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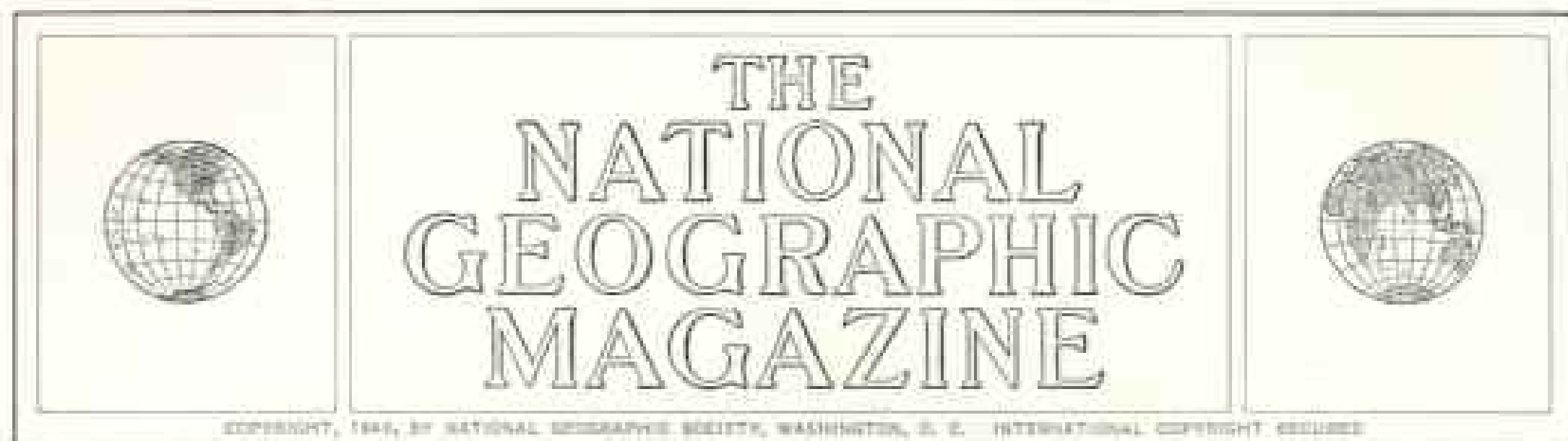
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Alaskan Highway an Engineering Epic

Mosquitoes, Mud, and Muskeg Minor Obstacles of 1,671-mile Race to
Throw the Alcan Life Line Through Thick Forests
and Uninhabited Wilderness

BY FROELICH RAINEY

TWO mosquitoes were discussing a soldier. One piped, "You take him by the heels and I'll take him by the head and we'll carry him home to eat." But the other said, "Oh, no, if we try that, one of the big fellows will take him away from us!"

Every soldier on the Alaskan highway has chuckled at this tall tale and added his own observations—all unprintable—on one of the most aggravating difficulties of his job (154).

The famous mosquitoes constituted only one difficulty which made life miserable for thousands of troops in the north woods. Mud so deep that even tractors were swallowed up, dust ankle high which rose in clouds like a dense fog so that a convoy of trucks could be spotted from many miles away, jellylike muskeg which had to be bridged with corduroy, cold, drizzling rain, frigid nights, vicious black flies, and ravenous gnats—all these now are part of the epic of the road.

Black men and white have cursed the country in a score of American dialects, and many have remarked at one time or another that if the Japs conquered the country it would only serve them right. Yet they are all not a little proud of the job they have done. When it is all over, some will return to settle the wilderness they have breached.

It has been said that the Alaskan-Canadian Military Highway—"Alcan" for short—is the greatest achievement of the U. S. Corps of Engineers since the construction of the Panama Canal. The building of 1,671 miles of highway in itself does not seem impressive

to Americans familiar with our own vast highway system. But there were two factors which made this particular task an almost incredible feat. One was the necessity for speed; the other was inaccessibility. The road must go through in one summer, and in the North the summer is brief.

There were only three points of access—in Alaska, Yukon Territory, and British Columbia—and only one settlement which could be called a town on the entire route. The country was a wilderness and some of it was barely explored. There were no adequate maps and, of course, no detailed survey for the route.*

A "Tote Road" Becomes a Highway

In theory the U. S. Army Engineers were to build an "access road," sometimes called a "tote road," which civilian contractors, operating under the Public Roads Administration, were to utilize in the construction of the finished highway. This Army road was to be just a trail pushed through at high speed.

But thousands of men and hundreds of machines require a constant flow of supplies in enormous quantities, and no trails through the northern forests could carry such a traffic.

Once they thrust out into the wilderness, men and machines must build well or starve.

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Our Air Frontier in Alaska," by Maj. Gen. (now Lieut. Gen.) H. H. Arnold, October, 1940; "Family Afoot in Yukon Wilds," by William H. and Ruth Albee, May, 1941; and "Strategic Alaska Looks Ahead," by Ernest H. Gruening, September, 1942.



U. S. Army Engineers

Surveying the Forest Primeval

Signaling to a rodman, the engineer notes direction and elevation through telescope on transit. A photographic reconnaissance, made by plane, already has determined the lay of the land. Now the surveyors must fix the road's exact course, skirting foothills to dodge muskeg. These two carry pistols because they may meet bears, wolves, or Japs.

Hence the "tote road" was drained, graded, bridged, and surfaced in many sections to supply the advanced working "points."

Furthermore, as the summer of 1942 progressed it became clear that war in the Pacific might not wait for the super-highway to Alaska; it was becoming a question of now or never. The "tote road" became the highway (map, 148).

At a press conference before the formal opening of the highway, November 15, War Secretary Stimson summed up the achievement thus:

"Ten thousand soldiers divided into seven Army engineer regiments and 6,000 civilian workmen under direction of the Public Roads Administration completed the job in slightly over six months. They pushed forward at the rate of eight miles a day, bridged 200 streams, laid a roadway 24 feet between ditches, and at the highest point, between Fort Nelson and Watson Lake, reached an altitude of 4,212 feet."

I arrived in Whitehorse, Yukon Territory, on June 6. Flying down from Fairbanks, I scanned the wilderness below us through which soldiers were to push a road across those endless hills. We slipped under the clouds above the Tanana River, which I had traveled many times in a small boat, then up the Chisana, and across the rugged country toward the White and the Donjek.

Old-timers in Fairbanks had said that the Army would do well to complete a survey in 1942; not a cut would be made before 1943. Looking down upon that lonely world of tangled northern forest, it struck me that they probably were right.

After we passed Lake Aishihik and were still 50 miles northwest of Whitehorse, we crossed a raw new cut in the forest running northwest and southeast as far as we could see. Small clouds of dust rose at intervals along the slender yellow track below us. Passengers crowded to the windows on the port side of the plane, exclaiming with excitement and surprise.

This really was the Alaskan highway, already crawling northward from the railhead at Whitehorse!

Brig. Gen. William M. Hoge, with his headquarters established in the old Mounted Police barracks at Whitehorse, was in command of the four U. S. Engi-



W.I.B., Canada

Brig. Gen. William M. Hoge, Flanked by Aides, Charts the Route North

From headquarters at Whitehorse, General Hoge controlled all operations from Watson Lake to Richardson Highway at Big Delta, Alaska. Beside him are Maj. Frank A. Pettit (left) and Maj. Eugene J. Stann.

neer Corps regiments in the northern sector. Three regiments had been landed at Skagway and moved up the White Pass and Yukon Railway to Carcross and Whitehorse; the fourth, a negro regiment, was disembarked at Valdez in Alaska and moved up the Richardson Highway to the Slana River.

Each supported a "working point" and all were to draw together some time in October. Contact between the four regimental headquarters and G. H. Q. was maintained only by plane and radio.

Col. J. A. O'Connor (now Brigadier General), with headquarters at Fort St. John in British Columbia, commanded three regiments in the southern sector. All three regiments had detrained at Dawson Creek, the railhead which is 500 miles northwest of Edmonton, Alberta, and then trucked up the last fifty miles of Canadian road to Fort St. John.

One regiment had arrived in March, before the spring breakup, to make the heroic trek from Fort St. John to Fort Nelson over a wagon trail with tractors, heavy machinery, and hundreds of truckloads of supplies.

By the end of April, when the rivers broke, it was isolated in the wilderness and could be reached only by air transport. Regiments in

the northern sector would meet those of the southern somewhere on the Liard River in the fall.

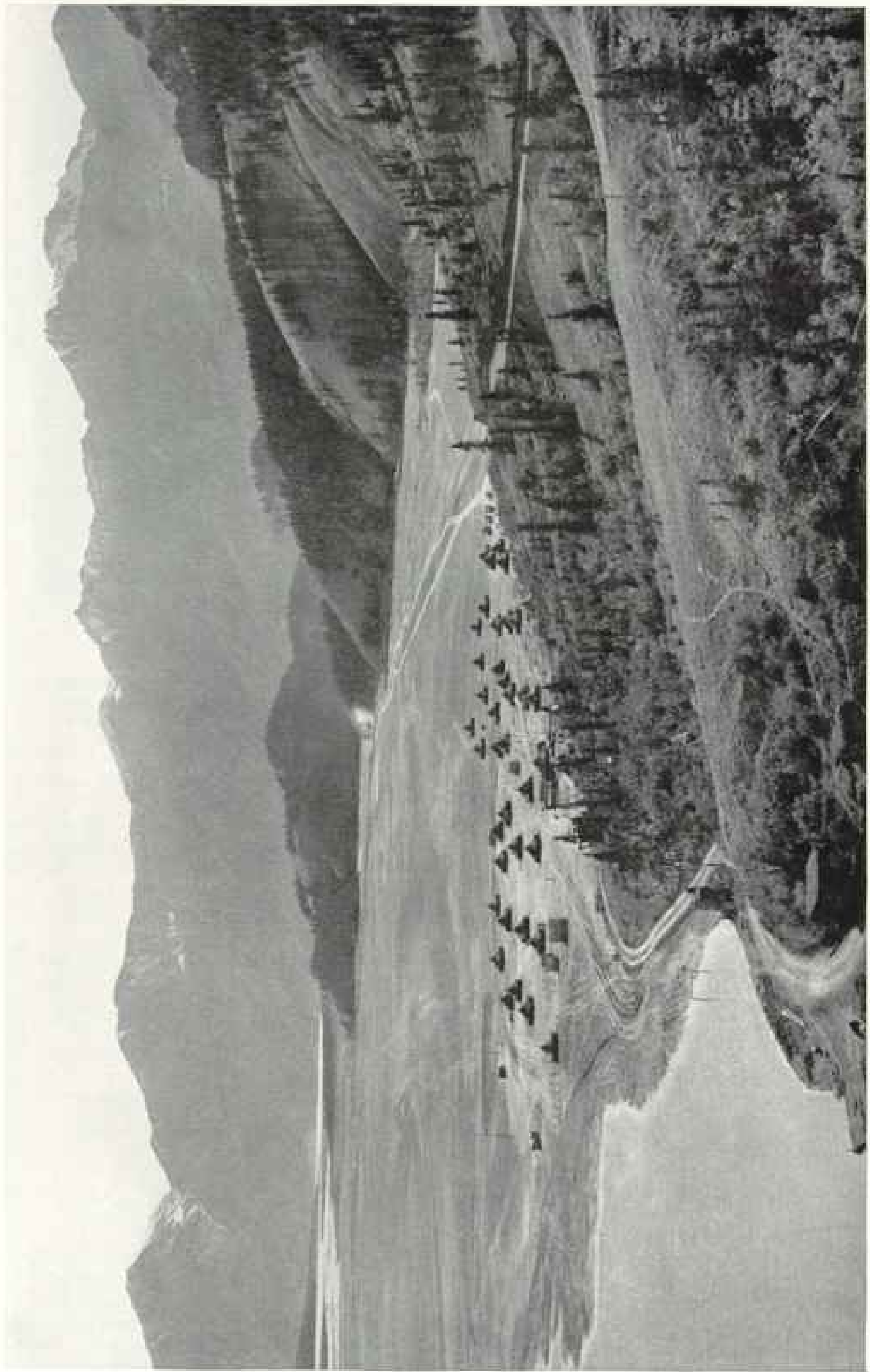
I reported to General Hoge. As a scientist employed by the University of Alaska and the American Museum of Natural History, I was to carry out an archeological reconnaissance along the route of the highway during its construction. Permission and cooperation of the U. S. Corps of Engineers had been arranged. I could move from one regiment to another and remain with the Engineers until the fall.

Two days later General Hoge wished me luck and arranged for me to drive up the newly completed road toward the northwest with Maj. C. E. Waite in his command car.

Whitehorse Recalls Gold Rush Days

Whitehorse nestles in the valley of the Lewes River, tributary to the Yukon, not far from the Lake Laberge of Gold Rush fame.

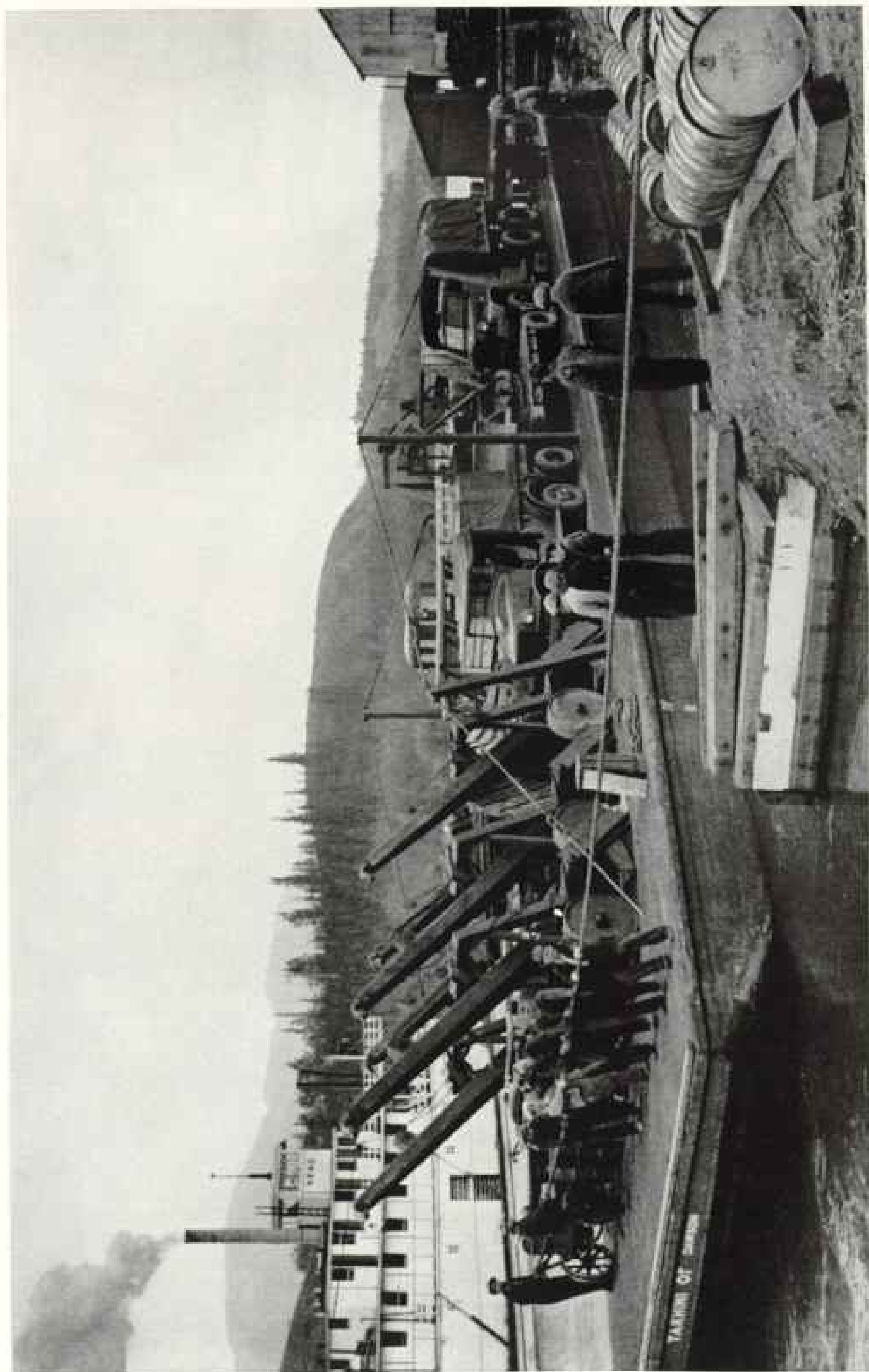
With a population of about 500 in normal times, it is the only real town on the 1,600-mile route between Fort St. John and Fairbanks. In June this once sleepy little village was attempting to house more than 3,000 people. Old-timers said it was just like the Gold Rush. One small restaurant pro-



W.E.D., Canada

Snow-capped Peaks Challenged the Road Builders, Here Camped on Klouane Lake's Flats, So They Skirted This Range

Crossing the bench, the Alcan Highway turns right at the mountains and follows them. Mount Logan (19,850 feet) is less than 70 miles away. Nowhere does the road rise above 4,212 feet of cross perpetual snow. After the war it will carry today's A-card motorists to the land of the midnight sun and northern lights.



U. S. Army Equipment

Like Field Guns Pointing Their Muzzles at the Asben Sky, Rooters Stand on the Prow of a Barge at Whitehorse

These sturdy harrows drawn by tractors break compacted soil, even cleavable rock, with tough, sharp teeth. Behind them are Army trucks and a tractor mounted on a trailer. Here on Lewes River, a branch of the Yukon, steamer *Keno* waits to tow barge *Tahini* on a long, roundabout trip to Tealin Lake (map, page 148). When road builders moved in, Whitehorse became a subarctic crossroads of rail, boat, plane, and highway.



**If the Alcan Highway Started in East Florida, It Would Span 1,671 Miles,
Reaching into Kansas**

The road links strategic Canadian airports—Fort St. John, Fort Nelson, Watson Lake, and Whitehorse—too distant from the sea to be bombed by carrier planes. From Whitehorse steamers sail down the Lewes and Yukon Rivers to the Bering Sea (pages 150-1). A 300-mile road to connect the navigable Yukon and Mackenzie has been proposed. Ships sailing the Inside Passage unload Alcan Highway supplies at Skagway and Valdez.

duced 900 meals a day, and at times a bed could not be had at any price.

Like most people familiar with the North, I carried my own sleeping bag and hence, like a hermit crab, I could find a place to crawl in almost anywhere. Cheechakos, or newcomers, are usually not so well equipped.

Once when I returned to Whitehorse after a trip to the north, the hotel proprietor rather apologetically explained to me that he had loaned my sleeping bag to three different Pan American Airways passengers during my absence. "But," he reassured me, "they were all nice, clean people!"

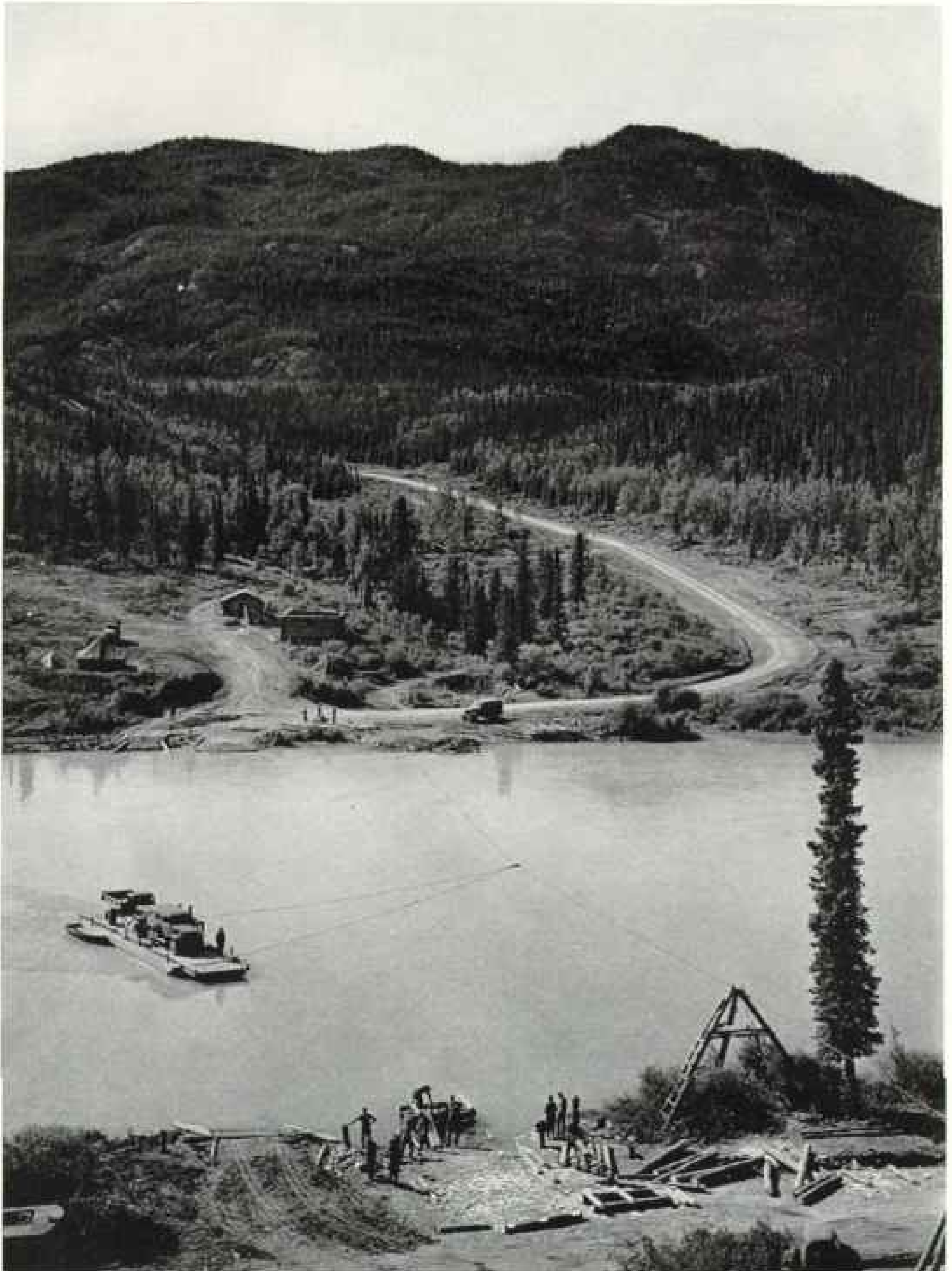
Years ago the Canadians cut a wagon road from Whitehorse to Kluane Lake, a distance of 160 miles (page 146). This was on the direct route of the Alaskan highway. The 18th Regiment operating out of Whitehorse used it as an access road to build the highway in that section. Each of six companies was detailed to build about 20 miles, and as each completed its assignment it moved along the wagon road to the head of construction.

Thus when we drove northward from Whitehorse for some 20 miles, we rode over a smooth, graded, and graveled road winding through beautiful mountain valleys.

But we soon reached an uncompleted section and were forced to take to the old wagon road. This was a tortuous little trail barely wide enough to allow one vehicle to work its way through the trees. Scores of Army trucks had passed over this trail each day for three weeks, so that by the first of June it had become almost impassable.

We plowed through deeply rutted bogs which required the lowest gear and four-wheel drive. With dry going the driver stepped up to what seemed to me an impossible speed, so that the major and I were thrown from side to side and beaten about as if we were in a small boat on a rough sea.

From time to time we met a truck convoy, a jeep, or another command car, and then we were forced to pull off into the timber, often breaking down young saplings so that oncoming vehicles could pass. Then after a few



W.I.R., Canada

Lacking Sail, Motor, or Oars, This Cable Ferry Taps a River for Power

By adjusting the bridle sliding along the cable, the barge is steered in either direction. Here the current, moving to left, strikes the boat at an angle, driving it toward the camera. For the return trip, the far wire of the bridle will be shortened, thus tilting the barge the other way.



Map of Aleutians on same scale pages 152 and 153



Alcan Highway Gets New Links to the Sea

At Big Delta the new road meets the older Richardson Highway leading to Valdez. A new cutoff, saving 100 miles, runs from Tanana Crossing to Gulkana. The new Glenn Highway connects Anchorage with ice-free Valdez. Anchorage Harbor, swept by 40-foot tides, is frozen in yearly. The Alaska Railroad's 470 miles (Fairbanks to Seward) have been shortened 50 miles by a cutoff to the sea at Whittier.



Battleground of the Northern Pacific—the Fog-swept, Barren Western Aleutians

miles we emerged on another section of completed road or on a graded section which had not yet been finished.

The Plague of Mosquitoes

From time to time in partially cleared spruce forests we came upon groups of dark-green tents dispersed among the trees so that they were hardly discernible. Small signs at the side of the road indicated the company or platoon encamped at that point.

At noon we drew in to one encampment for lunch and were greeted by a young lieutenant with a wispy beard and a downy mustache. He looked extremely husky and tough in spite of the youthful whiskers.

A long line of dusty, greasy men in fatigue clothes, each carrying his mess kit, waited before a row of huge steaming pots.

The cooks ladled out the food and returned the raillery of the men with good humor in spite of the swarms of mosquitoes which plagued everyone. Some men wore their light-green head nets down over their faces; others had them rolled up over their hat brims, taking the vicious stings with only an occasional round American oath.

One cooky behind the pot was obviously from Brooklyn, but the boy he shouted at replied with a Texan drawl.

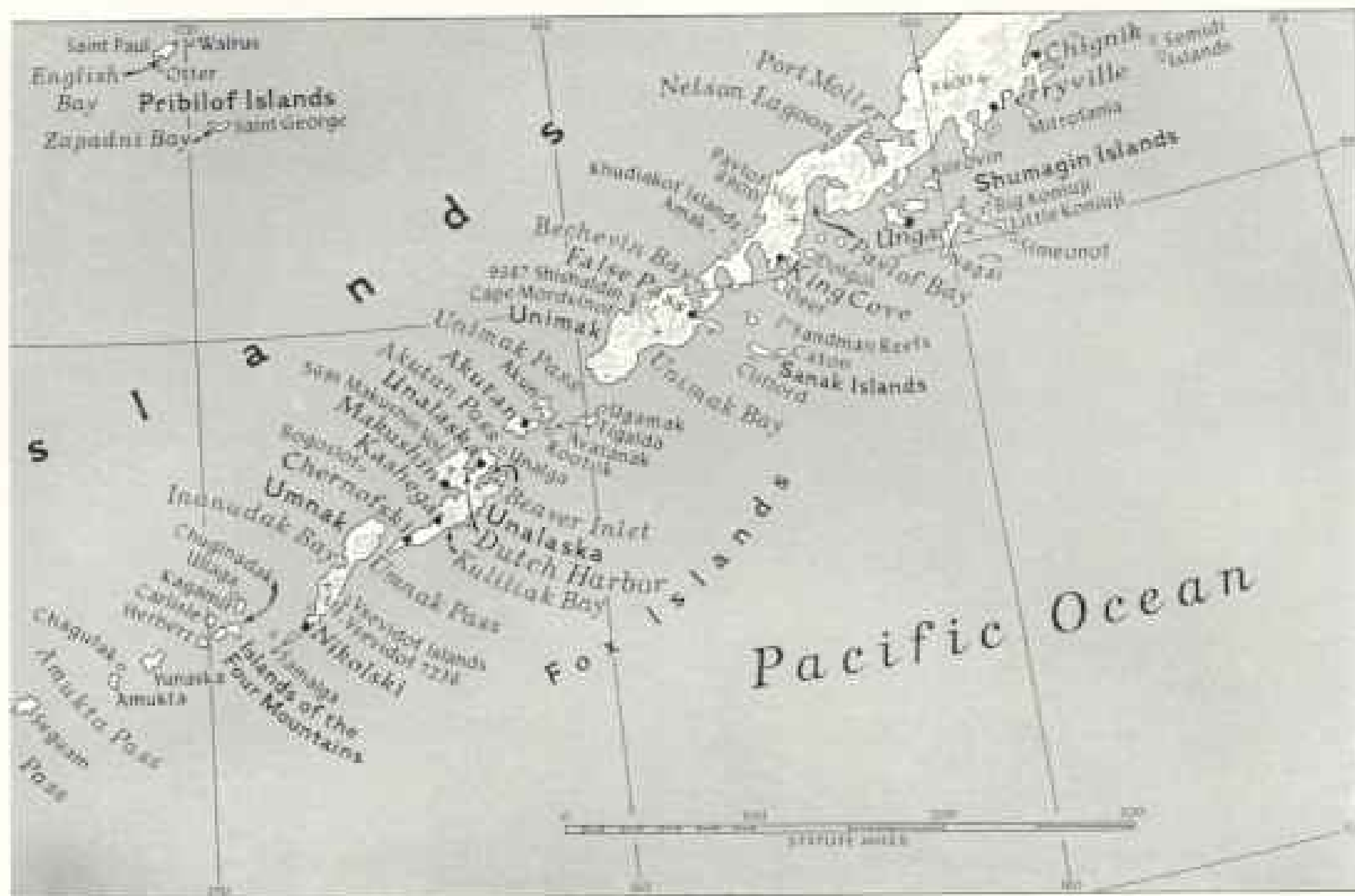
I remembered how I had suffered from countless buzzing mosquitoes during my first summer in the Alaskan bush and marveled at the way these boys took it with such good humor. It is most aggravating of all when one tries to eat. Everyone bolted his food in order to get back to swatting the mosquitoes.

The lieutenant discussed his difficulties with a particularly wet stretch of ground. He asked how the other companies of his regiment were getting along.

This was my introduction to the one great topic of conversation—the road. Men talked, thought, and dreamed the road. The war faded into the background.

Several hours later we drew in at regimental headquarters of the 18th Engineers, a large encampment with scores of pyramidal tents dispersed in an open spruce forest on the bank of a stream. Col. E. G. Paules was proud of his selection of a site for his headquarters camp—high, dry ground in the foothills of the mountains.

In the west a high, white range of mountains loomed against the sky, and in one of the steep valleys protruded the smooth white tongue of a glacier. But the major and I were satiated with stupendous mountain scenery. Caked with dust and feeling as if we had been beaten with a club for the entire



Bombed but Undaunted, Dutch Harbor Dominates the Stepping Stones to Asia

day, we were interested chiefly in a shower, supper, and a bed. All three were available.

A big canvas tank rigged up with an electric pump, a disinfectant plant, and a water heater provided the shower, the officers' mess tent with rough sawed plank tables and benches provided supper, and not far away was a guest tent equipped with wood-burning stove and Army cots.

Indians Lead Reconnaissance Parties

Cleaned up and revived with hot food, we gathered with the staff officers about an antimosquito smudge in a neatly arranged little glade before the chaplain's tent, and, lounging on improvised camp stools, we discussed the road and the war. Each camp was equipped with a radio car, and many men had private radios in their tents, so that contact with the world outside was maintained.

I soon learned that each regiment felt a keen pride in its own achievements and that a sharp rivalry among all the regiments had developed. This, the 18th, was a combat regiment and, although recently formed, the corps spirit was excellent.

The wagon road running through the first part of their section of the highway was a tremendous advantage and consequently they were many miles ahead of all the others and

regularly completing more than three miles a day. Enthusiasm ran high. They would finish their assignment far ahead of schedule.

Their reconnaissance parties, led by Indians, reported good going some distance ahead. But aerial reconnaissance and aerial photographs of the country ahead near the White River were not so reassuring.

There might be much muskeg and frozen soil which could not be by-passed (page 157).

These two conditions were the greatest problems. The discussion broke up in time for the late news bulletin with an account of the fighting in the Aleutian Islands.*

In the twilight of midnight the intermittent throb of tractors and the roar of trucks taking the grade up past regimental headquarters continued without a break. Work never ceased.

One shift replaced another, disabled tractors and trucks were serviced at the motor pools by night and day, and steadily the enormous supplies of Diesel fuel, gasoline, and food moved from the railhead at Whitehorse.

The next day, moving up the road with officers of the 18th Regiment, I saw all the different stages in the construction of the road.

* See "Riddle of the Aleutians," by Isobel Wylie Hutchison, NATIONAL GEOGRAPHIC MAGAZINE, December, 1942.



Wide World from Press Ass'n

Mosquitoes, No Respecters of Rank, Cluster on the Colonel's Knee

Lieut. Col. Albert L. Lane poses with difficulty; a moment earlier he was swinging arms and stamping feet to escape humming clouds. Mosquitoes are followed by black flies, horseflies, deer flies, and "no-see-ums." The last are so tiny they go unobserved until they strike like hot needles.

Giant lumbering 20-ton caterpillar tractors led the attack on the forest (page 160).

Equipped with broad cutting blades or bulldozers, they advanced into standing timber and simply pushed it aside, trunks, stumps, and all. Working back and forth across a blazed right-of-way, they mowed down the thick timber as if it were no more than a field of cornstalks.

The machines were like wild boars rooting and snorting in the jungle. But it was dangerous work for the operators. Some great trees fell backward over the tractors, and for protection the driver had only a heavy steel

bar running the length of the machine above his head.

Then, too, in a dense forest a driver would soon pile up a huge, tangled mass of broken tree trunks, roots, and entire trees, which he would move slowly toward one side of the clearing. Broken logs with jagged ends might swing about and smash the engine or knock the driver from his seat.

The advance tractors left a clearing some 50 to 100 feet wide. Behind them came more bulldozers which leveled the right-of-way, cut down the sharp, steep grades, and filled the deep ravines. With this second rank of tractors were the culvert gangs whose job it was to make rectangular green-log culverts from the timber at hand. When there were no iron driftpins to be had, they pinned their logs with wooden pegs.

If extensive fills were to be made, carry-alls were brought up from the rear. These machines, drawn by more tractors, transported an entire hill to fill a narrow valley in

an incredibly short period. Like ants they moved in a steady chain, usually loading at both ends of a fill.

Rough leveling was followed by finished grading. Still more tractors moved up, drawing ditchers and grading machines. These left behind them a neatly graded, ditched, and level roadway. But this finished grade remained a loose, soft-surfaced road which soon was churned by supply trucks into dust ankle deep and as fine as talcum powder.

Trucks dragged through the dust in low gear, and such clouds rose about them that drivers were nearly strangled and often

blinded. Every available dump truck was operated night and day hauling gravel for surfacing wherever it was available.

The whole organization was geared to keep the lead tractors moving forward into the forest as fast as possible; hence supply trucks must get through to them over uncompleted roads that seemed absolutely impassable.

Companies Race to Finish Their Stretches

Each company raced to complete its section so that it could pull out and move up the old trail to the head of the column. By the first of July, after only six weeks of actual road work, the 18th Regiment had pushed its leading company 160 miles northwest of the base camp in Whitehorse. Well might they be proud of their lead over all the other regiments on the job.

I returned to Whitehorse overawed by the speed of construction and the ingenuity of the engineer officers faced with the task of thrusting a road through one of the most sparsely settled regions in North America, but I had not yet seen really difficult going.

The mountain slopes northwest of Whitehorse are relatively dry and there is much gravel. Moreover, June was a dry month in that region.

When I landed at Fort St. John, the southern terminus of the road, some days later, our plane cut deep ruts across the soggy field. We had slipped in under dark rain clouds and taxied up the field in a drenching downpour.

A bus which was to carry us the mile and a half to the town stuck fast in the road in front of the Engineers' headquarters camp,



Wide World from Photo A&P

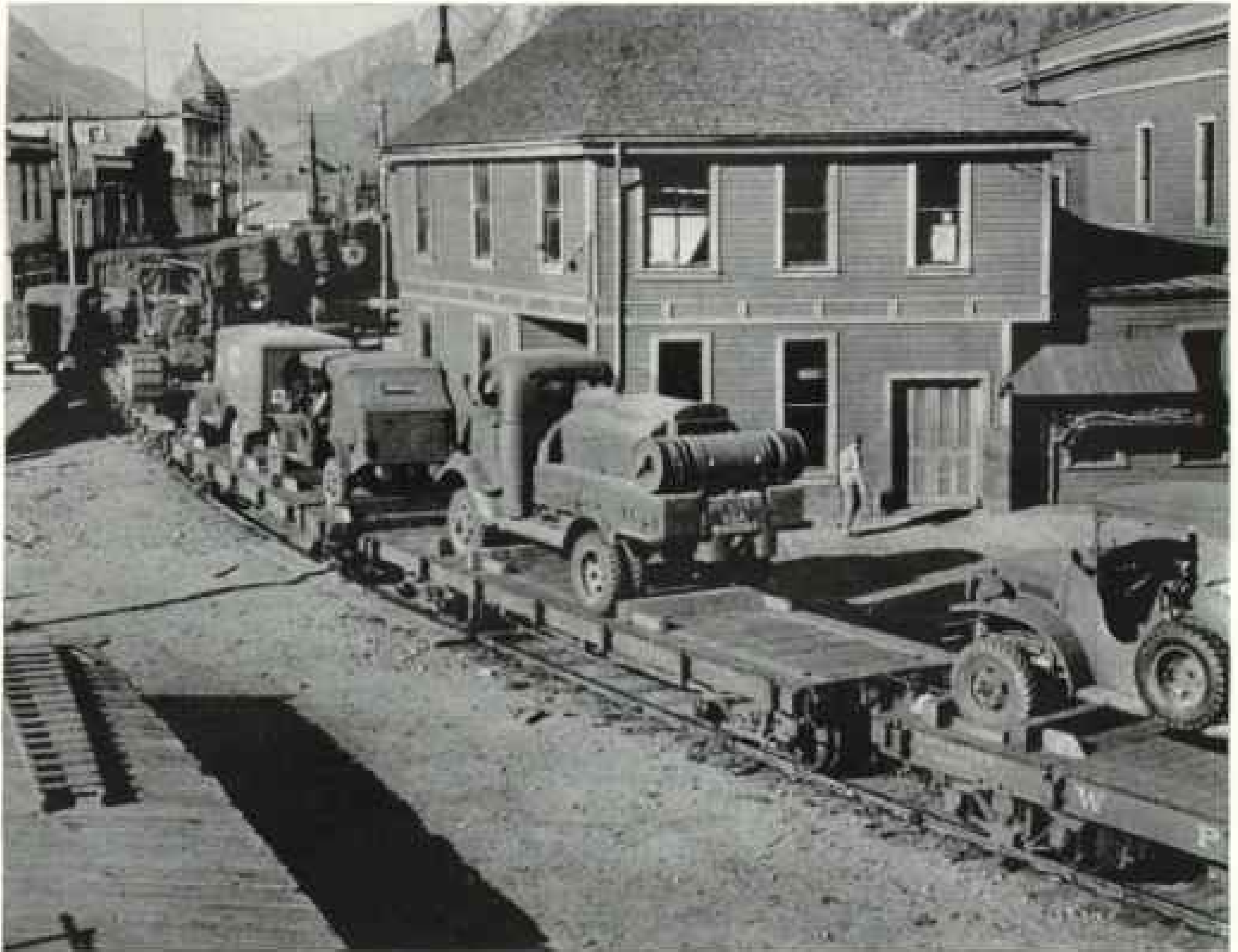
Two New Yorkers Solve Canada's Mud Problem

Though the temperature may rise to 90°, water is chilly, as the bather's expression indicates. Many city tenderfeet here learned to swing an ax, perhaps for the first time in their lives. The sign points to the Bronx crossing 2,300 miles away from camp here at Fort St. John.

and its disgruntled passengers slogged their way in on foot through the driving rain.

Fort St. John was the most dismal little settlement I had ever seen. The one street, lined by dilapidated and unpainted frame buildings, was a slough of mud which had the consistency of axle grease. There were no sidewalks, and the floors of all public buildings were nearly as deep in mud as the street.

The one hotel and the rooming houses were packed to overflowing, and the three small restaurants and one ice-cream parlor were so jammed with sodden soldiers and civilians that we latecomers must literally force our way in. There was little food to be had.



U. S. Army Engineers

Flatcars Twist through Skagway, Alaska, with Road Equipment Brought by Ship

Air compressor, jeeps, ambulance, tractor, and trucks have arrived from the U. S. by way of the Inside Passage. Now they are on the way to Whitehorse over the narrow-gauge White Pass and Yukon Railway. For 111 miles it parallels Chilkoot Trail, over which footsore prospectors struggled in the Klondike Gold Rush of 1898. Skagway, feeding the Alcan Highway from the sea, is booming.

Civilian workmen were pouring in from the United States, and they had turned Fort St. John into a typical boom town.

Private contractors rushed the construction of prefabricated barracks at the edge of town, but could not keep abreast of the influx of men. The one beer parlor had been closed, so ice-cream parlor and restaurant were the only gathering places.

Both Army and civilian trucks grinding through the morass of the town's one street raced back and forth between the railhead at Dawson Creek and the base camps just north of St. John. This was the southern edge of the wilderness.

Following the last war, homesteaders had moved into the fertile valley of the Peace River, at the northern extremity of the great plains, to establish the spearhead of settlement in northern British Columbia.

Twenty miles north of St. John was the last clearing at the edge of the forest. The new military road winding through a dense

forest past Charlie Lake and on up Blueberry Creek was closed to all traffic. Days of rain had turned its sticky clay surface into a mire which even Army trucks could not pass. After presenting my credentials to Colonel O'Connor at G. H. Q., I had to wait for a break in the weather before moving on up to the advanced companies of the two regiments working on the section between Fort St. John and Fort Nelson.

A Jeep Flounders Through

Two days later Lieut. Col. A. C. Welling was willing to try the trip in a jeep, even though the road was still soggy. We crawled along deep, sticky ruts, with two wheels following the ruts of the last truck and two up on the high center between.

Jeeps have a narrow wheel base and with their powerful, perky little engines and four-wheel drive can flounder through where heavy vehicles stick. We reached the headquarters of the 95th on Charlie Lake and then found



U. S. Army Engineers

Sea of Muskeg, Gluey, Quaking, Treacherous, Grips an Angledozer with Slimy Arms

Call it tundra or peat bog, it's still plain swamp—vegetation usually too frozen to decay into soil. Deep muskeg can swallow a tractor (page 160). It sticks like gum, slips like custard. Steel framework around the angledozer protects the operator from falling timber.

that all traffic beyond was detoured over local roads to the northernmost farms in the St. John's area.

Shortly after noon I left Charlie Lake with a convoy of supply trucks en route to the headquarters of the 341st Regiment some 15 miles beyond. All of the drivers were negroes from the 95th.

