The view was far more impressive to me than that from a New York skyscraper, for no other big buildings challenged the Cathedral's supremacy.

From the curving Rhine, dazzling in the sunlight, gray ranks of houses stretched out in a huge semicircle. Beyond, the flat plain seemed almost illimitable, broken only by a distant range of wooded peaks.

"What are those hills?" I asked the guide.



Photograph from European Picture Service

EVEN COWS ENJOY SWEET GRAPES AT HARVEST TIME!

Genial climate and fertile soil have given the Rhineland its noted white wines, mostly produced in the 90-mile stretch between Bonn and Mainz (map, page 832). Recent findings indicate that vineyards flourished here before Rome's legions occupied the valley.

"The Seven Mountains (Sieben Gebirge)," he answered. "The one nearest the Rhine is the Drachenfels."

I wondered where I had heard that name. Later I remembered — Byron's "Childe Harold's Pilgrimage":

The castled crag of Drachenfels
Frowns o'er the wide and winding Rhine . . .

To my disappointment, the nine bells in the south tower were not rung while I was aloft. Probably it was well, for the boom is deafening even in the street below. The largest bell weighs 25 tons. Formerly there was one of 27½ tons, cast from metal of French guns captured in 1870-71, but this was melted for use in the World War.

A ROMAN COLONY IN TIME OF CLAUDIUS

Köln's name dates from A.D. 50, when the Roman Emperor Claudius established a colony for war veterans and called it *Colonia Agrippina* in honor of his wife. She had been born here when the place was a military outpost in the land of the Teutonic tribe of Ubii. Her name was eventually dropped from the city's title, which was shortened to *Colonia*, then later

changed to its present forms, the German "Köln" and French "Cologne." Agrippina has been forgotten by much of the world, even though she was the mother of Nero; but in Köln I saw her name blazing in electric lights on one of the movie theaters.

The city does not dwell in the past, despite its long history. Strolling along the up-to-date docks and stone levees beside the greenish-white, smoothly flowing Rhine, I watched the unceasing river traffic.

A trim white side-wheeler with a bright yellow stripe put in from Düsseldorf on her way upstream with a throng of excursionists. A signboard on the wharf listed her ports of call.

Each name conjured associations: Bonn, where Beethoven was born; Koblenz and the fortress of Ehrenbreitstein, which American doughboys were the first to occupy after the Armistice (pp. 836, 839); Bingen, with its Mouse Tower where the wicked Bishop who starved his people was eaten up by rats (p. 841); Mainz, home town of Gutenberg, reputed father of printing.

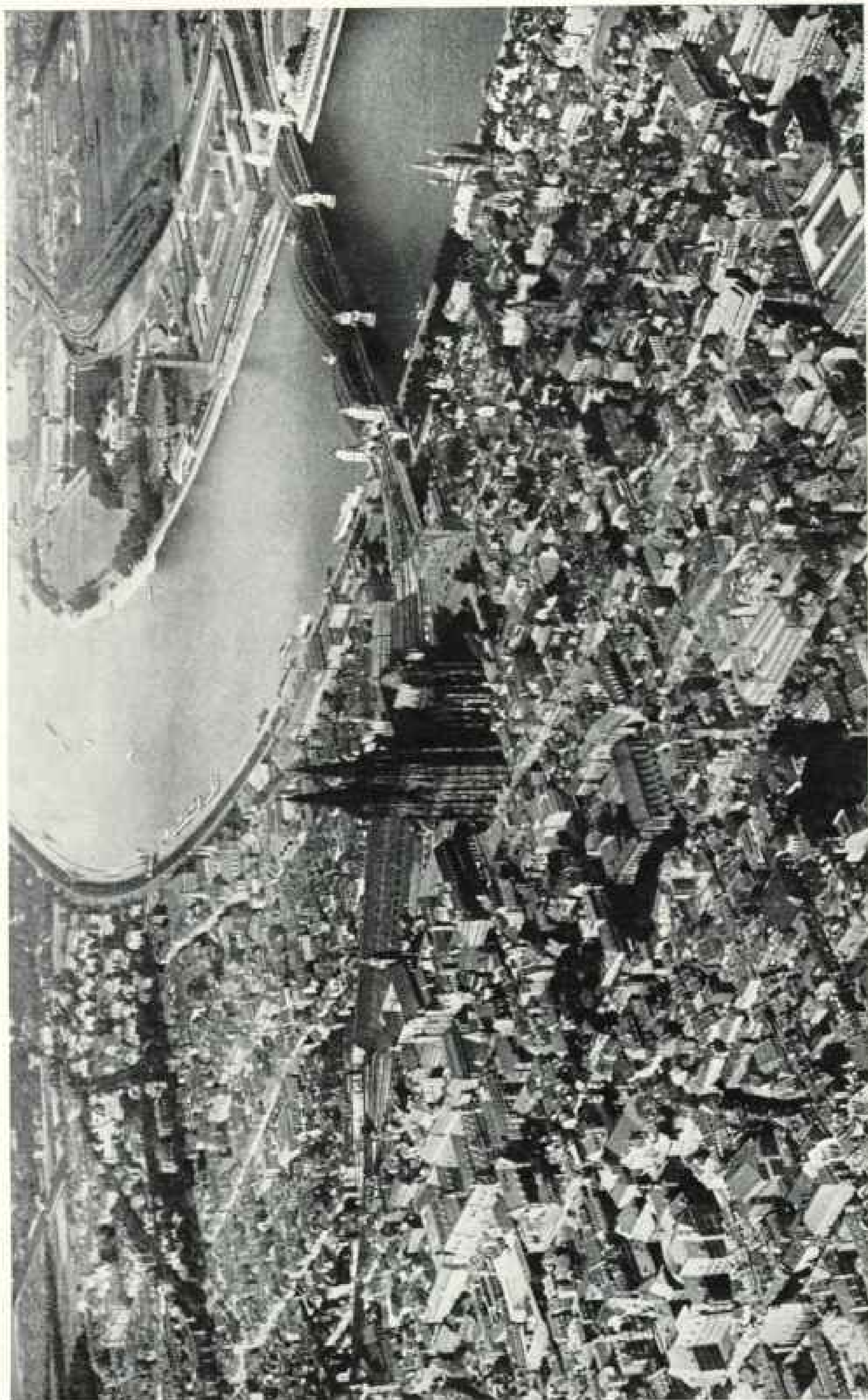
A black-hulled Rhine-sea cargo steamer bellowed a vibrant warning as she nosed



Photograph by Hans Hildebrand

SMOKE PLUMING FROM HER TANDEM FUNNELS, A SIDE-WHEELER THUMPS HER WAY UP THE RHINE WITH A TOW

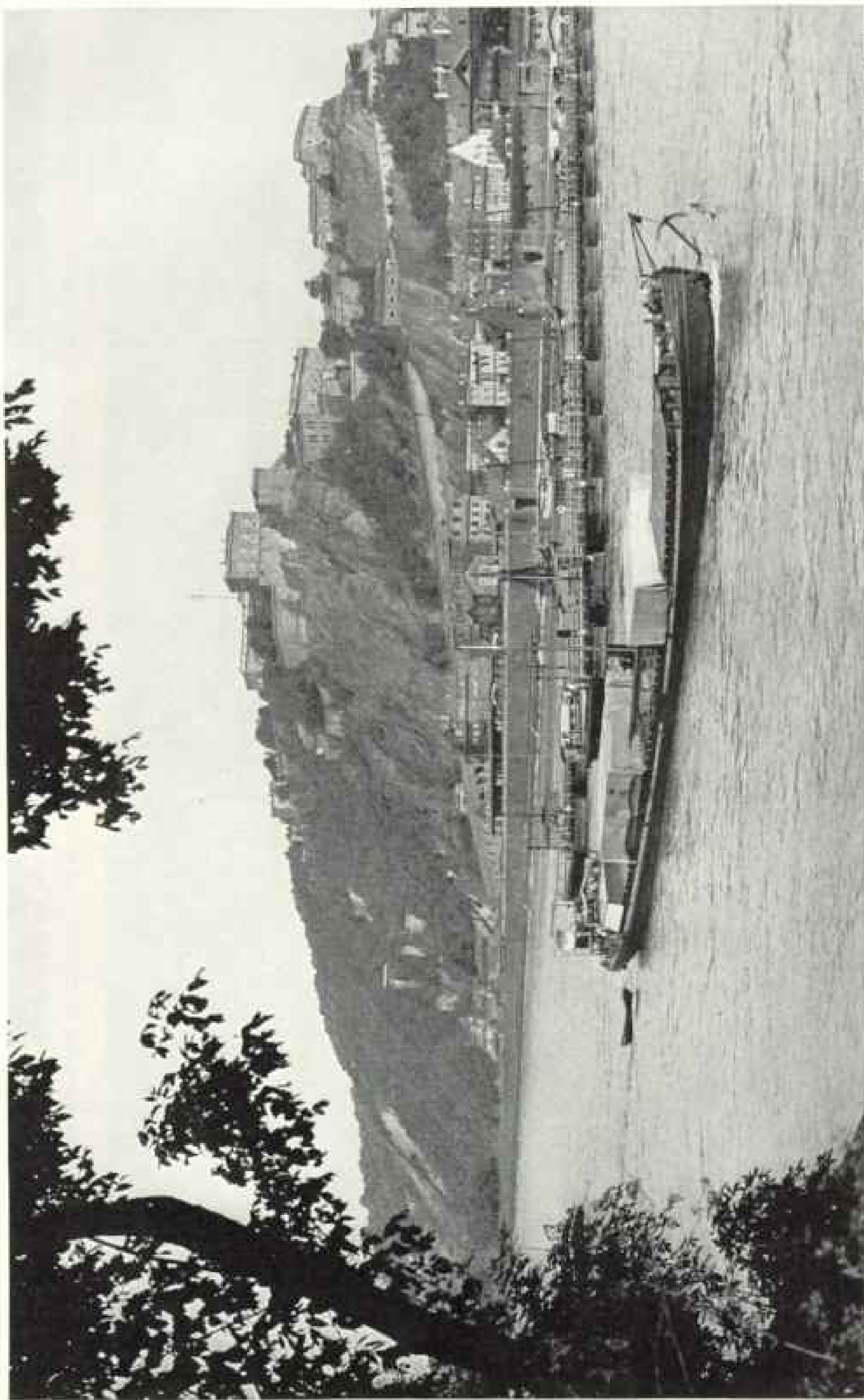
To a Mississippi pilot, she might seem odd-looking, but he would find her an efficient craft for these waters. Such tugboats draw only a few feet and pull barges of 3,600 tons barden about 200 miles upstream to Cologne (page 833). Smaller barges go on to Mannheim, where the river at low water is only about six and a half feet deep.