I rode with a Virginian who was terribly homesick and bemoaned the bright, hot days of his homeland. "This awful country—nothing but cold rain, mud, and trees!"

Five miles out we met a jeep driven by a young lieutenant who flagged us down to inform us that a bridge ahead had just caved in. The whole convoy of twelve trucks backed and filled to turn in the narrow trail.

The alternative was another log-and-plank bridge which was about to go at any minute. It sagged down a foot beneath the surface of the muddy stream under the weight of each truck, but guy lines held it. The last and

most heavily loaded truck stuck in the approach on the far side and not even a light tractor could pull it loose.

I transferred to the lieutenant's jeep, and we bounced along at the edge of the trail, sometimes through brush and light saplings, past lines of trucks mired down to the axles.

Many days of rain and an officially closed road meant that provisions up ahead had run dangerously low; hence truck convoys were now attempting to move both ways. Once even our jeep plowed into a bog and nearly disappeared.

A Moose the Pet of a Regiment

In one clearing trucks spread out and bogged down four or five abreast. At the worst holes tractors were maintained to drag out trucks both coming and going. We were six hours traveling less than fifteen miles, and everyone was wet and plastered with mud from head to foot.



W.L.B., Canada

He Works Long Hours to Feed 170 Men—Good-natured Taunts and Jeers Reward Him

This mess sergeant, lately from Rochester, New York, bends over a typical outdoor stove. Author Rainey saw hundreds like it on the Alcan Highway tour. At one, he was surprised by tempting cinnamon rolls.

I remember the men of the 341st Regiment, with whom I stayed that night, as the ones who had the pet moose. It had been raised from a very small baby on canned milk and was now nearly as big as a horse.

Not in the least shy, it claimed one of the officers' tents for a home and left very little room for the men. Long-legged, clumsy, overly friendly, and completely spoiled, it was a demanding pet; yet it was a favorite of the whole regiment (opposite page).

The truck head was only 23 miles north of Fort St. John. Beyond that point the road was impassable, and yet, 30 miles still farther on, the advanced company operated a fleet of tractors clearing the right-of-way. They must be supplied with food and fuel, and so, to reach them, the supply officers had devised large sleds to be drawn by caterpillar tractors.

I moved up with one of these sled trains, seated beside the "cat" operator.

This whole region had been one dense, trackless forest, and, as the trees were pushed aside, standing ground water ran into the clearing in every low place, so that we plowed through a pea soup of mud, mile after mile.

Each rise was fairly dry, but when we descended into the swales, soft mud shot up

between the treads and the engine to catch us full in the face.

At times even the tops of the treads disappeared beneath the surface of the muck. We traveled down an endless gash through the sopping forest, seeing no one except for the drivers of an occasional sled train moving back down to the truck head.

Near the advanced working point I found the horse camp of the packers who moved provisions up to the locating parties. They had found a little patch of pasture where their jaded horses could glean some feed and were encamped in a small clearing. Seated about a cook fire were three Cree Indians and three Canadians. Tinned and packaged Army rations were scattered about the lean-to tents.

In the distance I could hear the faint tinkle of the horse bells. We ate boiled beans and pilot bread and discussed the road.

These men had followed their trap lines through the quiet, somber bush for years and were now leading the clatter of civilization into their lonely world. Some guided the locating party for the U. S. Engineers; others led the Public Roads Administration surveyors who, at that time, were locating the superhighway more or less parallel to the Army road.



Wide World from Press Ass'n

Beloved Tyrant of the 341st Regiment, an Orphan Moose Becomes a Bottle Baby

Snoopy, spoiled, and demanding, he appropriated an officer's tent as his home. Several months after the picture was taken at Fort St. John, the author found him "nearly as big as a horse."

Horses, which once had small value, were now precious, and these men had come into a new prosperity, but in the eyes of the three Crees seemed to lurk fear of a future which meant a new world of mechanization.

Crees Gamble to Rhythm of Drums

The cold drizzle of the north woods had begun again. It was nearly midnight, but one of the P.R.A. surveyors, who had arrived at the camp on foot, headed back down the road toward regimental headquarters; therefore, I decided to turn back with him. Saddle-horses could be had at another horse camp a mile distant.

Walking down that way through the thick brush, I became aware of a strange rhythmic drumbeat somewhere on ahead. It seemed fantastic here in the north woods. The surveyor grinned and said that the Crees must be gambling again. The sound grew louder, and soon we stepped out into a small clearing where, before a fire, four Indians knelt in a row with their hands under a blanket.

They swayed and chanted to the rhythm of a drummer beating on an empty gas tin. This was the familiar Cree gambling game, in which participants take turns at guessing the

hand in which their opponents hold some small object.

It is always accompanied by drums, and anything may be wagered on the guess. After long hours at the horse camps, many of the white Canadians were playing also in the Cree manner.

Riding down that night, our horses often floundered in mud up to their flanks. In places it would have been easier to take to the bush, but tractors had piled trees up on either side of the road in an impenetrable wall, and we were forced to stick to the mire of clay which was the road.

At three in the morning we saw a big fire blazing at the edge of a clearing and, nearing it, could smell the exciting odor of hot coffee. A squad of soldiers from the 341st stood shivering about the fire. There was not a dry spot to sit or lie upon, and they had been standing about since evening waiting for a tractor which was to take them up to the advanced camp. We joined them and stood, with first one side and then the other toward the fire, until six in the morning.

They were all kids, homesick, tired, wet, and miserable, and yet there was remarkably little serious grouching. Their language was not



U. S. Army Engineers

A Snorting Steel Battering Ram Bursts through the Forest like a Wild Elephant

This 17-ton Diesel-powered caterpillar with a 3-ton angledozer clears a path 50 to 100 feet wide for grading crews (page 154). Fallen logs will corduroy the road's soft spots. In operations here no one cries "Timber!" when a giant crashes. So the operator, smoking nonchalantly, must be quick to duck.

pretty, but there was no bitter complaining. The remarkable morale of these Engineer troops under the most trying conditions impressed me early in the summer. My wonder at it grew as the summer dragged on without appreciably altering their high spirits.

In the north it had been dust and mosquitoes; in the south, mud and mosquitoes.

It was no picnic anywhere on the road, but in the north one regiment of engineers had advanced 160 miles, while in the south two regiments had beaten their way through for only fifty. It was obvious that the great enemy was wet ground. Officers and men prayed for clear weather, while the reconnaissance planes and the horse-packing Indian guides leading Army locating parties scouted for high, well-drained terrain.

The Nightmare of Muskeg

Some days later I had my introduction to the nightmare of the Alcan Highway—mus-

keg. Fifty miles northwest of Fort Nelson and south of the Liard River the 35th struck what is probably the worst stretch of muskeg on the whole route. At one point they were forced to lay more than two miles of solid corduroy in one stretch. Everyone was called out to cut timber—cooks, Medical Corps, machine operators, clerical staff—every available man regardless of rank or job.

A bridge of logs was laid on the quaking surface of saturated moss, peat, and silt; then ditching machines and scoop shovels were moved out on the log causeway. These bailed up the muck from both sides and piled it on the corduroy so that it could drain and dry. Later this drier earth was leveled and graded over the causeway to form the highway. Machines of all types sank half out of sight unless supported by corduroy (pp. 157, 166).

Officers and men of the 35th looked drawn and haggard when a particularly bad stretch of such going was completed, but they spoke



U. S. Army Engineers

Down a Canyon Hewn through Poplars Goes a Corduroy Built from the Forest Itself

Somewhere in Canada, a U. S. Army crew trims trees bowled over by tractors and lays them across a soft roadbed. This platform will be carpeted with mud from drainage ditches. After drying, the surface will be graded and, perhaps, graveled. Temporary culvert of short logs will give way later to steel and concrete.

hopefully of the good dry going beyond Steamboat Mountain. They found it, too, and by the end of the summer they completed their section abreast of the other regiments.

To most of the men and officers the whole summer was an endless round of extremely hard work, seven days a week and 24 hours a day. Speed was everything. But there were compensations. In spite of rain and cold, sickness of any kind was rare, and men who had spent years in an office grew tougher and stronger than they had ever been in their lives.

Then, too, the highway cuts through some of the most beautiful country in western Canada, where hunting and fishing are unsurpassed. Hundreds of lakes and streams are alive with grayling and rainbow trout, and every man could find at least a little time to fish. In many places grouse were so numerous that many a soldier's supper was enlarged by a brace of birds which he had killed with a slingshot.

Nasty-tempered grizzly bears and prowling black bears might be met at any time.

In spite of orders that hunting by the troops was forbidden, not a few fat young black bears were roasted. They were troublesome and had to be shot in self-protection. Several soldiers were mauled by bears during the summer.

"Roll Dem Bones!"

There was another pastime which is probably universal—the age-old game of craps. In the north woods, where very little money could be spent upon anything else, craps games reached into the field of big business, particularly among the negro soldiers.

Usually a few days after payday one man, a "scientist," held all the money in his company. Very often a single individual would send off money orders totaling \$1,000 to \$1,500. While officers played penny-ante poker, the men rolled dice at \$20 a clip.



U. S. Army Engineers

Pontoon Portage in the Subarctic Is Such Hot Work That Engineers Strip to the Waist

"Why wait for bridges?" Alcan Highway builders asked. So aluminum boats like this one carried the road across swirling rivers, eliminating delays. Sun-tan seekers had one disadvantage, mosquitoes, as the back-scratching soldier testifies.

One day in Yukon Territory, while I stood talking with a bright-looking colored boy whose truck was mired down beside the trail, he drew a huge roll of Canadian bills from the pocket of his jeans and showed me a \$100 bill wrapped about the outside.

Then, rather pensively, he observed, "You know, some of these boys kinda feel like this Canuck money ain't real. If a fellow had some regular U. S. dollars, he sure could clean up a pile, exchanging."

Canada, as a whole, was not quite real to many of the boys from Louisiana and Mississippi. One, writing his mother shortly after his regiment arrived at Carcross in Yukon Territory, said, "You know, Mom, the British have got this country now, but don't you worry, we'll soon get it back."

As the summer wore on and as all of the 10,000 soldiers in Canada and Alaska penetrated farther and farther into the wilderness, the problem of supply increased. Many a

harassed motor-pool officer remarked that the road might be finished if only the supply trucks held out.

In July when I revisited the 18th Regiment and drove up the 160 miles from Whitehorse to Kluane Lake in a jeep with Lieut. Col. W. W. Hodge, we saw scores of trucks out of commission for want of parts.

Ingenious mechanics had devised all kinds of makeshift parts to keep their fleets running, but, try as they might, the terrific beating taken by the machines on half-finished roads made their task almost impossible.

Flying Freight Cars

Service and supply companies are usually unsung heroes, since their work is not often dramatic, but the engineers, however much they may have ribbed their supply officers during the summer, must in the end admit that theirs was one of the toughest jobs of all.

Linked to the road and involved in the whole



An Engineers' Band Breaks the Stillness of the Spruce Forest with a Concert

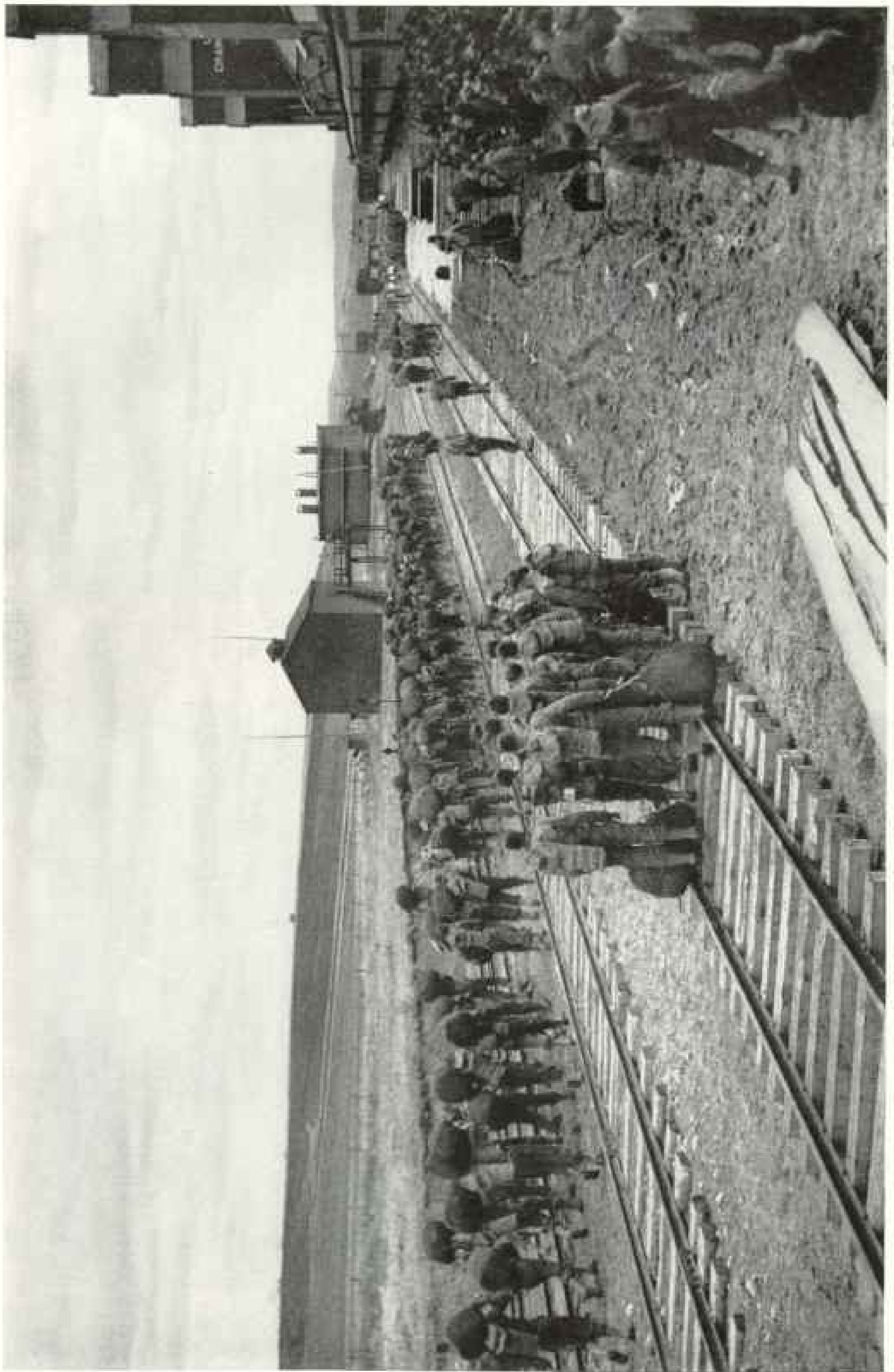
In this neck of the woods, troops entertained themselves with such popular songs as "Squaws along the Yukon Are Good Enough for Me." They wear old-style hats, suitable for suspending mosquito nets.



W.I.H., Canada

Log Walls Say: Wives or Sweethearts Are Far Away but Always in Men's Thoughts

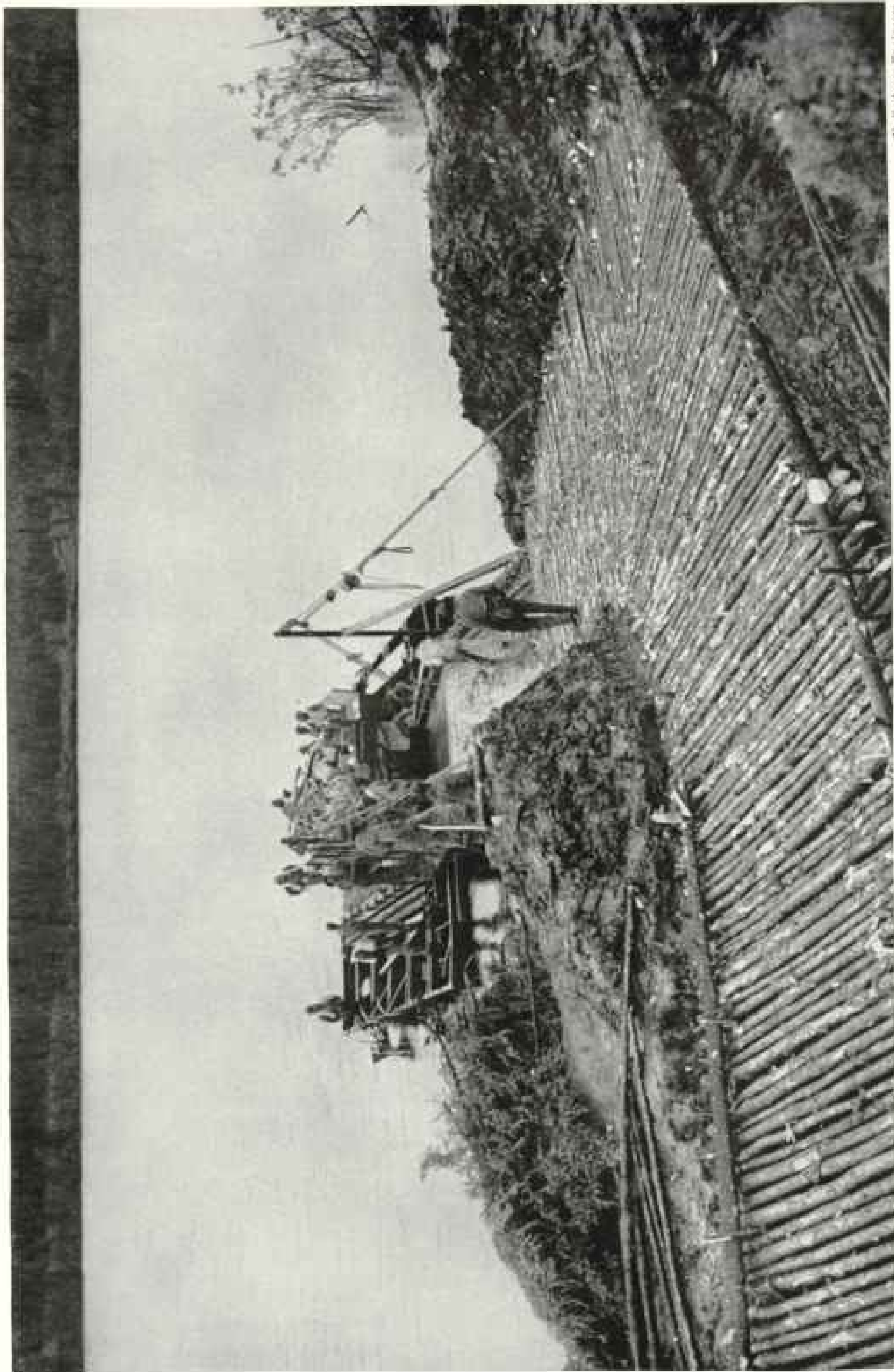
Since the road was built so fast, there was no time to construct barracks; therefore, these men have taken over a trapper's abandoned cabin in Yukon Territory. In the corner is a prize from a bighorn sheep.



U. S. Army Equipment

At Dawson Creek, Railroad's End, American Troops Pour off Train, Shoulder Full Packs, and March off into the Wilderness

Fresh from the United States, these engineers will not see another town until they reach Whitehorse, some 1,000 road miles northwest. To their right rise grain elevators; to left stretch typical Canadian wheatlands. Country beyond Dawson Creek, though arable, has lacked marketing roads. The Alcan Highway will bring new settlers.



U. S. Army Engineers

At Foot of a New Log Road, Six pontoons Lashed Together and Powered with Outboard Motors Ferry Troops across a Canadian River
Army's spelling for these boats is "pontoon," after the French. Logs bracing the strip will retain dirt and gravel to be added. Tractors cannot use such bare corduroy roads, as they soon grind them to pieces. Bridge builders will go to work here. They spanned 200 streams on the Alcan Highway.



W. I. B., Canada

Pushing a Truck out of the Muck Is Child's Play to the 20-ton Caterpillar

Lest his powerful tractor rip the van to pieces, the "cat" driver cautiously edges a corner of his angle-dozer against the rear bumper. Observe tires' clogged treads. The author was six hours traveling less than 15 miles in such mire (page 157). Wire guards protect the truck's head lamps from brush.

problem of supply and communication in the far north is the Air Transport Command.

Droning above the engineers as they worked strung out through 1,671 miles of wilderness were constantly the sturdy DC-3's (now Army C-47's) shuttling back and forth between Edmonton and Fairbanks. Fort St. John, Fort Nelson, Watson Lake, and Whitehorse are now like main stations on a busy railway line.

In August I left Fort St. John in a transport loaded with crates of onions, celery, and potatoes—food for the troops at Fort Nelson.

Transferring to another ship at Fort Nelson, I found it loaded with men and machinery directed to Whitehorse. On the last leg of the journey to Fairbanks, there was yet another ship with just room for me to slip in on top of crated military supplies and to lie at full length on a spare sleeping bag.

After years of flying over Alaskan bush in battered little two- or four-place single-engined planes, it was a strange sensation to shuttle back and forth in what seemed to me huge flying freight cars.

Pilots who had flown regular air-line routes in the States were usually overawed by the endless bush when they made their first north-

ern flight. One youngster, landing at Watson Lake to refill on his first flight to Fairbanks as a co-pilot, turned grinning to the two of us who perched on crates behind him and exclaimed, "Boy! What a lot of country!"

When I began my fifth and last trip over the Alcan Highway, not more than 250 miles remained to be completed. Col. L. E. Robinson's 97th Regiment of negro engineers in Alaska had raced across the flats of the Tanana Valley, completing eight miles in one day, and, using a ferry built up from five pontoon boats, had transferred their lead "cats" across to the far side of the river.

The Welden Brothers with their Iowa bridge-building crew were halfway across with a pile bridge, and other civilian contractors were taking over road grading, widening, and maintenance.

The 18th Regiment, moving northward from Whitehorse, and the 97th moving southward from Alaska, were each about 75 miles from the Canada-Alaska boundary. In regular contact by radio each reported the day's progress, and competition for the most miles completed in one day became keen.

The troops, having learned by bitter experience how to handle and maintain their com-



Wide World from Press Ass'n

On the Army's Heels Came Civilians to Widen, Surface, and Repair the New Road.

The U. S. Public Roads Administration, moving 6,000 workers to Canada and Alaska, also helped the Army survey and build the pioneer truck route. Shown is a P.R.A. field office at Dawson Creek, British Columbia.

plicated machines, and finally aided by experienced tractor men, were now working much more efficiently than they had during the first months.

At Last, a Three Months' Goal

South of Whitehorse, Col. F. R. Lyon's 340th Regiment had fought its way through rough mountainous country, which had been heartbreaking in July, and was now out on the level, dry country near Watson Lake, just north of the Liard River.

When the leading "cats" broke through to Lower Post on the Liard, early in September, I watched truckloads of bush-hardened soldiers come shouting and singing into the tiny log settlement—the goal they had worked toward for more than three months.

Less than one hundred miles of uncut bush lay between them and the advance company of the 35th moving northward from Fort Nelson. They pushed on to close the gap.

Winter was in the air. A film of ice formed on the small ponds at night and the air was frosty. Officers discussed the construction of permanent winter quarters, supply depots, and service stations at regular intervals along the highway. Rumors as to which regiments would stay and which would pull out for the

winter circulated daily. Home was in every one's thoughts, but some must stay.

Fleets of trucks were already pounding over hundreds of miles of completed road. Their drivers eagerly asked endless questions about the conditions of winter freighting from Dawson Creek in British Columbia to Fairbanks when temperatures would drop to 50 and 60 degrees below zero.

Some of us were familiar with winter driving in Alaska, but no one knew what problems must be solved to move thousands of trucks steadily (one every three minutes, some said) through such a vast region.

Back in the south at Fort St. John, I found that the yellow-painted machinery of civilian contractors had replaced the olive-drab machinery of the Army and had already improved and enlarged much of the road between Fort St. John and Fort Nelson. Civilian barracks, equipped for winter, had replaced the green tents of the Engineers.

If I were asked to design a monument commemorating the construction of the Alcan Highway, I would model a 20-ton caterpillar tractor driven by two soldiers, one negro and one white, but so greasy and grimy that the difference in color would be practically imperceptible. Just ahead of the machine and its



W.I.R., Canada

Roaring, Booming Dawson Creek, Alcan's Southern Terminus, Loads Supply Trucks

Ration boxes, flour bags, and construction materials, rushed by rail from the United States by Brig. Gen. Clarence L. Sturtevant, pile up at this British Columbia open-air depot. Supplying 10,000 soldiers, some wilderness-bound by muddy trails, was one of the Engineer Corps' toughest problems.

drivers, I would place a tattered and bewiskered officer riding knee to knee with a Canadian Indian, both mounted upon jaded and bony cayuses.

Not artistic, perhaps, but it is symbolic of the men and machines which have made it possible to reach Alaska with the supplies necessary to hold one of our richest territories.

Thousands of inexperienced men were assigned the task of completing a highly complex job in an unbelievably short time. Inefficiency at the beginning was unavoidable. Nothing similar had been done before.

No one knew how to go about it. But the thousands learned quickly in the building, and in the end the road went through at what is probably far less than the cost of a battleship.

If our fighting forces have the ingenuity, the morale, and the toughness of the U. S. Engineer troops assigned to the Alaskan highway, we may be sure that unavoidable confusion at the beginning will speedily give

way to efficiency and to a successful outcome of the war.

The map of Alaska on pages 150 and 151 shows recent railways and highways of Alaska, some connecting with the Alcan Highway.

Army engineers have disclosed completion of a direct connecting link between Anchorage and the Alaskan highway. The new Glenn Highway, from Palmer to Copper Center, and another new stretch from Gulkana to Tanana Crossing, combine with older sections to form this through link.

At Copper Center the Glenn Highway meets the Richardson Highway, which runs north from Valdez to Fairbanks. One important effect of this new road is to join Anchorage with the all-year ice-free port of Valdez. The port of Anchorage is frozen over several months each year, and also has 40-foot tides. Important, too, is the new Portage junction cutoff of the Alaska Railroad, giving the railroad a new southern terminal at Whittier, on Prince William Sound. This twin-tunnel project shortens the length of the road about 50 miles. The old terminal was at Seward, farther south. Seward's harbor is not well sheltered. Much of the first 40 miles of track north of Seward is built on trestles, which are vulnerable to air attack and are difficult to maintain in winter. —Editor.

Curaçao and Aruba on Guard

By W. ROBERT MOORE

With Illustrations from Photographs by the Author

ON CURAÇAO and Aruba, tiny Dutch islands off the Venezuelan coast, two of the world's largest refineries and one smaller one are producing oil and high-octane gasoline to keep Allied planes in the air, tanks rolling in battle, and ships plowing sea lanes with men and munitions.

It is revealing no military secret to speak of these huge island installations. They've been in operation for years. Millions of barrels of gasoline, Diesel oil, and other oils pour annually from their busy refining and cracking plants. Almost everyone on both islands is "in oil" in one way or another.

When the Germans sent their blitzkrieg crashing into the Netherlands in May, 1940, British and French troops were dispatched immediately to help the local garrisons on Curaçao and Aruba guard these fountainheads of precious fuel. After the sudden fall of France her troops were withdrawn.

The British remained until after United States forces came in February last year.

First Enemy Shots in New World

Less than a week after the announcement by our State Department that United States contingents had been sent to Curaçao and Aruba, at the invitation of the Netherlands Government, Axis submarines bobbed up on the scene and fired their opening salvos in the Western Hemisphere.

Early in the morning of February 16, they launched torpedoes against several tankers and sent shells from deck guns hurtling over the big Lago refinery at Aruba.

Some tankers were damaged or set afire and sunk, but the shells all overshot their mark, except one which dented a Diesel oil tank and ricocheted harmlessly. Not a single part of the installations was damaged.

"True, the subs sank a few ships and gave us some fireworks for a while," said one official. "But, all in all, they missed the boat. They'll get some hot stuff thrown at them if they come back!"

Since that first foray, one submarine has returned. It fired a few ineffectual shells at some outlying storage tanks on Curaçao, then crash-dived and fled.

There was a reason. Curaçao and Aruba are on guard.

When I visited the islands, I saw American officers and men up to their sunburned necks

in work perfecting the defense of these vital refineries.

Men, guns, and machines are dispersed over cactus-studded outposts ready to give any invader a deadly reception (page 170).

So alert to possible enemy action were the lookouts that night after night alarms were turned in to headquarters on suspected flashes of tracer bullets. They proved to be only the trails of particularly bright falling stars.

With its homeland conquered by Germany and the Netherlands Indies overrun by the Japanese, there is precious little of the Netherlands Empire still free.

These islands, together with Surinam (Dutch Guiana) on the northern coast of South America, are about all that remain at this writing (map, page 172).

The island of Bonaire, a few miles east of Curaçao, and tiny Saba, St. Eustatius, and part of St. Martin in the Leeward Islands chain hemming the Caribbean, also are Dutch. However, they are of little commercial importance and have only a handful of people.

The main sources of wealth under Queen Wilhelmina's control are these refineries on Curaçao and Aruba and Surinam's rich bauxite deposits—an important source of our aluminum supply. But with these two strategic weapons her refugee government still fights.

Despite this emphasis on oil, Curaçao and Aruba themselves have not a single drop. Most of it comes from the Lake Maracaibo and other vast Venezuelan fields nearly 200 miles away.

A Geological Bottleneck

A geological bottleneck in the ocean entrance to Lake Maracaibo allows the passage only of shallow-draft vessels.

To exploit the rich resources oil concerns needed deep-water facilities. Curaçao, possessing a wide, landlocked harbor, and Aruba, affording a deep anchorage behind a reef, thus have risen as the industrial refining middlemen to the Venezuelan deposits.

A constant procession of shallow-draft tankers shuttles back and forth between Maracaibo and the islands, bringing loads of crude oil. Here it is first refined and then loaded into big ocean-going tankers.

On a plane packed with persons traveling on wartime priorities, I flew from Miami to Maracaibo. So large is Lake Maracaibo that



U. S. Troops Now Guard the Huge Refineries on Curaçao and Aruba

Carrying his gas mask and "tin hat," this young American is on duty at the Lago refinery on Aruba. Invited by the Netherlands Government, American forces arrived in the islands in February, 1941. Less than a week later, German submarines made a concerted attack on tankers and refineries, but did little damage (page 169).



Philip Hanson III

Keen Eyes and Big Searchlights Peer Down on Interned Germans

The officer in charge of the internment camp on Bonaire and a native soldier stand in one of the guard towers to see that no one escapes. Germans who were in the Netherlands West Indies when the mother country was invaded were rounded up and brought here (page 183).

we could see none of the forests of oil derricks that stud stretches of its shores and reach far out into its waters.

This Maracaibo Lake Basin, as it is known to the oil industry, covers a water and land area of about 40,000 square miles, beneath which is one of the world's largest known deposits of crude petroleum. The hot tropic town of Maracaibo itself reflects little of the riches that lie in this fabulous region.

Transferring from the big Pan American flying boat to a land-based Lockheed of the K. L. M., or Dutch line, we flew to Aruba and Curaçao—and flew blind.

All windows in the passenger compartment were blocked by translucent covers as a military requirement. The authorities are taking no chances on letting anyone look down on the island defenses.

After being dropped down in the midst of a bustling military encampment, we were whisked away to little Holland! At least it seemed so to me as we rode into Willemstad, capital of Curaçao. If the Dutch had broken off a small chunk of the Netherlands, towed it out here, and anchored it in the blue Caribbean, the scene would be changed hardly a whit (Plates VI, VII).

Here are gaily tinted houses with fine old Dutch gables and doorways. Dutch names, difficult for us to pronounce, appear everywhere. The long, narrow harbor entrance and near-by slender lagoons add the illusion of canals. Lazy sailboats line the water front.

The likeness is hardly surprising. Curaçao has been under Dutch control almost continuously since 1634.

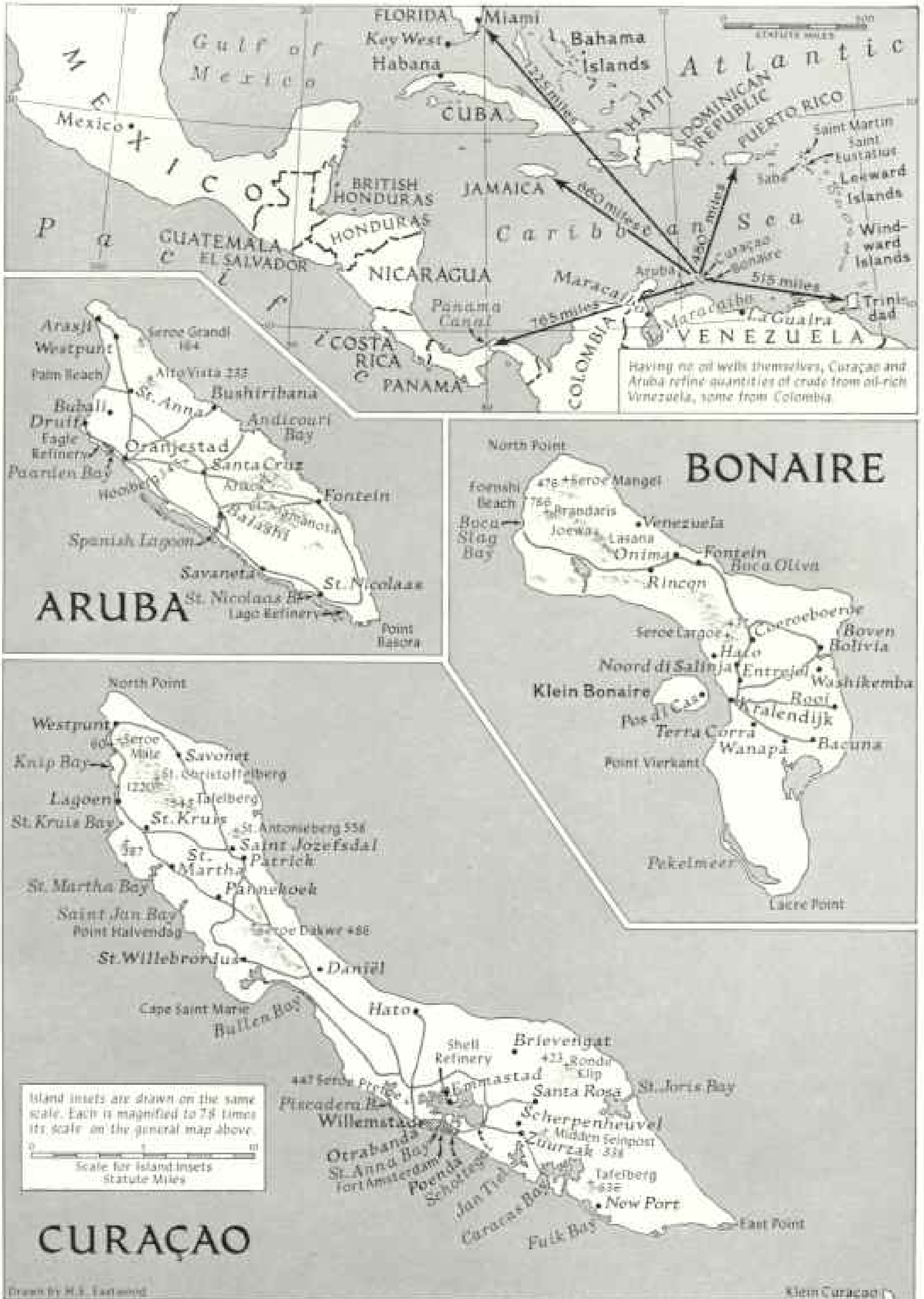
More surprising, perhaps, is one of its historical incidents.

When New York was still New Netherlands and was endangered by hostile Indians, the Governor of Curaçao sent troops to its relief. Two years later, 1646, this same governor was given the task of governing the young colony in addition to his duties of controlling Curaçao, Aruba, and Bonaire.

He was Peter Stuyvesant—he of the wooden leg and iron will.

Today, it seems but a fair turnabout that another former governor of New York, also of Dutch ancestry, should send troops down to guard Peter Stuyvesant's old domain.

Peter himself might be a little confused at the growth of New Netherlands to New York, that the streets of New Amsterdam through which he stumped on his wooden leg are now



From Huge Refineries on These Tiny Dutch Isles in the Caribbean Flows Oil for War



Home Is a Tent in a Cactus Patch for These U. S. Soldiers on Curaçao

Off duty, one soldier shaves, while another writes a letter to folks in the U. S. A. The third plays with a pet monkey, imported from Venezuela. Cactus affords excellent camouflage and serves as a windbreak for the tents pitched near gun positions on the dusty, wind-whipped island.

canyons between giant skyscrapers, and that there is a White House in Washington to which this later governor has been promoted!

Governor Stuyvesant Would Recognize Landmarks in Curaçao

Old Peter, however, would still recognize much of Curaçao.

He might even locate the place where his leg was buried! Sustaining an injury in the Caribbean which necessitated its amputation, he had his leg sent back to Curaçao. The spot where it reposes is not known, though some imaginative persons will point out the supposed burial place in the local cemetery.

Looking across the narrow harbor channel that bisects the town, the beholder is little aware of the importance of Willemstad as a port. One of the most advantageously situated havens in the West Indies, it has a deep waterway, known as St. Anna Bay, which extends some distance inland and then opens

into an expansive landlocked bay, called the Schottegat. Here dozens of ocean-going steamers and big tankers can lie at anchor almost completely concealed from the town. Hidden also are the harborside refineries (Plate VIII).

A bobbing pontoon bridge spans the unusual constricted channel, linking the oldest quarter of Willemstad, the Poenda, with the newer, but not exactly youthful, Otrabanda (Other Side). Pivoted at one end, the bridge is swung out of the way by cables whenever a ship approaches (Plate VII).

That happens often, for many ships pass to and fro. Before war came to upset steamship schedules and silence statistics, some 6,000 ships, with a gross register of 27,000,000 tons, passed through this waterway annually.

Invariably, if you are on one side and want to get to the other, the bridge swings away just when you want to cross! That seems especially true if you are in an automobile,

as only pedestrians and bicyclists are carried back and forth by the motor launches that do ferry service when the bridge is open. It is a standing excuse when you are late to an appointment!

Old Fort Amsterdam Signals Ships

Close by the Poenda end of the bridge and guarding the seaward approach to the harbor mouth, is old Fort Amsterdam. From its stone-block parapets signals are sent to ships entering port (Plates I, VI).

The Palace of the Governor stands beside its walls, fronting a wide courtyard about which are grouped government offices, the post office, and a church—a pocket edition of an Old World town. Husky Dutch marines with wide straw hats guard the gateway (page 184).

In front of the palace, as elsewhere throughout the town, concrete-coated sandbag shelters have been erected, giving Willemstad a wartime appearance.

Stocky, green-uniformed policemen ride about town on bicycles with rifles slung on their backs and "tin hats" tied to their luggage carriers. Here and there United States military police walk street patrol. Jeeps and reconnaissance cars in American war paint brush fenders with the 3,800 station-wagon buses and other passenger vehicles.

About half of Curaçao's 65,000 people live in Willemstad; many of the others are located at Emmastad, near the refineries. By far the majority of the population is of colored ancestry. In early years Curaçao was not only a slave-trading center, but its large plantation holdings were worked by negro labor.

The Hebrew colony also is large. Its roots reach back almost to the beginning of the island settlement by the Dutch, when many Jewish people, mainly of Portuguese and Spanish extraction, migrated here.

Many of the bazaars, long famous for their variety of almost-tax-free goods, are managed by East Indians. The oil industry has added to the medley of races.

By actual count, Aruba, for instance, had 45 nationalities before the Germans were sent to an internment camp on Bonaire (pages 171, 185). Curaçao, with more than twice Aruba's population, is perhaps even more varied.

The official language is that of the mother country—Dutch. But the native tongue, which almost everyone knows, is like none that you will hear any other place in the world. Called *papiamentu*, it is a patois made up of Spanish, Portuguese, Dutch, and a potpourri of other words.

Rich or humble, the island homes are gaily

painted in bright blue, pink, green, yellow, and other tints. The story is told that one early governor was disturbed by the blinding tropical glare on white buildings. It hurt his eyes, so he ordered that houses should all be painted in more restful colors.

Whatever may be the truth of the tale, the present effect is decidedly polychromatic. And there is an atmosphere of Dutch trimness about the whole picture.

A Tropical Blackout Problem

At night now a wartime blackout imposes its problems. How can all traces of light be blocked off in a tropically built home or hotel and still allow a ventilating breeze? How to shield an almost-open-air movie from sea or sky prowlers?

The people have had to find the answers. Going to bed early is hardly a solution, for here, only some 12 degrees above the Equator, nights are nearly the same length as days.

Groping through Willemstad's dark streets of an evening, I came upon native groups sitting in doorways and along curbs talking or strumming musical instruments. Inside black maws of buildings radios and phonographs blared. Cars find their way about with only tiny open slits on their headlights.

One evening as I sat on the balcony of my darkened hotel I saw a group of young native athletes file past. The last one in the procession was wearing a dim taillight. As they turned to cross the pontoon bridge, the light was obediently switched off until the party reached the opposite side!

If Willemstad's architecture is reminiscent of the Netherlands, the rest of the island is not. Thirty-eight miles long and eight miles across at its widest place, Curaçao is largely a thirsty coral and lime rockland. Tall cactus, prickly "Spanish ladies," and divi-divi trees form its main growth (page 189).

The trade wind blowing perpetually from the northeast over the islands has whipped and tugged at these divi-divi trees until their branches stretch out to one side like fantastic long pennants. Aviators don't need to look for windsocks or the drift of smoke here; they need only see which way the trees are blown!

Were it not for this constant trade wind the islands would be a much hotter and a less pleasant place to live. Even the fumes of the oil refineries are quickly dissipated in such a strong breeze.

Unfortunately, water is scarce. Rainfall averages only about 20 inches a year—if it comes. At the time of my visit the islands were suffering from a four years' drought. Though it was harvest time, there

Curaçao and Aruba, Oil Isles of the Caribbean



Flying the Dutch Flag, Schooners Bring Fruit and Vegetables from Venezuela to Aruba. Sailing vessels are the chief trade link in the Netherlands-owned islands, carrying food, salt, cattle, and fish.



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Kodachromes by Philip Hanson Hill

Dutch Marines Man a Defense Gun Atop the Walls of Old Fort Amsterdam

This historic battlement guards the narrow harbor entrance at Willemstad, Curaçao (Plate VI). Invited by the Netherlands Government, U. S. troops are stationed on Curaçao and Aruba to protect the refineries. American and local forces are under U. S. Navy command.

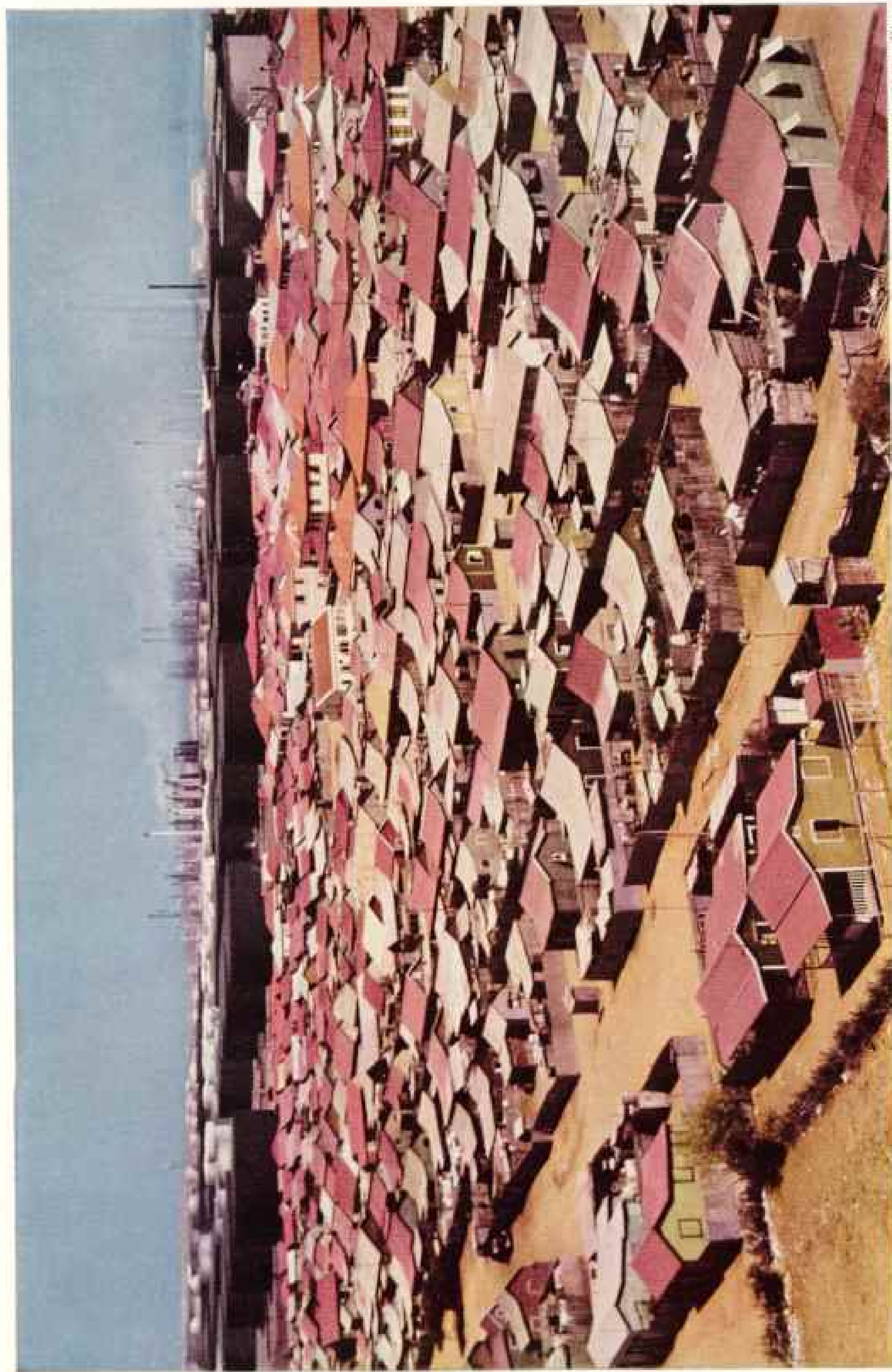


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With No Oil of Its Own, Aruba Has the World's Largest Refinery and Cracking Plant

Crude petroleum is brought by shallow-draft lake tankers from the Mameucibo wells in near-by Venezuela. After refining, oils and gasoline are shipped abroad in large ocean tankers. In February, 1947, German submarines attacked here, but succeeded only in setting fire to a few ships.

Illustration by Philip Barrett Hill

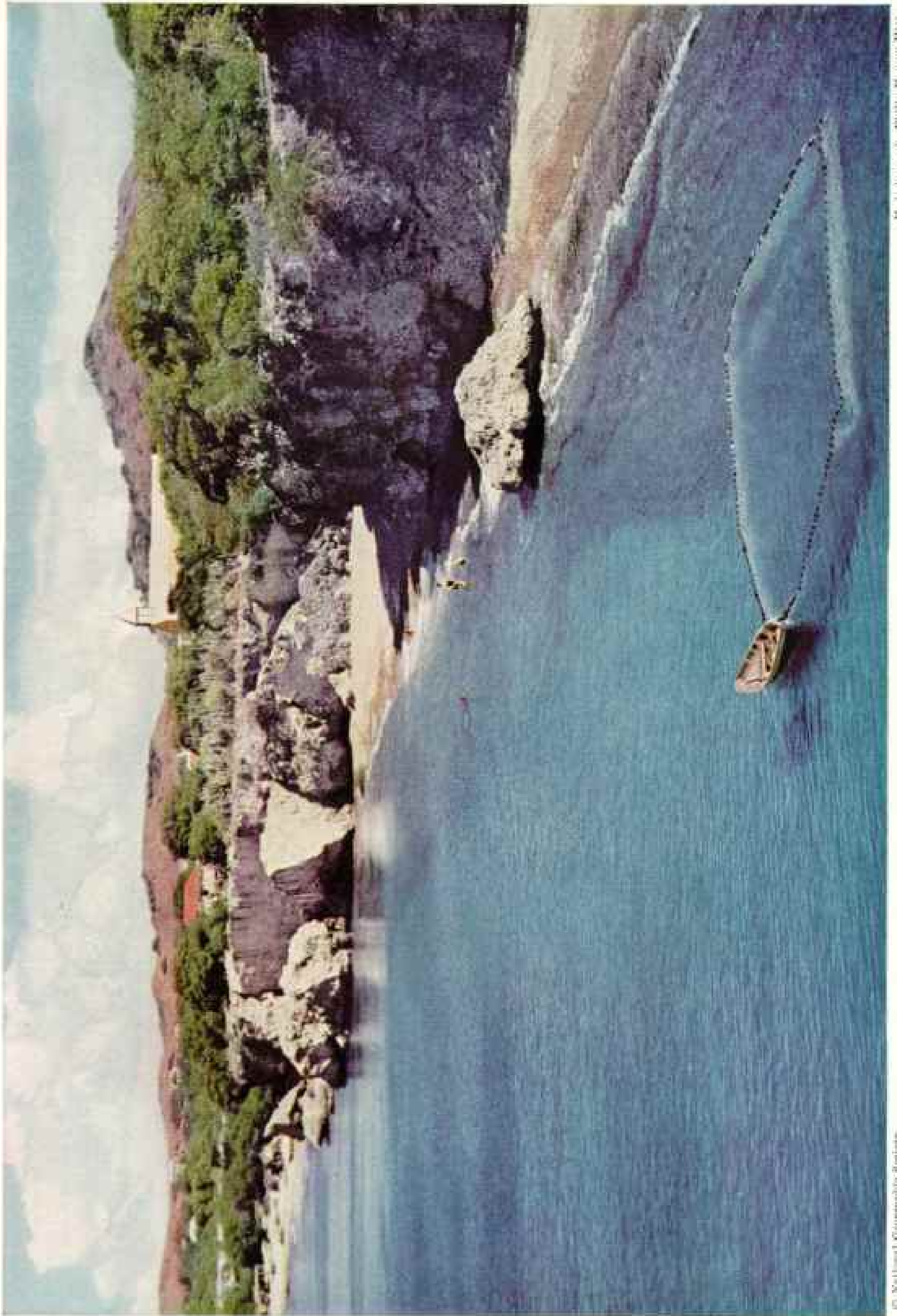


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Like a Western Boom Town, St. Nicolaas Has Mushroomed about the Lago Refinery

Among the workers are 44 nationalities. Near by is a trim settlement where American employees live. Another refinery is located at Oranjestad, near the opposite end of the island. Much of Britain's high-octane gasoline and fuel for her fleet comes from Aruba and Curaçao.

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West Point (Westpunt) on Curacao Is Only a Small Village on the Bluff and a Beach Off Which Fishermen String Their Nets

Redrawn by Philip Hansen, 1910



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Illustrations by Philip Hamann, III

Gaily the Younger Set at the Curaçao Sports Club Steps to the Rhythm of the Ganga

These folk devised this form of the conga as a theatrical entertainment and created their own costumes. Social life centers about the many sports clubs.



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Steaming Past Historic Fort Amsterdam, a Dutch Naval Craft Enters Willemstad's Bottleneck Harbor

Motorcars must pause while the posttoon bridge (opposite page) is drawn aside to let the ship pass. Across the narrow neck of St. Anna Bay appears a portion of the Governor General's Palace (left). Station wagons are often used in Curacao as buses.

Photographs by Robert Tammitt Jittelle



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Illustration by Robert Varnall Dutton

With Its Brightly Painted Gabled Buildings, Willemstad Suggests a Bit of the Netherlands Anchored in the Caribbean

The pontoon bridge, connecting the two portions of the town, is swinging to the left to let a ship enter the harbor. Small launches ferry people across when the bridge is open. Peter Stuyvesant governed Curacao before he was also given control of New Amsterdam, now New York.



The Refinery at Curaçao Bristles with Stacks, Towers, and Oil Tanks

A large portion of the island's 65,000 population gains its living in one way or another from this huge enterprise of the C. P. I. M. (Curaçoesche Petroleum Industrie Maatschappij), a subsidiary of the Royal Dutch Shell Company.



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Kodachrome by Philip Hansen III

Row on Row of Storage Tanks Surrounds the Huge Refinery at Curaçao

These sprawling installations rank third in cracking capacity and are surpassed only by the Lago refinery at Aruba and one at Abadan, Iran. Located beside landlocked Schottegat harbor, it has drydocks for its tanker fleet.

was hardly a stalk of corn anywhere on the island.

Windmills, not the picturesque Dutch kind but those familiar to the Midwest of the United States, whir in the wind to pump water from underground wells. Much of it, however, is so brackish that both Curaçao and Aruba use distilling plants for purifying sea water (page 188).

Gardens grow only in the sheltered areas between the hills and thrive mainly because Chinese gardeners painstakingly irrigate them. Much of the food and fruit consumed on the islands is brought by sailboat from Venezuela (Plate I).

Here and there orange trees grow, yielding the peculiar green peel used to flavor Curaçao liqueur. Most of this widely known liqueur was not made in the islands, but the dried peels were sent to Amsterdam or Hamburg for its manufacture.

The Pattern of Island Bays

One of the most striking geographical features of the island is the form of its indented bays. The Schottegat, about which most of the shipping is concentrated, is the biggest of these. There are a half dozen others notching the coast that follow the same pattern. From narrow, constricted entrances they spread out into large land-protected reaches of water (page 186).

A dozen or so sizable hills corrugate the landscape of Curaçao. St. Christoffelberg at the northwestern end of the island is the largest. It rises to a height of 1,220 feet. A lower one, Tafelberg, or Table Hill, at the opposite end near deeply indented Caracas and Fuik Bays, is a source of calcium phosphate.

Workers are hewing and blasting away the hillside and then trundling carloads down to the water front, where it is ground and then dumped into dusty freighters for shipment abroad as fertilizer.

At one time similar deposits were exploited on Klein Curaçao (Little Curaçao)—a tiny near-by island that now has a population of only three people—and on Aruba. Both of these have been exhausted.

Aside from this single mining operation, almost the sole industry on the island before the oil boom came was the making of native straw hats. Back in 1910 fully a fifth of the population was engaged in this home occupation.

The leaves from the palmetto (*Carludovica palmata*) used in the weaving were brought from Maracaibo. Some hat weaving still goes on, but the amount it pays cannot compete

with wages that can be earned at the refinery.

Long ago large haciendas, utilizing slave labor, tried growing sugar and tobacco. But the effort never had much success because of the lack of rainfall.

Some of the big houses of the old estates are scattered over the island, but many are unused and are falling into disrepair. They are so large that not even an oil baron could afford to keep them in order.

The magic of oil brought by the Curaçoesche Petroleum Industrie Maatschappij (let us call it C. P. I. M.; everyone does!), a branch of the Royal Dutch Shell, has radically altered the island (Plate VIII).

Lean years are no more. Since the establishment of the refinery during the last war, the population has more than doubled. Labor has migrated here from Surinam and from the West Indies islands.

Trade that Curaçao once garnered as middleman and distribution agent at the crossroads of the Caribbean also increased until war upset normal shipping.

"Cactus Pete's" Victory Garden

Many of the people have almost forgotten that much of the island is only a cactus patch. Not so the American soldiers.

At one post that I visited, "Cactus Pete," as the men call him, has laid out a small V-for-Victory garden, all in cactus! Collecting cacti is also the hobby of the American Vice Consul in Willemstad. He has 33 different varieties around his house.

"How do you like it here?" I asked another group of soldiers whose tents were crowded into clumps of cactus so thick that I wondered how they ever got to the guy ropes. "Fine," answered one. "It's just like Texas; I feel right at home."

"Isn't this luxury!" shouted one of two others urging pint-sized donkeys up the hill. "No more walking for us on the rocks."

By some fancy bargaining they had just bought their floppy-eared mounts for practically nothing. One pink-cheeked lad, with sunburned peeling nose, elsewhere had bought a pair of slippers for 75 cents and had a donkey thrown in—if he could catch it!

If the donkey had belonged to anyone in particular, the native salesman was not worried. The beast probably would soon get away and wander home. Both donkeys and goats seem to thrive on the islands and roam at random in the roads and fields (page 185).

In off-duty moments the troops play basketball, tennis, and other sports at local recreation clubs or indulge in sand-lot baseball. Cold "cokes" and beer at the canteens flush



"I Haven't Seen My Family for Three Years"

That was the comment of this brawny Dutch marine on guard in Aruba. They were in the Netherlands when it was blasted and overrun by Nazi hordes in the summer of 1940. Javanese and West Indies natives also serve with Dutch troops, manning coastal batteries and guarding oil refineries.

much coral dust out of their throats. Of course, as everywhere, they have their pets—mainly monkeys from Venezuela (page 173).

The contingent also has its daily newspaper, a single mimeographed sheet, known as Force. It specializes on news bulletins, poems, and the escapades of one Señor Rumorr.

The boys use an ice pick to cut the stencil for their daily cartoon.

But the men also work hard, and mean business. An officer and I walked up to an outlook post one day, only to be confronted by a very business-looking bayonet. Though the guard knew the officer, he had received no order to let us pass. We didn't, until his sergeant came to our aid.

With feelings intensified by seeing the Netherlands and the East Indies crushed by conquest, the Dutch marines, naval men, and other local forces (including some Javanese) likewise stand staunchly on guard.

Most of them have relatives in one broken land or the other; it's *not* going to happen here if they can prevent it.

"I'll do all I can to hurry this job along so that I can get back to my wife and children in the Netherlands. I haven't seen them for three years now," said one powerful marine who stood a full head higher than my mere six feet.

The Dutch as well as all the American forces on both islands are united under the unified command of the United States Navy.

With the fall of the Netherlands the main company offices of the large Dutch mercantile fleet withdrew to the Netherlands Indies; thence in turn it was forced to shift here to Curaçao. The K. L. M. air line likewise has had to bring its headquar-

ters to the islands. Some of the pilots who flew in the European service or out to the Far East now man the planes on expanding routes throughout this area.

Among the fleet of trim Lockheeds is one old veteran Fokker which first flew the mid-Atlantic from Amsterdam to Curaçao in 1934! Though a bit slow, it is still going strong and is in daily local service.

Several planes a day hop the 75-air-mile span to and from Aruba, and some of the flights continue on to Maracaibo. Others shuttle back and forth to La Guaira, or follow the north coast to Trinidad and down to Surinam. A frequent service has also been developed with Jamaica, where Dutch families

can gain a holiday in the hills away from Curaçao's heat.

On Sequestered Bonaire

Thirty miles east of Curaçao is Bonaire, the quiet, retiring member of these sister Dutch islands.

Two planes a week fly over with mail and passengers. In normal times a steamship plying to and from the Leeward Islands also pays it a call; otherwise, it is left pretty much to itself.

The term "quaint" that is sometimes applied to Curaçao could better be applied to Bonaire.

Big-billed pelicans are the reception committee at its pier. Its wide salt pans are dotted with thousands of pink flamingos. Iguanas and giant lizards scurry through the bushes on its coral rocks.

Yes, people live here—more than 5,000 in all. But life is simple. There are few time clocks to punch, few distractions. Here are no refineries to work in or to guard. The local forces have only to guard the Germans held in an internment camp. The nearest that its people get to commerce is the collection of salt in big salt pans and the draining of medicinal gum from quantities of aloe plants.

Kralendijk (Coral Dike), the capital where the Lieutenant Governor lives, is a peaceful village with a delightful Dutch flavor. The rest of the island is a slightly less than half-sized model of Curaçao, having an area of only 95 square miles against the other's 210.

Aruba is still smaller. It has an area of only 69 square miles. Yet in the oil picture it looms large (Plate II).

The Lago Oil and Transport Company operates the world's biggest refinery here. In its



"No More Hiking on the Coral Rock for Us!"

So boasted two U. S. soldiers to their buddies when they returned to camp. They bought these floppy-eared donkeys from the natives for almost nothing (page 183). A short time later the author saw one of the men afoot, trying to push his "mount" up a hill.

cracking capacity, especially, it outranks all others. Stills, cracking plants, hydrogenation units, and a maze of storage tanks crowd this concession, which is operated by the Standard Oil Company of New Jersey.

"Make Hitler Boil in Lago Oil"

Today, the oil people don't talk much about what they are doing. One large sign near the gateway of the refinery is brief but to the point. It reads: "Make Hitler Boil in Lago Oil!"

To get into the refinery isn't easy now. Armed with one pass and riding in an Army jeep, we made a long, circuitous drive to get to see the manager in the air-conditioned



Photo: Henson Blue

Sprawling, Multiarmed Schottegat Provides Curaçao with a Magnificent Landlocked Harbor

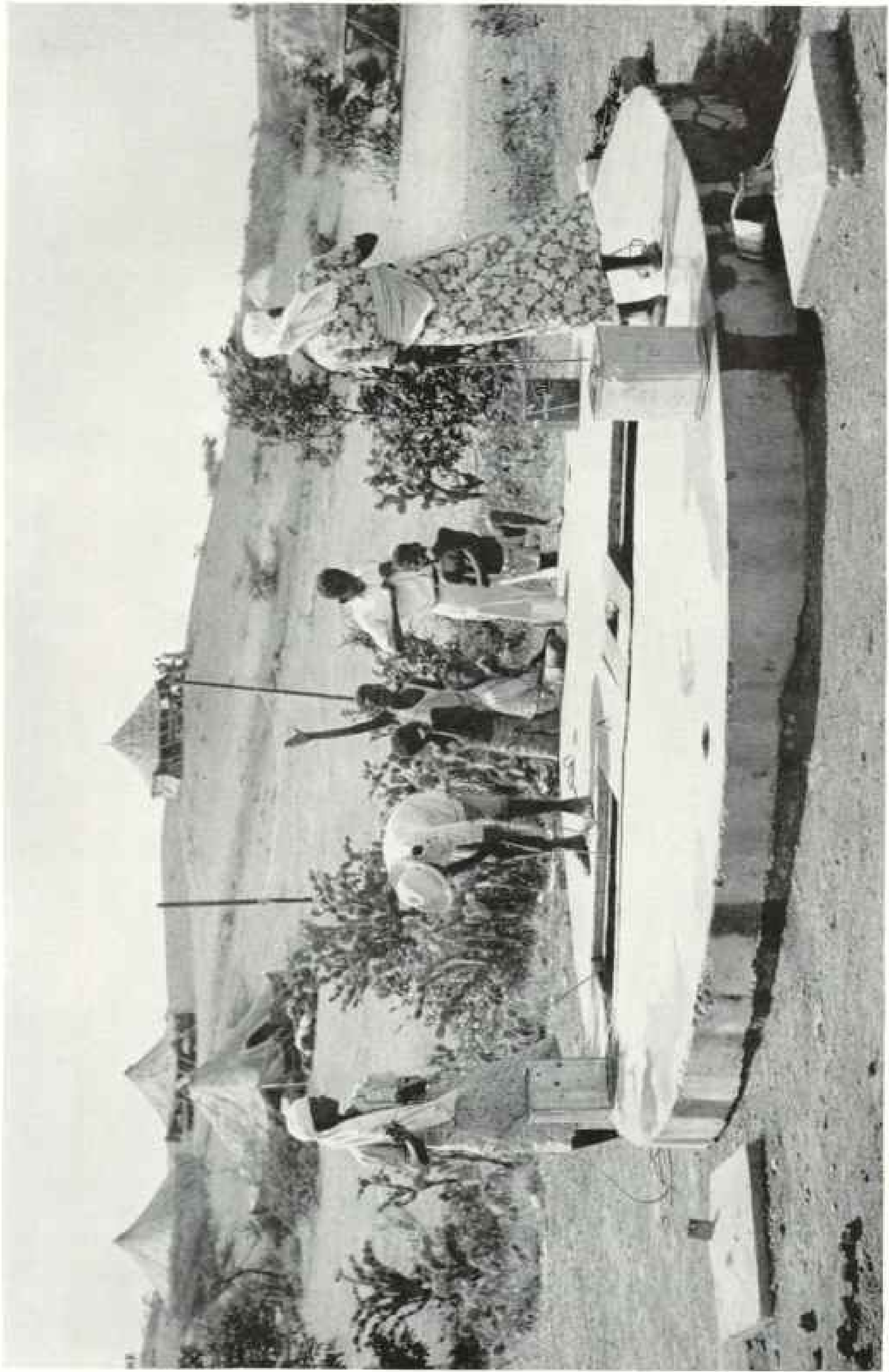
Oil tankers and freighters cluster about the wharves of the big C.P.I.M. refineries. Curaçao has several of these land-girt reaches of water, connected with the sea by bottleneck entrances. In the far distance, right, is Tafelberg (Table Hill), on whose side can be seen a white flash where phosphate is mined (page 183).



Philip Hanson Photo

Formal Ceremonies Attend the Opening of the "States," or Legislative Assembly, by the Governor at Willemstad

Wearing full dress with cocked hat, he leaves after the opening. The assembly is made up of 15 members, 10 elected and five appointed by the crown. Politically the "territory" of Curaçao consists not only of Curaçao and its adjacent islands, but also of Saba, St. Eustatius, and the Netherlands portion of St. Martin. In December, 1942, Queen Wilhelmina announced plans for postwar autonomy of overseas territories, giving them a voice in their home governments.



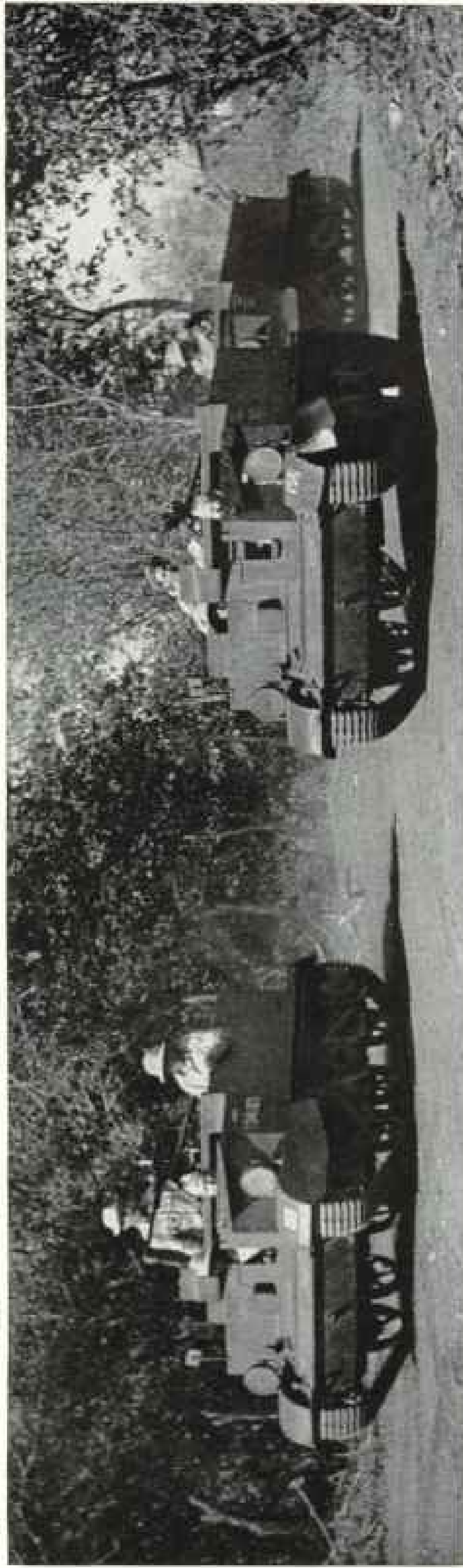
On Thirsty Curaçao and Tiny Aruba, Water Is a Precious Commodity

Rainfall is scarce, averaging about 15 inches annually for Aruba, and 20 inches for Curaçao. Water in many of these wells is brackish from salt-water seepage. Both islands have distillation plants for purifying sea water. Camouflaged tents of U. S. guard troops perch on the hill beyond.



Constant Northeast Winds Cause Divi-divi Trees to Grow Lopsided on the Curacao and Aruba Landscape

On this arid soil of Aruba are seen low-growing aloes, whence comes much of the world's supply of aloin, used in medical preparations (page 191).



U. S. Troops Maneuver in Bren Gun Carriers and Trucks Left by the British at Curacao



American Sailors Salute the Netherlands Flag as Their Warship Enters Port

Whenever an American craft sails in past Fort Amsterdam at Willemstad, Curaçao, this formality is observed. The Netherlands flag at the fort is dipped in reply. All military and naval forces, both United States and local, on Curaçao and Aruba are under the command of the U. S. Navy. Both Dutch and American vessels share in the patrol of the waters about the islands. A heavy traffic of ships, many of them tankers carrying oil to and from the refinery, passes through this deep channel, known as St. Anna Bay (Plate VI). In the background are sailboats which bring fruit and fresh vegetables from near-by Venezuela.

administrative offices. With another pass we were permitted to enter one of the main gates to see the chief guard, who was a six-foot-three Texan wearing a big badge and a six-shooter.

While we sat talking with him, as still another pass was being made out, the manager called to secure a permit for himself. He had just tried to get into one of the buildings and had been stopped at the door!

Outside the refinery area, but still within the concession, you are more welcome. In fact, hospitality is unbounded. Here is a little America where some 2,500 people live in trim company houses.

At homes or at the club you talk Texas, New Orleans, Oklahoma, and other places back home. You learn also that an Aruba chicken *can* be made to taste like chicken "Southern style"!

Flowers flaunt themselves bravely from handfuls of carefully watered earth that have been laid over the coral and lava rock. The company encourages gardening by providing soil and fertilizer. "Essoville" is almost home town, but not quite.

Close to the refinery compound is the village of St. Nicolaas, a tiny international cross section embracing 44 nationalities. Cactus and barren old lava flows encompass the near-by countryside (Plate III).

Oranjestad, the capital, lies a few miles away near the opposite end of the island. Just a short distance beyond its brightly tinted buildings, smoking chimneys smudge the cloudless blue sky.

Here are more stills, tanks, and other refinery installations. They belong to the Arend, or Eagle Company, a subsidiary of Royal Dutch Shell. Smaller than the Lago plant, this refinery is also older. Both, however, were constructed in the late 1920's.

Aruba Even More Barren Than Curaçao

Most of Aruba is even more barren than is Curaçao. Much of the vegetation that exists on the island is largely confined to the western portion where some of the wind-blown soil has found lodging. The rest is almost stripped bare.

Along the northern, or windward, side waves crash against rugged lime and lava bluffs, gouging out fantastic caves and creating overhanging ledges.

A lagoon fringes the southern side of the island, and coconut groves cover part of the western portion to lend a tropical appearance. Palm Beach, a lovely arc of golden sand, stretches beyond this band of coconut trees.

As on Curaçao, wind-blown divi-divi trees also hang lopsided on the landscape. In some places the pods of this tree (*Caesalpinia coriaria*) are collected commercially and shipped abroad for tanning purposes (page 189).

Over on the northern side of the island I came upon curiously eroded rocks which had been scooped out on one side so that they, like the trees, seemed all to be blown in one direction.

Source of Aloes and Aloin

At some of the roadside fields I stopped to watch natives cutting aloes, an industry that thrived long before the oil trade began. The men cut the thick fleshy leaves and place them in inclined troughs to drain.

The thick lemon-yellow juice that exudes from the leaves is collected in receptacles and is later taken away to be boiled down to a pitch-black gum. In this form it is shipped to world markets.

This gum contains aloin, which forms the medicinal ingredient of many cathartics. Some 60 percent of the world's supply of aloes comes from this tiny island.

According to some authorities, the variety of aloes harvested here was originally brought from the island of Socotra by Dutch West Indies colonists. The plants thrive almost without attention; the sun, thin soil, and limited rainfall are ideal for their growth.

More than a century ago gold was discovered on Aruba. Alluvial ore that had been washed into the sand beds of water-courses in the western part of the island was first exploited.

Later, primary gold deposits were located. Most of it was embedded in quartz, though in some cases it appeared in thin veins or more rarely in small nuggets.

From time to time companies were formed for extracting and smelting gold, but apparently without great success. While roaming about the island we came upon several old mine and smelter ruins. The gold had either run out or its recovery became so expensive that the work was abandoned.

Never a place for much agricultural enterprise, Aruba now has few fields.

Cultivation almost ended when the people found employment in the refineries and could get imported products. Amid a chaos of granite boulders that strew the island are some patches of green vegetation, but much of the sun-blistered landscape appears like something conceived by Dante.

Crisscross Aruba on any of its lanes and you won't find a single wooden house or tin



Philip Hannan Hillis

Dressed in Their Formal Best, a Bonaire Couple Is Wed

Like most natives here, they have probably saved for years to have fine clothes for their wedding. They stand before the Lieutenant Governor of the island as he performs the civil ceremony. A church service will follow. Most natives in these Netherlands islands are Roman Catholic.

shack occupied by the natives. All are of stone or durable plaster. All appear freshly painted or whitewashed. Few places elsewhere in the West Indies are in such enviable circumstance.

Native islanders here still show strong traces of their Arawak ancestry. Skins are brown and facial characteristics contrast strongly with the negro element of Curaçao. But as more workers have come to the refineries, this racial strain is in the minority.

More Vital Than Ever Before

Yes, an unusual group of islands are these fragments of the Netherlands here in the Caribbean.

Today they are important as never before. Not only are their oil installations vital to war, but as bases they serve as an inner defense guard to the Panama Canal, only about 700 miles away.

In Curaçao I talked again with the officer in charge of their protection.

"Now that you have seen my whole command, what do you think of it?" he asked.

I had been with the United States troops on field problems, had seen posts manned by forces whose fingers itched for action, and had watched patrols on active duty.

But perhaps I thought most about the determined expression on the face of the giant, good-natured Netherlands marine who wanted to see his family in the home country soon (page 184).

My answer was to the effect that I thought Curaçao and Aruba were fully on guard.

The Axis submarine that had returned to fire a few shells at outlying oil tanks apparently thought so, too. I knew the battery that forced it suddenly to crash-dive to escape.

Convoys to Victory

BY HARVEY KLEMMER

"YOU will find your ship at the explosives pier." I pricked up my ears at the mention of explosives. The mere sound of the word gave me a sinking feeling at the pit of my stomach. There was nothing that could be done about it now.

I had been very casual about the whole idea of crossing the Atlantic by freighter. It was too late to back out.

There was nothing to do but go through with it and hope for the best. Besides, the explosives probably didn't amount to much. A few anti-aircraft shells, perhaps, or some bombs with the fuses removed. I had a good lunch and set out for a certain desolate area adjoining one of our great ports.

A couple of friends, Jesse Saugstad and Inman Payne, came along. They said they wanted to have a look at the explosives pier. Actually, I think they wanted to make sure I didn't change my mind.

We found the pier area surrounded by barbed wire. There was a guard every hundred feet. Some carried rifles, with bayonets attached; others were armed with shotguns. Our papers were examined carefully, and we were asked to surrender any matches we might have in our pockets.

We were allowed to drive our car to the end of the pier; there we transferred to a dilapidated truck, in which, after a lengthy session with immigration and customs officials, we were taken to the ship.

Sailors were battening down a hatch as we came aboard, preparatory to loading Army trucks on deck (page 196).

"What's in the Hold?"—"TNT!"

"What's in the hold?" I asked with as much nonchalance as I could muster, looking over my shoulder at the rows of guards and the piles of neat white boxes standing on the dock.

One of the sailors rubbed the sweat from his face and came over to where I stood.

"TNT," he whispered.

I may have been seeing things, but I imagined that Payne and Saugstad were a bit profuse in their farewells when it came time for them to go ashore!

The ship was a modern vessel. Like all Norwegians, she was well kept and beautifully clean. The steward gave me a comfortable little room on the bridge deck, next to the captain's quarters. Here I was to spend a quiet and, in view of the circumstances, a not uncomfortable three weeks.

The captain, Frode Bjorn-Hansen, was a great lean man with large hands and a strong face. He was typical of the Norse seafarer—quiet, capable, determined. He had been at sea since he was a boy. I could tell at once (as a former seaman) that he was a real skipper.

Like most captains, he lived a lonely life aboard ship. Yet he was held in high esteem by his men, and the work went forward without fuss or bother.

The ship was built in Germany. The Norwegians paid for her with fish. It was an ironic thing, I thought, that this product of Dr. Schacht's barter system should now be on her way to Europe with a cargo of death for the people who made her.

Bremen gave this ship to the world. Now Bremen, in retribution for a crime against humanity, would be made to suffer through the instrumentality of its own skill.

The men were obviously good sailors. They bore the stamp of an early start and long experience—twin requisites of good seamanship. Many had worked in sail. Some had already had experience with Nazi U-boats. One chap, a mere boy, had survived three sinkings—twice by torpedo, once by mine.

The crew was almost entirely Norwegian. The exceptions were in the steward's department. There we had a sort of international brigade. The cook was Norwegian. His three messboys were divided up as follows: one Canadian, one Scot, one Czech.

The men were of all ages. The oldest was 57, the youngest 17.

Most of the men had families in Norway. The steward was married a few weeks before the war, and had not seen his wife since. The saloon messman had not heard from his family in nearly three years. The radio operator had only a wedding ring to remind him of a happy marriage.

The skipper's brother is in a concentration camp. He has had no news of his wife and children except a letter from a relative, smuggled out by way of Sweden, which said, "It is not so bad for the older people, but it is pitiful to see the children go hungry."

It is no accident that Norwegian seamen, when attacked, fight in a cold fury and that, when their vessels go down, they ship again at the first opportunity.

The Norwegians have been maintaining a good portion of the Atlantic life line, and I was anxious to see them in action.



The Author Tries on a Regulation Rubber Suit

The Norwegian Government provides such exposure outfits for every man who sails in danger areas. Seventeen thousand were ordered at one time. Many lives have been saved and arms and legs preserved through their use (page 211).

Ships have been Norway's number one contribution to the war effort. Before the war, the Norwegians had the fourth largest merchant fleet in existence. The Germans got some of it, but the balance, amounting to some 900 ships of more than 6,000,000 deadweight tons, was thrown into the Allied war effort.

It is hard to imagine what we would have done without this fleet. Norwegian vessels were at one time carrying nearly half of Britain's oil supplies, and a good percentage of her other requirements. The work of these vessels was so outstanding that a British editor was prompted to write:

"It is probably an understatement to say that, at the present time, this fleet is worth more than a million soldiers."

Norway has also contributed much to the war effort of the United States. Norwegian vessels have brought in prodigious quantities of raw materials essential to American industry. Outward bound, they have carried supplies required abroad (principally in Latin America) to enable our friends to carry on.

These ships carry cargoes designated as essential by the American Government, and they work for rates set by the War Shipping Administration. Their assistance has been hardly less important to the United States than to Britain.

The Norwegians, like the British, the Dutch, the Greeks, the Yugoslavs, and now like ourselves, have had to pay dearly for their devotion to the cause of freedom. To date, some 350 ships aggregating more than 2,324,000 deadweight tons, have been sunk or captured. Eighteen hundred Norwegian seamen have lost their lives. But Norwegian ships, and Norwegian seamen, continue to sail the seas.

"We Moved Majestically Out to Sea"

We left at noon. It was a beautiful day and the harbor was aglow with light and color. Coast Guard vessels escorted us through the traffic. It was an unnecessary precaution. The red flag on our foremast seemed to have an almost magical effect on other vessels and we were given a wide berth. Preceded by our outriders, we moved majestically out to sea.

Our progress from there on wasn't quite so majestic. We were bound for another port, several days away, where we were to join a transatlantic convoy.

Enemy submarines had been operating in the vicinity and we were forced to proceed

with extreme caution. We traveled part of the way in a coastal convoy, part of the way alone.

It gave me a queer feeling, in view of the reliance which we once placed on distance, to be slinking thus along the coast of my own country.

We saw at one place the masts of a sunken ship, rising from the sea within sight of land. At another place we passed the smoldering remains of a once-proud tanker demolished in the midst of a futile attempt to deliver gasoline to the eastern seaboard. We wondered about the crew.

It took us a week, including a three-day stop en route, to reach the port from which we were to leave for Britain. The harbor was crowded with ships. Big ships. Little ships. Immaculate cargo liners and rusty old tramps.

They lazed at anchor and awaited the signal that would send them plowing across the North Atlantic over the graves of hundreds of their predecessors. The skippers scurried about on shore attending to the seemingly endless paper work connected with clearing a ship in time of war.

There was also the convoy conference to be attended, a meeting called by naval authorities to instruct the merchant captains in the technique of sailing in convoy (page 199). After the conference there would be the business of getting out to the ships, and then we would be off.

The convoy in which we came up the coast had been disbanded. A new convoy, 60 vessels strong, was formed for the trip across. I will discuss this convoy in some detail to show how the system operates and to give an idea of the patience and skill required to



Retrich Coonton

There Is No Time for Frills aboard Ship

Convoy men have to be ready for action at all times. Every man must be at action stations within 90 seconds after an alarm. This gunner takes no chances; he puts a mirror on the gun and shaves at his post.

move such an aggregation of vessels across 3,000 miles of ocean. Sailing 60 ships in a group would be a feat of seamanship in time of peace; in time of war, it is sheer genius.

Making Up a Convoy

Making up the convoy is a complicated operation. We were told to be ready to leave at 3 o'clock. At 2:45 the pilot came aboard, and sharply at 3 we received the signal to up-anchor and put to sea. Twenty or 30 ships had already left and were now taking the places which had been assigned to them.

Each skipper had been given a diagram of the convoy at the conference, showing the position to be taken by his ship. We made our way slowly out of the harbor, joined the



Harvey Blumberg

It Takes All Kinds of Cargo to Win a Modern War

United States is sending men abroad with the tools they need to do a good job. We are also helping to victual and munition our allies. To speed the tempo of distribution, thousands of sturdy American trucks are shipped as deck cargo. Lest they shift in bad weather, they are secured with cables and chains.

other ships outside, and finally, after considerable maneuvering, found our place in the line-up.

Convoys, contrary to popular opinion, do not proceed in long lines fore and aft. Instead, they are spread out sideways. A convoy is thus likely to be wider than it is long (pages 198, 201, 206).

The reason for this method of grouping is that ships are more vulnerable to attack from the side than they are from the bow or stern. Ships sailing side by side protect one another's flanks. Moreover, a group of this sort is more compact than one containing long rows of vessels in a fore-and-aft line and consequently is easier for the escort ships to watch.

The latter vessels take up positions before and after the convoy and on the flanks. They have sensitive listening devices with which

they can detect a submarine some distance away. In case of attack, they race to the scene and drop depth charges in a pattern designed to trap any submarine within the danger area. The system must work, for subs have become increasingly wary in their encounters with convoyed vessels.

Submarines Greatest Menace

I am naturally unable to say much about the escort accompanying our convoy. There were destroyers and corvettes. The protection was much less than I had imagined it would be. It apparently was enough, for we saw no sign of the enemy on our trip.

The hazards which beset a ship these days are many. The greatest menace remains the submarine. Long-range bombers, from which the Germans expected good results, have not



U. S. Navy, Official

Wherever Men Sail, Wherever Cargoes Move, the Navy Stands Guard

They have been called "shepherds of the sea," these swift patrol ships of the United States Navy. "Wasps of the sea" would be more appropriate. A look forward from the afterdeckhouse shows a machine-gun nest for fighting off enemy aircraft, center; torpedo tubes for use against surface vessels, right; toward the camera, depth charges so deadly to U-boats. The blimp is part of the Atlantic patrol maintained for the protection of coastal convoys.

proved to be much of a menace. Any convoy which can send up fighting planes, either from a carrier or by catapult, seems to be safe from the type of big bomber which the Germans used to use in the Atlantic.

The ordinary bomber has proved to be very dangerous in restricted areas, especially in north Russia and on the route to Malta. Even here, however, carrier-based fighters give promise of relief from the admittedly heavy losses of the past. The great September battle off the North Cape proved that a convoy with air support and plenty of escort vessels can fight its way through hostile areas.