Photograph from European Picture Service

LIKE CHICKS AROUND THEIR MOTHER, CROOKED STREETS AND LOW BUILDINGS HUDDLE CLOSE TO COLOGNE'S BIG CATHEDRAL.

One of Europe's principal east-west railroads crosses the Rhine on the Holenzollern Bridge and curves into the station behind the Cathedral. A white excursion boat lies at a wharf near the bridge, while farther upstream are moored bathhouses resembling barges. On the right bank is the suburb of Deutz, with Cologne's fair grounds and a series of riverside gardens and popular amusement parks (page 844).



Photograph by Donald McLeish

BENEATH A CASTLE ONCE MANNED BY AMERICAN DOUGHBODYS, A BRIDGE OF BOATS SWINGS OPEN TO LET A BARGE PASS

Deeply laden with a cargo of grain, the vessel is in tow of a tug and linked to another "trailer" astern. The Stars and Stripes waved over Ehrenbreitstein when United States troops occupied Koblenz after the World War until 1923; then came the French tricolor for seven years. Romans once reputedly fortified this "Gibraltar of the Rhine," which rises 400 feet above the river.



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NAZI SALUTES AND CHEERS GREET THE REICH'S TROOPS AS THEY CROSS THE RHINE AT MAINZ

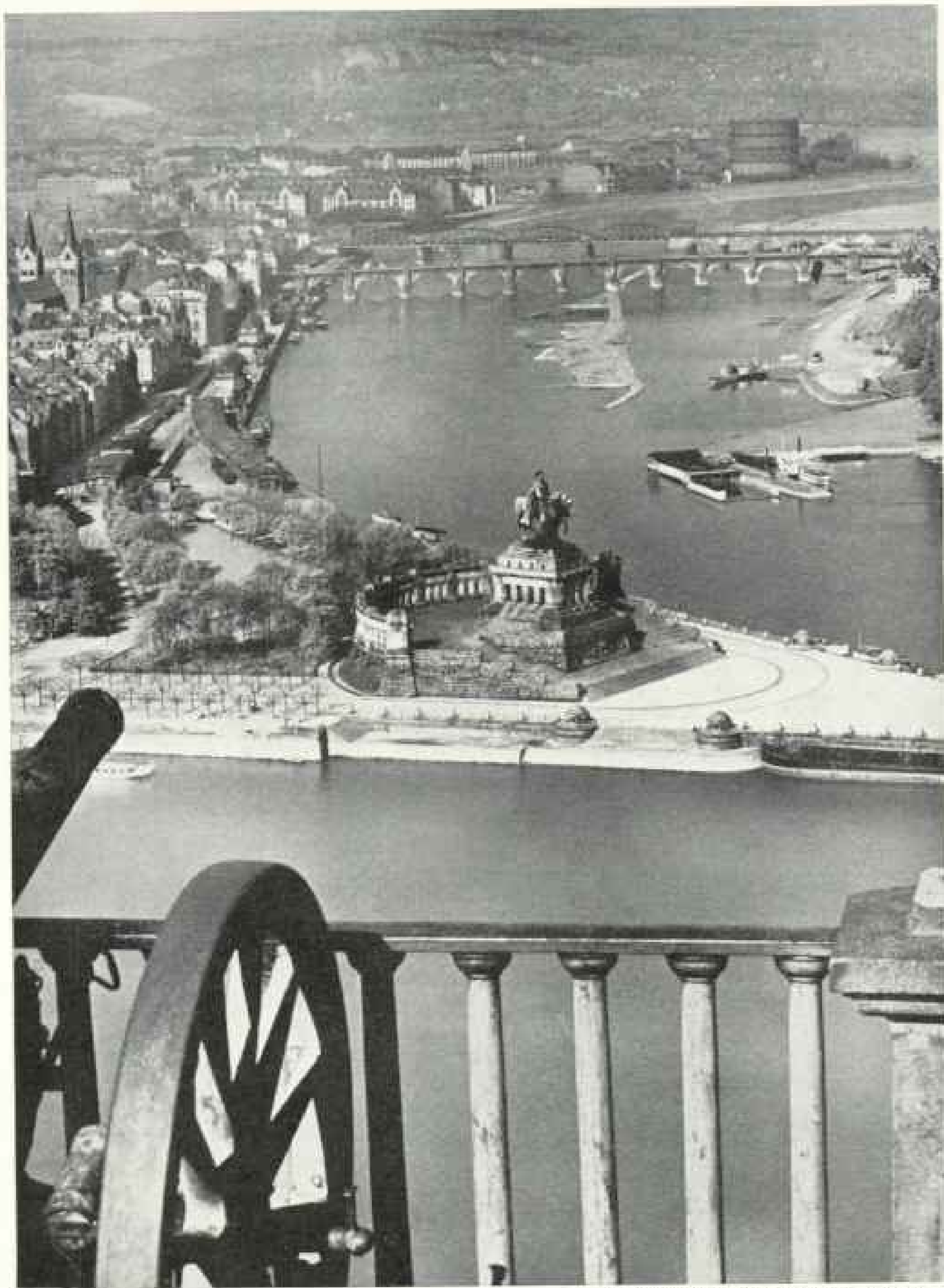
This dramatic bit of history was enacted on March 7, 1936, after announcement was made that the Rhineland was to be remilitarized. Not for 18 years had these citizens seen armed German soldiers in their city. The column of infantry is preceded by mounted officers, the commander at the head being escorted by three police officials on foot. Mainz was one of the Rhine towns occupied by Allied troops after the World War.



Photograph by Karl Müller

HOUSEWIVES OF FREIBURG FIND THEIR FRUIT AND VEGETABLES IN A MEDIEVAL SETTING

Farmers sell their produce from open-air stands in the market that sprawls on the cobbles 386 feet below the Cathedral's top. Merchants' Hall, built in the 16th century, has two pointed towers with zigzag roof patterns. The bristly spires in the foreground top bastions at the side of the Cathedral. As its name denotes, Freiburg was a free city of the German Empire, enjoying privileges similar to those of Cologne (page 847).



Photograph by Dr. Paul Wolff from *European*

A GIANT STATUE OF KAISER WILHELM I WATCHES THE MOSEL RIVER JOIN THE RHINE

The copper equestrian figure, 46 feet high, stands on a point of land called the "German Corner." This meeting of rivers gave Koblenz its original Roman name, *Confluentes*. The arched bridge was built about 150 years before Columbus discovered America. Restored and widened, it now carries street cars across the Mosel. To take this, the photographer climbed up near an old cannon on the fortress of Ehrenbreitstein.



Photograph from European Picture Service

WREATHED IN GRAPE SPRIGS, THE YOUNGSTERS MAKE MERRY DURING THE WINE HARVEST

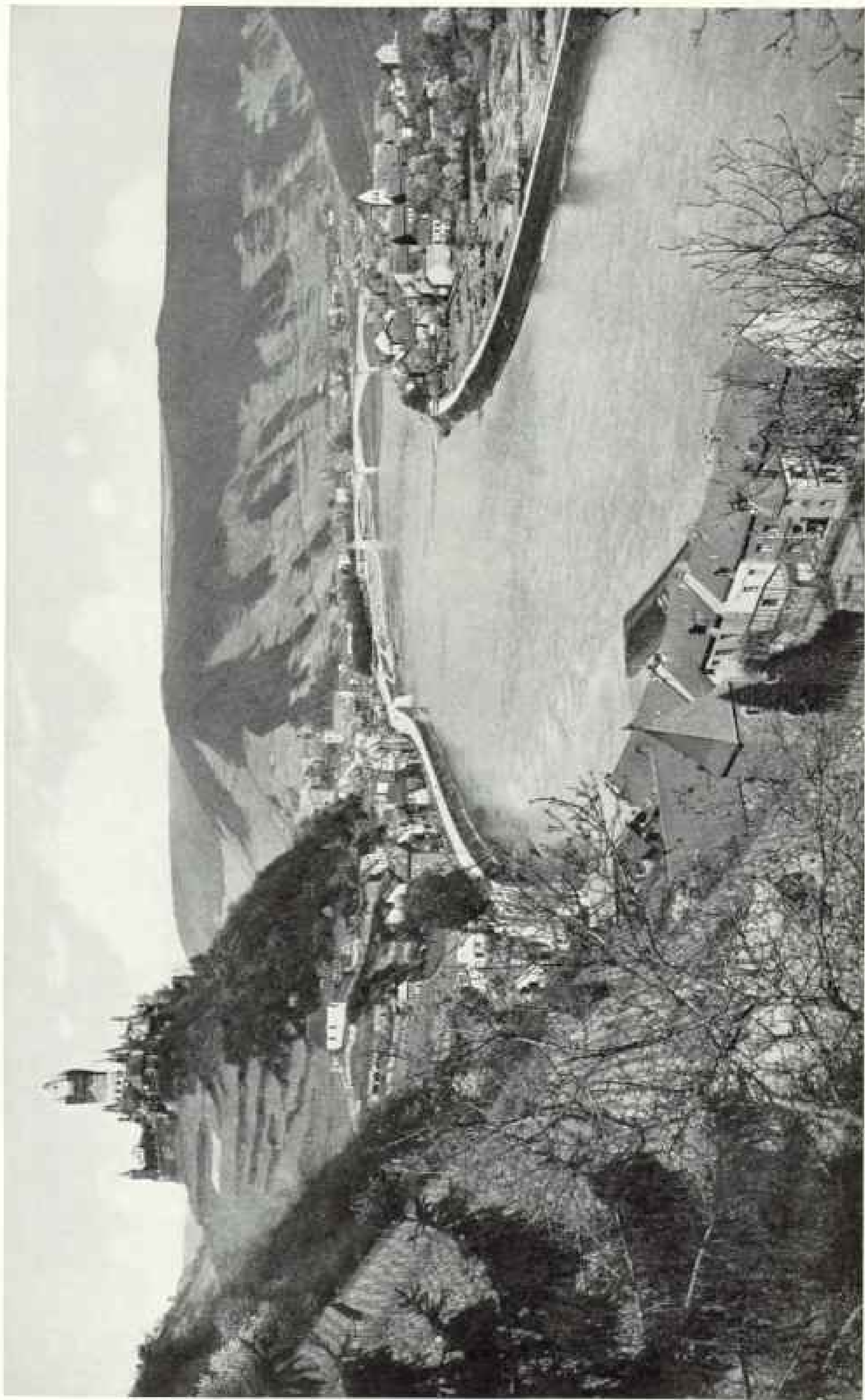
With mandolins, guitars, and violins they march down a cobblestone street in Bacharach, a little Rhineland community where wine is king. Nearly five centuries ago Pope Pius II esteemed this wine so highly that he ordered a cask sent to Rome every year, and Emperor Wenzel freed the town of Nürnberg in exchange for an annual shipment of the famed beverage.