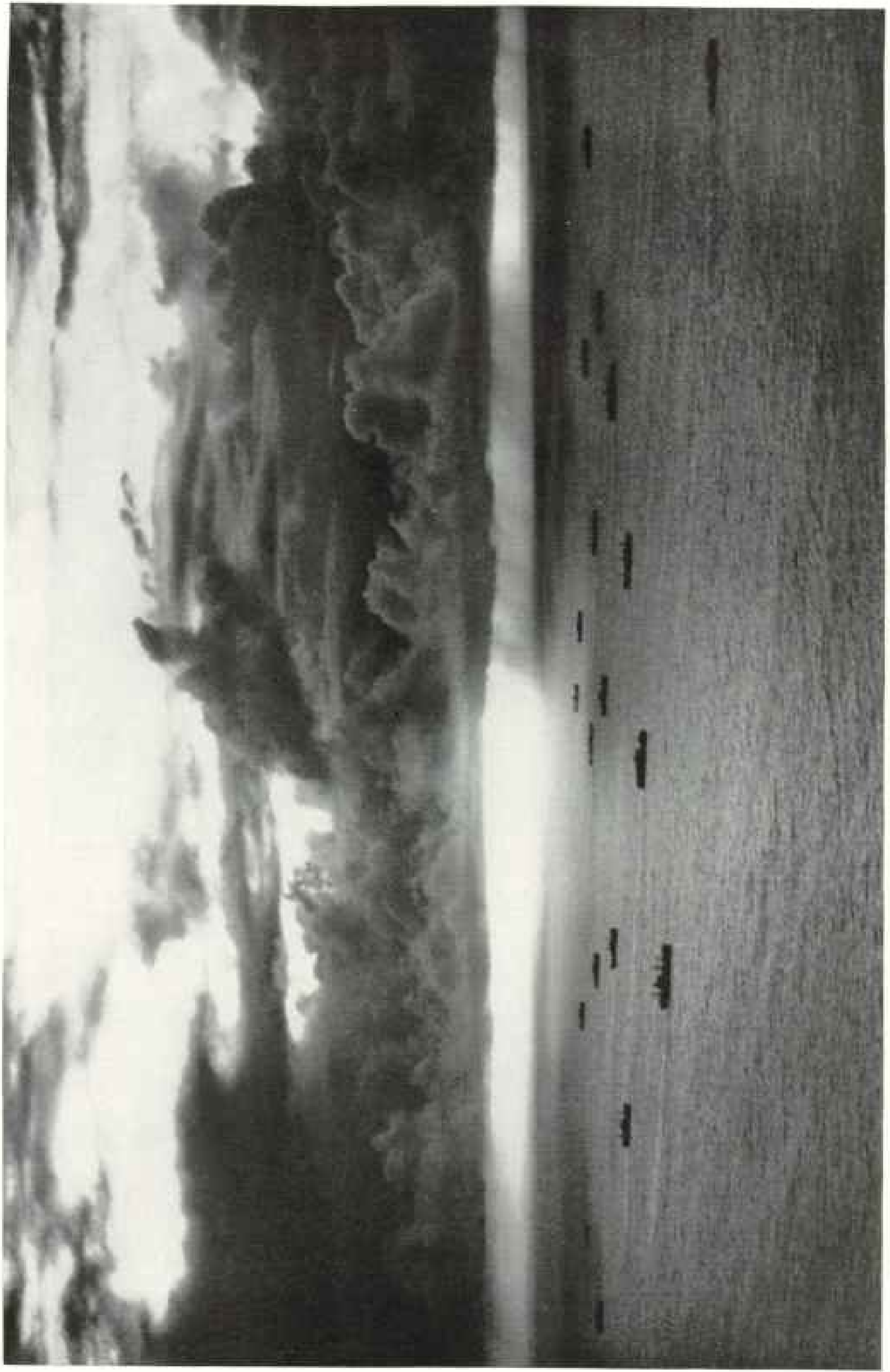
The losses of merchant vessels in that convoy were nothing like those claimed by the Germans. Not a single escort ship was lost.

The British apparently have the mine situation under control, including the deadly magnetic mine. Surface raiders have not played as much havoc with Allied shipping in this war as they did in the last.

The fate of the *Graf Spee* and the *Bismarck* has caused other warships to stick pretty close to their home ports.

Vessels of Many Types

Our convoy included vessels of every type. Freighters, of course, predominated. There were oil tankers, including some very fine ones. There was a famous whaling ship, with the greatest carrying capacity of any ship now afloat. There were little ships. There were oil burners and coal burners, and motor-



Under the Shadow of a Tropic Squall, an American Convoy Zigzags across the Vast Pacific

There is no place for unescorted cargo craft in the savage warfare now raging at sea. In carrying aid to our fighting forces in the Solomons, vessels must run a long, dangerous gambit of submarines. From San Diego to Guadalcanal their winding track is much longer than the 6,100-mile great-circle distance.

U. S. Navy, Official



British Information Service

At Convoy Conference, Captains of Merchant Vessels Receive Last-minute Instructions for the Voyage Ahead

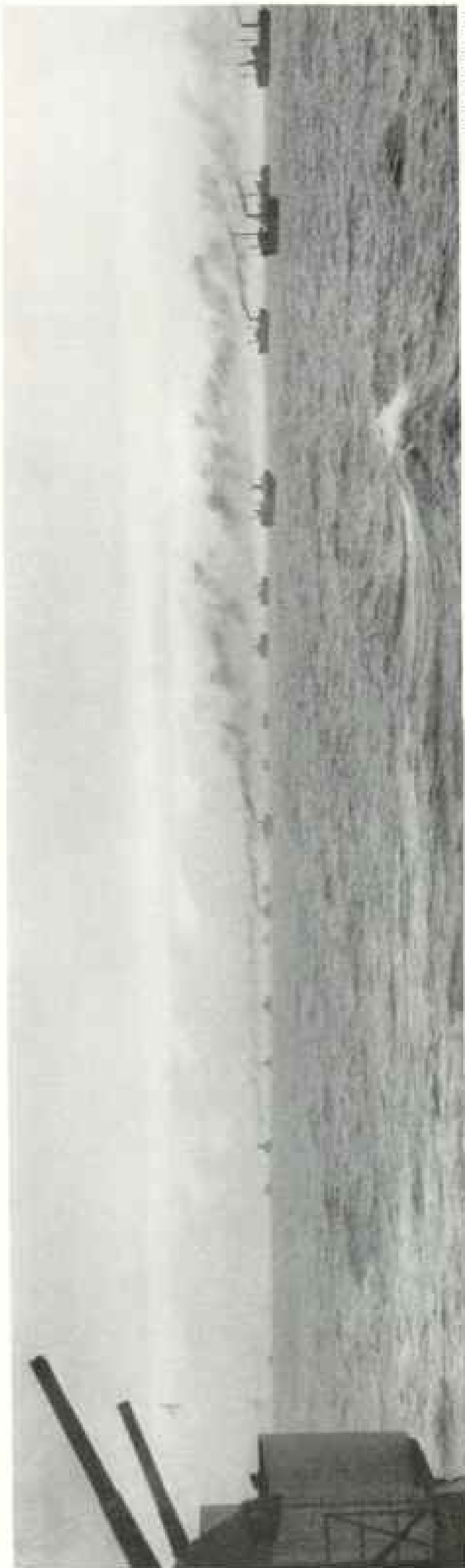
Shortly before sailing, the Commodore calls all captains together to discuss the route to be followed, precautions to be taken, and instructions on what to do in case of emergencies. The captains also receive code books and a diagram showing their positions in the convoy (page 195).



THOMSON

Canada Does Her Mighty Part in Keeping the Atlantic Life Line Taut—Corvettes and Mine Sweepers Take Position

Starting from scratch, our northern neighbors have built a navy that now numbers 500 vessels. This nation of only eleven and a half million people furnishes 42 percent of vessels conveying supplies to Britain and Russia! These figures were announced recently by the Canadian Minister of Supply.



British Convoy

Hitler Guessed Wrong; He Has Failed to Achieve Mastery of the Seas and Air around the British Isles

So long as scenes like this can be photographed in the Channel, the Axis cannot win. This convoy probably carries 100,000 tons of war supplies.



British Information Services

Convoys Link the British Empire—Keep Britain Supplied with Food, Arms, and Raw Materials

Eight hundred ships must reach the British Isles every month to preserve this bastion of freedom.



E. E. Kerr, Official

With a Thunderous Roar Depth Charges Blast a U-boat's Lair in the North Atlantic and Save Merchant Ships from Torpedoes

Two "ash cats," exploding simultaneously, raise geysers of death. This remarkable photograph suggests a gigantic bloom or a huge watery "V for Victory." It was taken from a speedy little PC boat of the United States Navy while an attack was being launched against an Axis submarine. Such fast submarine chasers, 175 feet long, are now prefabricated and turned out rapidly from the shipyards. They carry crews of about 50 men with three to five officers. Equipped with three-inch guns, they can put up a stiff fight against dive-bombing aircraft. Because of their maneuverability and deadly armament they are extremely effective.

ships. There were reefer (refrigerator) ships. There were old ships and new ships.

The only thing that matters in a convoy is speed. Ships doing 10 knots, say, go in one convoy; ships doing 12 knots go in another. The type of vessel doesn't count.

Several nationalities were represented. Britishers were first. Next came the Norwegians, with 14 ships flying the blue cross. A half-dozen Americans, a Swede, and a couple of Dutchmen completed the roster.

The fact that Sweden, a neutral who continues to trade with Germany, finds it necessary to put her ships in Allied convoys affords an interesting commentary on the ruthlessness of submarine warfare.

We had cargo of every description—food, explosives, ammunition, steel, medical supplies, guns, bombs, machinery, planes, tanks, timber, trucks. Also an item that bodes no good for the Axis in Europe—invasion barges.

Most of the freighters carried deck cargoes. They were piled high with vehicles and machinery to the point where some of them looked more like warehouses than craft capable of putting to sea.

They did put to sea, however, and hundreds of others like them put to sea every month, as concrete proof that America is beginning to hit her stride and that the products of the Arsenal of Democracy are finding their way overseas in ever-increasing numbers.

It was dusk by the time we were all clear of the harbor and squared away for the long voyage ahead.

Commodore's Flag Flies from a Freighter

The Commodore's flag flew bravely from a large freighter in the center of the convoy; other vessels carried the flags of the Vice-Commodore and the Rear Commodore.

If anything happened to the Commodore, the Vice-Commodore would take over; if anything happened to the Vice-Commodore, the Rear Commodore would take over.

I don't know where the line of succession would go after that. It probably wouldn't matter. A convoy which had lost all three commodores very likely would be at the stage where it was every man for himself.

We had a position at the outside of the convoy. The skipper grumbled a bit at that.

"I don't suppose it makes much difference," he said, "but you always feel safer in the middle."

The skipper had every reason to know what he was talking about. He had just survived a torpedoing that cost the lives of 14 of his men and subjected the rest of them to one of

the most terrible ordeals thus far recorded in the Battle of the Atlantic.

The men escaped with only the clothes on their backs. One group, with the captain in charge, spent 10 days in a lifeboat. A second group spent 16 days in a dory. The rest of the men, who were on rafts, drifted 48 days before being picked up.

The men lived on rain water, which they caught in a sail, and raw fish, which they caught with safety pins.

All of them, including those who had been out 48 days, were able to climb aboard the different ships which rescued them. Such is the stuff of which the men who sail our convoys are made.

Convoys Don't Turn Back

The coastline receded behind us and finally faded from view. We were off. Gone was the sight of friendly faces, the hubbub of cities, the security of the land.

We were on our own individually and we were on our own as a group. We were a little world in ourselves: 60 ships, 3,000 men, pledged to deliver the materials and the implements of war to those who would use them on the other side. We would not turn back, no matter what might lie ahead.

Convoys don't turn back. The toll may be heavy, and they may be forced to scatter, but, sooner or later, they turn up at the ports to which their cargoes are consigned. Convoy captains just don't think in terms of retreat.

The night came down black as ink. Naval vessels signaled about us. We plowed on, dark and silent. Enemy subs were known to be in these waters. They lay in wait throughout the broad Atlantic.

Would a "tin fish" come crashing through the side of our little ship and send her plunging to the bottom of the sea? Would we have to leap into the cold water and pray that the vigilance of the Navy would save us from death? Would we drift for days and even weeks in an open boat?

Perhaps a torpedo would find its way into those neat white boxes. In that case, no further questions would be necessary.

Captain Bjorn-Hansen took no chances. He was a fanatic about precautions. Our boats were swung out before we got out of the harbor and made ready for instant use.

Chips (the carpenter) spent days greasing and oiling the gear so that everything would work smoothly if we had to abandon ship. The battery in the motorboat was watched like a baby to make sure that it was fully charged.



© MADA from Three Lions

Sailors, Like Soldiers, Want to Hear from the Folks Back Home

If you have any friends or relatives at sea, write to them. Nothing cheers the boys up better than a batch of letters from the home front (page 210).

The skipper was always looking around to make sure that everything was in readiness.

"We had three minutes to get off the —," he would say. "On this ship, plan on one minute. If we escape the first torpedo, don't wait for another. We might be lucky once, but it isn't likely that we would be lucky twice."

One night the skipper smelled gasoline. He couldn't rest until the source of the fumes was established. It turned out that the men had spilled a little gas while filling the tanks in the motorboat. His attitude toward those fumes was typical of Captain Bjorn-Hansen's attitude toward everything on the ship.

The skipper was especially particular, it goes without saying, in respect to the boats.

"We had a little dory on the —," he explained. "She was used as a work boat and not considered to be suitable for a lifeboat. Well, I had her stocked and cut the lashings so that she would float free if the ship went down. Sixteen men are alive today as a result of that simple precaution."

I learned later, from another source, that they had been able to launch only one lifeboat. Another boat, with 11 men in it, was blown to pieces by the second torpedo. Sixteen men, who had jumped into the sea, were

able to reach the dory which had floated free—as the skipper intended—when the ship went down.

Lifeboats Stocked with Supplies

The lifeboats on our ship were stocked with an elaborate assortment of supplies (page 205). There were sufficient water and food to keep us alive for a couple of weeks.

There were hatchets to be used in clearing away debris, extra clothing for every man, first-aid kits, matches, flares, flashlights, lanterns, and fishing tackle. There were canvas covers to keep off the sun by day, to protect against cold at night, and to be used for catching water when it rained.

Each boat, in addition, carried the usual complement of oars, a sail, and a sea anchor. The latter is a cone-shaped affair made of canvas, designed to keep the boat steady.

The lifeboats even carried oil with which the men could massage their arms and legs to keep from becoming rigid after days of sitting in cramped positions.

One boat carried a portable radio set which, when turned on, would automatically broadcast SOS signals.

The days of hardtack are over for lifeboats. Modern science has given to seafarers special



Harry Kinnear

Lives Depend upon Quick-acting Lifesaving Equipment

Lifeboats, in time of war, are augmented with rafts. These cumbersome but effective devices are mounted on stands so they can be released by cutting a line. If the ship goes down before the rafts are loosed, they will float free. All lifeboats and rafts are stocked with food and water, warm clothing, medicine, lights, signal flares, navigating instruments, and fish lines (page 204).

rations containing ten times the nourishment of hardtack. One of these products is known as the "C ration" and tastes like a graham cracker. Another is a sort of pemmican, made from dried meat, raisins, and sugar.

There are also chocolate tablets (including some which won't melt in the sun) and milk tablets.

Self-heating Foods

One of the most interesting things in our boats was an assortment of self-heating foods. These foods are packed in a special can which, when punctured to admit air, will become piping hot in 15 minutes. Coffee can also be secured in these remarkable containers. We found it difficult, on our ship, to withstand the temptation to try one of these things just to see how they worked.

In addition to boats, we also had several rafts on board. These were lashed to the rigging in such a way that they could be dropped into the sea merely by releasing a gripe. The rafts were equipped more or less the same as the boats.

We kept double lookout throughout the voyage; one man on the bridge, another on the fo'c'sle head. In addition, the officers

usually overstayed their watches, while the Old Man more or less lived on the bridge.

Sometimes, with the officers and the quartermaster, we would have as many as six people scanning the sea ahead. That would be people on duty. Those of us who weren't on duty also spent a great deal of time scanning the sea. Somehow, crossing the Atlantic in time of war, with TNT for company, makes one very conscious of the beauties of Nature!

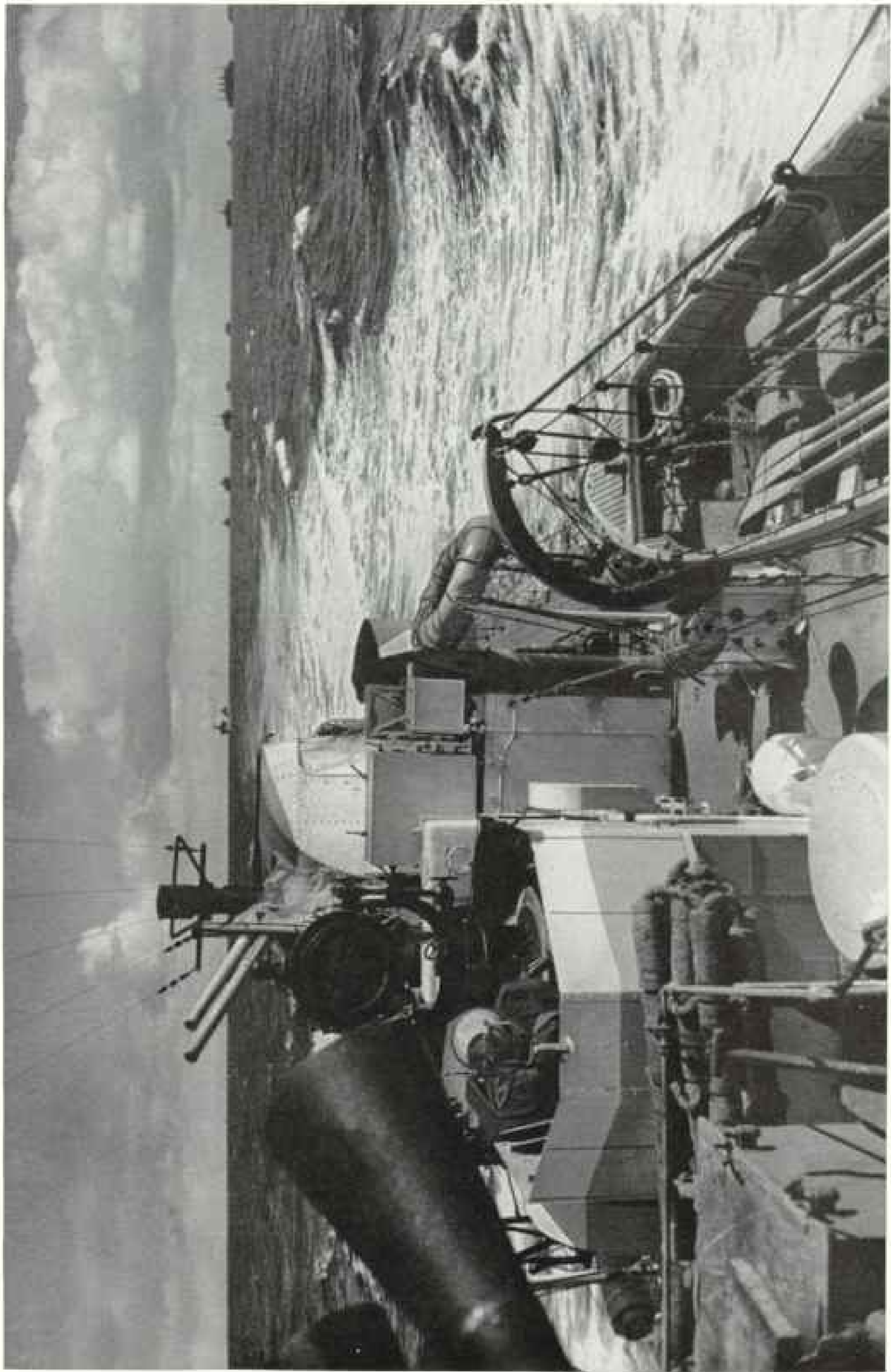
All ships naturally are blacked out. Portholes are painted over. Outside lights are removed, while alleyway lights are replaced with blue bulbs.

The dining saloon and a few other rooms on our ship were equipped with wooden shields which could be put over the portholes at night and then removed in the morning to admit light and air.

Most of the portholes were painted over, however, so that if it was too cold to open them the men had to use artificial light day and night.

The Commodore was very particular about the blackout. One morning he signaled:

"The convoy was endangered last night by an unauthorized display of light. Be more careful in the future."



British Comfilm

Vessels from Half a Dozen Navies Combine to Escort United Nations' Convoys

News that another shipment of supplies has reached an overseas destination means that seamen of the United Nations have done another good job. British, American, Norwegian, Dutch, French, Polish, and other vessels provide gallant protection.



British Commerce

Enemy Airmen Fear the Music of the Pom-pom

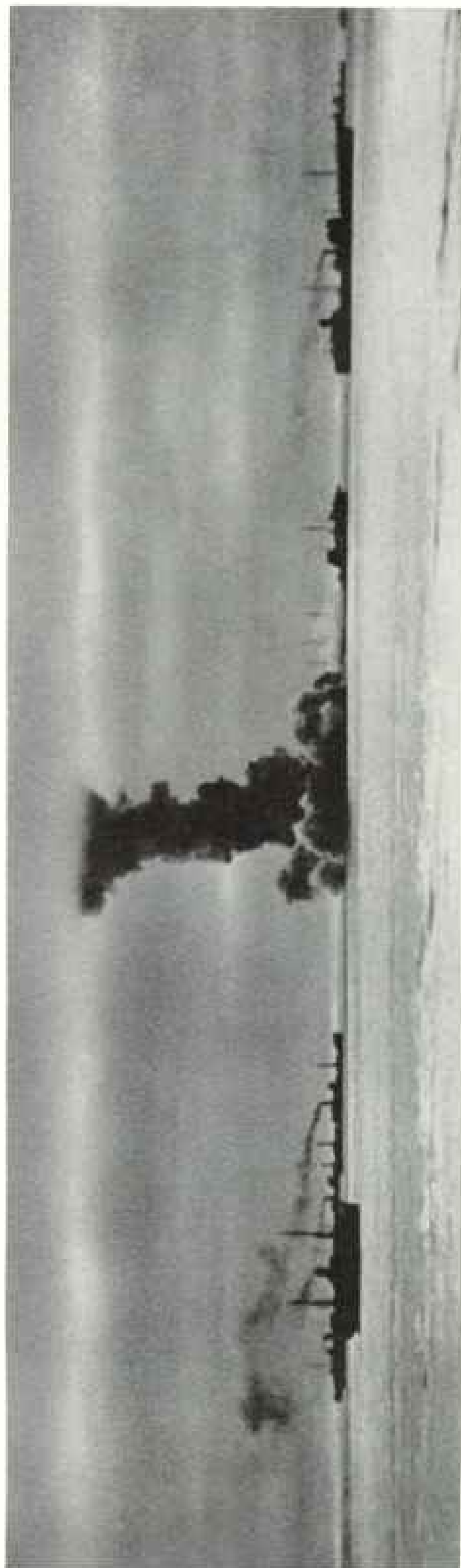
Naval men these days have a device which packs a terrific wallop for enemy bombers attempting to intervene in the operation of a convoy. It is the pom-pom, dubbed the "Chicago piano" because of the deadly staccato which can be played on it with 1.1-inch shells.



British Commerce

The Destroyer Is the Backbone of Convoy Protection

They never rest, these ocean-going busybodies. Seldom are the little vessels in port longer than the time it takes to oil up, check the guns, and take on ammunition. Looking after the depth charges is another of their jobs. Here they have an "ash can" on the hoist in its firing cradle.



AP from Press Ass'n

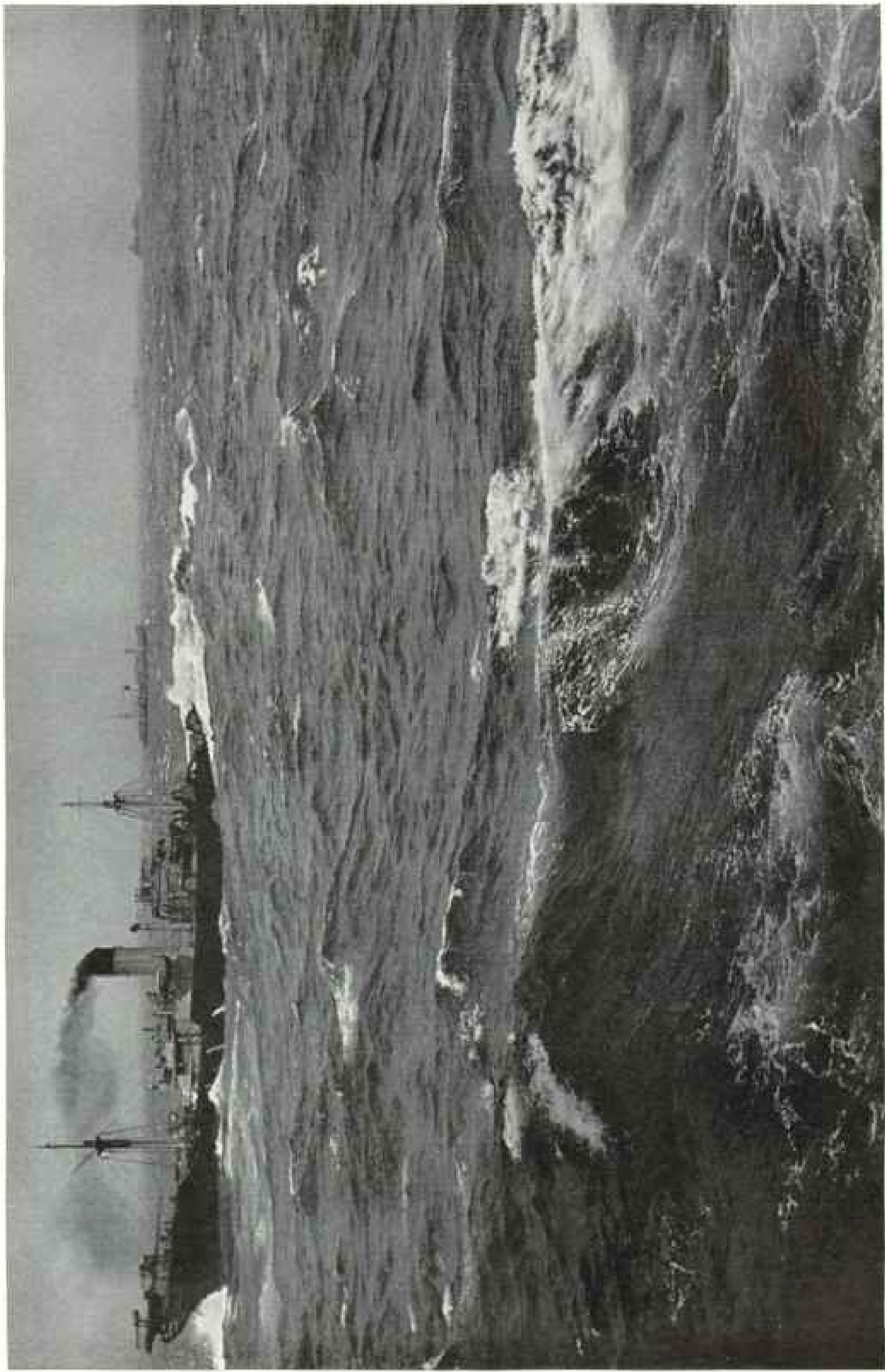
One of the Most Hazardous Voyages United Nations Vessels Undertake Is the Trip to Northern Russia

Our Soviet ally must be aided; the convoys must get through. Sometimes, as shown here in the Barents Sea, precious cargo goes up in smoke from aerial torpedoes.



Hutchins-Cummins

Heavily Laden with Airplanes and Other War Supplies, This Maritime Beast of Burden Plods the Ocean Lanes



Robert Cape—Eis

Nose under, Propeller Thrashing, a Deeply Laden Norwegian Freighter Plows Steadily on to Britain

She serves as one tiny span in the vast bridge of ships which will bring victory to the Allied cause. Day and night, month after month, in fair weather and foul, great fleets breast the seas with cargoes to smash the Axis. No terror or destruction the enemy could invent has stopped the flow of men and materials.



British Information Section

A Destroyer Postman Comes Alongside to Collect and Deliver Convoy Mail

Without slowing down, escort ships put mail aboard whenever possible (page 204). In good weather, contact is established between two ships by passing a line from one to the other. In bad weather, it may be necessary to shoot a line from a gun. Dispatches are passed from one to another in the same manner.

Personal radios are tabu in convoy. So are vacuum cleaners, electric razors, and the like. The enemy apparently can pick up the buzz made by electrical appliances. For that reason, all radios on our ship were locked up at the beginning of the voyage and the men were warned not to use appliances.

New Rubber Rescue Suits

The Norwegians have introduced to sea warfare a device which has saved scores of lives and which, in my opinion, should be standard equipment for all ships. That is the rubber rescue suit.

The first night we were at sea the skipper came into my cabin with a contraption which looked like a cross between a diving suit and a Dr. Denton sleeping garment. It also showed traces of an Eskimo parka.

"Here," said the skipper, "let me see you get into this."

I untangled the contraption and finally, after a considerable struggle, found myself encased from head to foot in black rubber (page 194). The skipper looked at his watch.

"That won't do," he said dryly. "Keep on practicing until you can get into this suit in 15 seconds."

I kept on practicing until I could get into the suit in 15 seconds. It made the voyage much pleasanter.

The Norwegians have ordered one of these suits for every sailor on their boats. The suit consists of a pair of heavy rubber boots, a coverall, and a bright yellow hood. Yellow is the easiest color to spot in water.

The top part is rolled down over the boots. The procedure for getting into the suit then is to jump into the boots, push your arms into the sleeves, and pull the suit up over your head.

The sleeves are equipped with tight cuffs to prevent leakage, and the whole suit is drawn around the neck with a cord to prevent water from getting in there.

We kept these suits by our beds throughout the voyage. It improves one's morale immeasurably to know that he can leap safely into the water and drift for days, if necessary, without suffering any ill effects.

A gruesome aspect of the war at sea has always been the large number of seamen suffering from exposure. There must be some hundreds of men who will never be able to go to sea again because of the loss of arms and legs. Rubber suits will prevent these tragedies, at least.

The boots are weighted with lead to keep the wearer upright in the water.

At the time he gave me my rubber suit, the skipper also handed me a life jacket to be

worn inside the suit; a knitted helmet; a long-bladed hunting knife; a whistle, and a red flashlight.

"The jacket, in conjunction with the lead in the boots, will keep you upright and at the same time keep your head well out of the water. The helmet will protect your head from the cold rubber of the hood. The knife will enable you to cut yourself loose if you get caught in any lines, and it will be useful also if we should have to lash things together in making a raft. The whistle is to be used instead of yelling, in order to save energy. The red flashlight will help rescuers find you in the dark."

That skipper certainly didn't miss anything. I was especially grateful for the knitted helmet, having heard that bald-headed men suffer agonies in the rubber suits unless their pates are suitably separated from the hoods.

Ship Was Well Armed

Our ship was well armed. There was a new gun aft, a brilliant weapon which we never tired of inspecting. The gunners spent a great deal of time cleaning and polishing it and trying out the various instruments with which it was equipped.

The gunners had just come from a training camp in Canada and they were anxious to try their skill. Unfortunately for them—fortunately for the rest of us—they didn't get an opportunity to sight on anything more tangible than clouds.

We did have a couple of practice shoots with the antiaircraft guns, of which we carried four. Two of these were a new type capable of amazing performance. The mate one day gave me an opportunity to try one.

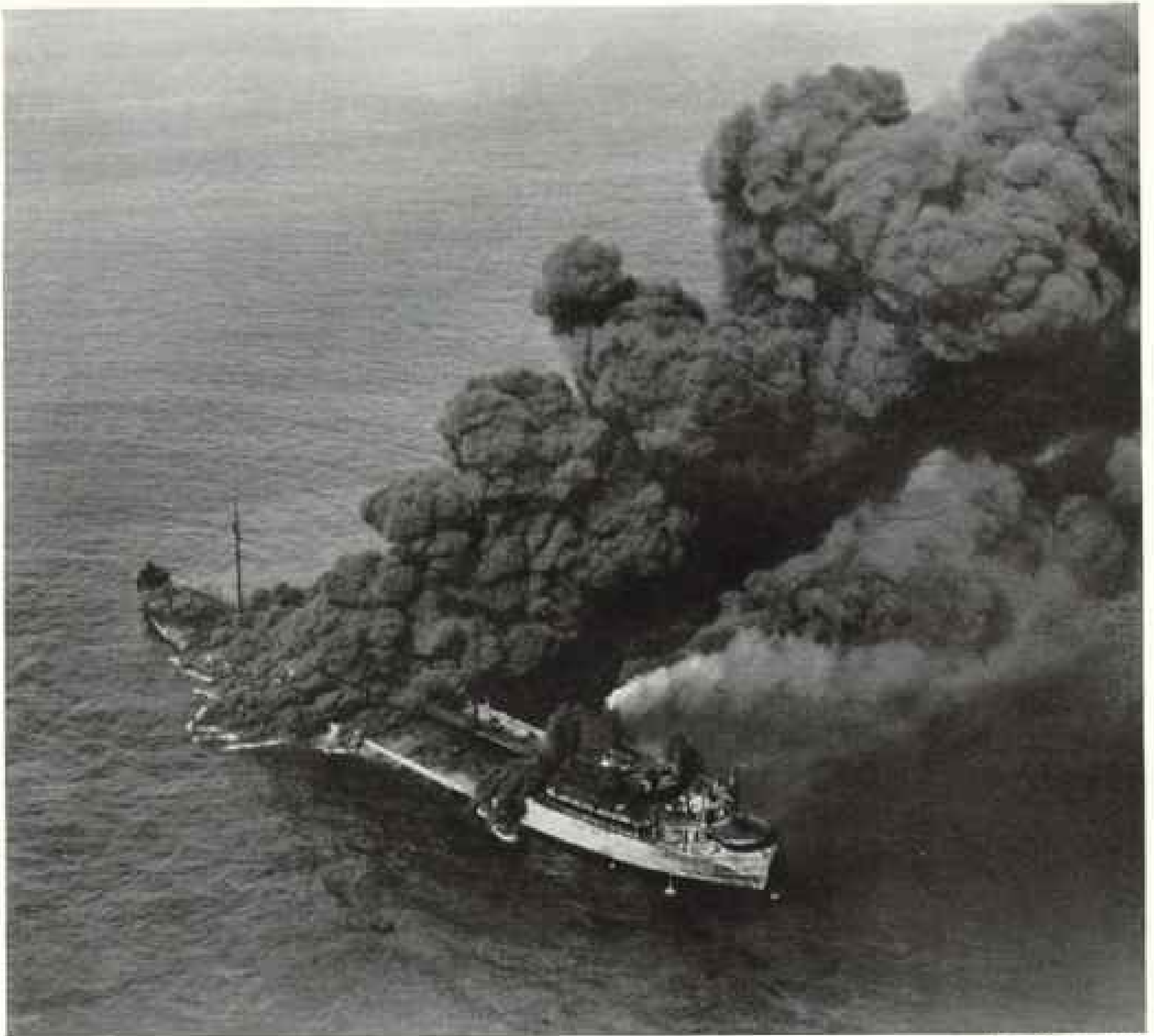
I touched the trigger timidly and then jumped out of the way to keep from being knocked down by the recoil. The men had a good laugh.

"No," said the mate, "grab onto it. This is not a rifle. It is not a shotgun. It is a hose, and you must squirt it like a hose."

I squirted it like a hose. The bullets went out in a red stream. I should hate to be the pilot of a dive bomber rushing into that stream.

The ship had been strengthened in various places as a protection against bombing and machine gunning. The bridge was encased in cement blocks; also the radio shack. The gunners were protected by steel shields. The pilothouse looked like a machine-gun nest. The helmsman, when he took his eyes off the compass, gazed upon the outer world through a loophole the size of a shoe box.

The days went by. We loafed and read



U. S. Navy, Official

Here Is One the Axis Didn't Get: An American Tanker Shortly after Being Torpedoed

Despite a raging fire which sent columns of oily black smoke billowing into the sky, crew members remained aboard and succeeded in saving their ship. The battered craft was towed to port by a U. S. Navy vessel; her doughty crew saved from death.

and sat in the sun and did the work of the ship. At night we argued and cursed the Jerries and worried about the future of our respective countries. We slept in our clothes.

"If you have to undress, do it in the daytime," said the Old Man. "I don't want anybody running around in his nightshirt when it comes time to abandon ship."

I found it difficult to sleep with my shoes on, so I compromised by putting on an extra pair of woolen socks.

We let our whiskers grow. The men, I noticed, managed to keep clean. I bathed once or twice but soon got out of that habit.

Invariably, as soon as I stepped into the tub we would get some kind of signal from the Commodore and I would have visions of having to go overboard *au naturel*. Civilization

has spoiled us to the point where we are very helpless without clothes.

After a week of good weather, we ran into a bad fog. The skipper was on the bridge four days and four nights without respite.

60 Ships Keep Together in a Fog

Sometimes we could hardly see the bow of our own ship. Meanwhile, we were expected to keep our place in a great convoy containing 59 other ships. God must look after seafarers at a time like that.

It is nothing short of a miracle that ships in convoy are able to come through a North Atlantic fog without disastrous collisions.

Everlasting vigilance is the only safeguard. Officers and lookoutmen probed the mists hour after hour to spot any gray shapes which



AP from Press Ass'n.

A Convoy Arrives in Britain, Bearing Sinews for the Second Front

Another voyage is over; another great caravan of weapons has arrived for use against the Axis. As many as a hundred vessels, carrying more than half a million tons of war supplies, have been sent to Britain in a single group. From his overseas office a U. S. lieutenant commander looks over the anchored ships,

might come too close to us. Sometimes they would get quite near before being detected. Then there would be a quick toot of the whistle, the flash of an electric torch, perhaps an abrupt change in course.

Once the Commodore signaled for all vessels except those at the end of a line to hang cargo lights over their sterns. We also put out our fog buoy. This device of wood and metal, when towed behind a ship, will keep other ships off her taffrail (page 214).

The buoy is towed several hundred feet behind the ship. It digs into the water in such a way that a sizable geyser results, much like the spout given off by a large whale. This spout can be seen quite a distance. It also makes enough of a hiss so that it can be heard as well.

Notwithstanding our precautions, we were hard put to keep our position and once or twice we strayed from the fold. On one occasion, we came out of a foggy night to discover that we were in the wrong line. That wouldn't have been so bad except that between us and the line where we belonged was another line.

Morning Search for Lost Ships

How we got through this intervening line without being challenged, or bumping somebody, must remain a mystery of the convoy system.

We were not the only ship to have this experience. In the morning, after a bad night, we would amuse ourselves by looking for lost vessels and laughing at the skippers



Harvey Klammor

Convoy Vessels Tow a Buoy in Fog to Keep Ships Astern in Position

During the last war, such craft dragged barrels to prevent others from crashing into them during thick weather. Today our captains have a better device, the log buoy, which resembles a surfboard and creates such a commotion in the water that it can be heard as well as seen for several hundred feet. In addition to skipping wildly from side to side, this contraption spouts water like a whale (page 213).

as they tried frantically to get back into their places.

Once or twice we got a little behind. I don't think anybody minded that. We all felt that, in a fog, our chances of going up in a collision were much greater than our chances of stopping a torpedo.

We never slowed down, no matter how thick the weather. We started off at a certain speed and we maintained that speed as best we could all the way over.

Sweet Soup and Fish Balls

The food on our ship was incredibly good. Norwegians know good food and Norwegian seamen are no exception.

We saw much of that old Norwegian stand-by—sweet soup—compounded of prunes, apples, and dried apricots. We also had sweet macaroni.

The cook used fish in endless variety.

Among the many fish dishes was a variety of fish ball known as the "Stavanger egg." The steward had put on a supply of lobsters and we worked on these all the way across.

The best part of a Scandinavian meal, so far as I am concerned, is the hors d'oeuvre.

The Norwegians are not behind the Swedes and the Danes when it comes to a *smörgåsbord*. In the afternoon at teatime, and in the evening, our messman would produce an array of canapés that would do credit to any hotel. I usually ate so many of these things that I could not do justice to the meal which followed.

The messman's ability with the *smörgåsbord*, we discovered, was explained by the fact that he had sailed on passenger vessels before the war. He had spent 28 years in the Norwegian America Line.

"How many times have you been across the ocean?" I asked him one day.



Harvey Klummet

Fog Provides Welcome Cover but Makes Convoying Difficult

Sailing the 50 or 60 vessels of a large armada through mists of the North Atlantic requires dauntless seamanship and courage. This is especially true when one of the ships, such as the author's, carries a cargo of explosives! The thick weather lasted eight days. It hid the ships from the enemy but made the captains nervous (page 112).

He thought for a moment, then said simply: "This is my 564th crossing, sir."

We figured out that he had traveled the equivalent of nearly 100 times around the world.

One night a flare—the signal for subs—went up from one of the ships. We saw nothing further and concluded that it must have been a false alarm.

After the fog lifted, the weather grew colder. The sun shone dully, if at all, and the wind began to blow. We had cold, gray skies the rest of the way in.

The Refinements of Zigzagging

Several times during the voyage we had maneuvers. The Commodore would order two or three sharp changes of course. Sometimes we would all change at once; at other times each ship would proceed to a specified point and then turn.

These exercises were carried out to get the captains used to changing course *en masse* so that they would not become rattled in case of emergency.

Zigzagging, as practiced in the last war, has been greatly refined. Ships in this operation do not, as is popularly imagined, veer from side to side in a regular pattern.

They may make a long sweep to starboard, then work their way back in a series of short sweeps. There are numberless combinations, all worked out in the sailing instructions, that may be used to take a vessel off her course and get her back again without adding too much to the length of the voyage.

The purpose of zigzagging, of course, is to prevent subs from getting ahead of a vessel and then releasing torpedoes as the vessel goes by.

As we approached the coast of Scotland, signals came from the Commodore in quick



British Coasties

Patrol Sailors in the North Atlantic Tend to Their Knitting

A major difficulty of convoy operation, in the long, cold months of winter, is keeping warm. Another problem is what to do with one's spare time. British tars shown here have solved both by making their own caps, socks, and sweaters. But woe to the Nazis who take these tough fighting men for sewing-bee softies!

succession. The whole convoy was due to be reshuffled.

Ships peeling off for Scotland were ordered to take positions at the left; ships going to Northern Ireland went to the right, while those which, like ourselves, were bound for England got in the center.

It took about a day to accomplish this. When it was all over, we on our ship found ourselves in one of the middle lines, right behind the Vice-Commodore.

I could see Captain Bjorn-Hansen growing by the minute. He saw us entering port at the head of the parade, with only the Vice-Commodore ahead of us. And that's the way it worked out.

The ships for Scotland duly left us, along with part of our escort. The Commodore split off with the ships going to Northern Ireland.

The rest of us steamed proudly down the North Channel and, late one evening, be-

held the noble sight of Scotland rising on one bow, while, equidistant and equally beautiful, Ireland came up on the other.

The next day, at noon, we dropped anchor in English water.

We were there!

There was no man who had been so long at sea that he did not get a thrill from the thought. We had come over the greatest sea route of the war; we had faced the enemy and outwitted him; we had brought to the people of these harassed islands 400,000 tons of food and weapons with which to carry on the struggle against tyranny; we had helped to hold—briefly but effectively—the life line of liberty.

It was 21 days since we had come aboard this thing of steel and wood, and 13 days since we had watched the American mainland drop over the horizon.

We did not complain. We had played our little part in history and we were satisfied.

Notice of change of address for 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 April number, The Society should be notified of your new address not later than March first.

King of Cats and His Court

BY VICTOR H. CAHALANE

"TIGERS and leopards are becoming scarce," wrote a deputy conservator (forest ranger) in his cabin in the Nallamalai Range of India. A strong breeze blew behind him. The screen door flapped open. His gasoline lamp flickered suddenly. A strange presence seemed to be in the room. The ranger's back hair rose in apprehension. Something was rubbing against his chair.

Slowly, cautiously, he turned sideways. Out of the corners of his eyes he saw a TIGER! With amazing aplomb, the ranger got to his feet and eased himself out of the room. Calmly and firmly he turned the key.

"I have just locked a tiger in my room," he remarked to his boss.

"God bless my soul!" replied the forester, who always said this when the temperature went up or down. He was a bit surprised, but accompanied the deputy around the cabin to the barred window.

Sure enough, there was the big cat rubbing himself now against the vacated table. The forester lifted his gun and took aim.

"I must be devilish careful," he reminded himself. "If I make a bad shot, we may have a man-eater among us."

Bam!

The tiger leaped into the air. The lamp fell on the floor and was fortunately extinguished by the fall. They could hear the beast thrashing about. For fear that he might break through the bars, they then climbed up the thatched roof and fired through a hole.

All was still.

Flashlights showed that the tiger was dead. The animal was a female. She had died like a lady without uttering a cry. They also found that she had a thigh wound swarming with maggots. Apparently she had been asking for itching powder, Flit, and aspirin!

No wonder this is a favorite story of the officers and rangers of that district. Although occasional tigers have been known to enter a hut or cabin, I have never heard of any other tiger's making a purely social call.

Once upon a Time—Say, 50 Million Years Ago—

About fifty million years ago the predecessors of the modern cat tribe may have been prowling about in the Eocene forests. They left no trace, however, until the Oligocene epoch, some 20 million years later. Spreading out from Asia, cats hunted in all parts of the world except Australia and New Zealand, Madagascar, and the Polar regions.

During the Oligocene epoch, or perhaps a little before, the cat separated into two branches, the true cat and saber-toothed tiger.

An odd-faced lion-tiger, the saber-tooth's mouth was obstructed by a curved saber eight inches long with inner edges finely serrated. He went around slicing and stabbing mastodons, elephants, and great sloths until they bled to death.

When these big, slow-moving creatures began to die out, the saber-toothed tiger went, too. Life had become too effete. There was no fun eating tender little deer after hacking into thick-hided mammoths!

As a matter of fact, the smaller prey were too agile. The saber-tooth weapon became obsolete; it blocked the animal's mouth for any other type of attack.

Perhaps the climate and food in America disagreed with the large true cats. At any rate, during the Pleistocene epoch, the larger cats, like the saber-toothed tiger, became extinct. The smaller cats have stayed on to present times.

Cat's "Nine Lives" Well Guarded

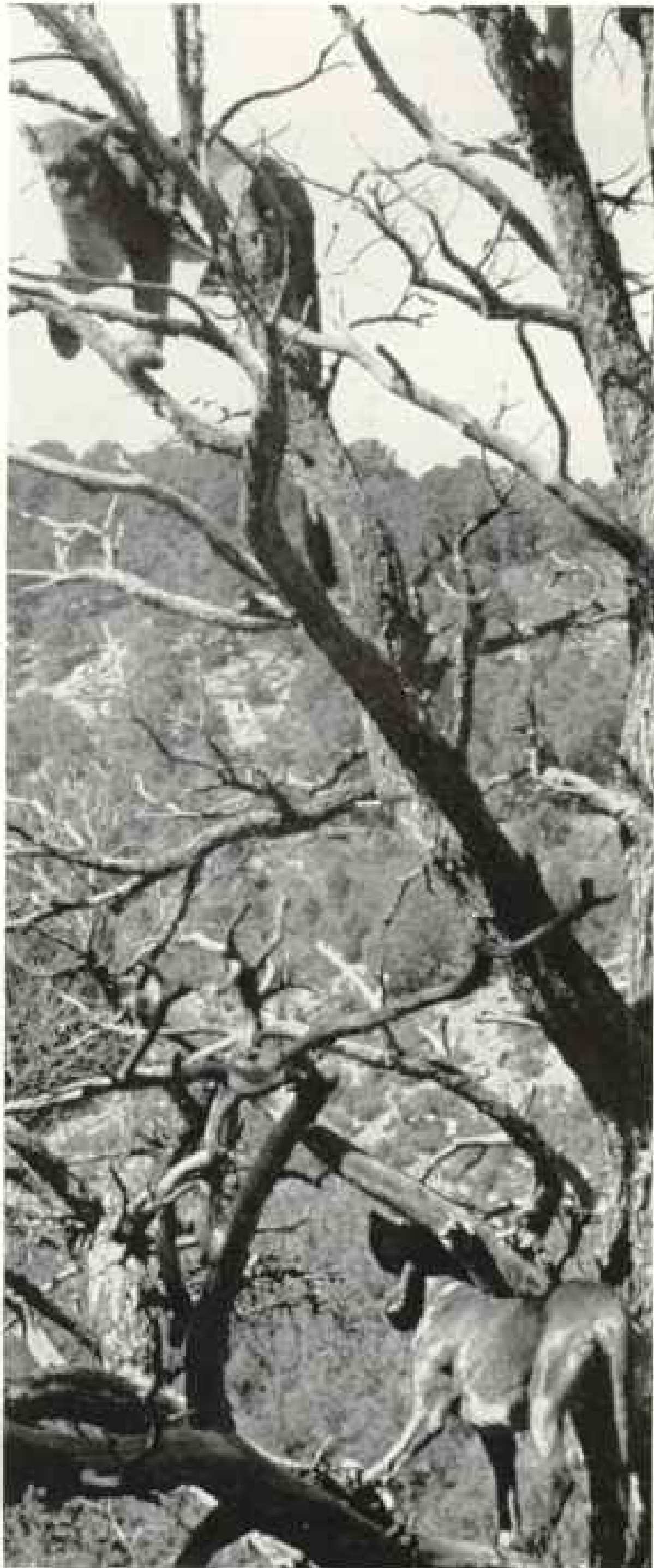
No wonder the cat is credited with nine lives. He is outfitted with foot pads, feeling whiskers, automatic cutlasses, flashlights, and a warm camouflaging coat.

These coats are coveted by women. A woman often chooses her coat to be conspicuous; the cat prefers his to blend into the background.

All cats are assumed to have originally worn plain-color coats. As time went on, some of them developed camouflaging patterns to match their environments. The lion which once lived in the forest is supposed to have made himself a dappled coat, but changed it back to a plain brown when he came to live on the plains. Thus the leopard, according to Kipling (but no scientists) started wearing spots when he went to live in the jungle.

Of course, no one can prove that a cat has actually changed the color style of his coat. Biologists deduce it from the fact that in the lion, cheetah (hunting leopard), and some other cat families, the cubs are born with coats different from those of their parents. Apparently, in this stage of growth they are an evolutionary throwback to earlier ancestors. In a short time the birth coats change, and the cubs become conventional reproductions of their immediate parents.

Plain coats blend into open country. Loud coats, shrieking with color and design, fancy



Arnold C. Schuman

"Fraidy Cat, Come Down and Fight!" Bays the Dog, Climbing Lower Branches

But the puma, though its claws could mutilate the hound, prefers safety. Usually puma dogs run in a pack of five—one a "cold trailer" in the lead, three to take up warm scent, and one on leash to guide the hunter to distant chase. To such canyon slopes most western pumas have been driven by the stockmen's relentless war (pages 241, 249).

spots, rings, rosettes, dashing stripes, meet and dissolve into the lights and shadows of the forest.

Walking on his toes with soft, fleshy cushions, the cat pads through the forests so quietly that nobody can hear him coming. He cultivates whiskers that are much more useful than those of man. Equipped with sensitive nerves at each root, they measure the width of tight places and tell him when he has room to slip through.

Armed with Disappearing Weapons

Not on his hips but attached to his toes are automatics more valuable to him than any gangster's Colt—five on each forefoot, and four on each rear. He has only to lift a paw.

Instantaneously the catch releases four or five long cutlasses that strike and flay his victim without mercy. If he goes into heavy action with all eighteen weapons operating, there is little chance for his prey.

When the claws are not in use, all of them (except those of the cheetah—page 237) are folded neatly away in little pockets, to be saved from the wear and tear of constant travel.

We have all been startled by the apparition of a cat's eyes moving in the night with apparently neither face nor body.

During the day the pupils of his eyes are scarcely more than slits. As the light diminishes, the iris opens until by nightfall the pupils almost fill his eyes. Not even the faintest glimmer escapes. A metallic luster at the back of his eyes reflects the almost invisible light. His shining headlights make it possible for him to see his victims and often to scare them.

Many of the cats are arboreal to some extent. Some spend time in the trees, climbing up and down and leaping from branch to branch. Of not much use except for balance, their long, graceful tails wave aloft or trail elegantly to the ground.

Unless teaching their children, usually only very hungry or bored cats will hunt in the daytime. The larger cats may knock their small prey flat with a mighty paw and occasionally hamstring a big one.

Sometimes they have been known to seize an animal by its throat and sink

their teeth into its neck. Ordinarily they leap on its back, twist the neck backwards until it is broken, and sink eager fangs into the throat.

Cats Live Alone and Like It

Usually cats live alone and like it. The lions are the most sociable. You will often see seven or eight traveling about together. Sometimes there may be as many as 16 in a pride (group), including perhaps a couple of families, neighbors, some aunts and uncles, and a grandfather or so (page 233).

Such large groups must hunt in wide circles to find adequate food. Their night life seems to be well organized. Separating into pairs or groups, one unit, it is said, will terrify and stampede the prey into the claws and mouths of the other.

Every cat has many tricks in his trade. The ocelot stretches out on a branch and stays quiet. His tail hangs limp and he doesn't move a muscle as chattering monkeys gather curiously. They call excitedly to their relatives to come and see the "body." They scream insulting epithets at the "corpse," but it stays dead. At last one of them gets enough courage to approach and tweak its hair. And "that is the end of the monk!"

The jaguar has an ingenious way of getting food. Brazilian Indians say he catches fish by drooling over a limpid pool. Splash goes the saliva. Up leaps the fish. Down dips the jaguar. A big helping is caught, and with practically no effort at all.

Some of the cats occasionally go mad with the lust of killing. A bloodthirsty puma has been known to kill as many as thirty sheep in one night. Ordinarily food is not plentiful, and today the puma's big-game kill probably doesn't amount to more than one or, rarely, two deer a month. He frugally covers it with brush and leaves and returns every day or so for a meal, unless he runs across something a bit more tasty meantime.

The leopard often carries the remains of his dinner up a tree and improvises a pantry in a tree crotch. With less effort, the tiger at least takes the precaution of storing his kill in the bushes.

Scrub Selves with "Washboard" Tongues

Cats usually dislike water. Most of them detest getting their feet wet, and few besides the tiger and jaguar enjoy a swim (pages 228, 229). Even so, they keep themselves fastidiously clean. For hours they will scrub themselves and their children with washboard tongues.

As we all know, from the tabbies on our back fence, the courting period of a cat's life

is lusty and loud. The cavaliers roam yowling through the night. Apparently the nocturnal serenades are sweet to some ears, however, and the race continues to increase. The wild Felidae, including the lordly lions, are even more vocal when they get to feeling that way.

Most dramatic cry is that of the puma. Especially at mating season, it sounds like the scream of a woman being murdered. Apparently that is just "pie" for the lady pumas, because they always succumb.

The real lion makes more hullabaloo than any other cat. You never catch him purring. If he is satisfied, he tells the whole world about it.

There is not a great deal of wooing in a lion's life. Lion meets lioness. They like each other. Leaving the pride, they go off and settle down to family life.

Even in married life, some cats appear to be affectionate. Once I watched a pair of Sumatran tigers dozing in fond embrace. Mamma lay behind Papa, her head cushioned on his back and her foreleg thrown caressingly over his body.

Many times I have seen long-wedded cheetahs apparently kissing each other. The caress was not a perfunctory peck.

A few months ago I watched a pair of cheetahs gazing amorously at each other. They nuzzled affectionately. They rubbed shoulders comfortably. Then the male licked the female's face fondly, and she responded with equal ardor.

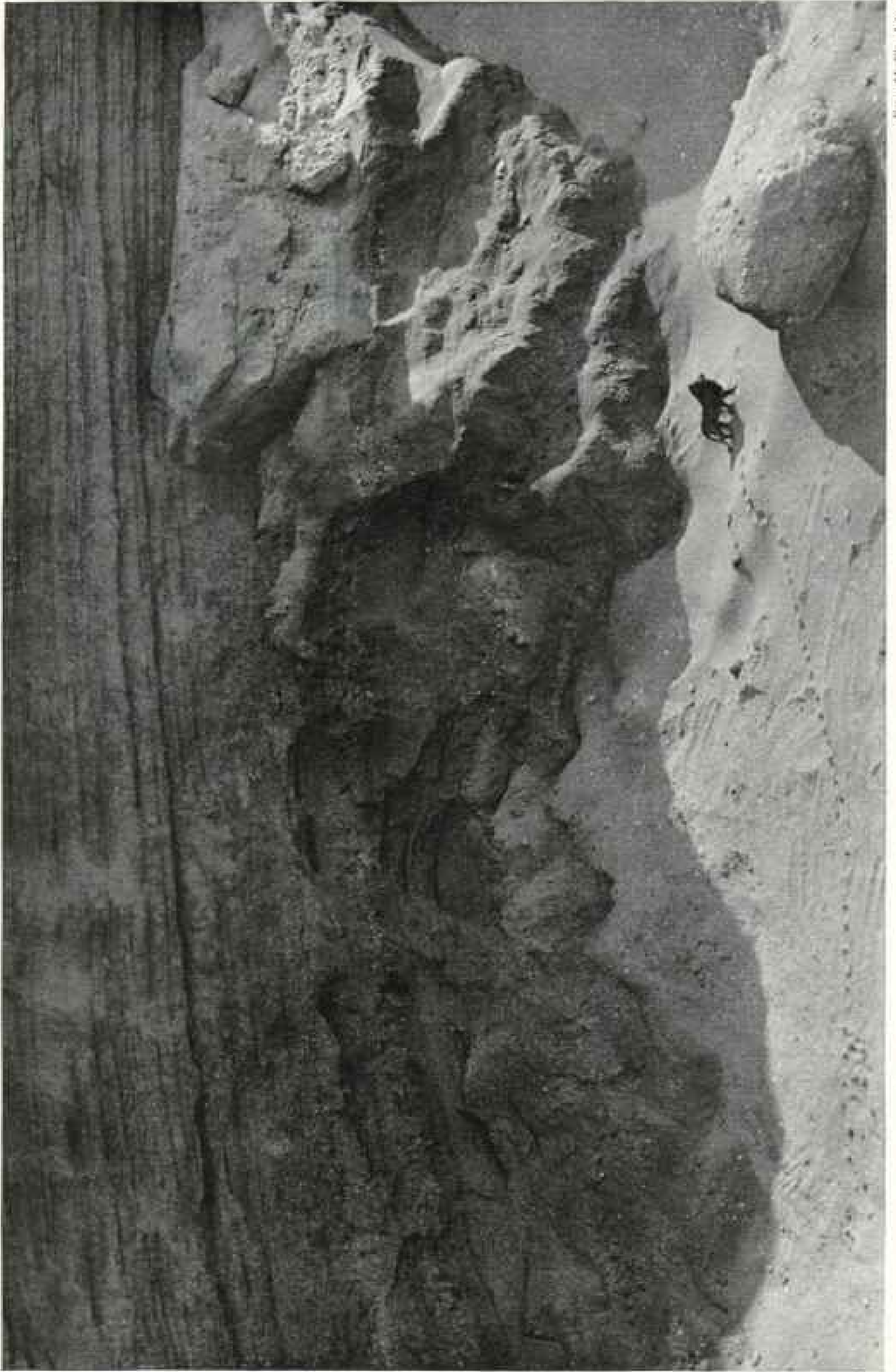
Having thus expressed their devotion, they set to work washing each other. When a thorough job was completed, the lady reached out her long foreleg and coquettishly chucked her spouse under the chin. Apparently he liked this, for he regarded her complacently. As she sprawled languidly in front of him, he held his head high with pompous dignity. He blinked and closed his eyes, looking very bored and smug.

Of course, not all love-making is idyllic. Roaring and snarling, the lover may chase his ladylove through the jungle.

They may frolic and play tag boisterously, keeping half the jungle awake. Although a tigress is said to be monogamous and sometimes attacks a man to save her mate, she forgets him quickly. At least one tigress is known to have mated 24 hours after the death of her former lord and master.

The King Sometimes Turns Nursemaid

In the bosom of his family the roaring male of the lion home may occasionally be a mild, kindly spouse and act as nursemaid while his wife lolls comfortably a few yards away.



Seen as in a Dream, a Lordly Lion Leaves His Footprints in the Burning Sands of West Africa

From M. Flanery



Jack Wolfe

Tourists Are "Caged" in Cars, and Lionesses Are Free to Dispute the Right of Way in South Africa's Kruger National Park

These motorists, with man odor concealed by exhaust fumes, go unmolested by the "road hogs." By day they must stay in their cars; by dark, in one of the park's rest camps. There they hear lions roaring almost at their door. A party may carry one scaled gun, for self-defense only. The lions, roaming 8,000 fenceless square miles, are free to live as lions did before white men arrived. They share their realm with zebra, giraffe, elephant, baboon, buffalo, hippopotamus, leopard, and others.

Rolling on his back, he has been seen to take the youngsters on his chest. A lion version of "Trot! Trot! Trot to Boston!"

Every day is Sunday. The parents sleep late and, when finally awakened by the demands of their progeny, mother feeds them left-overs from the night's kill.

She also does most of the work in starting the offspring on the road to a higher education. She boxes with the youngsters, smacks them hard when necessary, and takes them out on practice hunting trips.

Since so much time and energy are required to bring up the children, Nature has provided a convenient law of birth control. When living in a wild state, the larger cats, such as the lion, tiger, and leopard give birth to cubs only once in two or three years. In the zoo, where living is easy, plenty of food supplied, and the keepers take care of the children, these animals have twins, triplets, or even sextuplets every year.

Most cats are born blind and helpless, and all of them require a comparatively long period of education, in contrast to their weaker prey, who come into the world with their eyes open and begin running from their enemies almost immediately. Appealing, cuddling little kittens, they show no signs that they will grow up to be sinister night prowlers.

The female cat is just as fierce and sometimes even more ferocious than the male. Many a hard-working tiger wife has been known to slaughter a big dinner and then roar to her mate: "Come and get it!"

They both fall to and gorge themselves into a stupor. Sharp, hooklike projections which point toward the throat cover the tongues of all cats. These act as scrub boards and greatly facilitate eating. Any cat can strip a bone clean in a few minutes with its tongue.

Cats Not All Man-eaters

Having once tasted human flesh, cats sometimes conquer their natural abhorrence and become man-eaters. Now and then—very rarely—there is even a young cat who has a naturally perverted taste or who learns by accident to enjoy the delicate flavor of human flesh.

Ordinarily, wild cats not only fear but detest man. Unless a tiger is starving or has overcome his natural antipathy for humans, he will not enter man's buildings or even touch cattle in a man-made forest clearing.

A friend of mine in India once watched two tigers approach a native farmer's clearing where bullocks temptingly grazed. They advanced slowly and with much hesitation. Then they looked at each other.

"What do you think?" the male seemed to growl to the female.

"That disgusting man odor!" she responded. "What do *you* think?"

"It stinks!" returned her mate slangily. And they departed forthwith.

Even grown-up cats like their fun. In national parks all over the world, they often lose their fear and distaste for man. In Africa one of the many tourists who spend vacations in Kruger National Park was rudely shocked when he discovered Simba's family romping off with his underclothes and nightshirts.

The Lady Had a Way with Lions

Some cats are devoted friends to man. One April morning, Walter Weber, who painted the pictures for the accompanying color plates, was watching a bored and indifferent mountain lion, or puma (page 249), sunning himself at the National Zoological Park in Washington, D. C. Though Walt spoke to him persuasively, the cat didn't blink an eyelash.

Ten minutes later the animal suddenly came to life. His ears twitched. He listened. He sniffed. His body quivered. He looked eagerly up the path. Greatly mystified, Weber looked, too. There wasn't a soul in sight.

The cat became jubilant. He leaped about and bounded excitedly up and down the cage. From time to time he peered up the walk, obviously expecting someone. Suddenly a girl came into view. She was a pretty brunette, young and rather foreign-looking. As she approached the cage, the mountain lion pressed eagerly against the bars.

"*Mon ami! Mon ami!*" exclaimed the girl affectionately.

The mountain lion went into an ecstasy of contortions and gymnastics. The visitor put her hand into the cage and he pressed his face against it happily. Then he looked about to find a gift for his enchanting friend. He picked up a leaf from the ground and brought it to her in his mouth.

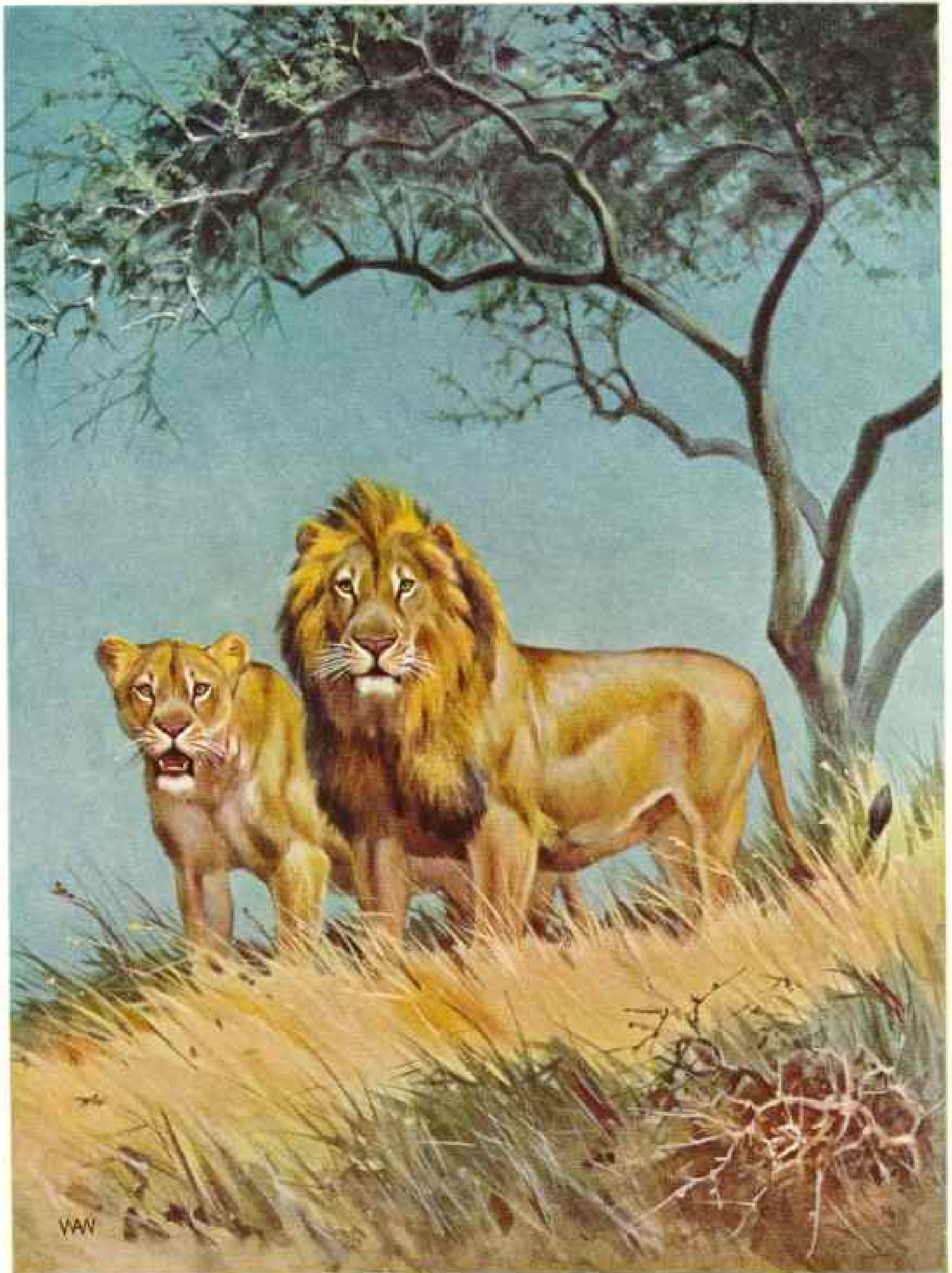
She handed him a small twig which he carried back and forth across the cage and then returned to her. This little play was repeated several times until he bore his present into the den for safe keeping. Once he peeked out to be sure she was still waiting and then went on hiding his treasure.

"Is he an old friend?" asked Weber. "Did you raise him and train him?"

"*Non! Non!* I nevaire see him before I come here. But he like me. He is a good friend. Always he is verry glad to see me."

Just then the mountain lion bounded out of the cave and threw himself against the bars. The girl scratched him under the chin

King of Cats and His Court

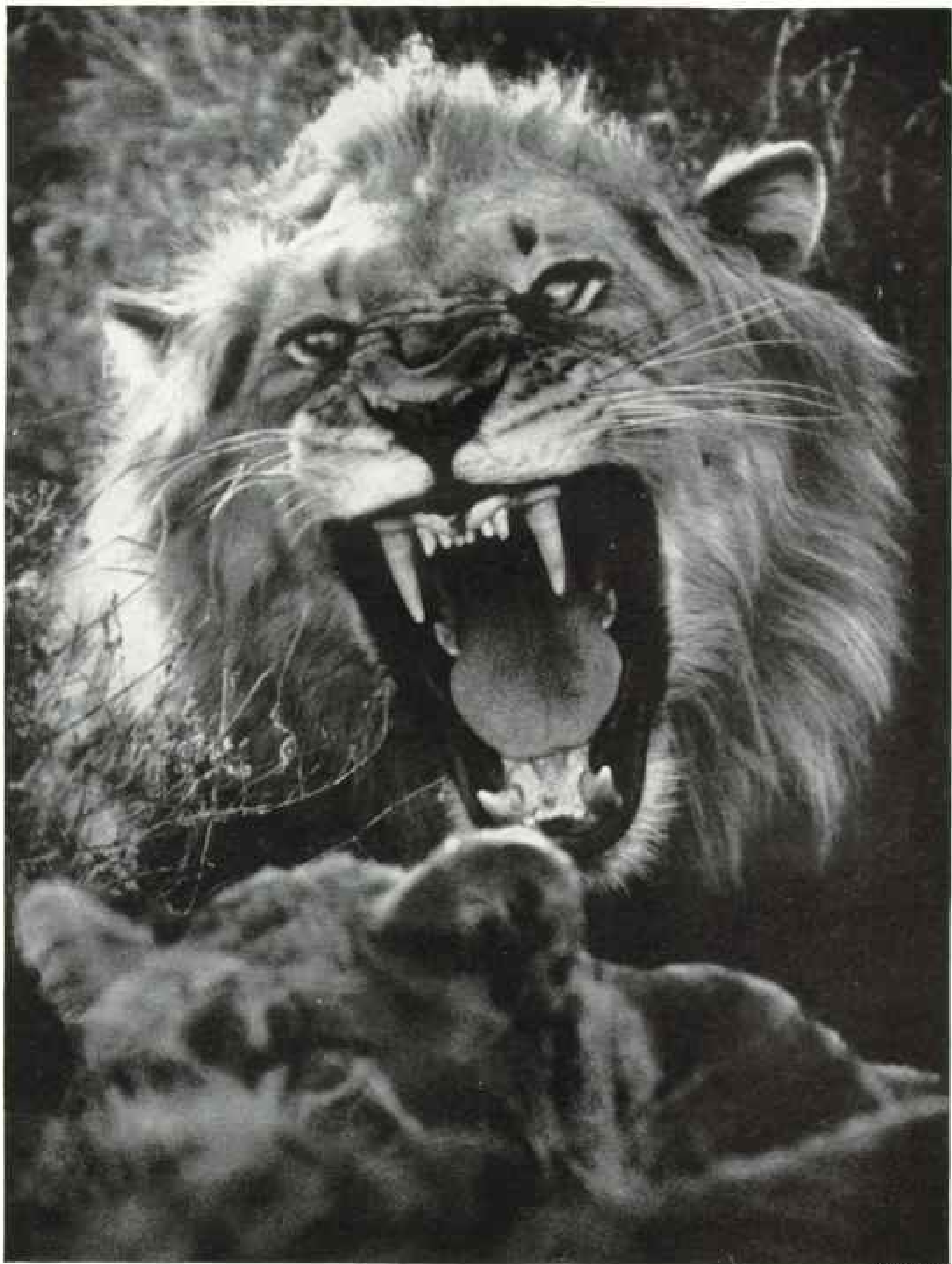


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Painting by Walter A. Water

Beneath an Acacia, Simba and His Consort Escape Africa's Hot Sun

A wild lion's magnificent muscles make his captive brothers appear lean, flabby, and humpbacked. One paw blow, backed by his 500 pounds, can break a zebra's neck. Within historic times *Felis leo* roamed southern Europe. Today he flourishes in Africa, exists in Iran, nears extinction in India.



Dick Wolf

"Not One Foot Closer!" Roars Simba, Protecting His Mate in Kruger National Park

Androcles, the slave, pulled a thorn from an African lion's foot; later the beast befriended him in a Roman arena. Daniel, thrown into the lions' den, was delivered by the Lord. But not so fortunate were the 28 laborers slain by two man-eaters in Uganda. These beasts stopped construction on a railway for three weeks in 1898 by invading thorn barricades and seizing workers.

and around the ears. Rapturously, the cat rolled over and lay on his back. He purred in perfect contentment.

"I must watch out for ze cops!" exclaimed the girl, looking over her shoulder lest the guards discover such dangerous goings-on.

"*Mon Dieu!*" looking at her watch. "I go at once!" The cat tried to detain her, thrusting his paws through the bars. Not once were his claws unsheathed. She patted his head affectionately.

"*Au revoir, mon ami!* I will return. Be good!"

Crouching on the floor, the deserted mountain lion pressed his face against the bars, watching long after she had disappeared.

True lions have also formed close human friendships. The mascot of Rameses the Great was an African lion which fought in the wars with his master. The Cid, Rosa Bonheur, and other historic celebrities have possessed lion pets.

However, lions are not recommended for one's home. Apparently one must be *sympatico* like the brunette zoo visitor and the mountain lion, or like Edmund Kean, the actor, who taught a lion to follow him around like Mary's little lamb.

Such pets are rare, and even naturalists seldom see a bobcat, mountain lion, or jaguar outside of a zoo. Usually nocturnal, these American cats are shy and wary.

Kissed by a Mountain Lion

Once in a great while a mountain lion gets lonesome. He is hungry for company and affection, or perhaps just for food.

A forest ranger in California was sleeping in a pup tent one night. He was lonesome, too. There was a girl back in town he hadn't seen for two months. Suddenly he smiled as if in a pleasant dream. Something touched his lips softly. He brushed it aside.

The caress was repeated. It wasn't like his girl's at all. Cold and a bit prickly it felt. He opened his eyes in pitch darkness. He felt that someone was beside him. Reaching for his flashlight, he flooded the tent with light.

There, looking wistfully down on him, were *two* mountain lions! The ranger let out a yell. No one will ever know who got out of the tent first—the lions or the ranger, but the ranger kept on going.

When he reached the first telegraph station, he was still too overwrought to count words. He wired his resignation. "I didn't hire out to Uncle Sam to be pawed over by California cats. They can have my job and welcome."

Besides other cats, the only animal which can really annoy any of the Felidae family

is that stupid, slow-moving little creature, the porcupine. Either the African lion or the American mountain lion may come home with his face and paws sore and festering, as full of quills as a cushion of pins!

The cat's greatest enemies are men. For a million years men have hunted him, improving their technique as the centuries passed. Their hunting methods vary according to the habits of the animal, of course.

Since cheetahs must be captured alive and in good condition, they are snared in horsehide nooses laid under trees where they congregate to relax for a few days from over-eating or to sharpen their claws for the next kill (pages 232, 237).

Tigers intended for a zoo used to be caught in pits baited with live goats. Under modern methods, the babies are kidnaped (or rather, "cubnaped") and carried in baskets for thousands of miles. Fed scientifically from nipples bottles, they arrive in New York bursting with vitamins and good health.

Hunting is much simpler when the animal is wanted only for his skin and meat. Natives in the jungle drive the tiger into strong woven netting and spear him. Europeans sit luxuriously on elephants while native beaters drive the tiger up to be shot. Occasionally a desperate cat will leap up on the back of the elephant, giving the hunters a real thrill.

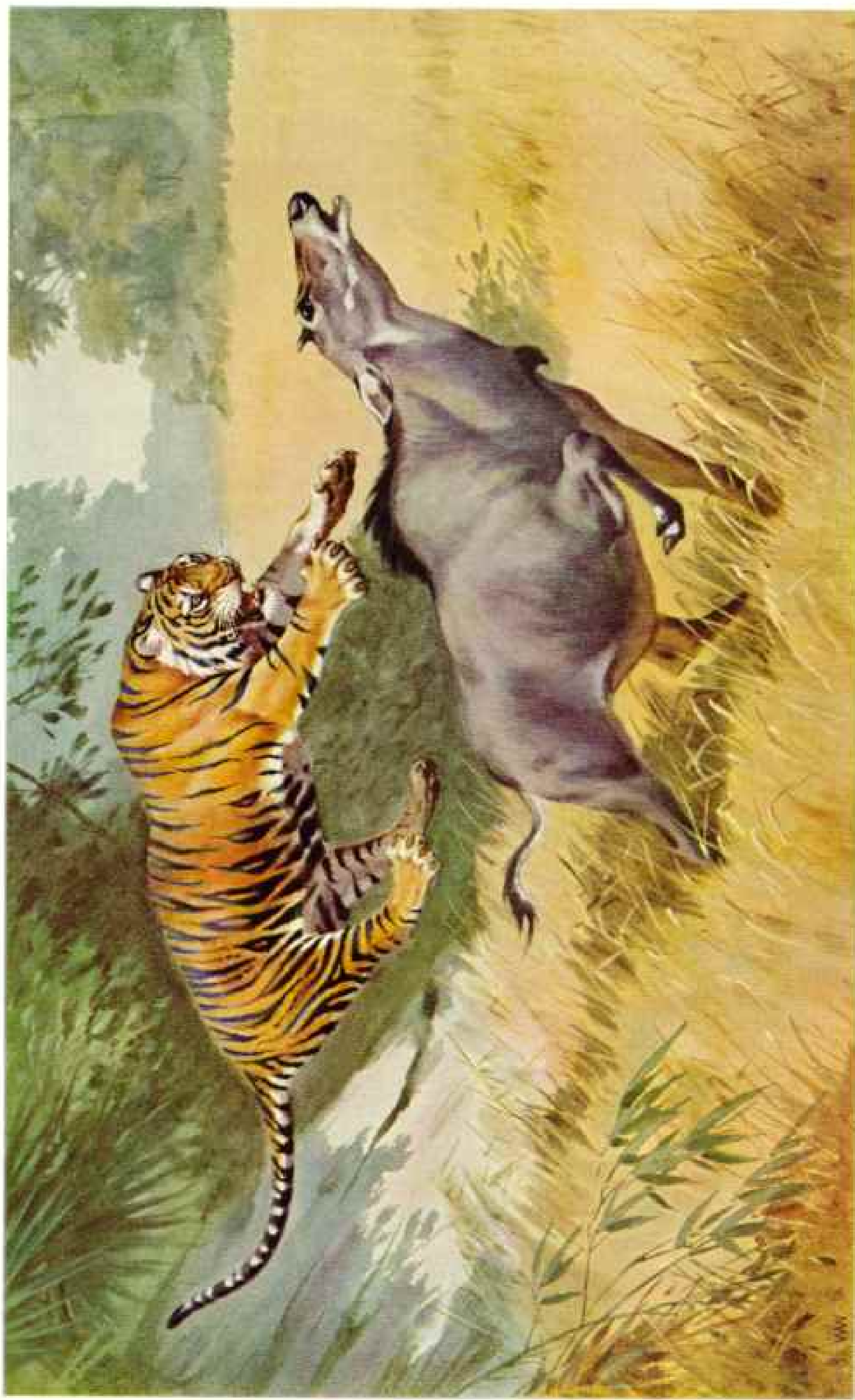
Not so long ago, in the course of a five-hour beat in the hot sun, a tigress frightened the elephants, wore out an army of beaters and *shikaris*, and injured one man. At last, completely surrounded, she took refuge in the reeds. The only way the mob could get her was to set a fire. Several acres were burned as she leaped from one smoking area to another. Singed and wounded, she did not cry out, but at last they caught and killed her.

A native who can afford a gun will roost on the branch of a tree over a big cat's kill and wait for him to come back for his second dinner.

Luxury Hunters Take Mean Advantage

Wealthy sportsmen want more comfort. They have their natives place hunting platforms in a tree above the big cat's kill, or above bait that they plant themselves. Tied to two stout stakes driven into the ground for several feet, the carcass cannot be carried off. Pulling and tugging at it, the cat gives the hunter time and opportunity to get a good aim.

The two-decker platforms in the trees are made of tightly woven branches that will not creak and will hinder a maddened, wounded leopard from tearing through them. They

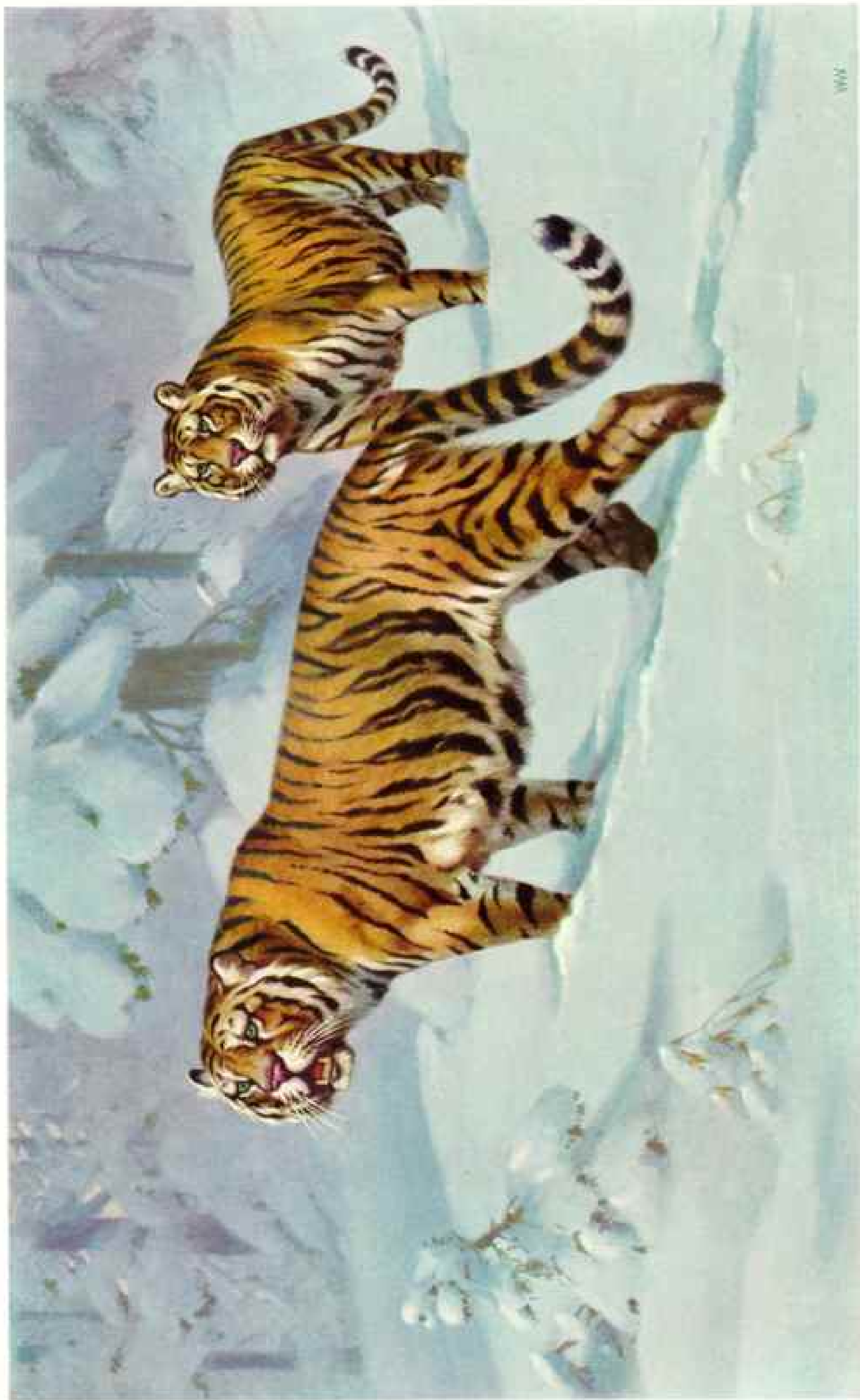


© National Geographic Society

Painting by Walter A. Weber

Scourge of India's Game, the Bengal Tiger Leaps from Ambush upon a Blue Nilgai Heavier Than Himself

With a twist of his jaws, the lord of the jungle will dislocate the antelope's neck as he bowls it over. A fat 10-foot Bengal weighs 500 pounds. Man-eaters have terrorized entire villages lacking firearms. Only the rhinoceros and elephant appear safe from the beast's attack.