Photograph by Dr. Paul Wolff from *European*

WOMEN PICKERS TOIL AMONG THE VINES OPPOSITE THE WICKED BISHOP'S MOUSE TOWER

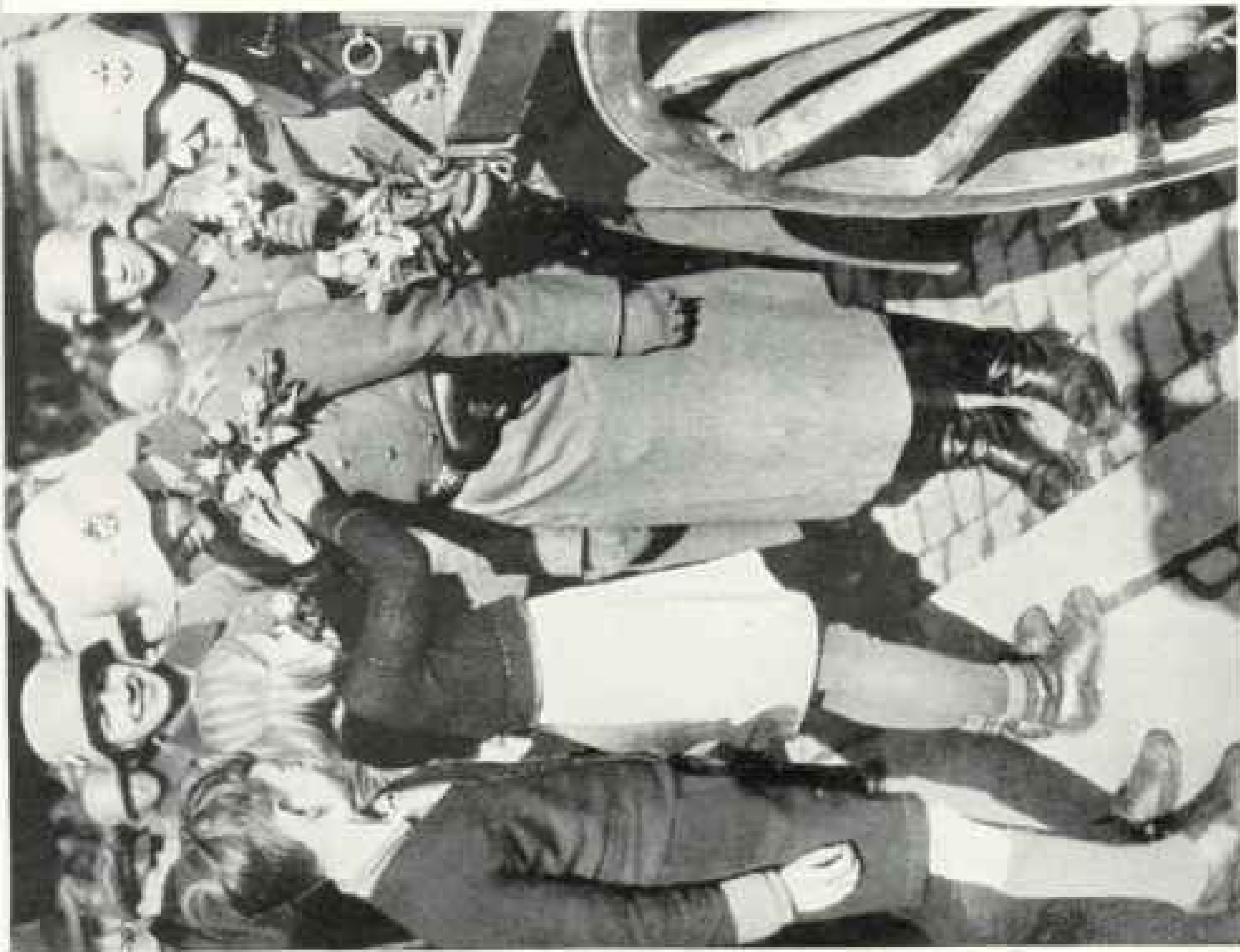
So fertile is this sunny slope of Rudesheim that terraced vineyards flourish to the very hilltop (page 848). The 13th-century Mouse Tower in the Rhine at Bingen was made famous by Southey's poem about Bishop Hatto, who burned his starving people to death. Here he fled, hoping to escape an army of rats, but "they gnawed the flesh from every limb, for they were sent to do judgment on him!"



Photograph by C. Könnig

STRETCHING A HUGE CHAIN ACROSS THE MOSEL HERE, KNIGHTS OF THE CASTLE STOPPED BOATS AND EXACTED TRIBUTE

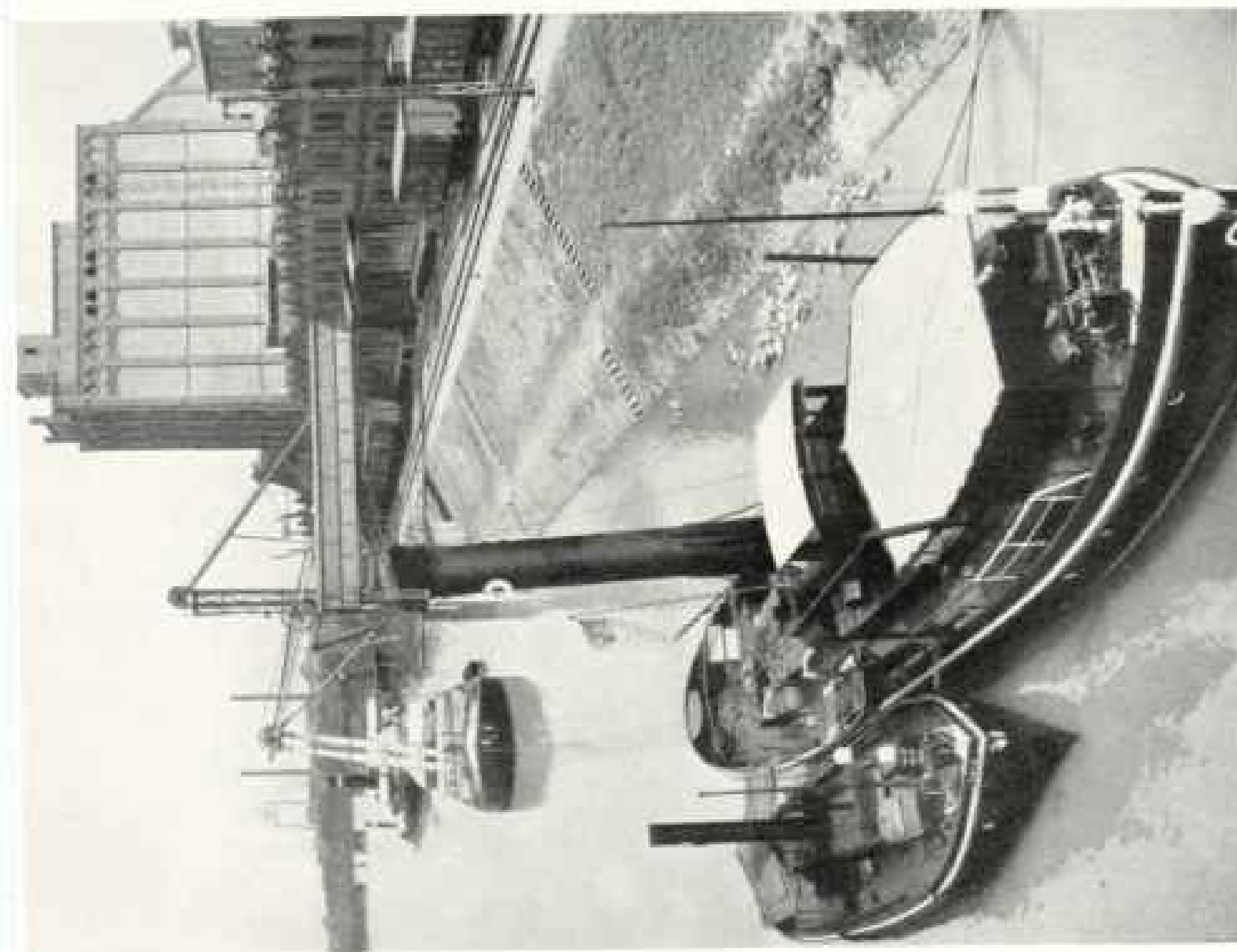
The present "medieval fortress" on the cone-shaped hill is only about 60 years old! French troops destroyed the original in 1689. It was rebuilt as a residence, with windows instead of loopholes. Perched below on the steep bank is the town of Kochem, a busy wine center and one of the valley's most popular summer resorts. Flood-control dikes on both sides of the river make delightful promenades.