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Siberia's Mr. and Mrs. Stripes, World's Largest Cats, Grow Warm, Shaggy Coats to Resist Zero Winters

Painting by Walter A. Weber

All tigers belong to the same species, *Felis tigris*, but the Siberian is heavier and longer than the Bengal (opposite). He approaches 11 feet from nose to tail tip. Apparently the tiger originated in northern Asia; his smaller emigrant brother of India still does not like tropic heat. Huge bulk serves no special benefit today; it is not needed for pulling down pigs and small deer.

W.A.W.



© F. W. Champion

Her Broad Stripes Blending with the Reeds, the Tigress Awakes from a Cat Nap in a Cooling Brook

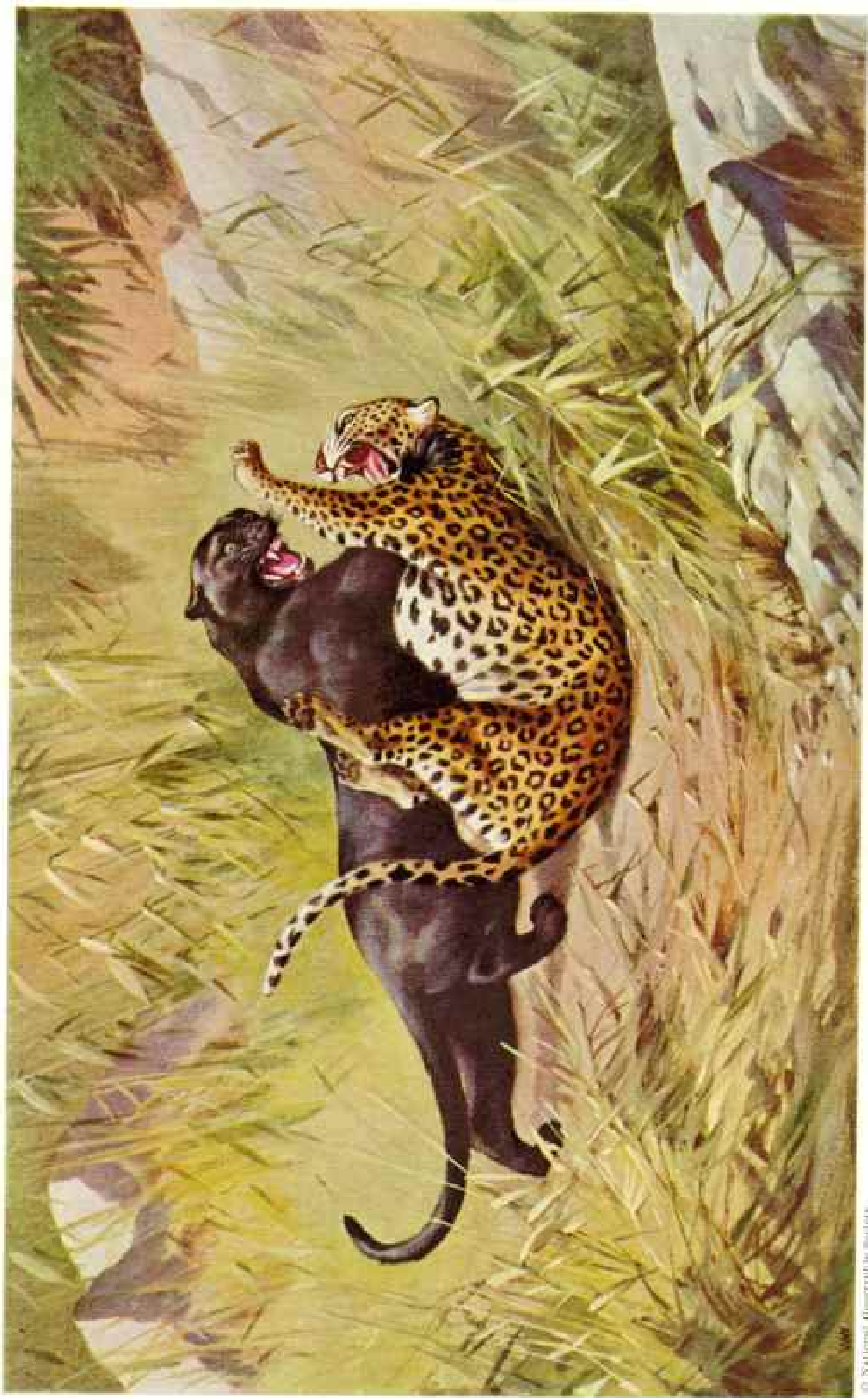
This India beauty "probably regarded the photographer as a kind of monkey," writes the photographer. "She decided I was a somewhat annoying but harmless object perched on a tree." For five days "she took little notice of me," or of Mrs. Champion, who occasionally occupied an adjoining platform. But rage knew no bounds when crows settled on her kill near by. Her cubs are hidden in the reeds. Their father, doubtless gun-wise, refuses to come near (page 236).



A. Chaudh

Not All Cats Hate Water—the Tiger, Wearing a Benign, Contented Air, Enjoys a Swim in a River in India

Nearly every afternoon this handsome fellow was seen crossing the stream somewhere in the realm of the Nizam of Hyderabad. The photographer, 20 feet above water, waited until he had this view. Whiskers skimming the surface, the animal leaves a broad wake. Tigers have been known to cross even small salt bays (page 219).

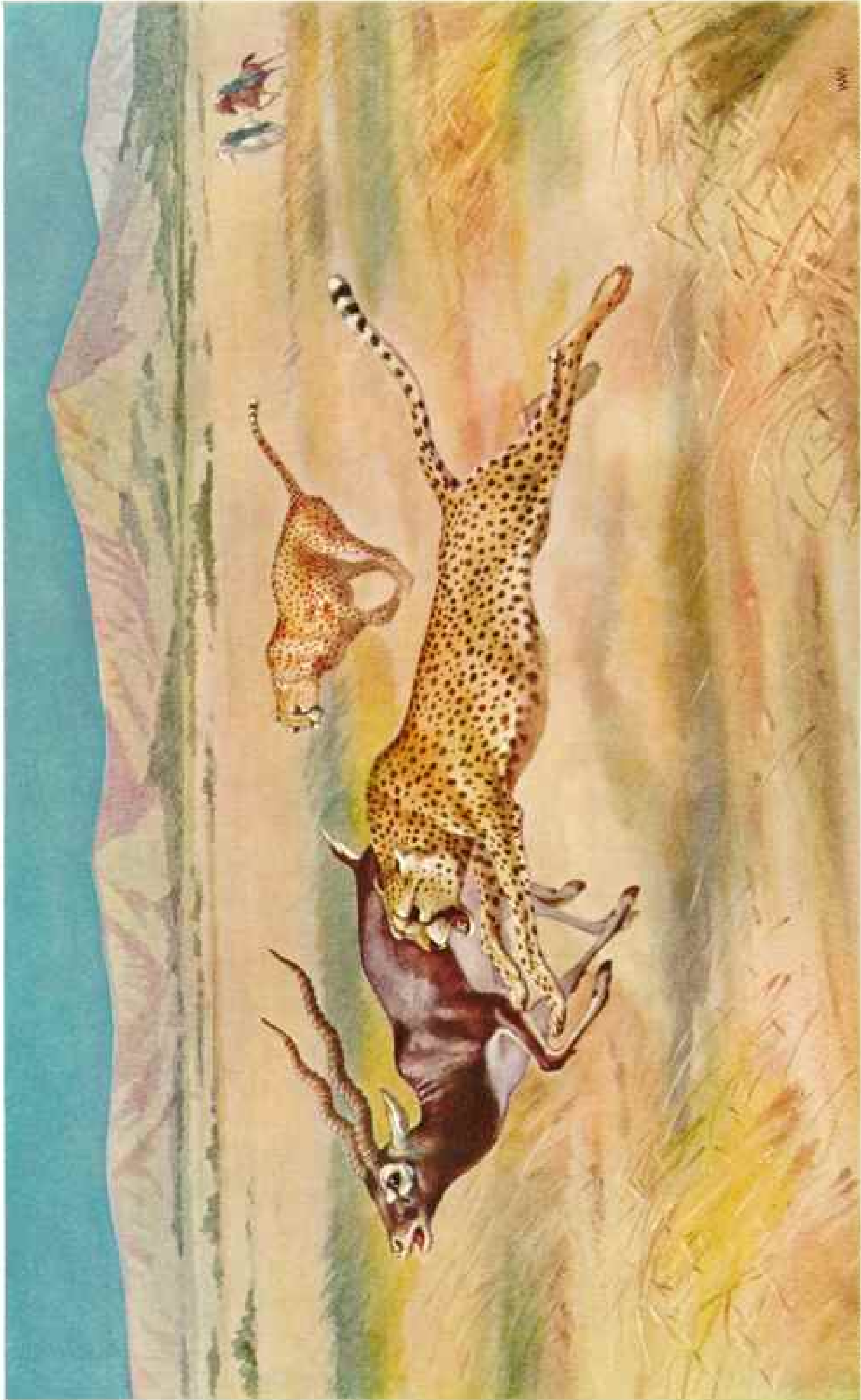


© National Geographic Society

Painting by Walter A. Weber

Under Their Skins, Battling Spots and Blackie Are Common Leopards—They Could Be from the Same Litter:

The misnamed black panther is a melano or "black sheep" of this leopard family. Even he has faint spots. Both he and his lawny kin are, pound for pound, the most destructive of feline killers. They weigh 100 to 140 pounds. *Felis pardus* roams Africa and warmer Asia. He is not an American.



© National Geographic Society

Painting by Walter A. Weber

Fleetest of Beasts, Cheetahs Overtake a Black Antelope as Racing Horsemen Lag Behind on an Indian Plain

The "hunting leopard," spurring at 70 mph, soon overtakes and kills. A ladle of blood is his reward. He makes a docile, purring pet, sometimes sleeping with his trainer. Faster than the greyhound, *Acinonyx jubatus* resembles a canine in his non-retractable claws and long, doggy legs.

are padded with soft blankets for ease and quiet. The hunter has virtually every comfort except a radio.

Close at hand is installed an electric flood-light or torch that the hunter may switch on at the first suspicious sound. The startled animal is momentarily blinded, and the sportsman can take a good aim in the bright light.

Also handy is a bag of rocks to hurl at the "corpse" after the shot, for surety against its coming alive when approached. Having shot his prey, the hunter lets down a rope ladder and descends with dignity.

A wounded animal which escapes is either followed immediately on elephant back or flushed by buffalo driven into the jungle. If allowed to live, it may be maimed sufficiently to become a man-eater.

The Machine Age in Africa enables the hunter to search for lions by automobile. When the animals are sighted, the men alight from their cars and, with some effort at concealment, proceed on foot to within shooting range. Times have changed since the days of Stanley and Livingstone!

"Shining" Game with Light Illegal

"Shining" big game at night with headlights and spotlights—with intent to kill—is an unethical and illegal sport. Yet an interesting "spotlight sportsman" experience was recently reported from India.

It was midnight in the jungle. A flicker of moonlight trickled through the lush foliage and lay across the narrow ribbon of road. A sleepy myna squawked. The distant bang of wheels and noisy engine approached. Floodlights broke the darkness. A big-game hunter was abroad—"shining deer."

As he came nearer, twin balls of fire grew out of the side of the black jungle. The sportsman slowed down. The shining eyes were low and large. As he approached, the eyes became green. Gradually his lights picked out the handsome stripes of an adult tiger etched against the thick green growth!

Blinded by lights so much larger than his own, the big cat stood there staring. Following curiously after him came his wife and young son. She placed the cub between herself and the male for safety. The tiger is not always the bloodthirsty father that some naturalists picture.

Just then the fourth member of the family joined the group. About two years older, he was apparently an older child or stepson. All four sat in a row and watched.

Although tiger families have often been seen together, the offspring are nearly always of the same age. When a new litter is to arrive,

the cubs are sent packing to earn their own living.

The four tigers must have been a tempting target. Fortunately a law-abiding citizen, and somewhat touched by the appealing family scene, the sportsman drove on.

A favorite pastime of certain natives of Assam is still tiger baiting. Each able-bodied man in a cluster of villages provides a jute net about 100 feet long by 15 feet wide, the meshes 6 inches square.

Having spread the nets in the vicinity of a recent kill, the men set forth with spears and bamboos. Hideous yells, shaking of cymbals, and the beating of drums make a din. It may take hours or days and many miles of beating to drive a tiger into the nets. Instead of killing him at once, the huntsmen shorten the nets into an arena some 50 yards in diameter.

A log about 10 feet long and 10 inches thick is then fastened to two long bamboo ropes stretched from one side of the area to the other. Dragged back and forth across the field, it crushes down the tall, waving grasses and forces the tiger to dash about, much to the enjoyment of his bloodthirsty tormentors.

Thousands of natives applaud and yell. For perhaps five days and five nights they watch and bait their prey. When the tiger is nearly dead with thirst and exhaustion, and the netters themselves are ready to drop, a howling crowd closes in for the kill.

Maddened with the sight of blood, they spear the beast again and again. Men splashed with the tiger's blood fight for a piece of flesh until only a few bones and shreds of hide are left of the tiger. The festival is over, and the mobs return home.

Cats Have Become Wonderful Hunters

Some fifty million years of training and experience have developed the cat's hunting methods and skill. The natives so admire his ability that they often use certain members of the family as hunting dogs.

Even the holy Egyptian cat was not too deified to be useful. Ancient paintings show him hunting with his master. Caracals held on hunters' saddles are trained to bring pigeons, peafowl, cranes, small deer, gazelles, hares, and foxes to their master.

Not caught until he is adult and fully experienced, the cheetah goes through a severe training period. Kept awake and starved, he is subjected to the constant talking of women and children. It takes more than one scolding woman to nag him into submission, however. Worn out, the women take turns and at last even the cheetah has to admit their victory.

When completely trained as a hunting servant, the animal is treated kindly. He enjoys caressing pats, lives in the house, and often sleeps on his master's bed.

The cat is sometimes an important factor in saving the farmer's crops. Tigers are especially appreciated in parts of India for their work in reducing the excess deer population.

An example of what the world might be without cats has occurred in New Zealand. Neither deer nor cats were native there. Deer were imported about 1860 by homesick Britishers and eventually parts of the country were overrun by the animals. Crops were badly damaged and farmers were raging. It became necessary to call in the Pied Piper or an exterminator. Only exterminators were available, and they still have a long, hard job ahead of them.

Lion

Felis leo

Ambassa! Simba! Lion! Whether it be in Abyssinian, Swahili, or English, the name means "king." Perhaps because the lion makes more noise than any other animal, he has been called "king of the forest" (Plate I).

Although he has several regal characteristics, he is not a king nor does he often go into the forest. He would seldom dream of dictating to the elephants or African buffaloes or of reaching up to the giraffes in their prime of life or normal state of health.

Looking larger than any of the other forty or more cats that prowl over two continents, the male lion may weigh as much as 516 pounds. Seldom standing over 58 inches at the shoulder (the present record is 45 inches), he averages 9 feet 6 inches from the end of his broad black nose to the tip of his tufted tail.

Hidden in the thick clump of hair at this latter extremity is a small horny scale attached to the skin at the tip of the last vertebra. The modern lion has never found out how or if his ancestors used this extra piece of equipment.

When about three years old, most male lions begin to grow a badge of manhood, a royal mane; it is complete in about six years. At its best, it is very luxuriant, framing his massive head and flowing over his neck and chest.

A female does not appear in any kind of mantle or ruff of distinction. She is smaller and looks much less dignified and formidable than her mate, but she is even more savage at times.

Under easy zoo-living conditions, the lion's coat becomes smooth, well tailored, and trimmed with an extra-heavy mane. His large, intelligent-looking eyes and facial markings register patience and proud resignation. Less nervous than tigers and leopards, he has greater dignity and poise.

The mane of the wild lion is underdeveloped. Wear and tear of making a living in thorn-shrub country keeps it frayed down.

In Kruger and other national parks of southern Africa, where lions have learned the safety of protection, the tourist frequently sees a lioness "with her hair down." Two or three frisky cubs play tag with the black tuft on the tip of her impatient tail (pages 221, 224).

The lion is born before or after his eyes open. Most other cats don't get them open for some time after birth. If closed, the lion's eyes often remain so for six or seven days. Then they have a glassy stare for about three weeks and apparently do not see very accurately.

Born probably in March or April on a bed in long grass or bush, the kittens are frisky youngsters. Their thick, woolly fur, usually striped on the body and spotted on the legs, disappears in six months, but occasionally is retained for two or three years. It changes to the parents' uniform tawny short hair, with finally only dim spotting on the lower flanks.

When five or six months old, they start to follow their mother and sometimes their father to the hunt. Excitedly they snuggle in the grass while they wait for an unwary antelope, wart hog, or even creep up to a young elephant, hippopotamus, or buffalo. One of the parents may then spring more than 21 feet in one leap.

Small victims are seized by the throat, which is torn open or the neck broken. Heavy animals may be dragged down by a paw on the flank or shoulder while the other paw clutches the nose. The lion can break a zebra's neck instantly with one blow of his mighty paws. He disembowels his prize through an opening ripped in the flank, and usually buries the entrails.

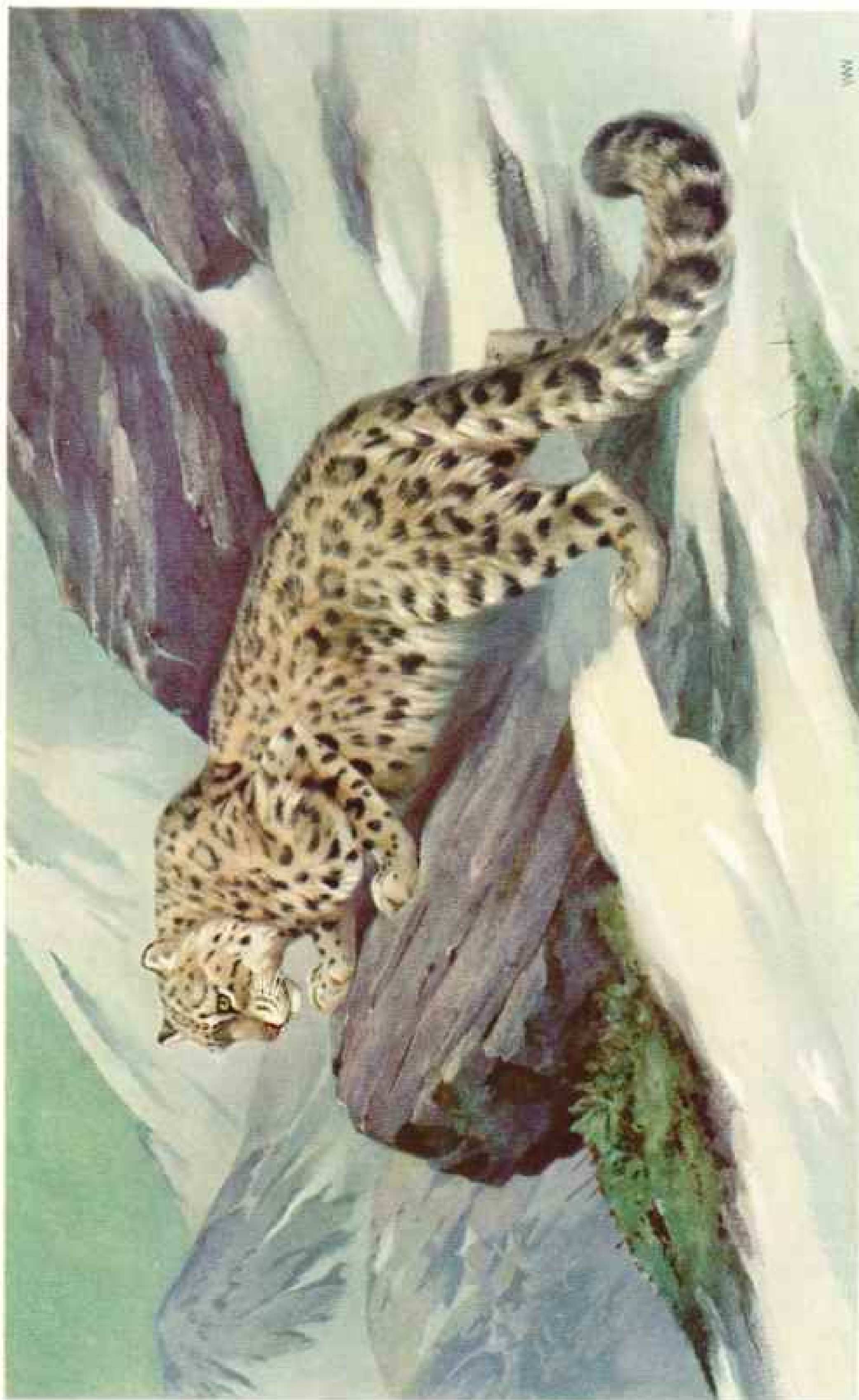
An epicure, he eats first the heart and the lungs, then the steaks of the thighs, and the brisket if it is fat. Preparing for the proverbial rainy day, he habitually covers the remains with rubbish and comes back the next day or several days later for another meal. He likes all meat—carrion or fresh. Wart hogs, bush pigs, and cane rats are titbits that he never refuses.

Sociable to some extent, lions often travel in prides (parties) of four or five to a dozen or more—sometimes as many as 25. When one clique meets another at the water hole, each tries to outroar the other, like rival college rooting groups.

A lion usually holds his head to the ground as he roars, so that the terrific volume of sound reverberates and the whole wildlife world rocks with his thunder.

From long experience the potential victims seem to know that the lion prefers to hunt at night and usually has a full stomach by morning.

Lions have left their fossil bones over most of the world. According to some views, even Alaskan gold miners are washing them out of the ground; or perhaps they may be jaguar affinities. Like many rulers, these kings have been sent into exile. Man drove them out of southeastern Europe and southwestern Asia (Persia and Mesopotamia). Civilization, climatic changes, food limitations, disease, and other factors have finally restricted them to northern India and Africa.



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Snow Leopard, Mountain Climber of the Cat Family, Stalks His Prey at 13,000 Feet in the Himalayas

But even *Felis uncia* makes concessions to the Tibetan blizzard; in winter he descends to 6,000 feet. There, sometimes, to the delight of zoo directors, he is warmly clad; the padded tail is as bushy as a Persian cat's. Ibex and other wild goats and the monal pheasant are his meat.

Painting by Walter A. Weber

1941



© Nathaniel Currier Society

Painting by Walter A. Weber

Dread Foe of the Peacock, the Clouded Leopard Wears a Garment Almost as Spectacular as His Quarry's

Pelle nebulosa is sometimes known as Tortoiseshell Tiger. He is about six feet long. Not related to the common leopard, he resembles the extinct saber-toothed tiger. Observe his fangs! Despite them, he can be tamed. He lives in northern India, Tibet, and Burma. Zoos rarely see him.

Only about 70 or 80 remain in India, where they live in the 500-square-mile Gir Forest in Kathiawar, near the western coast. Except in settled districts and the western and central forested area, the African lions are generally distributed south of the Sahara. Even here they have been forced to relinquish large areas. How the mighty have fallen!

Tiger

Felis tigris

Loudly striped with shiny black bands, the tiger's bright-orange coat shrieks at visitors in the zoo, but melts quietly away in the streaks of jungle light and shadows (Plates II and III). Nearly invisible in the daytime, the big cat hunts at night, sometimes until eight or nine the next morning if he is still hungry.

His jaunts are heralded by the warning squawks of monkeys and peafowl, and the barking of muntjacs. The big cat is not choosy. His menu is large and varied—carion or fresh meat. He feeds on anything, from adult cow elephant, buffalo, and the mighty sambar to the spiny porcupine. Antelope and wild boars, lizards and insects, even frogs, fish, and crocodiles, are food for him in time of flood.

Pangolins he eats at any time. In China tiger lairs are sometimes raided for pangolin scales, which, like a lot of other odd parts of animal anatomy, are thought to have medicinal value.

Not so noisy as the lion, the tiger has a similar roar but is much more discreet in the use of it. He is supposed to save it largely for mating season. If surprised, he is apt to ejaculate a tigerish "Woof!" When worried, he goes around making a series of "pooking" or "titting" noises. Many a mortally wounded tiger has been known to die without uttering a sound.

Never having been a tree climber, the tiger has yet to learn that danger may lurk above him. He pads nervously down a forest trail, looking to right and left, but he seldom looks up. The big-game hunter in the tree remains unseen.

Like other cats, the tiger stands up on his hind legs and sharpens his claws on the tree trunks. Sometimes these long scratches are seen at a height of eight feet.

If ever a tiger sees a man approaching in a jungle, he will probably turn tail and run. However, it is just as well for the man to fade politely into the background also. Panicky running or excited waving of arms may be misinterpreted by the tiger.

"As uncertain as a tiger," is the saying in Asia. One never can tell what a tiger will do. Cowardly or shy by instinct, this big cat will sometimes fidget and slink away from needed food when people are working unaware a quarter mile or more distant. Another time, the same tiger will not hesitate to leap on a goat or cow that is being led down the trail on a short tether.

After listening all my life to horrifying tales of man-eating tigers, I was disappointed to discover that tigers generally detest the taste or odor of man, his buildings, and his cattle. Of

course, if he kills a person for startling or scaring him, he may accidentally discover that the flavor of human flesh is not bad.

No matter how prolific tigers become in Assam, India, they are protected. Although they are not sacred like the cow, they have an important mission to perform. Were it not for them, deer and other browsing and grazing animals would increase too rapidly for farming and domestic grazing.

One can hardly imagine erecting scarecrows for tigers. However, some natives believe that rags tied to bushes will frighten the nervous tiger away!

Although there is only one species of tiger, the numerous geographic races vary considerably in size and coat pattern. The male of the typical Indian or Bengal tiger, the one most commonly seen in zoos, is 9 or 10 feet long—perhaps as much as 10 feet 7 inches—and weighs about 400 or 500 pounds; heaviest, 645 pounds. The tigress averages considerably smaller, about 290; heaviest, 347.

Although the Bengal wears the usual tiger ground color of ochraceous tawny, its stripes are pale and narrow. In south China, where tigers are rather common, they are more richly colored but distinctly smaller. Sumatran tigers are smaller yet, standing fully 8 inches lower at the shoulders and weighing less than half as much as those from India.

Home of the Most Majestic Tigers

Most majestic of all the tigers are those from south-central Siberia and western China. Husky brutes, some of them have weighed 550 pounds, and tanned skins measured from 10 to 12 feet in length. (These measurements were probably taken after the skin was stretched and therefore are not strictly accurate.)

Intense cold forces the growth of warm, luxuriant coats which are beautifully marked. Perhaps white animals have a better chance in this land of ice and snow. At any rate, north China has produced a number of albinos, with the inevitable, but faint, brown stripe. Very rare melanistic (black) tigers are also known.

Tigers appear uncomfortable on summer days in the steaming jungles of India. Their way of cooling off is to take a long swim (pages 228, 229).

These handsome, restless creatures with the cruel open mouths are sometimes faithful husbands and fond fathers. They breed at various times in the year. In southern China the young are born in December.

The tigress probably litters only once in two or three years in her natural environment. She may have quadruplets or even sextuplets, but rarely more than two survive to travel about with her. It is thought that sometimes the extra ones are killed off to cut down the grocery problem.

Although cubs have more prominent stripes, they are similar in color to the adults. Usually they remain with their parents until they become of age, about two years old.

Leopard

Felis pardus

Like a gossip paying calls, shredding reputations, and wearing impeccable white gloves, the leopard pads through the forest with his merciless claws in snow-white mittens (Plate IV).

The most gorgeous feline, adorned with a necklace at his gleaming white throat, and attired in the coat of black and yellow rosettes that all women covet, he is a dreaded caller. Pound for pound, he is the most destructive of all predatory animals.

Because the yellow centers of the black rosettes reminded the Chinese of their hexagonal-shaped coins, he is called the "golden cash leopard."

Leopards are frequently listed as vermin, and there is a price on their heads in India. Five thousand of them are killed each year, but they continue to breed.

Averaging 2½ feet in height at the shoulders, the leopard measures about 7 feet 6 inches in length, of which less than three feet is accounted for by the tail. A big male weighs 100 to 160 pounds, and the average female 64 pounds; largest female, 75 pounds. Twenty leopards measured more than 8 feet in length; the largest are 8 feet 11 inches, and 8 feet 7 inches. The heaviest ever weighed tipped the scales at only 170 pounds.

Despite the comparatively small build, the short legs and deep body are all muscle—steel sinews and springy hands that can propel the creature for an unbelievable distance through the air. He seldom leaves his left-over food on the ground. Carcasses of prey weighing 80 to 150 pounds—often as much or more than the leopard himself—have been found lodged in trees 12 to 20 feet above the ground, dragged there by this middle-sized Hercules.

The leopard ranges over much of the warmer lands of the Old World—the hotter the range the better—from the eastern side of the Black Sea across southern Asia, to Cochinchina and southern China, north to Amur and south to Java and Ceylon. Africa, except for the Sahara, is also home.

There is only one common leopard. From Cape of Good Hope to Turkistan to Malaya, he varies little in size, shape, and habits. Those living on the open plains of Tanganyika are paler than the leopards that spend their lives in the shadows of the jungles of southern India.

A leopard cannot change his "spots." Even the albino and melanistic (black) phases have them. Faint, because there is little color contrast, the markings still brand him.

In parts of southwestern China and in the Malay Peninsula, the black individuals are not uncommon. Their dispositions are supposed to match their coats.

On velvety-black nights in the jungle, the thousand and one little noises of the varied animal life abruptly cease for one sound—a deep, rapidly repeated, barking cough, like a coarse saw passing through a hardwood log. A leopard! He is

too smart to make it often. But once in a while he gets upset and expresses himself.

Muntjacs, antelope, jackals, peacocks, and reptiles all taste good to him. He will even tackle porcupines of Africa, which have quills six inches long. If ground animals are scarce, he takes to the trees for birds and monkeys.

One of his favorite dishes is dog. His audacity in obtaining this tidbit is proverbial. He is remarkably adroit in drawing dogs away from the safety of native villages.

It is difficult for a hunter to roost in a tree and watch for a leopard unseen. Because of his semiarboreal life, the leopard keeps a sharp lookout above and below. He dislikes to get his feet wet, but, if necessary, he can swim as well as the tiger. A night's ramble may take the leopard as much as 20 or 30 miles.

Back home two, three, or four little leopards may be waiting. At birth their spots are solid black on a dull yellow background. Later—we don't yet know just when—the yellow-spot center begins to appear and starts to grow. Then the whole coat takes on the beautiful sheen characteristic of the grown-ups.

Man-eating leopards are rare, but sometimes a leopard—old, toothless and decrepit—may discover that man is a most helpless being.

Cheetah

Acinonyx jubatus

A high-wheeled wooden cart creaks shrilly as the little procession winds across a dusty plain in central India under a blazing sun. Three or four turbaned, swarthy men bestride gaily caparisoned horses. A long-robed man on foot leads the pair of bullocks hitched to the vehicle.

Alongside walks a second Indian. In his hand he holds the ends of two leather thongs fastened to the collars of the occupants of the cart. Two strange creatures, they sit bolt upright, swaying with the lurch of the wheels. Their sandy-fawn fur coats are thickly dotted with black spots.

Like condemned men about to be hanged, their heads are covered with black cloth hoods. They have had no food for 24 hours.

Suddenly the horsemen stiffen to attention as one of them throws up his hand. "Black buck!"

Far off in the distance, almost lost against the bush-dotted desert in the shimmering heat waves, are a few dark objects. The procession moves on until the small dots become antelope.

A short command is given. The cart stops, and the two attendants climb to its floor. Each unfastens a prisoner's collar, pulls off the hood, and faces him toward the antelope. Released, blinking in the sun are two cheetahs, or hunting leopards (Plate V).

Seeing the distant prey, they stiffen and whine. The manes rise on their necks. Their short faces with the heavy black stripe running down from the intent, red-rimmed eyes look fiercely cruel.

Muttering and gesticulating, the men loosen their hold on the necks of the hunters. The cats



Golden Ocher on His Back Gives a Name to Asia's Golden Cat

Dark markings on his face give *Felis temminckii* a plaintive look. Chinese catch his kind with bamboo-sprung traps.



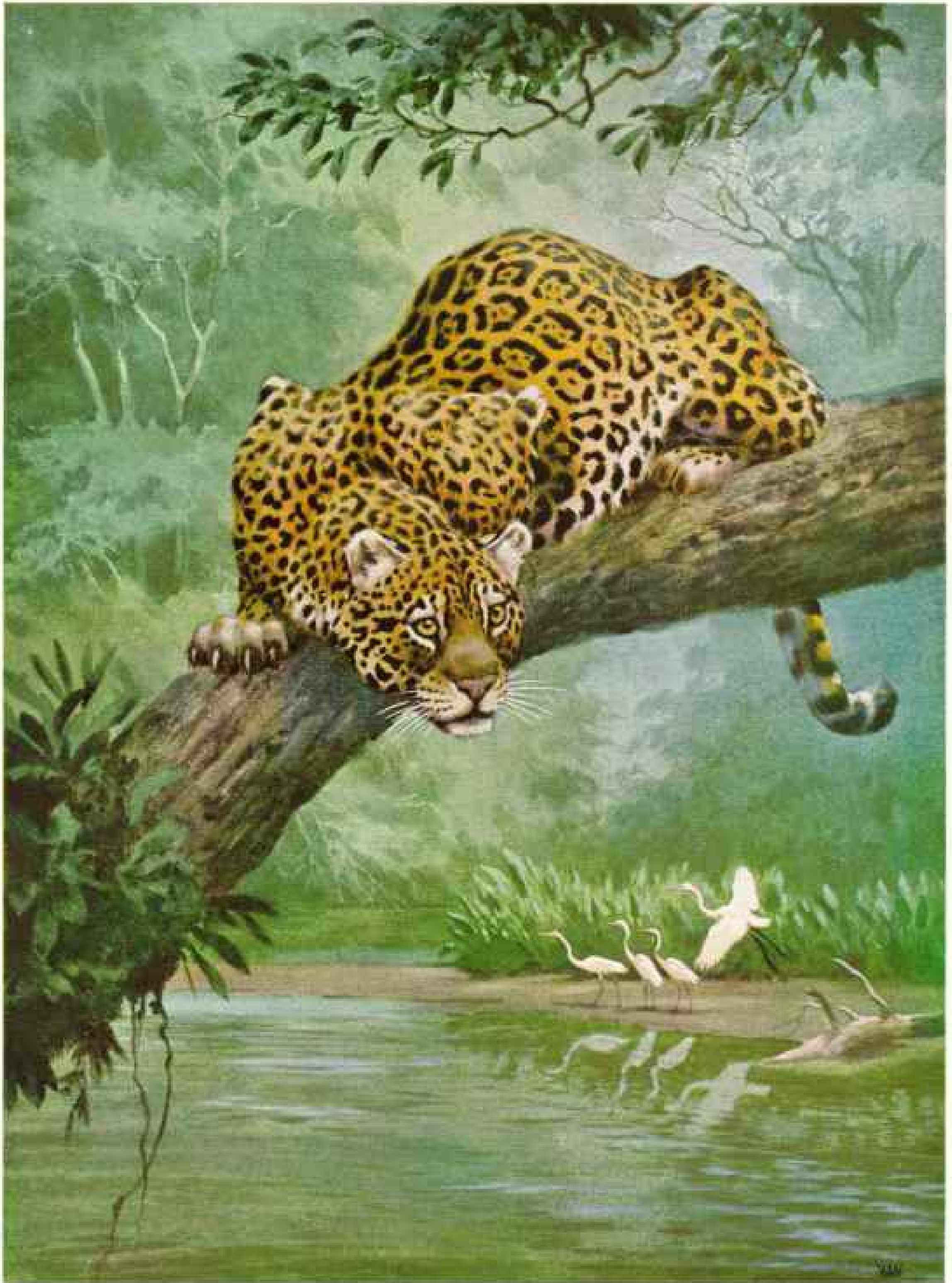
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Paintings by Walter A. Weber

Marbled Cat, Secretive and Rare, Laps Water from a Jungle Pool

Felis marmorata gets his name from his coat pattern. A stranger to zoos, he lives in Malaya and East Indies.

King of Cats and His Court



© National Geographic Society

Painted by Walter A. Weber

With Hungry Eyes, a Crouching Jaguar Surveys a Jungle Stream

Gorgeous but lethal, *el tigre* is lord of forest and pampa from Arizona to Argentina. In Brazil he grows to be a 250-pound, 8-foot streak of death. This specimen ignores egrets; he may want a crocodile. Unlike most cats, *Felis onca* is an avid swimmer. South American hunters stalk him with spears.

slip noiselessly to the ground. Perched high on their ridiculously long legs, they stoop and begin to walk toward the outguard buck. Cautiously they take advantage of every bush to keep out of sight.

The big buck senses danger. He grows more and more nervous. Perhaps he catches a glimpse of a yellow, black-spotted back. Suddenly, with a whistled snort, the antelope wheel and scatter like fragments of a bomb.

Perhaps a hundred yards away the cheetahs dig their heavy claws into the hard ground and in a moment are running like yellow streaks after the big male. They flow over the ground so fast that their legs are blurred.*

Although running for his life, the fleet black buck seems slow by comparison. He is probably going 45 or 50 miles an hour. Built for speed, the cheetahs' stilllike legs may be taking them at a rate of 70 miles an hour. The hunting leopards cannot keep up this pace—about 600 yards at most—but on short runs it is not necessary. In a few seconds they have overtaken the buck. Striking out with a paw, one of the cheetahs tumbles the prey into a heap. Like a flash they are at his throat, and the chase is over. They kill by strangulation and seldom relax their grip on the throat until the animal is dead.

Running up, the attendants cut the buck's throat, collect a ladle of blood, and, when the cats release their hold, reward them with a drink. The growls become a contented purr. Then the hoods are replaced and the party, masters and hunting leopards, return with their prize to the cart.

The doglike behavior of the hunting leopard indicates an unusual physical equipment. Lean, long-drawn-out, standing high on fantastic legs, he lacks the round contours of the cat tribe. Instead of hanging his tail modestly in the generally approved feline manner, he often points it straight out from his body two and a half feet. One is tempted to make a "pointer" out of him! His narrow feet are equipped with hard pads and strong, blunt claws similar to those of a dog.

The cheetah is the only cat which cannot retract its claws and tuck them away in little lobes of skin to keep them from becoming dulled. Its disposition is more like that of a dog, for a trained cheetah regards its master as a friend to be trusted and obeyed at all times. Standing 2½ to 3 feet high at the shoulder and weighing 90 to 136 pounds, it is a formidable hunter.

Cheetahs were once found in open or thinly forested country, from northern India west to Iran and over most of Africa except the central forested area. In India today they are nearly extinct in the wild state. Wealthy rajas must import their hunters from east Africa.

The hair of the cheetah is among rocks or in the tall, thick grass jungles. Daylight is as good as darkness for them to stalk their prey. Generally they hunt in pairs, but after the two to four youngsters have shed their silk baby coats of unspotted bluish gray on the upper parts and put on spotted coats like those of their parents,

they may be taken along, too. Usually small game is abundant, but wild cheetahs do not hesitate to run down and kill the kudu, which is as large as a saddle horse.

This extraordinary cat, when domesticated, has been used for hunting by princes of Asia, Africa, and Europe.

Snow Leopard

Felis uncia

Zoo directors go mad when the rare and magnificent snow leopard is offered for sale (Plate VI). Shrieking high bids, they go far beyond the limit of their budget.

Only in zoos do humans sentimentalize about the snow leopard. Like other leopards, he has a cast of the eyes that at times gives him an appealing expression. Visitors exclaim over his "wistful friendliness" and the beguiling curve of his heavy tail.

In his native home the snow leopard has few kin and neighbors, for he lives high up in the mountains of central Asia. Along the Tibetan tableland north into the Altai Mountains and southward to the Hindu Kush Mountains and the mighty Himalayas, he often climbs to 13,000 feet in summer.

But even a snow leopard cannot face the Tibetan winter at this altitude. He descends into the valleys as low as 6,000 to 7,000 feet during the coldest part of the year. There he preys on domestic stock. Through this descent into "warmer" climes, Western people have most of their scanty knowledge of the snow leopard. Here he is trapped and shot.

He is warmly clad in heavy fur, even his tail being extra-padded and as bushy as a Persian cat's. Natives say he drags his tail after him to destroy his footprints.

He wears an immaculate white vest and stomacher with a pale-gray coat trimmed with brown rosettes. Deep brown spots on his head and back enlarge into paler rosettes (pentagons) on his flanks to the base of his hind legs. A black streak runs from the middle of his back to the base of his tail. The forward part of this bushy appendage is marked with spots which gradually change to rings and end in the black tip. He is about the size of a small leopard, his total length running from 6 feet to 6 feet 8 inches.

There are no trees in his habitat to climb or hide behind. His gray coat, with tawny tinge, broken by its camouflage of brown rosettes, blends well with the rocky ground of the cheerless wind-swept country.

Thus concealed, he can lie unseen in wait to pounce on a passing ibex, bhoral, or marmot. He does not even pass up the little pikas, no larger than guinea pigs. When flocks of sheep are driven into the high country for the scanty summer pasturage, he welcomes them—with outstretched paws and open mouth.