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BOUQUETS FOR THE SOLDIERS!

A flaxen-haired girl pins bouquets on the stalwart warriors who have just marched into Cologne. A double celebration is going on, for the reoccupation of the Rhineland was timed to include Germany's Memorial Day, March 8, 1946, when the Nation honored its war dead.



Photograph by Evelyn Galloway

BARGES UNLOAD AT MANNHEIM, NAVIGATION TERMINUS

Only very small vessels can go farther up the Rhine. A vessel discharges a cargo of grain at the big flour mill in the distance. The port has the second largest inland harbor in Germany. Canals and rivers are used for hauling much heavy freight.



Photograph by Julius Söhn

NO LIGHTHOUSE, BUT A LAIR FOR MEDIEVAL "RACKETEERS"

Here robber barons waylaid passing vessels and forced them to pay tolls. The six-sided Pfalz, built on a rock ledge in 1326, contains dungeons below the river bed and has only one entrance, reached by a ladder. Victor Hugo called it a "stone ship—eternally at anchor on the Rhine." Visitors come by ferry from near-by Kaub.

into the current, bound for ports of England, the North Sea, and the Baltic. Smaller vessels and barges floated by with coal, ores, cases of manufactured goods and wines. Some were headed for Rotterdam and other river-mouth ports to exchange their cargoes for foodstuffs, chiefly grains, which the Rhine Valley lacks.

When I watched this parade of vessels, then glanced up at the strings of freight cars rattling across the bridges, I could see why Köln has become the Fatherland's third city, surpassed in size only by Berlin and Hamburg. Later I visited the big airport which helped make the city one of Europe's vital traffic centers.

On a Sunday afternoon I walked across the suspension bridge which has replaced one of Köln's old-time curiosities, the

bridge of boats. Tiny sailing craft, speed-boats, and one- and two-man sculls darted back and forth in the quarter-mile stretch between the shores.

A "CONEY ISLAND OF THE RHINE"

I followed crowds of holiday-makers down the right bank, through the suburb of Deutz, beyond the Köln fair grounds, to a delightful public park which seemed to be everyone's goal (page 835). It suggested a corner of Coney Island. Thousands of Kölners, mostly in family groups, were riding merry-go-rounds, staking their pfennigs on games, or chattering away at café tables while a band blared forth. Barkers cried their hot dogs, plumper ones than ours, but sold in split rolls in the approved American style.



Photograph by Dr. Paul Wolff from *European*

COOPERS IN OLD-TIME GARB HOLD ALOFT WREATHS TO MAKE A CROWN

Their dance is a feature of Frankfurt's Handicraft Festival. The craftsmen manufacture casks for Rhenish wines and other products. Connected with the Rhine by the canalized Main River, Frankfurt has long been one of Germany's foremost commercial cities.

The chunky little ferryboat that took me back to the Köln side of the river was named *Lorelei*, for the legendary siren of the Rhine, whose seductive singing lured sailors to destruction on her rock.

On the Kaiser Frederick Embankment were bathhouses where one could swim in tanks without fear of being swept downstream by the strong current. The water felt surprisingly chilly on this warm summer day—and no wonder, for not long before it had come from melting glaciers high in the mountains of Switzerland.

Along the wide esplanade ran pathways, one for cyclists and another for pedestrians. The wise walker kept to his allotted track, safe from the swarms of bicycle riders whizzing by in shorts and open shirts.

Oddest of all the riverside resorts was a circular restaurant with glass sides, perched

on top of a thick concrete pedestal about 20 feet high. Like a huge flat mushroom, its edges projected far beyond its base and almost overhung the water. Climbing the stairs, I found a tea dance in progress, the orchestra playing Tin Pan Alley's latest hits as well as favorite Viennese waltzes.

The venerable City of the Three Kings has not taken to modern architecture as readily as many other German towns. Old structures are cherished on the Rhine. The very rows of gabled houses that I saw in musty etchings still rise above the waterfront. The city fathers still gather at the ornate Town Hall, holding council in a lavishly decorated room where the Hanseatic League met five centuries ago.

Köln was one of the leaders of this medieval organization of powerful merchant communities. Like Lübeck, Bremen, Ham-



Photograph from European Picture Service

FRANKFURT'S POINTED ROOFTOPS CROWD TOGETHER NEAR THE CATHEDRAL, WHERE GERMAN EMPERORS ONCE WERE CROWNED

Many of these sculptured and pinnacled buildings were old when the poet Goethe was born here nearly two centuries ago. Another of Frankfurt's native sons was Meyer Anselm Rothschild, who about 1800 founded the famous banking house that helped make this city one of the world's chief money markets.



Photograph by Associated Press

THE NEW WATCH ON THE RHINE

Silhouetted at dusk on the ramparts of historic Ehrenbreitstein, these helmeted men-at-arms call to mind the words of the Fatherland's anthem—

"Steadfast and true, each son of thine
Stands sentry o'er our noble Rhine!"

burg, and others, she was a free imperial city, independent of petty princelings, subject only to the German emperor. These towns could make treaties with foreign powers. They even raised an army to chastise King Waldemar IV of Denmark when he trespassed on the League's territory.

Silks, spices, and other riches of the Indies, transported over Alpine passes from the Mediterranean and floated down the Rhine, came pouring into Köln to be distributed throughout western Europe. Wines from up the river could be transhipped here to seagoing vessels. Kölners carried on a flourishing wine trade with London, where they maintained their own guildhall and docks.

THE "HOUSE OF FESTIVITY AND DANCING"

I tried to imagine the old burgomasters and merchant princes debating weighty matters of business and politics in the Town Hall, but somehow it was easier to picture them in the near-by Gürzenich, the "City Fathers' House of Festivity and

Dancing." Distinguished visitors were feted in this turreted pleasure-palace, erected 40 years before the discovery of America. In the banquet hall I fancied I could see impressive Frederick III, who was here in 1475, warming his imperial hands before one of the big sculptured fireplaces.

Today the Gürzenich is as busy and popular as ever. Köln's stock exchange occupies the ground floor. Merrymakers crowd into the grand hall at carnival time, and the concerts have won international renown.

"Don't bother to see St. Ursula's," advised the manager of my hotel, who had lived in New York before the war. "It's an ugly old church, and you'll find nothing to look at but bones." But I went despite the warning.

The tale of Princess Ursula and her 11,000 virgins had tested even my childhood credulity. It had always been difficult to believe that 11,000 young ladies would sail their own fleet of ships from Britain to the Rhineland, then trek across

country beyond the Alps to Rome. Still harder to credit had been the story that the fair pilgrims, on returning from Italy, had all been slaughtered by the Huns at Köln.

Myth or no myth, however, I saw the church that commemorates the martyrdom and preserves the amazing, gruesome collection of "virgins' bones." Many were exhibited in glass cases, others formed bizarre patterns on the walls. Some of the skulls wore gorgeous crowns of jewels.

A half hour in St. Ursula's helped me to understand why the author of "The Ancient Mariner" called Köln "a town of monks and bones."

Coleridge saw Köln at its worst, in Napoleonic times. Like other Hanseatic ports, it had rapidly lost commercial prestige after the 16th century. New trade routes had opened, strong rivals had sprung up. When the French took over the old free city in 1794 they found only 40,000 inhabitants, most of them destitute. The Cathedral was converted into a hay barn during the French Revolution. After Waterloo, Köln was incorporated with the Kingdom of Prussia. Steamships, railroads, and the development of the Ruhr Valley made it once more a thriving export center.

"Are there any local industries besides perfume-making?" I asked my hotel manager.

"Many," he answered, "ranging from chocolate, cigars, and textiles to toys, machinery—and Fords! The cars you see with the familiar trademark have been made right in Köln ever since the American company opened a plant here in 1931."

HALF A DAY AROUND THE "RINGS"

Where medieval ramparts once stood, I sauntered along a handsome chain of boulevards, the Ring-Strassen, which describe a wide semicircle round the former town limits. So fast was Köln's expansion during the 19th century that the old line of fortifications had to be pulled down, and blocks of houses spread out in a vast, thick crescent away from the river. The "Rings" are not quite four miles long, but it took me

almost half a day to walk them. I was sidetracked by remnants of Roman walls and by the city gates, which now serve as museums and are crammed full of interesting things.

Many of the boulevards were lined with attractive residences, well-trimmed shade trees, and flower beds arranged with Teutonic precision. But this new district was much like that of any other modern European city, and I was glad to get back to the old town nestling round the Cathedral.

A FAREWELL DINNER

My last night in Köln I sought out a famous eating-place in the street called Little Budengasse, and there supped on excellent wiener schnitzel garnished with tiny, pickled flower buds. At wooden tables, scrubbed so they shone like white enamel, patrons were drinking the bitter beer known locally as *Kölsch*, served in a rotund mug called a *Wiederkomm*, which means "come again."

A sign over the bar advertised in German and English, "We Grow Our Own Wine."

"But I have seen no vineyards in the vicinity of Köln," I remarked to the proprietor.

"Our wines come from Rüdesheim, near Bingen," he explained. "My people have owned vineyards there more than 300 years."

I expressed surprise at his family's long residence in the Rhineland.

"The vineyards have a much older pedigree," he said. "Charlemagne himself is supposed to have planted vines at Rüdesheim."

Köln has changed with the rest of Germany. The Place of the Republic has become "Adolf Hitler Platz." Brightly colored Nazi banners drape the gray stone fronts of old buildings.

Even before the entry this year of the Reich's armed forces, bands of brown shirts often swung through town singing at the tops of their voices, hurling loud echoes down narrow ancient streets.



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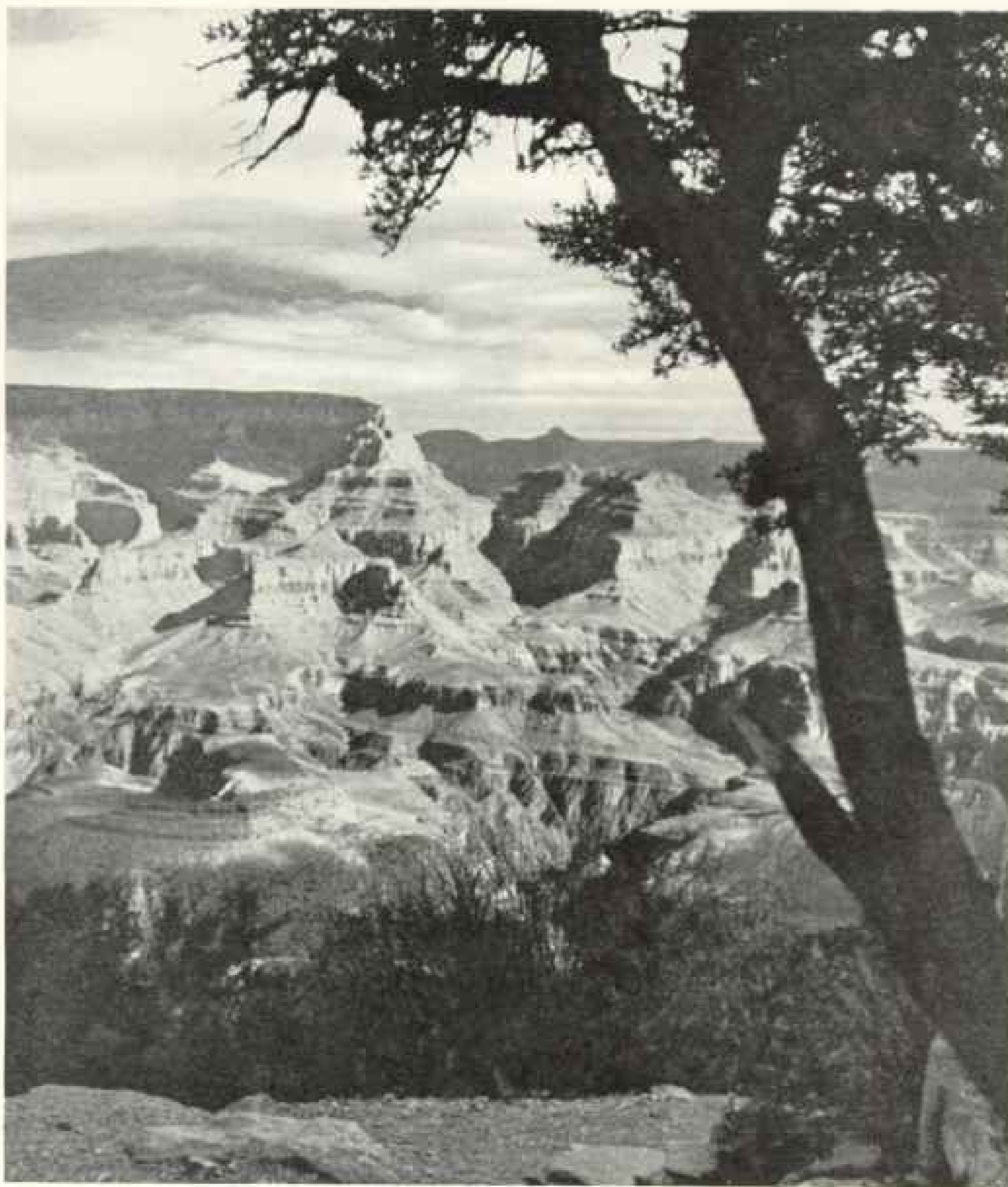
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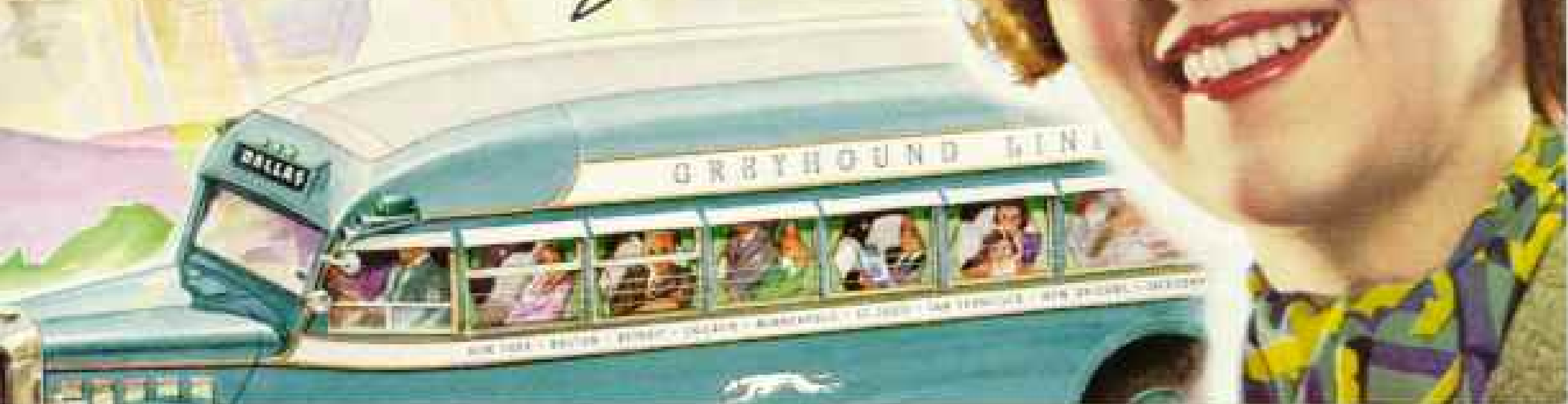
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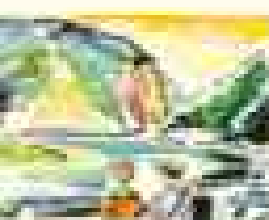
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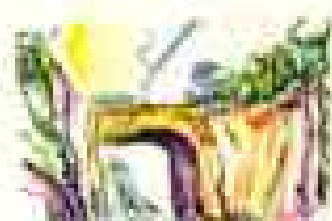
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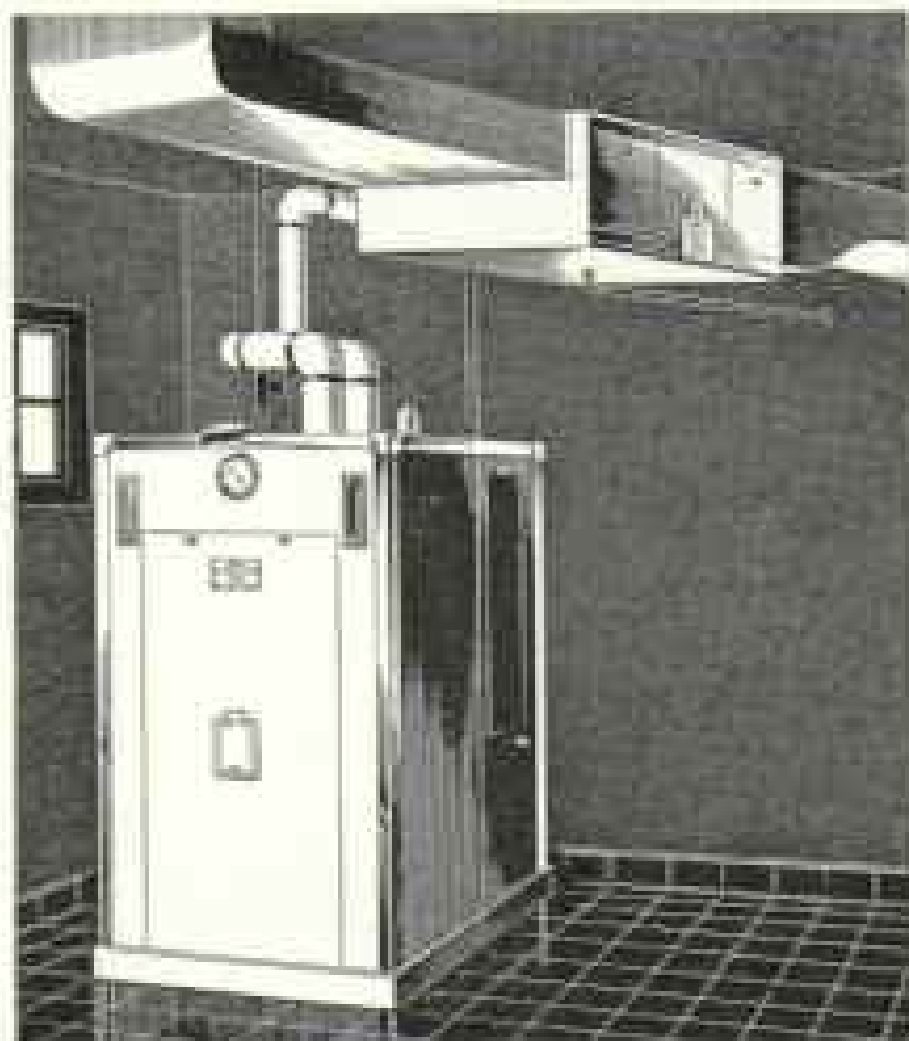
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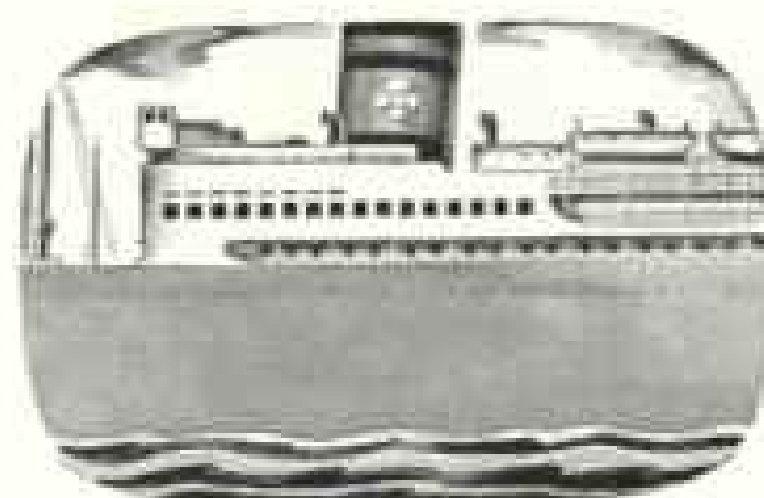
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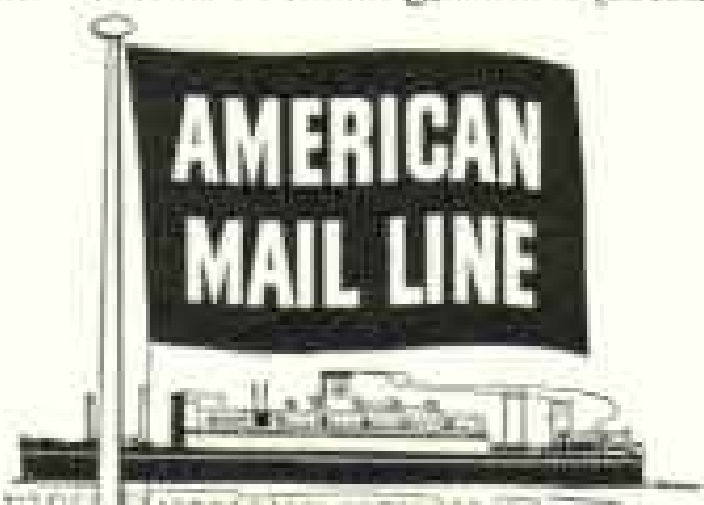
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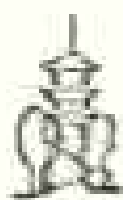
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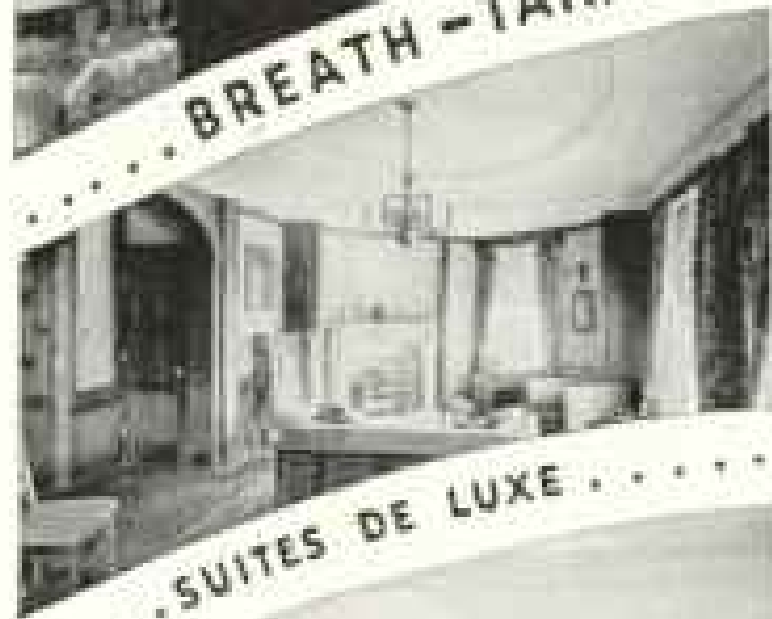