At the coming of snow, the brown tints fade

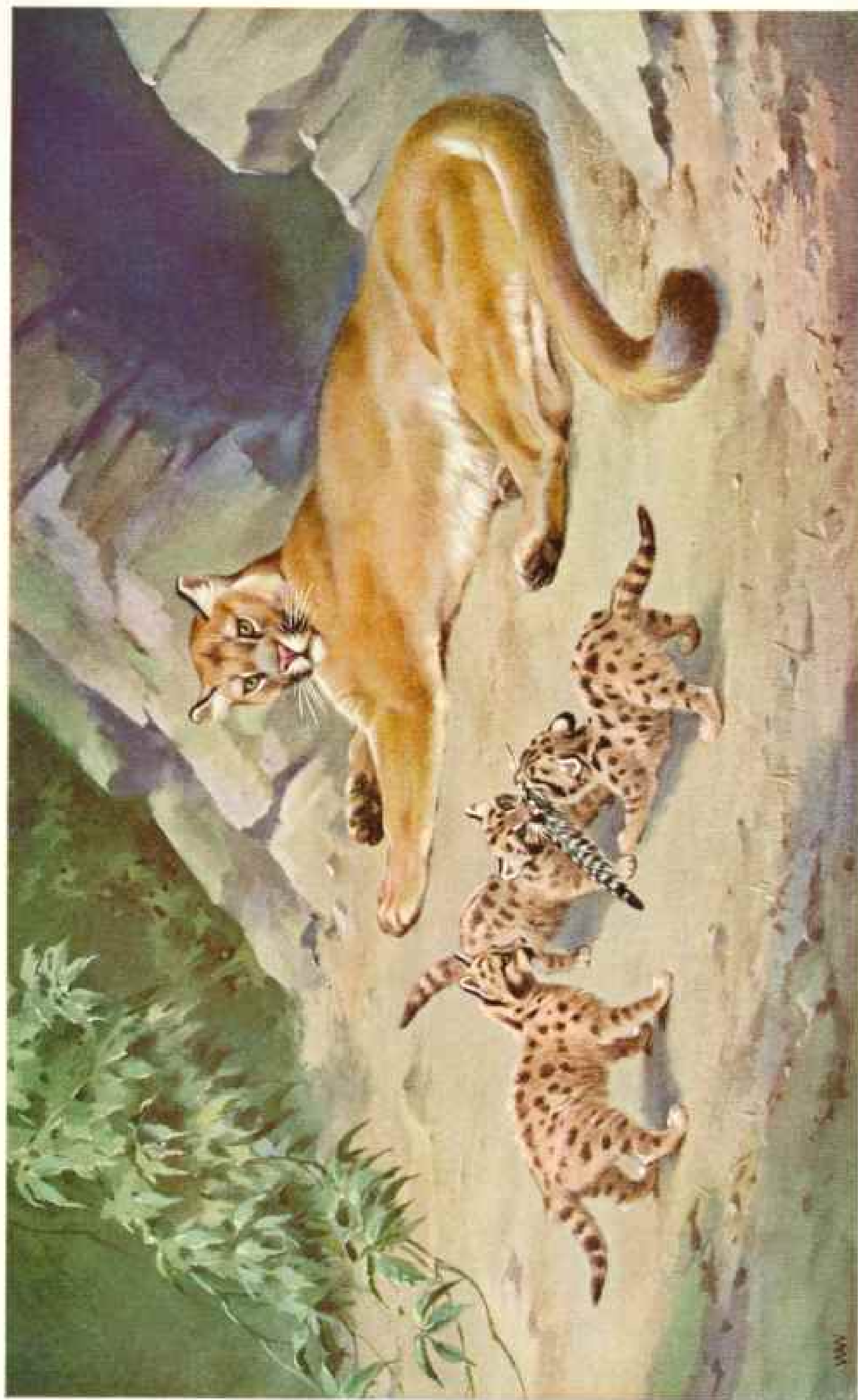
* See "Life with an Indian Prince," by John and Frank Craighead, February, 1942.



Paul J. Fair

A Picture of Power and Grace, the Puma Leaps from an Oak

When he lands, forearms from elbows down are stretched out to absorb the shock. This cat of the western United States, snapped in mid-air against a cultivated field, was not a marauder; he had been tamed. His wild brother, just like tabby, responds to oil-of-catnip lure (pages 218, 249).

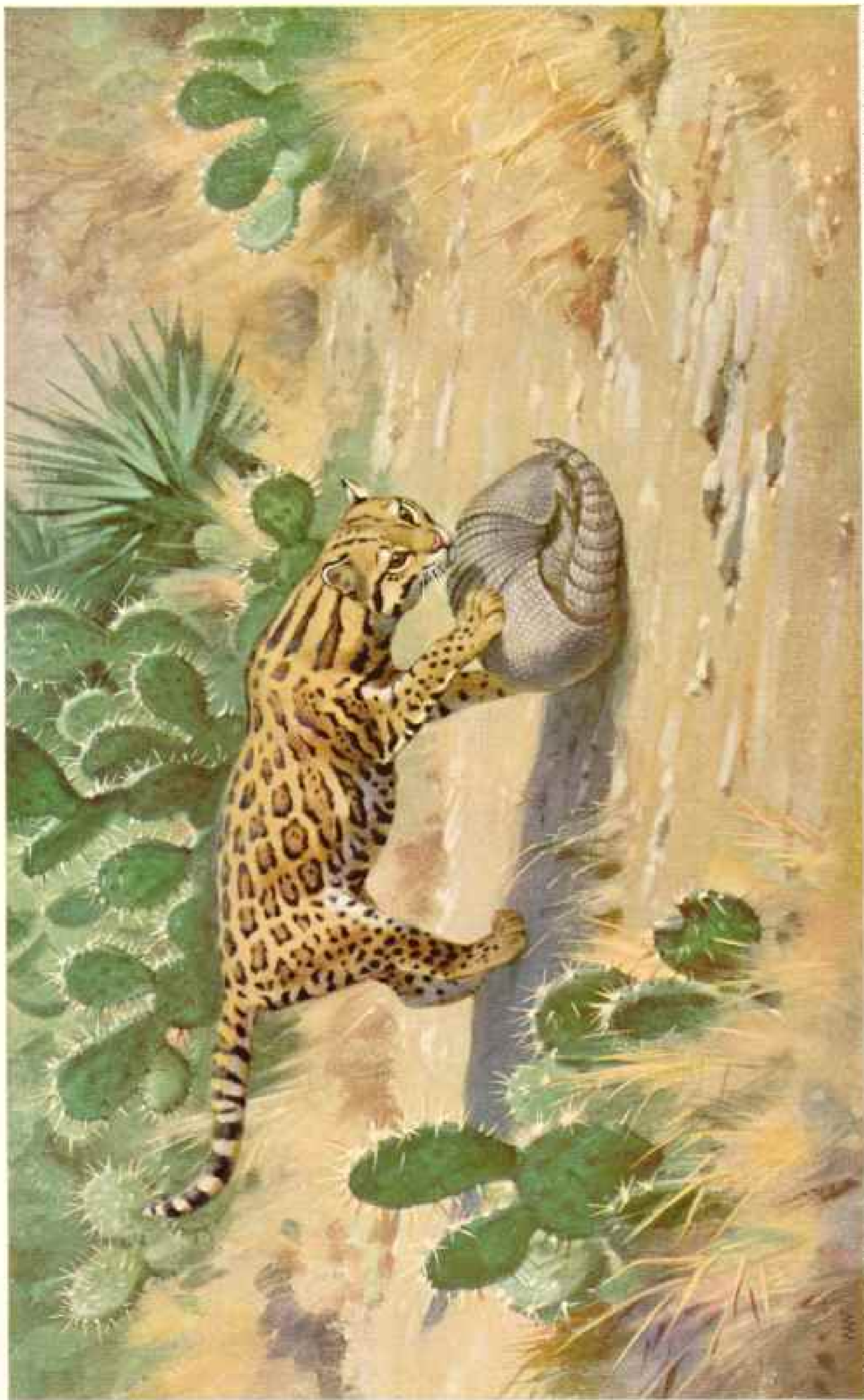


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Painting by Walter A. Weber

Puma, the American Lion, Fondly Guards Her Playful Kittens—They'll Change Their Spots to Solid Tan When They Grow Up

Call her panther, catamount, mountain lion, cougar, or "varmint," she still is *Felis concolor*, of the scientific treatise. Mother is a dainty 125 pounds. She has banished her 175-pound, 7½-foot mate for fear he would kill her youngsters. A devoted mother, she will watch many days for a lost kitten. Like the deer they prey on, pumas range from Peace River, Canada, to the Strait of Magellan. In eastern United States they have become rare.



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Painting by Walter A. Weber

When Strong Offense Meets Tight Defense—Texas Ocelot Tests Nine-banded Armadillo's Sealy Ball of Armor

No two ocelots have the same dizzy color pattern. Furriers find their skins hard to match. *Felis pardalis*, a third larger than a big tomcat, makes a friendly pet, even in an apartment. In his wild state he roves Latin America, preying on birds and rodents. But he is not afraid to tackle 6-foot inkers, small dogs, or rheas.

out of the snow leopard's fur. His hair becomes longer, thicker, and even more silky. On a bright winter day the sun transforms the grayish coat into a magnificent robe of gleaming white. Solitary as a royal personage, the snow leopard goes his lonely way.

Clouded Leopard

Felis nebulosa

The clouded leopard is decked out with the rosettes of a jaguar, the spots of a leopard, the stripes of a tiger, the blotches of an ocelot—a mixed attire climaxed by a much be-ringed tail (Plate VII). His fantastic magnificence accompanies a most amiable disposition. When caught and tamed at an early age, he makes a delightful, though dangerous, pet.

Not related to the larger, more common ordinary leopard, this gorgeously marked creature is 6 feet long and stands about 18 inches at the shoulders. Nearly half of his length is his extraordinarily heavy tail, with the indistinct blackish rings alternating with bands of grayish white. His body is grayish buff above, splattered with the black rosettes and blotches, while the lower parts of white are decorated with rows of dark-brown spots. On his short-eared head and neck he wears a typical cat pattern of black stripes.

Clouded leopards are found from the eastern Himalayas (Nepal and Sikkim) to south China, Hainan, and Taiwan (Formosa), southward to Burma, Annam, Malay Peninsula, Java, and Borneo. They pass most of their lives in trees. In Borneo they are said to build large nests of sticks.

Whether these treetop retreats are sleeping quarters or hunting blinds is unknown. In fact, little has been learned of the habits of these mysterious animals.

Usually reluctant to attack men, at least one misguided clouded leopard was rash enough to attack an Indian herd boy. Fortunately the lad saw him spring. Quick as a flash, the courageous youth drew his brush knife and struck. The leopard's skull was split wide open.

In a Borneo jungle one of these cats was once seen to rush out of its nest, grab an unwary macaque monkey, and run back to its lair with the screaming victim.

The practical natives have given the clouded leopard several distinctive workaday names. Because his rosettes resemble mint leaves, the Chinese have named him the "mint leopard." The Malays often call him the "tree leopard," but they also speak of him as "tiger of the forked branch," because he has a habit of lying flat along a horizontal limb of a branch with his short legs dangling on either side. Although largely arboreal, he may be hanging over a forest trail to pounce on ground-dwelling animals passing beneath.

Of all living cats, the clouded leopard has the largest upper canine teeth in proportion to its size. In this respect, it is the only modern cat that resembles the saber-toothed tiger (p. 217).

In Borneo, the Kayans and some other native tribes (but not the famous Dyaks) prize these tusks and will pay the equivalent of \$20 for a matched pair to tie into a string of beads. The savage dandy drills holes in his ears in which he inserts the decorated leopard tusks, points downward. He passes the attached string of beads around the back of his head. The effect is a fashionably ferocious appearance!

Once these ornaments could be worn only by a man who had collected an enemy's head, but since the Dutch have insisted that their subjects pursue a peaceable way of life, almost anyone can wear them.

Among the Kayans the clouded leopard is so sacred that, even though the tusks are coveted, no one will commit the sacrilege of killing him. Envious young bloods get around this tabu, however, by purchasing the teeth from neighboring tribes. Many native Borneans prize the skins for seat mats, while the Chinese list parts of the carcass as potent medicine.

Golden Cat

Felis temminckii

Temminck's cat has many different coats and goes by many names (Plate VIII, upper). Although scientifically named for his discoverer, he is more commonly and descriptively known as the "golden cat." The Chinese call him "yellow leopard" and "rock cat."

Long-legged and long-drawn-out for his size, he stretches to about 4 feet. A dozen of these small leopards will show wide variation of color and markings, from reddish to gray and with or without stripings. The kittens have long, thick coats and, unlike their parents, are not marked.

The forehead, neck, and back of most golden cats are bright reddish-brown, while the sides and upper legs are much paler, almost cinnamon. The head is striped with black and white, the chest is speckled black and cinnamon, and the feet are covered with gray, which looks like dust.

Another coat pattern, which sometimes appears in individual cats from the same litter, is handsomely spotted and striped, something like that of a heavily marked tabby (page 259). The Chinese value these striped skins more highly than the plain ones, but all are briskly traded.

Golden cats are found in forests from Tibet and the Himalayas through southern China, and south to Burma, French Indo-China, Thailand, Malaya, and Sumatra. Scientists know little about their lives, and native lore is open to question or is downright contradictory.

Although his Burmese name is "lord of all cats," even the tiger, this particular cat is naturally overawed by the noisy dog. He is neither fierce nor lordly. The brave Burmese title is not always undeserved, however. Natives once speared a golden cat after it had killed a water buffalo calf. Most animals are too much terrified of powerful mother buffaloes to attempt such a meal.

The usual fare of the golden cat, at least near villages, consists of sheep, goats, and perhaps

once in a while a calf. When these victuals are not available, the cat is often fortunate enough to kill a small deer.

In parts of southeastern Asia, golden cats are common. The natives trap the forest trails of one of these areas, the southeastern Chinese Province of Fukien, with steel-jawed traps equipped with bamboo springs. Besides the handsome and valuable skins for which there is large demand, the bones bring a good price in country medicine shops.

Marbled Cat

Felis marmorata

Rarely seen in the zoo, the marbled cat is probably never common even in his out-of-the-way home (Plate VIII, lower). Three races range from Sikkim in the Himalayas to Tonkin, Annam, the Malay Peninsula, Sumatra, Borneo, and possibly Java.

Although only 37 to 42 inches long, the marbled cat resembles the amazing clouded leopard (page 244) in coloring, coat pattern, texture of fur, and relative length of tail. The tail is almost as long as head and body combined.

His general color varies, regionally, from tawny brownish-gray to a bright, rich brown. He gets his name from the marbled effect of dark stripes on his crown, neck, and back, blotches on his flanks, and spots on his legs and tail. His ears are low and rounded.

Like many another cat, he is probably nocturnal. He walks by himself and is so secretive that little is known of his habits. Judging by his short, broad feet, which are covered with velvety fur, he is a tree dweller. Cats that live mostly on the ground, like the puma (page 249), have longer toes. R. I. Pocock, a British zoologist, says, however, that the second marbled cat ever exhibited at the London Zoological Gardens had been captured in a poultry house in country where the forest was cleared for agriculture.

This particular cat had evidently adapted himself to living on a brushy cliff along a river. He had an erect carriage, standing on long, straight legs. Peculiarly, he carried his great bushy tail curled around by his side instead of out behind him like other cats.

Jaguar

Felis onca

The jaguar leads a gay, insouciant life (Plate IX). He is something of a swashbuckler, and cuts a brilliant figure in his tight-fitting coat of yellow with dashing black rosettes.

Sometimes he lies along a tree limb over a forest trail watching, like his Old World cousin, the leopard, for something edible to pass below. Usually, however, he stalks the deer, alpaca, and llama, capybara, peccary, tapir, and even the humble cavy (guinea pig).

If really hungry, he may go so far as to tackle and kill a large crocodile. Now and then he searches along the river banks for turtle nests, digging up the leathery-coated eggs for a change

from the usual all-meat dinner. On moonlit nights when the turtles are hauling, he may intercept one of them on shore leave before it can regain the water. He can scoop up fish with a dextrous stroke of the paw (page 219).

Even man's domestic stock is not safe from a hungry, wandering jaguar, for he can easily break the neck of a full-grown horse, mule, or ox. Ranchers loathe him, and many jaguars are killed. Thousands of skins are exported from Buenos Aires, Rio de Janeiro, and other centers to be tailored into ladies' coats.

The only leopard now living in the Americas, the jaguar is known by several picturesque names: the American leopard, the American tiger, the Mexican tiger, the spotted king cat, and the ring-tailed panther. The most powerful of all American cats, he so closely resembles the true leopard that at times the two skins cannot be distinguished. Generally, however, the jaguar's hide carries larger and fewer black rosettes, and these frequently have black spots in their centers.

The American animal is also more stocky in build than the real leopard, with a larger head and shorter tail. He looks like a middle-aged wrestler, heavy-jowled and chesty, with broad hips and short, stocky legs. The real leopard is more like a young, lithe boxer, streamlined and in a trained-down condition.

To me, the most elegantly clothed of all the jaguars is the black one (melanistic phase). Sophisticated, wicked-looking, he wears a sleek tailored coat of shiny black velvet in which the family rosettes are faintly outlined. The close-cut garb reveals every motion of rippling muscles and rhythmically moving bones. He holds his tail well up from the ground and moves it often, beating out a restless obligato to the nervous movements of his body.

The jaguar's real home is South and Central America, from 41° south in Argentina to the northern boundary of Mexico. However, a few adventuresome strays show up periodically in southern Arizona. Jaguars have been killed in the Rincons and in the Baboquivaris. One was slain near the Arizona town of Globe, and several have been killed by Papago Indians in the scrub-covered hills southwest of Tucson. They formerly occurred in California.

The skin of a jaguar killed by the Hand brothers on the west slope of the Chiricahua Mountains is at the University of Arizona. The animal was 7 feet 4 inches long from nose to end of tail, a good-sized cat for the region. Farther south jaguars grow larger—much larger in southern Brazil, where the tribal champions live. A large male there will be slightly more than 9 feet in length and weigh about 250 pounds; the female about 50 pounds less.

The frontier sections of South America are full of tales of his ferocity and aggressiveness. In times of flood along the great rivers, Indians and other inhabitants are frightened by the old folks' tales of jaguars attacking villages when their food is gone.

One jaguar is said to have raided cattle on



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Painting by Walter A. Weber

WWW

Nature Equips the Lynx with Snowshoe Pads, the Fleeter Red Fox with None—When Soft Snow Falls, Watch Out, Reynard!

Look closely and you will see what is meant by "lynx-eyed." Webster defines the word as "having acute sight." When resting, *Lynx canadensis*' hard yellow eyes are squinting and intent. Tufted ears, side whiskers, and short, black-tipped tail characterize him. A 3-foot, 25-pound child of the northern wilderness, he has relatives in Eurasia. Trappers have almost exterminated his kind in eastern United States.

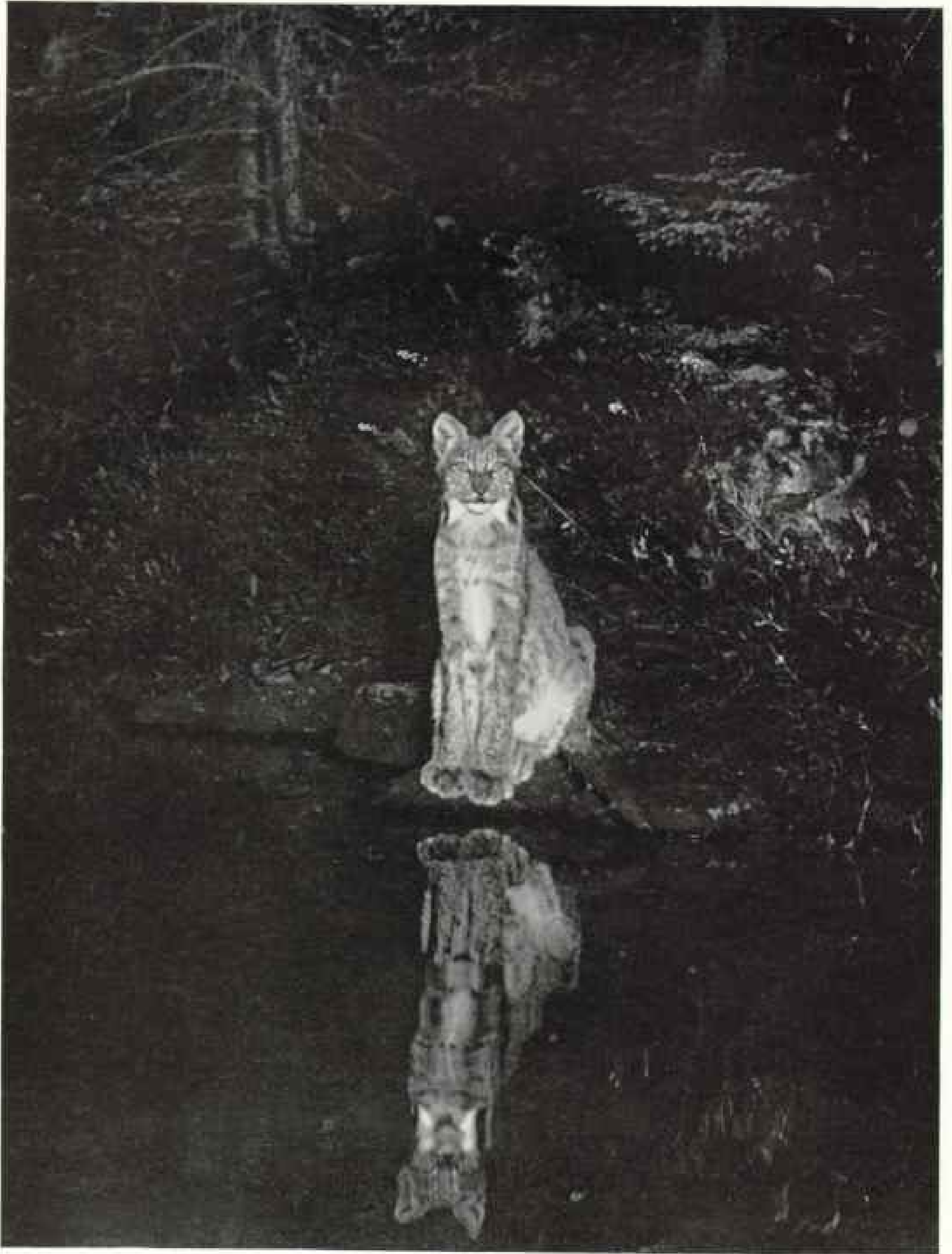


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Painted by Walter A. Weller

Bobcat, Named for His Stubby Tail, Agilely Trends Branch and Snow with a Spruce Grouse—He Is a Southern Edition of the Lynx

When you hear a man boast, "I can lick my weight in wildcats," he refers to *Lynx rufus*, the naturalists' bobcat. Ordinarily shy, the cornered beast is a 20-pound bundle of claws, fangs, and hisses. He is rarely tamed. Bob is fairly common from Canada to Mexico, but is seldom seen, for he is an elusive, nocturnal hunter. Reddish fur and white-tipped tail distinguish him from paler Canadian *Lynx* (opposite).



Canada Lynx, Surprised by Flashlight, Casts a Serene Reflection on Loon Lake, Ontario

The late George Shiras 3d, father of wild-life photography, was nearing shore in a canoe when "greenish-yellow eyes appeared, glowing brightly . . . We saw an erect, catlike figure eyeing the jack light with curiosity . . . I raised the flashlight and fired it. I saw the animal leap high . . . It gave a piercing cry." See "Hunting Wild Life with Camera and Flashlight," by George Shiras 3d, published by National Geographic Society, two volumes.

board a boat anchored in the middle of a stream.

Certainly the animal is amazingly powerful. While on his River of Doubt expedition, Theodore Roosevelt was told of a jaguar that, after killing a horse, had dragged it a mile from the scene of the kill. By comparison, man would be hardly more than a toy. The jaguars of northern Mexico and our southwestern border, however, are not aggressive. More retiring members of the jaguar family, they never attack man unless they are attacked first.

An animal trainer finds that jaguars are among the most difficult of all the cats to train for acts. They almost never abandon their efforts to kill their trainer.

The jaguar adapts himself easily to local conditions. The Argentine animal is perfectly comfortable on the hot, treeless pampas, or high up in the cold mountains. Our northern jaguar lives in semidesert country, crossing wide stretches of mesquite plains to reach the isolated mountain ranges of the Mexican tableland.

Throughout the great central part of his range, the jaguar dwells in the deep forests, in river valleys, and on mountains. Seemingly he prefers the borders of streams. Waterways serve as a road for traveling, as a place to swim for fun to cool off on the hot, humid nights, and as an escape from flies and gnats.

Although the jaguar mother has 3 or 4 young each year—there is no definite breeding season—the tribe is being thinned out. Comparatively few remain in Argentina. None remain in that country's greatest wildlife sanctuary, Nahuel Huapi (Indian for "Island of the Tiger") National Park. Undoubtedly jaguars have also greatly diminished in our own Southwest, for there are indications that they may have once ranged to southwestern Louisiana.

The Tropics are being colonized and converted to agricultural uses as the rest of the world grows more crowded. It may be that, in but a few centuries, the last wild jaguar will have coughed his last series of powerful, repeated grunts—"uh, uh, uh, uh."

Puma

Felis concolor

When studying mammals in the Arizona mountains, I have heard the puma's shrill, high-pitched voice that sounded much like a human female in great extremity, and exactly like a puma at the Washington Zoo (Plate X).

One temperamental lady puma at this zoo has a range of voice from A minor to G sharp. She sometimes greets me with a long series of low "p-p-r-r-ows." But when she is bored, she gives me only an indifferent silence or a casual, sharp meow.

If she takes a violent dislike to a visitor, she expresses her displeasure by growls punctuated with violent spits. When she becomes really annoyed, she will scream with rage—a series of ear-splitting screeches that if heard from a closed apartment would certainly bring out a police squad to rescue the "poor woman."

Reading early hunting books or listening to the yarns of old-timers, one might infer that the Americas were once teeming with wild animals now extinct. Nineteen of these creatures were only one—the puma (pages 218, 241).

Best known today, perhaps, as the mountain lion, he is also called cougar, panther, painter, catamount, brown tiger, varmint, sneak cat, red tiger, silver lion, purple panther, deer killer, Indian devil, mountain devil, mountain demon, mountain screamer, king cat, and American lion.

A lean, lithe creature with closely clipped tawny coat, clear yellow eyes, and a dignified mien, this American lion drags his long, round tail like the true lion. Thicker at the end, it is not tufted, however. The puma also lacks the size, the heavy ruff, and the roar of the real lion. He stands 26 to 30 inches high at the shoulders and measures from his nose to the tip of his tail from 6 to 8 feet. A very large male measured 8 feet 7½ inches. A male's weight averages 140 pounds; extremes run from 100 to 165 pounds and sometimes considerably above. Mrs. Mountain Lion, not at all demure, is about a foot shorter. She may keep her weight down to 88 pounds, or run it up to 105 pounds in California. Elsewhere heavier females are found.

I have often watched my lady puma getting ready to leap on an imaginary victim. Preparing to jump, she crouches down on all fours, her haunches sticking up in twin peaks, her eyes alert. Looking upward and from side to side, she pretends at last to spy her prey. Her sleek body twitches from side to side in excitement. Her long tail keeps time until she springs. Triumphant she lands with a thump on the bare concrete in the opposite corner of her small cage.

Usually late in winter or early in spring, the cubs arrive. There is no fixed rule, however. They may be born in any month of the year. Twins are the rule, but the litter may number from one to five.

The little fellows are pale brown and, unlike their parents, marked with dark, clear-cut spots on the body, while the tail is barred. With their big, rounded ears and wide, short faces they have a perpetually questioning expression.

Their appetites are voracious for every kind of meat. Their mother must scour the country for miles around to satisfy them.

As a rule, the puma captures prey by stealth, not by chasing it. But occasionally in the snow country she spreads her wide paws and leaps over the drifts like a man on fast snowshoes. In summer she may leap over logs or ground 25 feet at a time.

While the kittens are young, the mother must eat heavily to maintain herself and to manufacture milk for her family. Later, when the little ones begin to walk around the cliff den and to venture outside, she brings home bones and meat. Surplus food—partly eaten carcasses—are covered with brush and leaves for further use.

When the kittens are two months old, the spotting on the body and barring of tail become dimmed. The family now travels together. The



Africa's High Jumper, the Serval, Makes a Broad Leap for a Guinea Hen
Felis serval, 44 inches long, is a sprinter, too. He is recognized by long ears and short tail.



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Illustrations by Walter A. Weber

Slinky Jaguarundis, Red and Gray, Are Tempted by a Tree Duck

From Texas to Paraguay, *Felis yagouaroundi* displays two color phases. "Otter cat" is his popular name.

King of Cats and His Court



East Asia's Stealthy Tiger Cat, Somewhat Larger than Kitty, Creeps through a Treetop
Roosting wild birds are his bread and butter. For a snack, *Felis bengalensis* likes chicken.



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Paintings by Walter A. Weber

Asian Pallas's Cat and African Wildeat, Portrait Companions, Dwell Continents Apart
Egypt's sacred *Felis lybica* (right) sired the house cat. Short ears help *Felis manul* hide in the flat Gobi.

children learn the vital art of hunting, running down the local game. Well known for horse thieving, one of the puma's geographic races has been given the scientific name of *hippolestes* (horse pirate).

Besides deer, the prey may be tapirs, sloths, peccaries, agoutis, and coatis in the tropical jungles, or alpacas and guanacos in the high mountains of South America. Pumas are fond of poultry, from the wild turkey of the north to the ostrichlike rhea in the south. When food is scarce, they are not above eating grasshoppers.

The puma is probably the most widely distributed cat in the world. At least he has the greatest range of all American mammals. His race spreads from Peace River, Canada, to the Strait of Magellan and from the Atlantic to the Pacific. This range covers a variety of climates and living conditions, from the cold, high mountains up to 13,000 feet in elevation, through scrubby, torrid desert, to the deep gloom of the steaming jungles at sea level.

Those that live in arid deserts are faded to a paler and grayer shade; those of the dense jungle are darker and browner.

Generally speaking, the puma likes his home to have plenty of cover, or, failing that, broken topography where cliffs and canyons afford many hiding places.

An unchanging factor in the puma's life is his persecution by man, his one deadly enemy. In Patagonia, where he was once very abundant, in our own Rockies and at any way stations, ranchers fear his depredations. One Argentine animal is said to have killed 14 sheep from a flock in one night, and a hundred in a few weeks.

Our own eastern pumas, locally called "panthers," took advantage of man's livestock as soon as the first colonists reached the American coast. With guns, dogs, and poison, men retaliated, and the big cats were exterminated from vast areas. Except for a few in wilderness sections of Florida, Louisiana, and Texas, and possibly in West Virginia and the southern Appalachians, none remain in the United States east of the Rocky Mountains. In nearly all other parts of the country the numbers have been thinned.

The stockmen are happier, but extirpation of pumas, along with other predators, has not been without disadvantage. Human hunting cannot entirely take the place of natural checks on such animals as deer and elk.

Naturally prolific and endowed with insatiable appetites, these animals may endanger their own food supply. This has happened in many places, most notably on the Kaibab Plateau in northern Arizona. Now enlightened game management regulates the numbers of pumas in the Kaibab, but does not seek to exterminate them.

Such a powerful cat as the puma can be an extremely dangerous beast to man personally. Fortunately for us, he is a very retiring soul and will take every possible precaution to avoid man, or to get away if a meeting takes place. A few exceptional "lions" have made unprovoked attacks, several on children.

Ocelot

Felis pardalis

The Tropics poke a blunt finger into the lower Rio Grande Valley of southern Texas. In their warmth lives a considerable number of strange animals and birds. Among them is the handsome little ocelot with the short, smooth fur that is yellowish buffy, brownish, or grayish (Plate XI and page 256).

Often called "tiger cat" or "leopard cat," the ocelot is dizzily splashed with black spots, blotches, rings, bars, and stripes. No ocelot has the same pattern; in fact, not even one side of him matches the other. The fancy markings on his back and sides run in chains or broken lines, often giving the effect of stripes. His stockings and white underpinnings are prettily spotted, and he has bold black rings and dots on his tail.

The ocelot's eyes, huge, reddish brown, all iris and no whites, dominate the little pointed face. Even in half light they glow like living coals.

The ocelot is found south through Mexico, Central America, Colombia, Ecuador, to the Amazon and lowlands of Brazil and northeastern Argentina. There is a great variety of color and coat pattern in different parts of the wide range. The animals vary in size, from 40 to upwards of 54 inches; one from Ecuador measured 53.8 inches. Always forest dwellers, they are partial to the neighborhood of streams and lakes.

This debonair man-about-forest is in and out and all over the place. He usually hunts on the ground. He loves good living, and his menus are large and varied. They include every kind of animal life that he is capable of killing—snakes and other reptiles, sometimes perching birds (including poultry), mice and wood rats, rabbits, lambs, young pigs, pacas, agoutis, and monkeys. He stalks and kills the rhea.

Since he is perfectly at home in trees, and hunts at night, he finds it a simple matter to steal up on the monkeys which are sound asleep in the top of the jungle. Probably because prey animals are not abundant in the tropical forests, the ocelot has a large range.

The ocelot is generally inoffensive toward man and when cornered does not fight vigorously. At heart he is apparently a sweet-tempered, friendly creature, for he tames easily and makes a good pet.

Little is known about his family life. The young may be born at any season, or there may be two litters a season.

Lynx

Lynx canadensis

The lynx family is spread around the world north of the Equator. The various species and subspecies resemble our own American animal (Plate XII and page 248).

This lynx is 36 to 39 inches in length, including a stubby little 4-inch tail. He looks out of grayish cheeks above an imposing ruff. His hard, yellow eyes have a cruel expression because they are set close together and are usually squint-

ing and intent. From these features we have coined the phrase "lynx-eyed."

Stiff black hairs rise out of his sharp-pointed ears like war bonnets. These "tassels" or tufts give an alert and bumptious air to his bewhiskered face. Perhaps they were useful to some of his earlier generations, but they are only ornamental now.

He weighs about 20 to 25 pounds, although one super-lynx is known to have tipped the scales at 44 pounds. His loose, inch-long body fur is grizzled brown, gray, and blackish, but there is much variation of color in individuals. All are browner in summer and grayer in winter. His long legs end in big, broad, useful feet, which act as snowshoes in his wintry habitat.

In North America the lynx is found over much of the Arctic mainland, including Alaska, south along the northern Sierras, in the Rockies to Colorado, and in the east to Pennsylvania. Trapping has all but eliminated his kind from the eastern United States.

The lynx is a true forest animal, rarely leaving the deep woods for the more scrubby cover that is acceptable to his smaller relative, the bobcat. Destruction of the eastern forests by logging and fire has undoubtedly played a large part in his disappearance from this part of his range. An old sourdough, the lynx cannot adapt himself to life outside the wilderness.

No other inhabitant of the woods moves more stealthily on cushioned feet than the lynx. Since his "nefarious business," like that of most other cats, will not bear the light of day, he hunts mostly at night. People who have lived for years in lynx country may never see him unless he is trapped or treed by dogs.

Even small cubs can overtake him within a short distance. His forte is neither running a long-distance race nor attacking. If any way of retreat remains open, he takes it. He is cautious, crafty, and has the good sense not to take on any bruisers he cannot conquer. In captivity he does a lot of snarling and spitting.

He is not reticent with his voice. His repertoire is similar to that of the house cat. He meows when lonely and growls like a tabby when he is trapped. Since he is considerably larger than a house cat, his cries are magnified accordingly. When two lynxes get together, their duets would make house cats on a backyard fence green with envy. French-Canadian lumberjacks and back-country farmers have built up a considerable folklore on the basis of these caterwauls and shrieks.

Many of the guides believe that the male is monogamous, but has little to do with his offspring. The kittens, from one to five in number, are born in spring or, in the far north, even as late as June. Their eyes are open at birth—or partly open—and in other ways they are precocious, as felines go. At the age of two hours they can stand on sturdy legs and soon after stagger around the nest, which is in a hollow log or hole in the rocks.

After about three months the youngsters are

weaned completely. Since they have been eating grown-up fare of the more tender varieties—such as mice, grouse, and young rabbits—they now strike out with their mother on her hunting expeditions. Soon they are rambling long distances, perhaps as much as 20 miles from the home den if food is scarce.

Although foxes, and young of caribou, bighorn, and deer are eaten at times, rabbits are the staple item in the lynx's bill of fare. So dependent are the lynxes on these big rodents (whose coats vary from brown to white to match the seasonal surroundings) that hunger and wholesale starvation accompany the cyclic declines.

The northern Indians and other trappers watch the rabbit population carefully, for well they know that the great "die-offs," occurring approximately every seven years, mean that lynx and other fur bearers will be scarce for the following couple of years. Poor results from the trap line, in turn, mean hunger for the squaw and papooses back in the wickiup.

A lynx similar to the American variety once inhabited all of Europe except the Mediterranean countries. Now only a few survive in the Alps, in Scandinavia, and in northern Russia. The central Asiatic lynx is classified by zoologists as belonging to the same species, but varying slightly with the locality. In the Himalayas the animal is found to be more plentiful at altitudes above 10,000 feet.

Bobcat

Lynx rufus

Looking much like an oversized tomcat, the bobcat (length 30 to 45 inches) is named for his absurd short tail (Plate XIII). It twitches with excitement, hangs inert, or sticks impudently straight out in the air.

He can generally be distinguished from the lynx, the other cat with a short tail (page 252), by his redder and browner coat. The lynx is usually clad in grayer tones and is famous for his long legs and huge feet. The end of the bobcat's tail should be black on top and white below, while that of the lynx has a completely black cap.

When cornered the bobcat will fight like a demon. He may look equable and demure behind the bars in the zoo, but in a few minutes he is likely to be making hideous faces spitting, hissing, and growling at visitors.

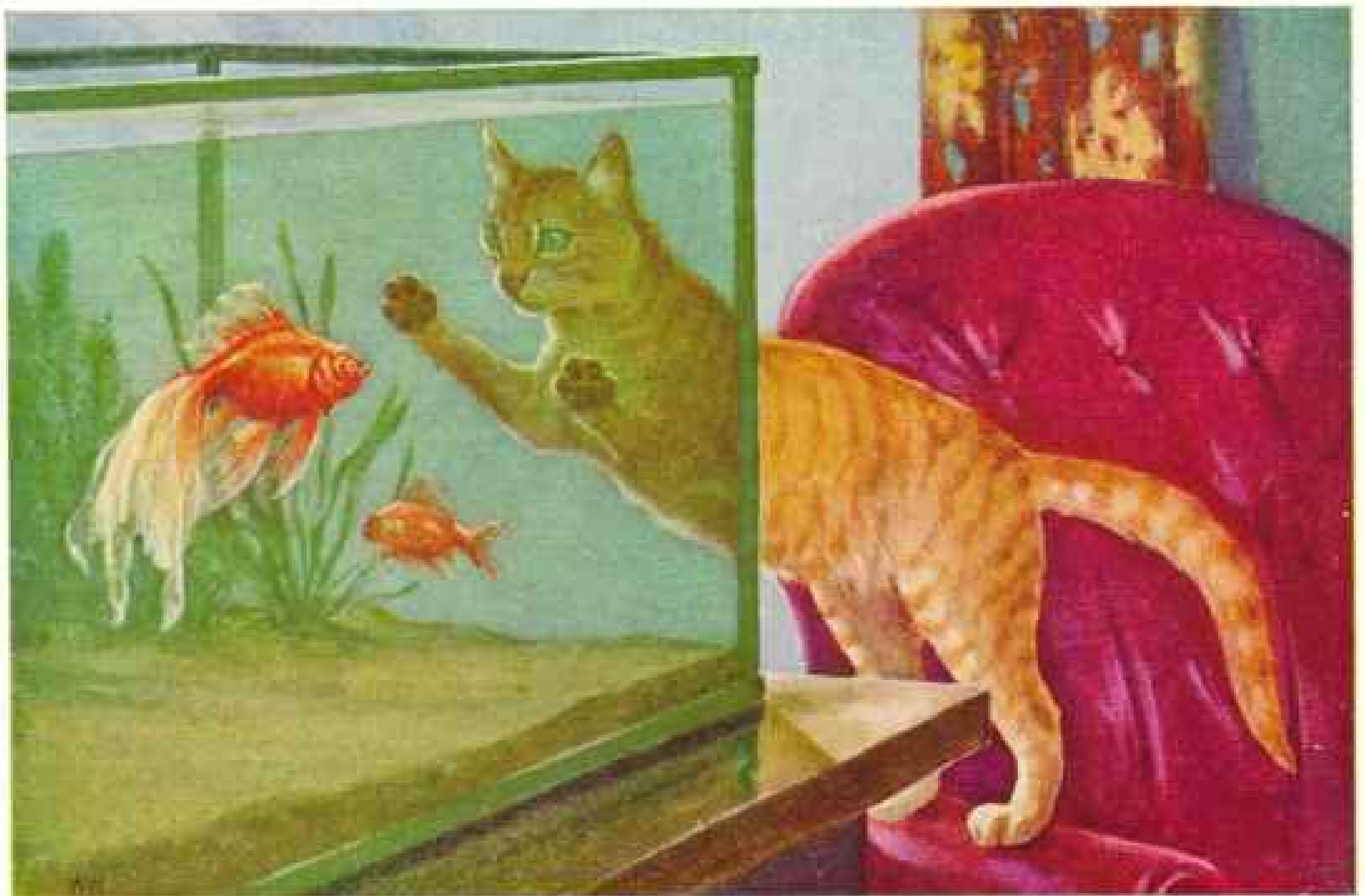
Because of his fury when annoyed or attacked, he is often known as the "wildcat." He has amazing courage and strength for a cat that seldom weighs more than 20 or 30 pounds. (A male in Wyoming weighed 39¼ pounds.) The highest compliment that woodsmen and country people can pay to a scrapper is that "he can lick his weight in wildcats."

Most cats purr when contented, meow questioningly, and scream shrilly when angry, hurt, or just impatient. The bobcat's voice plays the octaves with a remarkable repertoire of hisses, snarls, and spits. He is seldom tamed.

Bobcats are widely distributed, from southern Canada west to British Columbia, over all the



European Wildcat, Clutching a Black Grouse, Snarls a Warning
Ranging from Scotland to Asia Minor, *Felis silvestris* averages three feet in length, weighs 10 to 15 pounds.



© National Geographic Society

Paintings by Walter A. Weber

Call of the Wild—*Felis catus*, Stalking Goldfish, Forgets She's Civilized
Tabby originally owed her name to her brindled coat. Now the title is applied to any domestic cat.

United States, and south to the extreme southern end of the Mexican tableland. Less numerous along the northern border of this range, they live wherever enough forest or even brush exists to provide adequate range and food. Even the brushy creek bottoms of the Prairie States are occupied.

Unlike the nonconforming lynx, the bobcat shows remarkable adaptability. His coat color varies slightly with the general color of the country. Dark-shaded bobcats live in the green forests of the East and North; pallid-furred cats match the gray, sunbaked sand and chaparral of the Southwestern States.

Bobcats persist in farming country in spite of trapping, as long as any woods survive the ax. It is their ingrained shyness and caution, together with a strong preference for the hours of darkness, that cause the general impression that bobcats are rare.