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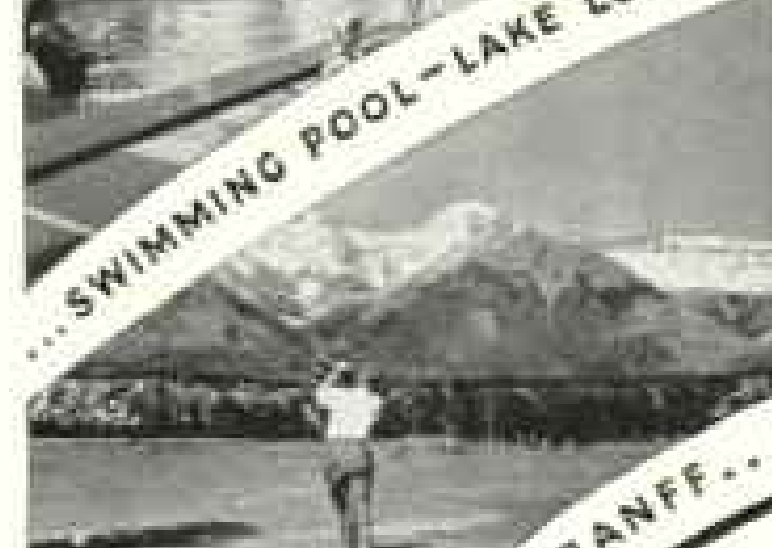
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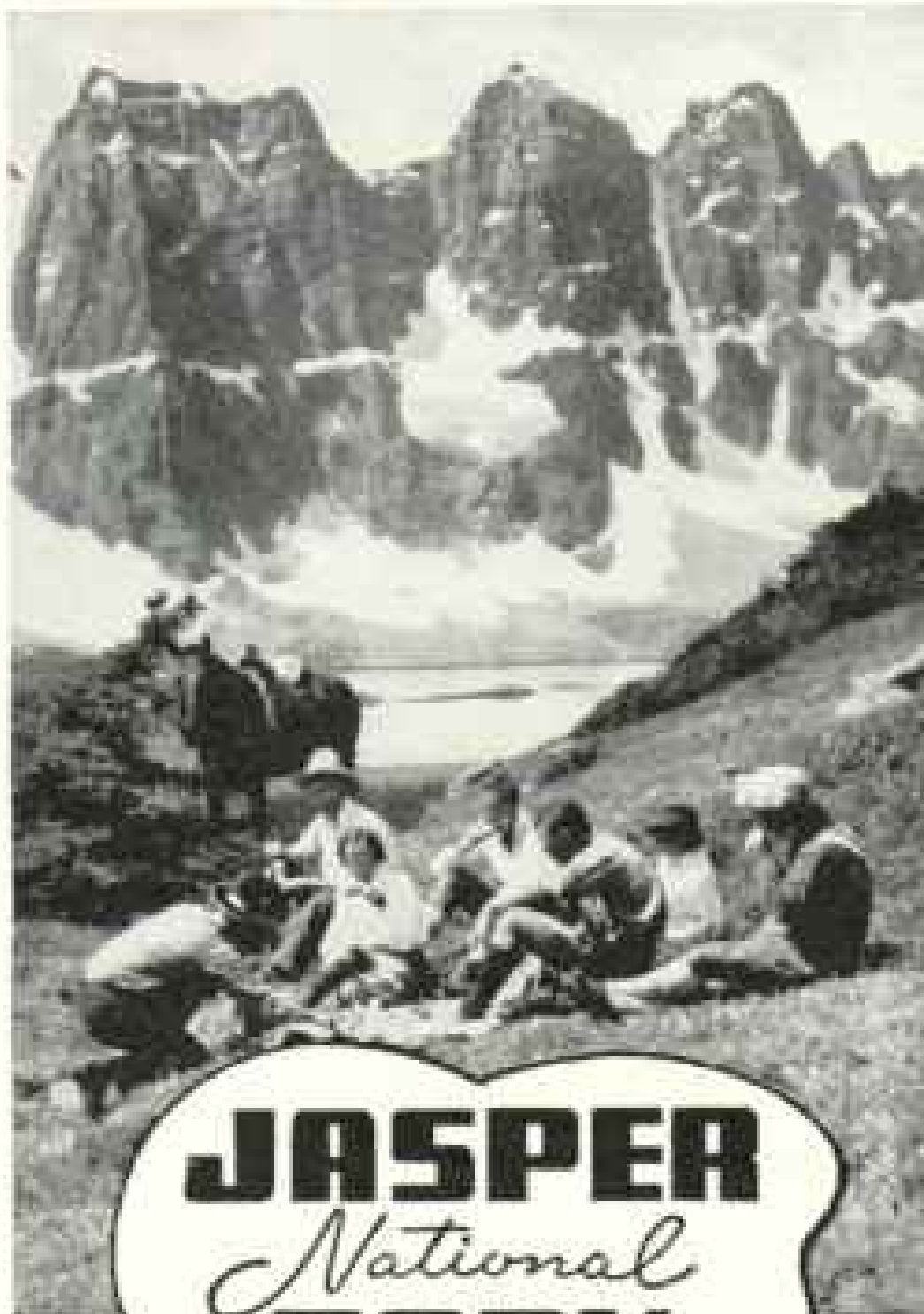
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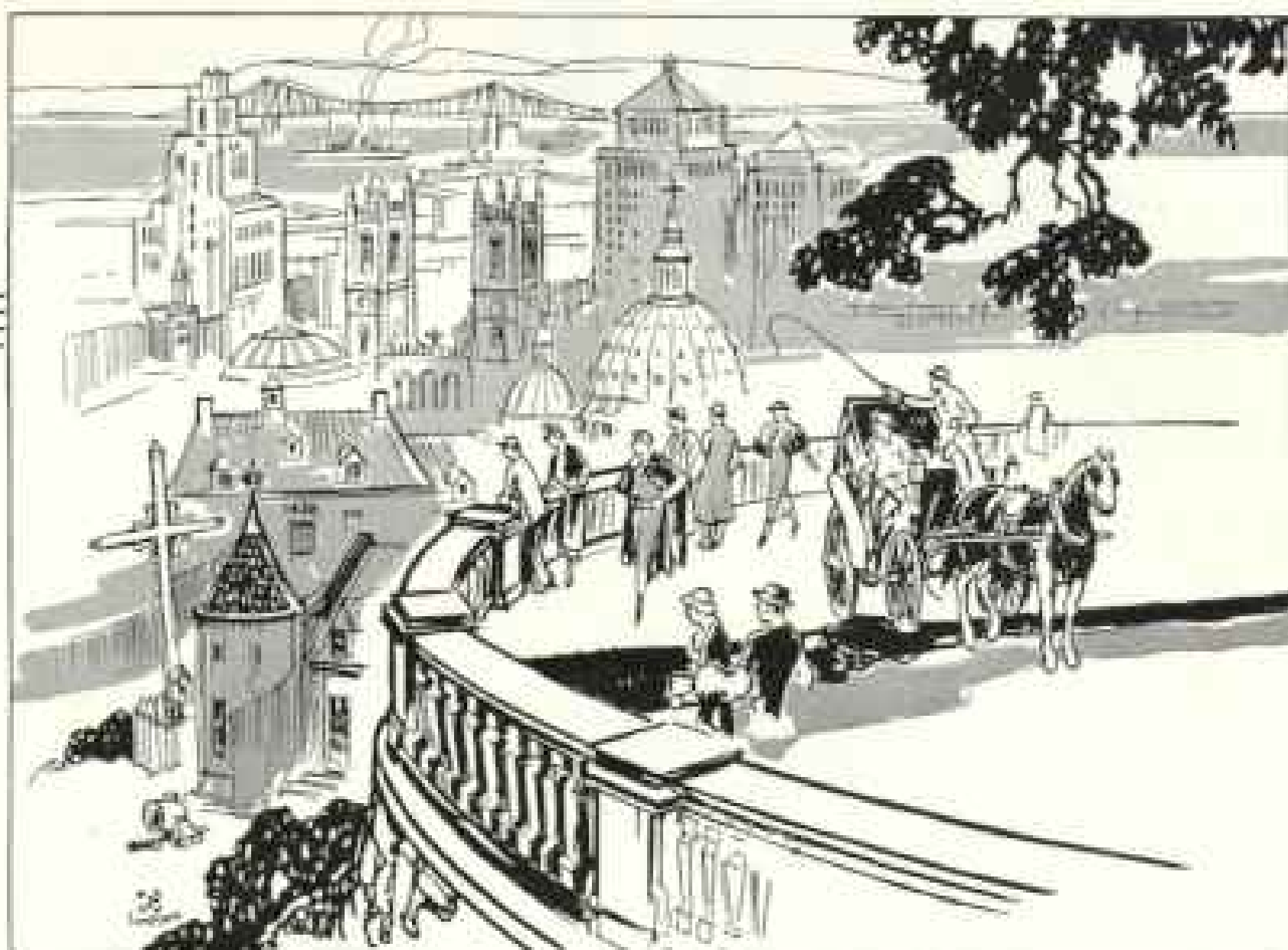


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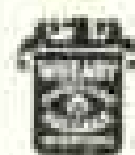


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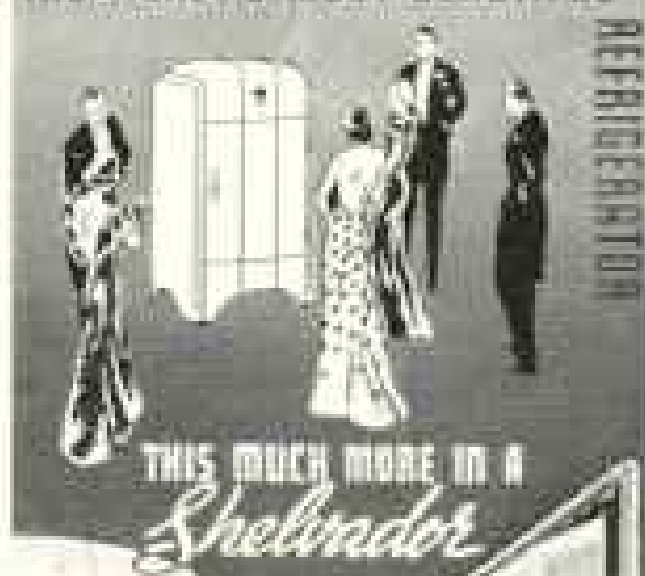
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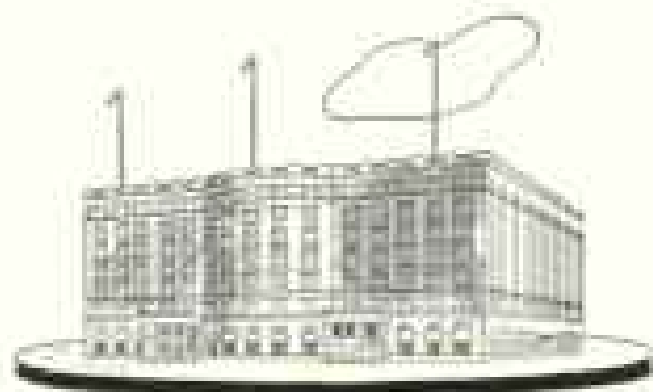


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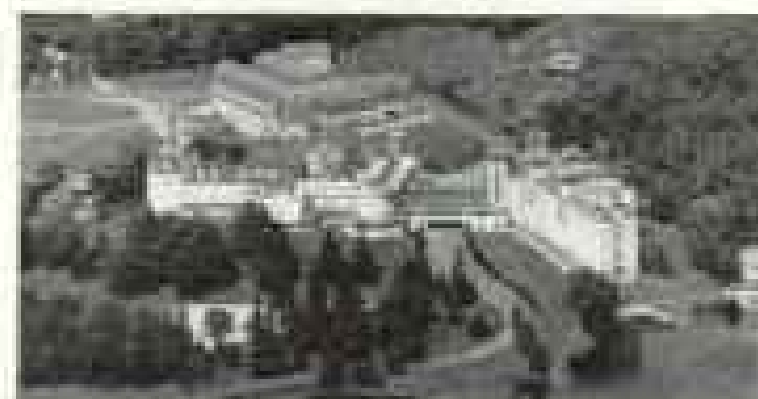
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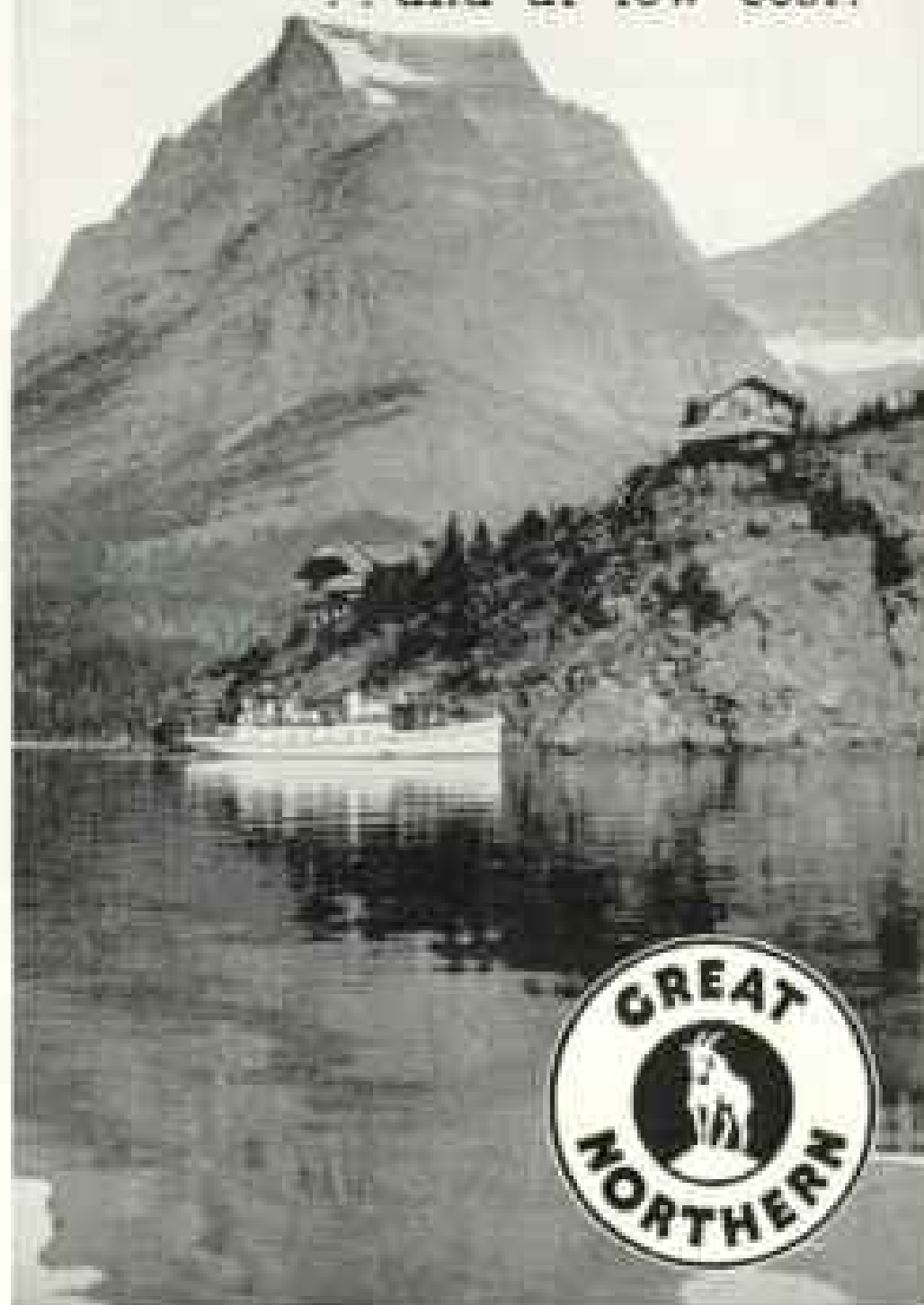
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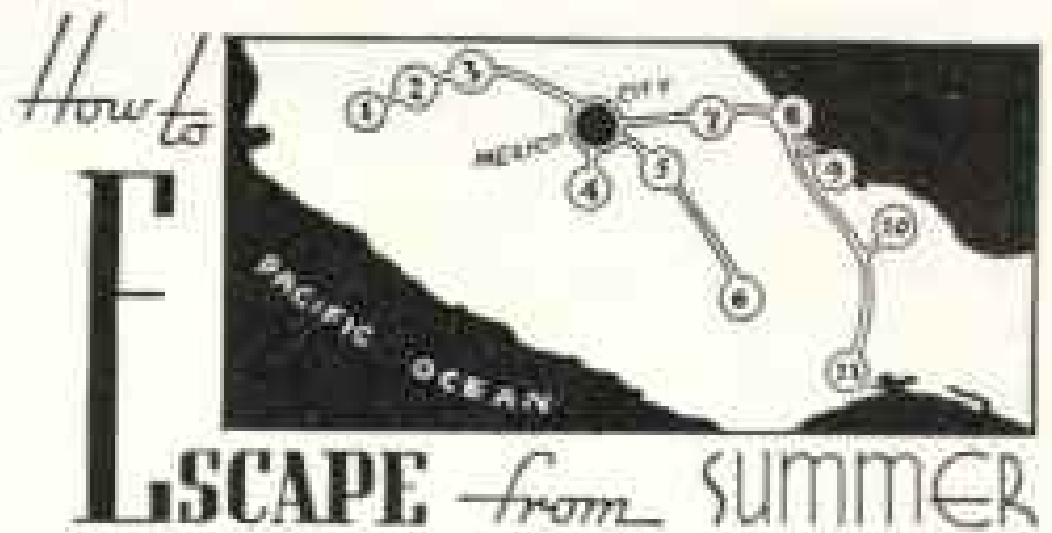
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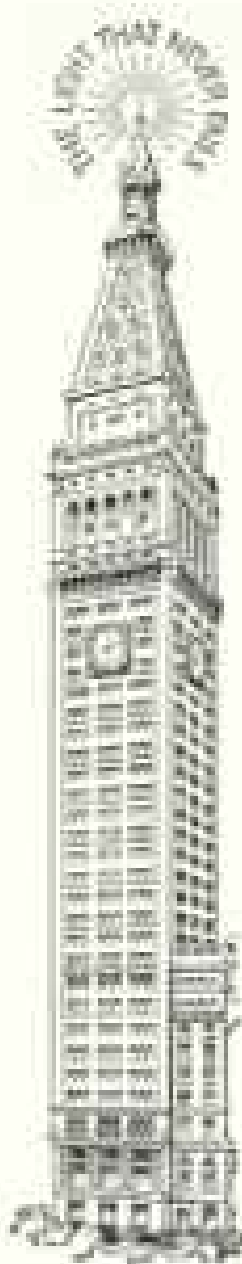
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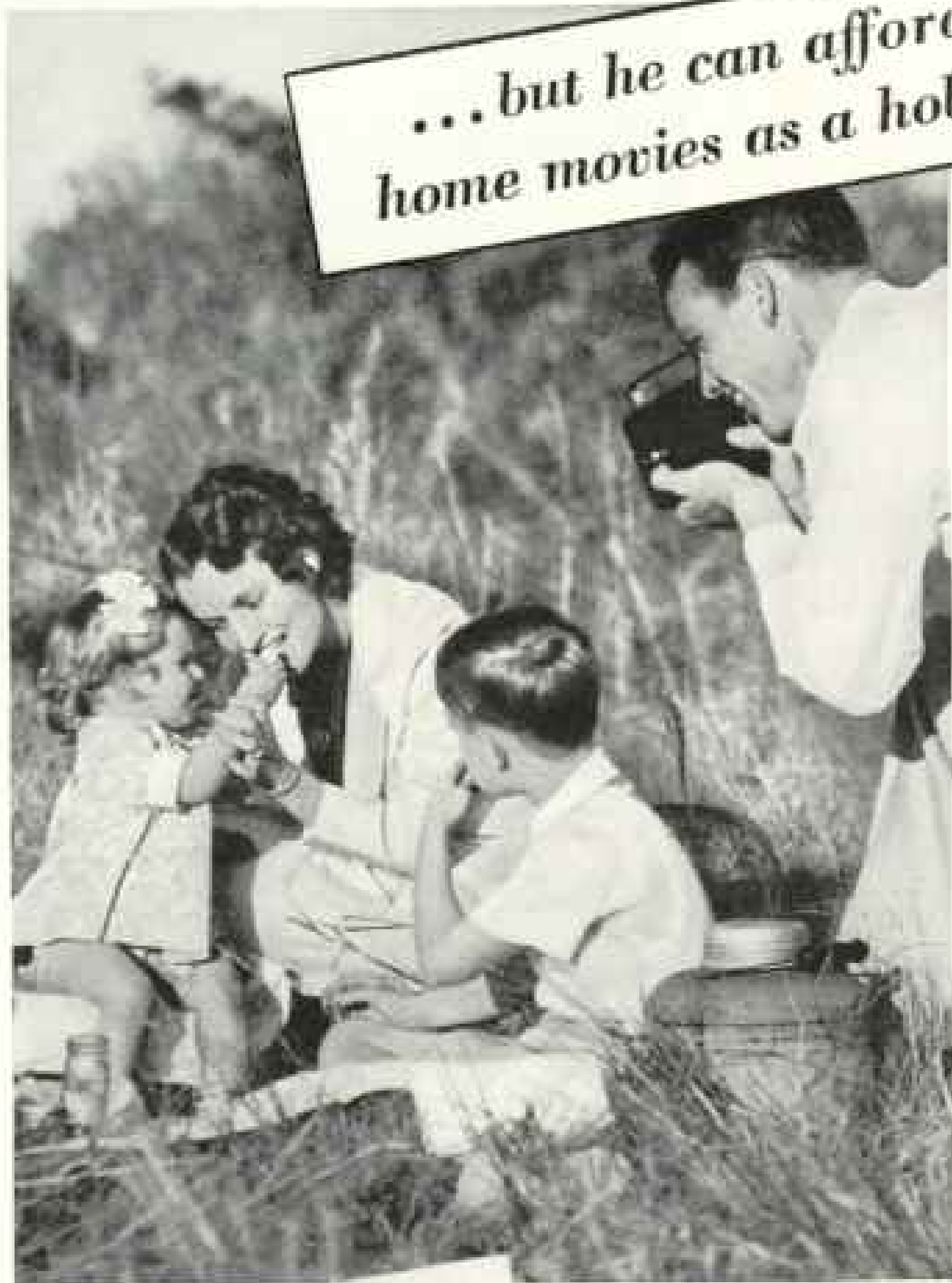
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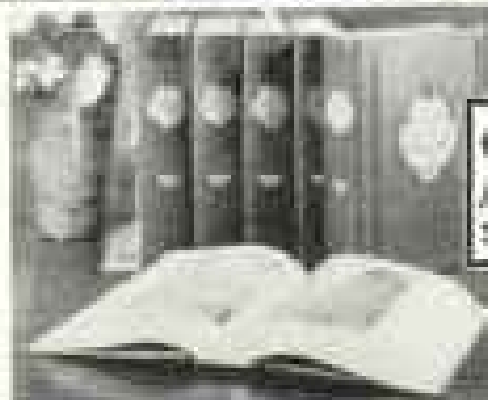
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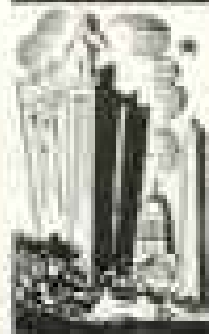
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300 PARK AVE. **PERU** INDIANA



BECAUSE WOMEN LIKED KETTLES



*I*T IS TRUE that a man, and a bachelor at that, made the first commercial Aluminum. But it was the women of America who first gave it commercial importance. It seems incredible that, only fifty years ago, few homes in America contained a single ounce of Aluminum in any form. Today Aluminum ranks fifth in the great family of common metals. In the homes of 1936 there is hardly a room in which Aluminum is not serving, visibly or invisibly.

It all began with a teakettle.

Timidly, because men are creatures of habit and tradition, the young Aluminum industry ventured to make a teakettle of the new metal, because it would conduct heat so much faster than the older metals. The kettles were offered to women with some trepidation.

But women are bold spirits! They liked the kettles! The mere fact that the metal itself was new and comparatively unheard of, meant less than nothing to them, so long as they got results. They liked the kettles and they demanded other Aluminum cooking utensils that were light and bright and friendly to food.

This preference for lightness and brightness was quickly recognized by the men in the aggressive young electrical industry. Thanks to their enterprise, the teakettle and the shining Aluminum pots and

pana soon had labor-saving electrical appliances as working companions.

The electric vacuum cleaner, the drudgery-banishing electric washing machine, the smart electric waffle mold, and a score of other electrical appliances for easier and more gracious housekeeping, all made use of one or more of the advantages of this versatile metal. With the coming of electric refrigeration, ice cube trays were made of Aluminum to speed freezing.

It took more to make an industry than the discovery by Charles Martin Hall, in 1886, of an economical process for extracting Aluminum from the common mineral, bauxite. It took long, plodding years of research, and scientific and manufacturing development, to attain the strong capable alloys of today. Also it took generous co-operation from the engineering profession and the metal-working industry.

But when we who work in Aluminum are tempted to pride ourselves on the progress the industry has made in a brief half century, we are made properly humble by the realization that the modern streamline trains, the motor trucks and buses, the building facades now being constructed of Aluminum, are a tribute to the audacity of the homemakers of America; to them and to the enterprising household utility industries which have grown up to serve them,

A FIFTIETH ANNIVERSARY MESSAGE FROM

ALUMINUM COMPANY OF AMERICA