Their home is a subterranean den in a thicket or under a log, preferably in a hollow tree, either standing or fallen. In a nest of dry, soft leaves and mosses the two to four blind, helpless kittens are born. In the warmer parts of the range they arrive in late March or early April, but in the north about a month later.

The father is allowed no responsibility in rearing the infants. In fact, bobcats are normally rather solitary creatures, and the marital relationship—if monogamous—is only intermittent.

In the Southwest, where rodents may be said to rule the range because they are so abundant and prolific, the bobcat is one of the important checks on the numbers of rabbits, kangaroo rats, and many kinds of mice. Since he may also levy toll on sheep and calves, his value is not always appreciated by wrathful ranchers. Sportsmen accuse him of killing deer, but it seems improbable that he gets an appreciable number, excepting possibly fawns in some areas.

Serval

Felis serval

Although he wears a handsome spotted coat, the serval's legs are too long and his tail is too short for him to cut much of a figure (Plate XIV, upper). He is an exceptionally lightly built cat. His large rounded ears stand up close together on top of his small head.

From 18 to 23 inches tall at the shoulders, he is not to be sneezed at. A serval from the Belgian Congo, which ended its career as a specimen in the U. S. National Museum, is 44 inches long, counting the 12-inch tail. East African males run 35 to 46 inches in length.

The general color of the serval's short, rough fur varies from bright buffy to reddish orange, heavily spotted with chocolate brown or black spots and streaks. The nose is flesh-colored and the lips are white on an unspotted face. The tail is spotted at the base but ends with black rings. Melanistic, or black, servals are rather common. Their pale-green eyes stare out of this background, glowing like jewels on black velvet.

Mrs. Serval cares no more about excavating than the rest of the cats. She moves into a second-hand burrow that happens to be vacant and sets up housekeeping. Nor does she like the daylight. She sleeps in her basement apartment while the outcast Mr. Serval takes a snooze in the thick brush of some dark ravine, usually not far from water.

For a short run, the serval is a good sprinter. He knows his limitations. When hunting, he creeps silently up to his prey until within close range. Then he makes a swift rush. He is excellent at high jumping, too, and can snatch a bird roosting in fancied security ten feet above him. If his prey is perching higher, this expert climber goes after it. As soon as he seizes it, he throws all caution to the winds and crashes vain-gloriously through the branches to the ground. Besides birds, he feeds on mice, rats, hares, and sometimes small antelope.

His home is Africa, from the Cape of Good Hope north to Senegal in the west, thence south of the Sahara over to the Anglo-Egyptian Sudan in the east. In South Africa, where his kind is most populous, the Cape Dutch call him *tierboskat*, and the English label him "bush cat" because of his choice of country for a home.

The natives usually trap the serval with snares or hunt him with dogs. Being a timid soul, he takes to the trees when pursued, and is shaken out and quickly killed by the pack. If captured alive, he is easily tamed but is not much of a pet. Becoming apathetic in captivity and refusing to take any exercise, he soon loses his health and vigor.

Jaguarundi

Felis jagouarundi

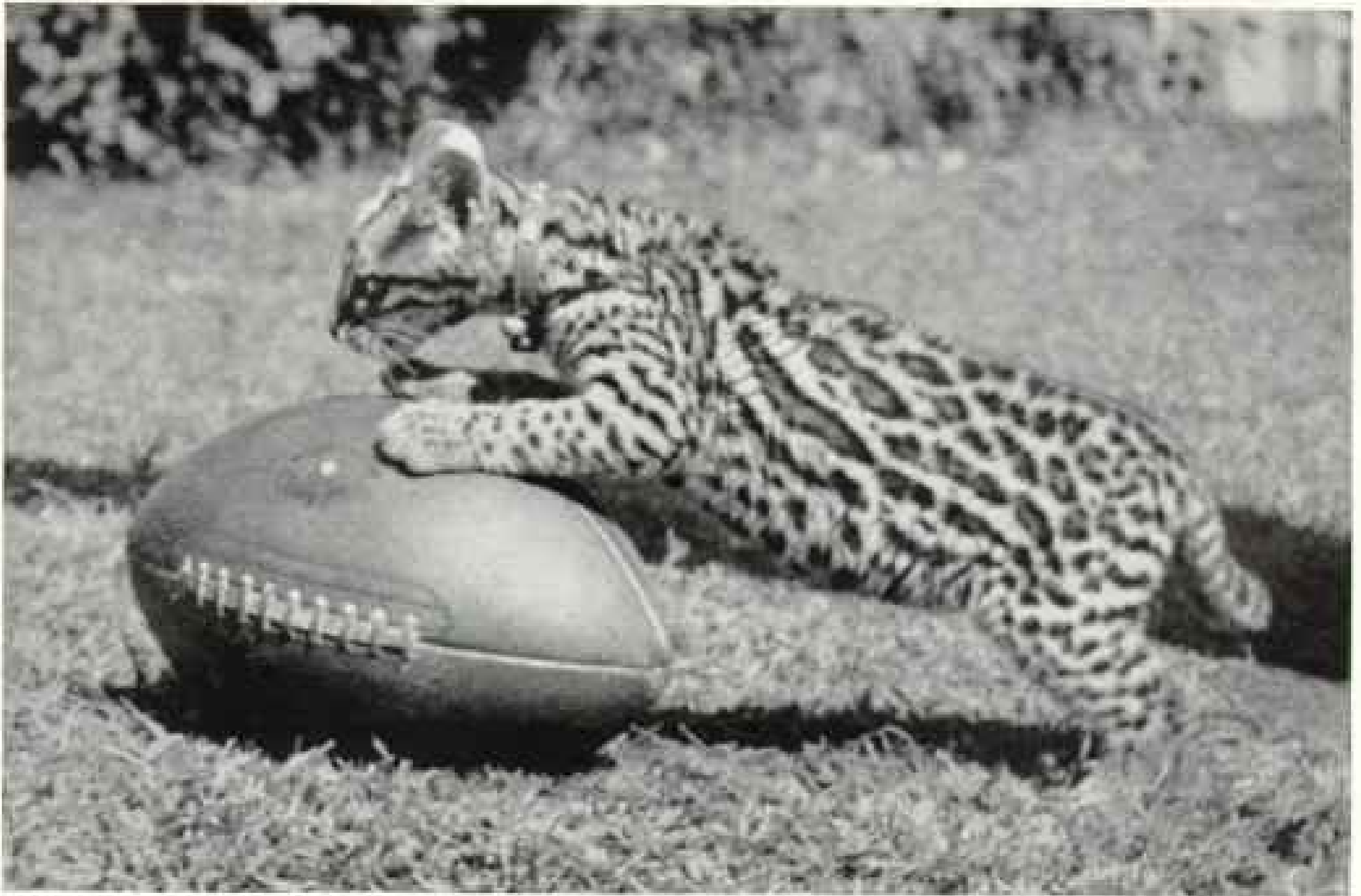
The jaguarundi reminds us of an otter (Plate XIV, lower). A sleek, unspotted creature 35 to 54 inches long, he has a small, flattened head, short legs, and a long tail. Besides climbing trees, on the Pacific coast region of Mexico he likes water, taking to it and crossing rivers whenever it is necessary. Popularly called the "otter cat," he, like his prototype, probably indulges in fish and frogs. They are not his favorite food, however.

Like our screech owl, the jaguarundi is an example of dichromatism; that is, he occurs in two distinct color phases. Because these phases are red and gray, he is sometimes called the "red-and-gray cat."

Because many of the jaguarundi's hairs are dark at the tip and much lighter next to the skin, his color changes slightly when he bristles with annoyance. As the hair rises, the paler parts come into view and he "pales with anger."

The gray-phase jaguarundi is a smoky gray, grizzled by buff, black, and whitish until the rather short fur seems sprinkled with pepper and salt. His underparts are slightly paler. In winter the entire coat is a little darker than during the hot months.

The red-coated jaguarundi adds still another name to his calling card—*cyra*. Rusty red, his



W. O. Land

This Ocelot Cub Led Lafayette's "Leopards" to an Undefeated Football Season

Captured in Venezuela by a college student, the little fellow became a powerful mascot. Its home was a fraternity house. Too much food, too much attention, and pneumonia proved fatal after a year (page 252).

back is sprinkled with black-tipped hairs, his legs and head are brownish, and his lips and throat usually white.

Few North Americans have heard of this creature outside the zoo. He ranges from Paraguay through South America east of the Andes, through Central America, and stops in southern Texas. Here he occupies the same range and general habitat as the ocelot (page 252), but, because he is smaller and can retreat through thicker undergrowth, he is even less known.

In the drier country of south Texas he lives in the dense thorny thickets. King of his stunted forest, he has no rival, for a larger or less agile and limber creature could not travel through the network of spiny, tortuous byways.

He dines on the teeming small animal life—mice, wood rats and cotton rats, rabbits, and jack rabbits. For dessert he goes into the mesquite and cat's-claw shrubs for birds. In Paraguay the natives say that he jumps upon deer, killing them by biting the neck, but this is probably true only of fawns and perhaps of the very small species, the brockets.

Many cats are active only at night, but the jaguarundi is frequently seen hunting or seeking water in the daytime. Perhaps this is because he never gets his hunting done! In southern Texas, young have been seen in both summer and winter; these were probably born during March and August. Whether this indicates two broods a year is uncertain, for in Paraguay these cats

are said to have only one pair of twin kittens a year.

Tiger Cat

Felis bengalensis

The name "tiger cat," flatteringly given to several of the Felidae, has a much more dramatic appeal than *Felis bengalensis*. Although other cats, including the South American form of the margay, claim this title, this striped creature from southern Asia has more votes from scientists (Plate XV, upper). "Bengal cat" and "leopard cat" are two other names.

About the size of the house tabby and neither much better nor different looking, he sports an ocherish general color on back and sides, with indistinct black and white stripes.

Running lengthwise along the flanks are about five rows of domino-shaped, brownish-black spots, which repeat themselves on the white belly. To complete the picture is the buffy tail circled by blackish rings and a whitish spot in the middle of the back of each ear.

The spots on the tiger cat's flanks have given rise in southern China to another name. Fancying a resemblance to their money, the Chinese call the animal "money cat." When tamed, he is an excellent mouser and ratter; perhaps, after all, he is nearly as valuable as his nickname indicates.

Including numerous local races, the tiger cat ranges over much of Asia. He does not like

deserts; but wherever there are forests or even scrub growth, he can be found from southern Baluchistan and Kashmir across India and eastern Tibet, all of China to Manchuria and Korea, as well as on Taiwan, Borneo, and the Philippines in the southeast. He is not so shy that he avoids civilization entirely. When he discovers by chance the advantage of man's chicken compounds, he stays and thrives even in thickly settled parts of China.

Normally, however, the tiger cat stays in his forest away from temptation and dines on birds and small mammals. Being a night traveler, he appears only when the ghosts of Chinese ancestors are also abroad.

Small families are the rule. The kittens, two to four, may be born in spring or summer. As evidence of this lack of regard for the seasons, zoologists tell us of three Chinese "tiger kittens," apparently only about two weeks old, being found under a boulder in a brush jungle at the end of May, and another set of three discovered in late March. Westward in India, however, a kitten, judged to be about a month old, was located in August.

Seemingly, the young develop slowly, for two sucklings found in China on May 24 were still very small the following December. Perhaps, because of the poor fare available, they did not have adequate or properly balanced diets!

Zoologists hold in high regard the skin and skull of the specimen from which a new species is first named. As perpetual evidence, it is carefully stored away in a vault, available for checking and comparison with other specimens.

The original specimen is called the "type." In the case of the tiger cat, the type specimen is no longer in existence. An animal that swam out to board a ship anchored in the harbor of Calcutta, he has disappeared into the limbo where thousands of his undistinguished brothers have gone.

Pallas's Cat

Felis manul

Once seen, the Pallas's cat, or manul, is not likely to be forgotten, for he has two characteristics that distinguish him from all other members of the feline tribe (Plate XV, lower). His short, rounded ears, unlike those of other cats, are set far apart and low on his wide crown, so that he can peer over his "blind" constantly without having his mother spit at him, "Pull in your ears!" His tail is bushy, and half the length of head and body.

This cat inhabits central Asia from Transcaspia to Mongolia and Kansu, and south to Afghanistan, north Persia, Baluchistan, Kashmir, and Tibet. Much of this area is high, desolate country, cold even on summer nights, and bitter throughout the long winter. An ordinary cat of fur coat would never be adequate, especially when the owner must lie down to sleep on the snow-covered ground.

One inhabitant of a part of this same country, the yak, has solved the problem by going in for

heavy underwear. He puts his warmest clothing over his belly and throat. Since this seems to provide such comfort, Pallas's cat has apparently gone to the same tailor for outfitting. Unlike all other cats, he wears his longest fur on his throat, chest, belly, and thighs. No trouble now about getting into a cold bed!

The total length of Pallas's cat is from 27 to 37 inches, but his heavy fur coat gives a false impression of greater bulk. There is, of course, some shrinkage in summer when a lighter covering is sufficient. His body is pale buffy tinged with reddish brown and with a sprinkling of black hairs, while his long tail has several blackish rings and tip. A few black spots break the pale gray of the head, and across each cheek runs a broad white band edged with black.

Few Caucasians have ever seen Pallas's cat in his native land, and the Mongols care nothing about making records of the habits of their wildlife. The cat is said to prey on small mammals, chiefly rodents such as the chipmunks or the long-legged, leaping gerbils and jerboas. The northern race includes pikas and birds. His meow has been described as "a combination of the bark of a small dog and the hoot of an owl!"

The very few Pallas's cats ever exhibited in European zoos have been affable and self-contained.

African Wildcat

Felis lybica

Several thousand years ago the African wildcat enjoyed honor and glory such as he has never known since and probably never will again (Plate XV, lower). Perhaps, because of his importance as a mouser in the vast granaries, he was praised and revered by the Egyptians. Nothing was too good for him.

Priests issued decrees protecting and exalting him. This homage became worship, and the cat joined the ibis as one of the group of sacred animals. Temples were erected in his honor. The narrowing of his eyes in the daytime and widening at night was compared to the waxing and waning of the moon. The goddess Bubastis, or Bast, had her lion's head replaced by the cat's head.

Whenever a cat died, the whole family went into mourning by shaving their eyebrows. The body of the cat was mummified, wrapped in linen bands, given a shroud—sometimes, even a prayer-decorated wooden coffin—and often laid away in the tomb of a prince or princess.

Naturally, this adulation went to the cat's head. He has never been the same since. Pride and aloofness are characteristics of his descendants, our ordinary domestic cats.

The Romans scorned the Egyptians, Egyptian work, and Egyptian cats. They considered the near-Oriental worship of many gods insulting to their own more simplified religion. Consequently, when Augustus defeated the fleet of Antony and Cleopatra and overran Egypt, the royal maintenance of the cat began to decline. The cat was never mentioned in Roman polite society. Arche-

ologists tell us that not a trace of a cat was found in the ruins of Pompeii and Herculaneum.

But the Egyptian cat was not downed. In spite of the haughty Roman Empire, he spread into Europe and all over the world.

Probably the Romans themselves helped the cat to spread. His useful qualities must have finally overcome their prejudices. Sailors and traders brought a few of the strange animals to Rome, smuggling them out of Africa on to their galleys.

Shocked at the sacrilege, the Egyptians made every effort to prevent these abductions and to buy back from "slavery" the cats that reached Italy. Finally the cats were taken with the conquering legions and the following colonists and traders into northern and western Europe, where the French and Germanic barbarians learned to appreciate their mousing qualities.

African Wildcat Knows no Luxuries

The African wildcat knows no luxuries today. Sometimes he is even reduced to killing and eating snakes. Usually, however, the living is better, although it means hard work. No more gold platters, nightingale tongues, or incense! He eats hares, birds, and especially the abundant bush rats and other rodents; also the young of small antelope, sheep, and goats; lizards, tortoises, and insects. In farm districts he is a persistent poultry thief.

Undoubtedly he is one of the chief deterrents of the voracious rodents, which, if unchecked, would be serious competitors for food with the antelopes and other grass eaters.

As we have seen, the lions, leopards, and cheetahs act as regulators on the populations of hoofed animals. In Africa's teeming wildlife, as well as elsewhere, each species has its own place and function.

The African cat goes under many aliases: "booted cat," "fettered cat," "Kaffir cat," "Egyptian cat." But most Africans today know it by some interpretation of the quaint Cape Dutch name: *vaalboskat*.

Counting the 12-inch tail, the African wildcat is from 28 to 37 inches long. Today he wears either a sandy-gray or pale-cinnamon coat (according to his phase) and light-buff underwear. Close scrutiny will reveal that his upper parts are mottled with indistinct, elongated brownish spots, and a faint dark streak along his back. Two or three dim black rings and a black tip mark the end of his tail.

He and his related races live in Sardinia, the large Mediterranean island, and over all Africa except in the deep tropical forests and the Sahara. In prehistoric times some of his ancestors lived at Gibraltar, for their fossilized bones have been found in fissures of that great rock.

European Wildcat

Felis silvestris

Not an exciting animal, the European wildcat is interesting to us largely because of his share in the ancestry of our house cat, barn cat, and alley cat (Plate XVI, upper). The story goes

that when the highly educated Egyptian cats were brought to central Europe and Britain, they naturally took up more or less with the wildcats of Europe. The resulting crossbreeds then apparently succumbed in weak moments or inclement weather to the comforts of man's fireside and offers of food.

The purebred European wildcat which has not yielded to the overtures of "foreigner cats" or the luxury of man's home still keeps to himself. The true wildcat has never inhabited Ireland. His range was from Scotland and England across central and southern Europe to Asia Minor. He has been gone for centuries from a large part of this domain, for man is notoriously selfish and will not allow other animals to kill "his" hares, rabbits, and grouse and other birds.

The few wildcats left in Britain today survive because their parents and parents' parents were fortunate enough to live in the most remote and mountainous parts of northern Scotland.

The European wildcat's overcoat, brownish to buffy gray frosted with whitish, banded and marked with vertical black stripes, has apparently been handed down to our domestic "primitive" barn tabby.

His fluffy, rounded tail is barred and tipped with black. Parts of his chest and belly are usually white. By reputation, the female is supposed to wear more modest and less strikingly marked apparel.

Because of this wildcat's way of life, he is much more muscular than our tabby. His thicker, longer hair makes him look even larger. The male measures from 33 to 39 inches in length, and the female is usually smaller.

The mother wildcat lives in a hollow tree or a den among the rocks. When the two to five kittens arrive, usually in May, she is doubly pressed to make a living.

She creeps carefully and deliberately through the forest, her manner of walking reminding one immediately of a tabby on the prowl. In fact, the regular, even trail of tracks could hardly be told from that of a very large domestic cat.

Dawn and Dusk are Hunting Time

Dawn and dusk are her favorite times of day for hunting. She stalks her prey—anything alive of a reasonable size, from mice to European hares, and grouse and other birds. After creeping close, she rushes in swiftly with great bounds.

The wildcat is a good hunter and rarely returns to her family without bringing something to eat. She is also a fierce champion against any danger that threatens the children and will not hesitate to fight man himself if necessary. One may stroke her crossbreed cousins and second cousins, but no one should try to pat this lady's back!

Many wildcats have been exhibited in European zoological parks, but they do not adapt themselves to life in a cage. Uniformly sullen and resentful of man, they drag out a comparatively brief existence.

Tabby

Felis catus

As wildcats have been domesticated and carried over the world, their offspring have developed new traits. Cat nature being what it is, the paternity of succeeding generations has always been interesting, if unconventional. You can't keep a normal cat at home. If he goes walking on a lonely night and meets up with a new race, there are bound to be crossbreeds with Chinese papas, Indian papas, African papas, South American mamas.

These meetings have resulted in an amazing and bewildering group of domestic cats (Plate XVI, lower).*

House cats may be divided into two classes, the short-haired and the long-haired. The short-haired cats usually have the blood of the African and European wildcats in their veins. The long-haired breeds are an Eastern importation. They are apt to be more highly strung, more irritable, and more courageous.

The ordinary stripes are credited to the wildcats of Europe, the spots to many species, and the blotches possibly to an Oriental influence. No doubt every species of the smaller wildcats has contributed somewhat to the ancestry of the domestic cats in their locality.

Spotted Coats from Desert Cats

The spotted domestic cats of India are supposed to get their spotted coats from the Indian desert cat. Perhaps the Abyssinian cat is descended distantly from the jungle cat.

At any rate, he has the same large ears which sometimes sprout long hairs from the tips as if in imitation of the tufts of the jungle cat. The Paraguayan domestic cat is assumed to have inherited certain characteristics from the jaguarundi (page 255).

Angora and Persian cats may trace their ancestry to Pallas's cat (page 257). The Persian cat has replaced the Angora in western Europe and has become so involved with other races that his family appears in practically every pattern of the short-haired cats.

Most beautiful and glamorous of all domestic cats is the royal Siamese. His original ancestors certainly never had anything to do with the European or African wildcats. Endowed with blue eyes, with fair, slim body of pink or cream, he wears a strikingly contrasting chocolate brown on face, ears, feet, underparts, and tail.

The aristocrat of all cats, with long, svelte figure and pointed head, he came in recent centuries from the royal palace or the homes of the nobility. His owners claim that he is the most companionable and intelligent of all cats. The offspring are completely white at birth.

Strangest of domestic cats is the Mexican hairless. A natural nudist, he goes absolutely naked in the summer. During the winter he pays some slight deference to the season and custom by growing a little hair over his back and the ridge of his tail.

Supposed to have once been a pet of the Aztec Indians, he is now nearly extinct.

Most ridiculous of cats is the Manx cat. Except for a few long hairs, he hasn't even a ghost of a tail. His forelegs are short, and his hind legs push his rear high in the air. Jumping about like a rabbit, he is sometimes called the "rabbit cat." It is said that his lack of tail is due to the inbreeding of the isolated cat population of the Isle of Man for many centuries. He is very common now in parts of Russia.

House cats come in many colors as well as many breeds. The vertical black stripes, curved or spiral, are usually considered less fashionable than the solid, clear color coats. The Persians and tortoiseshells are said to owe much of their distinctive coloration to the climate of the lands in which their ancestors developed at the eastern end of the Mediterranean. Carefully nurtured albinism and melanism produce most elegant blonds and brunets.

Although we no longer shave our eyebrows when the house cat dies, nor put him in our family tombs (page 257), he is still the favorite of many families. When he first accepted man's largesse, he shed none of his independence. Today he can return to nature and forage for himself with more success than almost any other domesticated animal.

For many centuries an official government employee, the cat is now rivaled by modern exterminators and their poisons. Back in the year 930, a thrifty Welshman included cats in a comprehensive national plan to keep down a plague of rats and mice. In those days of poorly constructed buildings and primitive methods of handling food, the cat was a lifesaver. Big rats were common in the best residential streets and in the palaces of kings and princes. The cat was man's ally against the consumers of grain and carriers of disease.

Price Ceilings for Cats

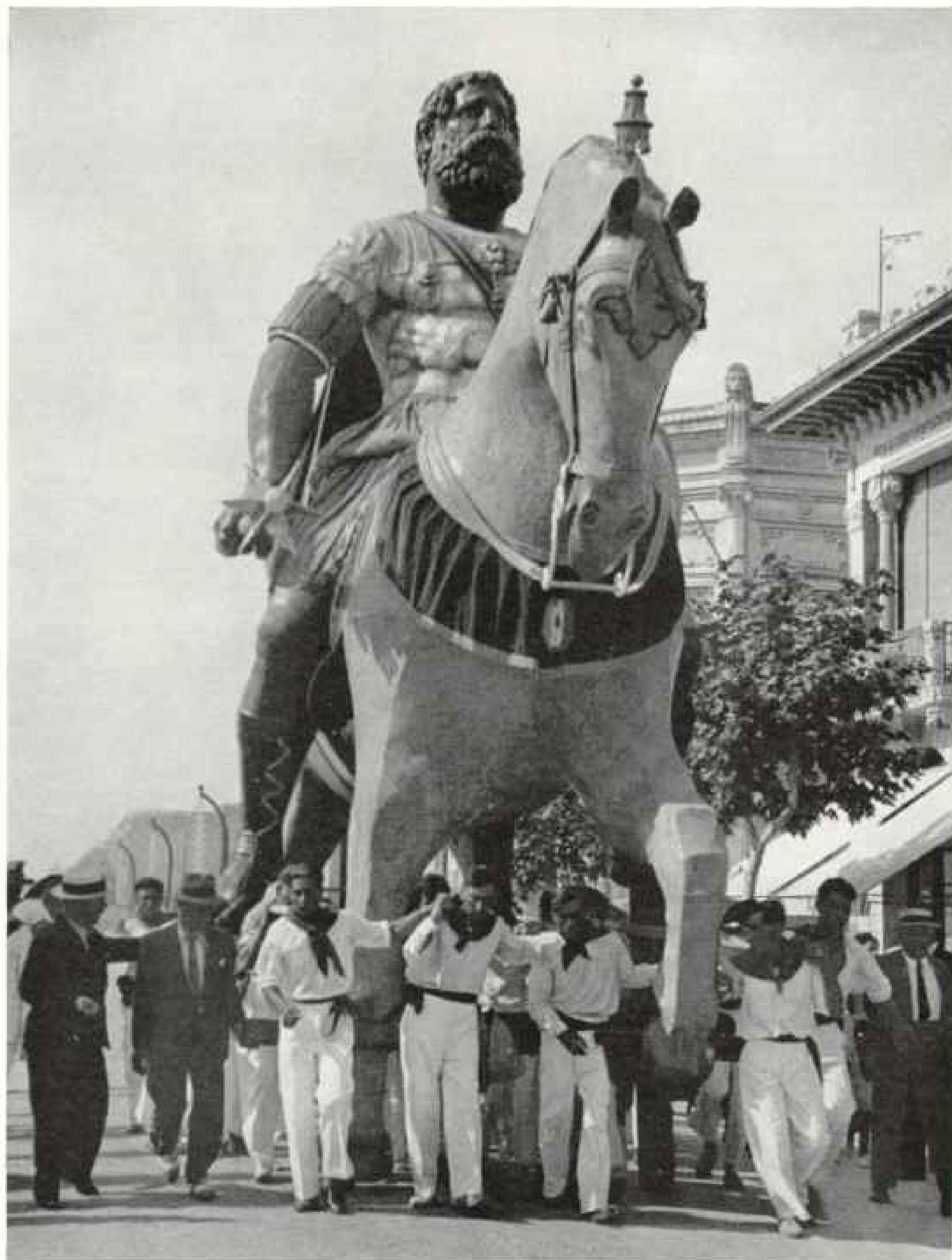
The Welsh chief, Howel the Good, published a list of standard prices for cats: for a newborn kitten, one pence; for an inexperienced youngster, twopence. After a cat had caught a mouse, however, the price tag was marked up to fourpence.

Such a cat had to have good sight and hearing. He must not have had his claws clipped, and woe to the man who palmed off on the buyer a mother cat that would not properly educate her kittens!

The cheater was forced to refund a third of the payment.

Unlucky was the miscreant who was caught shying a rock at a cat that guarded the royal granary. The fine for killing a ratter was a ewe sheep with her lamb and fleece. Or the judge might sentence the culprit to forfeit enough corn to cover the dead cat, suspended by the tail with her nose touching the floor.

* See "The Panther of the Hearth," by Frederick B. Eddy, NATIONAL GEOGRAPHIC MAGAZINE, November, 1938.



Filippo Cianciuffara.

Like a Trojan Horse, the Figure of Messina's Plunderer Parades the City

When Messina was controlled by Byzantine Greeks, the Latin islanders called them *grifoni*, or plunderers. After the *grifoni* were ousted, this legendary figure remained in Sicilian pageantry. Again, as often in the past, beautiful Sicily lies in the path of war. Occupying sites where history was made for 3,000 years, Italian and German airfields now serve as springboards for Axis transports between Europe and Africa (page 261).

Africa First of 1943 Global Warfare Maps

BY WILLIAM H. NICHOLAS

FIRST of The Society's 1943 series of wartime maps is the New Map of Africa, which goes to The Society's 1,250,000 member-families with this February issue of their NATIONAL GEOGRAPHIC MAGAZINE.*

On this detailed chart, 29¼ by 31½ inches, may be located headline places—some new as the need for airports, others half forgotten in the mellow pages of history: Carthage, Dakar, Oran, Algiers, Bizerte, Bengasi, Tobruch, Casablanca, and many more.

Shown also is the entire Mediterranean Sea of age-old wars, and all its islands, strategic air and sea bases for 1943 fighting. An example is Sicily, where history has been made for 3,000 years, which now is a springboard for Axis planes and transports to and from North Africa (pages 260, 263 to 273, and 276).

War Speeds Road Building

Up-to-month news this map brings members is the network of highways and railroads, here first delineated, over which troops, munitions, and supplies fan out from debarkation ports to widening zones of Allied occupation.

Before World War I few good roads existed in most of Africa. When peace came, motor routes swiftly spanned enormous areas, north to south, and thrust farther inland as European industry reached out for more and more tropical products.

Now The Society's new map reveals thousands of miles of new all-weather highways born of World War II.

Amazing is the 1,700-mile road from Douala, in the coastal curve of the French Cameroons, to stately Khartoum, in Anglo-Egyptian Sudan. Before France fell, this route was a rough trail through arid desert and humid jungle. Free French workers widened and improved this heart-of-continent highway until heavy trucks sped over it with supplies for Egypt and the valiant British Eighth Army.

Bound up with the war north of the Sahara is the road along the Mediterranean which stretches through 2,500 miles of fertile fields, deserts, and history, all the way from the Atlantic Ocean to age-old Alexandria, Egypt.

The map features a table giving air-line distances between principal cities and bases. This detailed compilation affords a clear understanding of the vast areas involved in military operations. Your Society's cartographers computed 1,055 great-circle distances for this comprehensive table.

Africa's shape, like that of an oversized question mark, suggests the problem the giant continent has interposed in the affairs of men. Only bulbous Asia surpasses Africa in size. Its latitude reaches as far north as Washington, D. C., and about as far south as Buenos Aires. It thrusts out so far westerly at Dakar that the oceanic span is only 1,620 miles to Natal, Brazil.

Skiing is possible on the high slopes of Mount Kenya near the Equator, and winters are as severe in southern Africa as in parts of northern Africa.

Primarily, however, Africa is a tropical continent. Bulk of its vast area, the map shows, is an enormous tableland, surrounded by a narrow lower shelf on the edge of its encircling seas.

This geographic fact is one major reason why Africa so long remained the "dark continent." Practically all its rivers tumble down from its vast plateau over waterfalls to its narrow continental shelf. Therefore, ships could not sail up Africa's rivers into the heart of the continent as they can in eastern South America.

Africa Has Few Harbors

Study of the map reveals another reason why inner Africa was not easily penetrated until the airplane came. Its regular coastline affords few harbors. If some hardy hiker started to walk around Africa's shores, his pedometer would show no more mileage than if he covered the choppy coastlines of the British Isles and Norway combined. Yet Africa is three times the area of Europe.

Look at the map again for the third reason the continent long was isolated. Men could sail all the way around the Cape of Good Hope to get to India, even to Mozambique and Madagascar on Africa's east coast, more easily than they could traverse the broad belt of desert that stretches across the continent's fattest latitude.

Europe is benefited by winds blowing off the warmer Gulf Stream and condensing into bountiful rainfall over the cooler interior.

In Africa winds from the Mediterranean make the coastal strip of North Africa the

* Members wishing additional copies of the new Map of Africa may obtain them by writing the National Geographic Society, Washington, D. C. Prices in United States and Possessions, 50¢ on paper (unfolded); \$1 on linen; Index, 25¢. Outside of United States and Possessions, 75¢ on paper; \$1.25 on linen; Index, 50¢. All remittances payable in U. S. funds. Postage prepaid.

historic granary and fruit basket of Europe, but farther south they strike tropical temperatures and do not condense; hence the Sahara, biggest desert in the world.

In that vast desert area, larger than all of our forty-eight United States, not a river flows between the Nile and the Atlantic Ocean. Not that the Sahara is a sea of ceaseless sand. Much of it is rugged and hilly; some is mountainous, as high as 10,000 feet.

Blankets for Troops in the Sahara

Also, the sands of the big desert grow extremely cold. By day the heat may register 100° F., to drop again the same night below freezing.

Our Army knows its geography when it ships mountains of blankets to American soldiers fighting on the fringes of the Sahara.

Quick cooling and heating cracks up waterless rock in the vast desert to form enormous sandy areas.

Mediterranean Africa differs widely from the rest of the continent. Its native races are white; south of the broad Sahara the native population is black. In many ways it is more a part of Europe than of Africa.

Airplanes make the long neighboring shores of the two continents only minutes of flying time apart. It takes no longer to fly from some peninsular points in Europe to the coast of Africa than to ride the North River ferry from Manhattan to Hoboken.

The Isthmus of Suez, land neck for migrations from Asia, now is the canal-cut focus of military drives into the Near East cradle of all Western civilization.

At its northwestern corner, Africa is separated from Europe only by the narrow Strait of Gibraltar, western gateway to the Mediterranean. Bizerte, French naval base in Tunisia, is only 120 miles from Italian Sardinia, on the northwest, and 150 miles from Italian Sicily, to the northeast.

When United States troops invaded Morocco and Algeria, then pushed into Tunisia in November, 1942, they entered a fertile coastal area, backed by a high and less productive plateau, on which vegetation trails off to the south until it vanishes in the rugged Atlas Mountains bordering the Sahara.

The vast expanse of French Morocco, Algeria, and Tunisia, four times as big as Texas, has a wide range of climate.

Along the Atlantic and Mediterranean coasts extremes of temperature are rare, but inland wide ranges of heat and cold are recorded. Summer heat is intense, and the nights are bitterly cold in winter. To the south, near the edge of the Sahara, rise the Grand Atlas

Mountains, with peaks towering more than two miles above sea level. Snow covers the summits for months. Nowhere in this part of Africa do tropical fevers occur.

Near the coast the rainy season ends with November, and from then until May sunshine and comfortable coolness prevail. This climate, typical of southern Europe also, has given the name "Mediterranean" to the climate of similar areas all over the world.

Such conditions favor cultivation of orchards and vineyards, rather than the field crops of root vegetables and hardier grains which thrive where winters are colder.

Along the Tell, coastal margin from 50 to 100 miles in width, American soldiers saw olives, grapes, mulberries, oranges, lemons, wheat, and barley growing.

Many of the lower mountain slopes are terraced and planted in these crops, too. As far back as Roman and Phoenician days, the Tell of Algeria and Tunis was granary and vineyard for European peoples. Many of its food products went to France and the Nazis before the American invasion.

Americans occupied Marrakech, Casablanca, and Rabat, in Morocco; Algiers, Oran, Philippeville, and Bône, in Algeria, to gain control of all the principal seaports and cities.

Then they put to use some 2,000 miles of railway and many more miles of first-class highway in Algeria to move supplies eastward to Tunis.

On the way to their objectives of Bizerte, commanding the sea passage between Sicily and the Mediterranean coast, and Tunis, capital city, General Eisenhower's men passed through more of the same kind of territory. Tunis is the center of most of the foreign trade, and, next to Algiers, is the largest city in the Atlas Mountains region.

Below French Morocco and Algeria, in the continent's "bulge," stretches spacious French West Africa, with its capital and strategic Atlantic seaport of Dakar. Its area of 1,815,768 square miles is half as large as that of the United States.

A Patchwork of Colonies

Interrupting the coastal margin of this vast expanse of French holdings is a patchwork of colonies and one independent state, extending around the bulge to the Gulf of Guinea. In order, they are: Spain's Rio de Oro above Dakar; tiny British Gambia below it; then Portuguese Guinea, British Sierra Leone, and the independent nation of Liberia, in which United States troops now are stationed.

The new map also shows four groups of islands off the Atlantic which are closely

linked with Africa's northwestern tip both by wartime strategy and by geographic similarity. These are the Azores, Madeira Islands, and Cape Verde Islands (inset), which belong to Portugal, and Spain's Canary Islands.

At the eastern end of the Mediterranean stands Egypt, "gift of the Nile." Only lack of rain keeps the Sahara from being fertile.

Egypt is like the rest of the desert except for the floods of the overflowing Nile and the irrigation they make possible.

Of Egypt's 373,100 square miles only some 13,600, or about three percent, are under cultivation.

Upon this oasis strip of irrigated land live some 13,000,000 people—densest agricultural population in the world. Thus the Nile's bounty keeps alive some 1,000 humans for every thirsty square mile that drinks up its waters.

The Nile flows almost due north, from Lake Victoria to the Mediterranean, an inland waterway comparable only to the Mississippi-Missouri system. Transplanted from Africa to the Western Hemisphere, the Nile would reach from Ecuador to Jacksonville, Florida.

Not until 1862 did explorers discover the White Nile's source, nearly 4,000 miles south of the Mediterranean, high in the mountain lakes of the Congo-Tanganyika borderland.

The Nile drains well over a million square miles in its route to the sea.

Along this life-giving river the ancients erected the monumental Pyramids of El Giza and the temples of Karnak and Luxor.

Modern men, through British enterprise, made their mark in the valley by building the



HARRIS OFFICIAL

An Egyptian Laborer Unloads Beef for the British Army

Because the land of the Pharaohs does not produce enough meat for normal local needs, most of the supply for the troops is imported from Australia. It is carried inland from the ports in refrigerator cars of the Egyptian State Railway.

huge Aswan Dam, impounding more than five billion tons of water for irrigation.

At Aswan the Nile begins to rise about the first of June, and continues to rise until mid-September, when it starts its annual fall. As the flood subsides, the river leaves behind a film of fertile silt. Chief crop from this rich coating is cotton, accounting for four-fifths of Egypt's exports in normal times. Sugar, rice, millet, and maize also are grown.

Suez Canal Vital to Great Britain

Great Britain is vitally concerned in the wartime fortunes of independent Egypt because of the Suez Canal, the Empire's peacetime highway to India and Australia. The

Canal, opened in 1869, is 103 miles long, and joins the Mediterranean and Red Seas.

Between the Atlas country in the northwest and Egypt in the northeast lies Italian Libia, won from the Turkish Empire in 1912.

Best parts of the country are coastal Tripolitania and Cirenaica, which have many of the features of the Atlas regions and produce the same kinds of crops. The principal ports, Tripoli and Bengasi, are starting points for caravans bound south, and southeast to the Anglo-Egyptian Sudan.

Two and a half years of bitter fighting between British troops and German and Italian forces along the coastal route between Tripoli and Alexandria have made the names of many cities on this Mediterranean strip household words. A glance at the map locates El Agheila, Bengasi, Derna, and Tobruch, in Libia, and Sidi Barrani, El Dabá, El 'Alamein, and the Qattara Depression in Egypt.

When explorers penetrated Africa's interior they found that the Nile was only one of the continent's amazing rivers.

For example, there is the Congo. Deep in the heart of equatorial Africa it finds its source, flowing 2,500 miles to plunge over the plateau margin of the Guinea coast and sweep into the Atlantic. Some 1,600,000 square miles of heavy-rainfall area make up its basin. With its tributaries, it is part of an 11,000-mile network of waterways.

From Lake Tanganyika to the Equator the Congo system is navigable, but at the Equator the famous Stanley Falls close the river to traffic for 50 miles. Then, for 1,200 more miles, it again is navigable until it reaches the edge of the plateau near the Atlantic coast.

Most of this vast basin is equatorial forest, hot at all seasons. In the depths of this forest dwell the tiny, childlike, four-and-a-half-foot Pygmies.

Rubber and Copper in Congo Basin

Most important product of the Congo Basin is rubber. Other crops—palm oil, ground nuts, rare cabinet woods, for example—are vital to industry. From herds of elephants which roam the basin much ivory is obtained. The Katanga District of the southeast Belgian Congo is rich in copper and gold.

One of the Congo's tributaries drains Lake Tanganyika, world's longest fresh-water lake. Near-by Lake Victoria is larger than any of North America's five Great Lakes, except Superior.

Near its mouth the river becomes the boundary for 400 miles between the Belgian Congo and French Equatorial Africa. This huge French colony, extending northward beyond

Lake Chad and Fort Lamy to the Libian desert, is a Free French stronghold.

After the fall of France, Brazzaville on the Congo became a rallying point for forces under General Charles de Gaulle. From Fort Lamy, desert patrols have pushed north to clash with Italians and cooperate with United Nations armies on the Mediterranean coast.

South of the Congo is the Zambezi River, which flows into Mozambique Channel. Punctuating its course are the famous Victoria Falls, over twice as high as Niagara. Their native name means "Smoke That Thunders."

The Niger River, by a strange topographical quirk, rises within 150 miles of the Atlantic, but flows for 2,600 miles through French West Africa and British Nigeria before emptying into the Gulf of Guinea.

Pirate rivers raid its headwaters. These are short streams, fed by heavy rainfall along the coast. They cut deeper and deeper inland each year, capturing more and more of the Niger's watershed.

The African plateau reaches its highest points in East Africa. Tallest peak is volcanic Mount Kilimanjaro, 19,317 feet above the sea. Other famous mountains are Kenya, 17,040 feet high, virtually on the Equator, and the snow-capped mass of Ruwenzori, called the "Mountains of the Moon" centuries ago by Claudius Ptolemy.

All jut out from a high tableland, politically divided into Kenya and Uganda, British possessions, and Tanganyika, the chief part of former German East Africa, placed under British mandate by the Treaty of Versailles.

Big-game Hunting Ground

The uplands are celebrated big-game hunting grounds where antelopes, zebras, lions, and rhinoceroses abound.

North of this area, on the large, irregular projection below the Gulf of Aden and the southern Red Sea, lie the lands which Mussolini expected to incorporate into a vast Italian empire—Ethiopia, Eritrea, and Somaliland.

Most amazing progress in the development of the continent has been made in South Africa. From a geographic standpoint, South Africa is the vast area of some 1,300,000 square miles south of the Zambezi River. A glance at the new map shows that this includes, in addition to the Union of South Africa, the British protectorates of Bechuanaland, Basutoland, and Swaziland; Southern Rhodesia, Southwest Africa, and about half of Portuguese Mozambique.

Discovery of diamonds (Kimberley) and gold (Transvaal) provided stimulus for development and growth. One-third of the

world's annual output of gold now comes from the Transvaal.

Today Capetown, Durban, Johannesburg, Pretoria, and other modern cities dot the area. More than 2,000,000 Europeans and descendants of Europeans now dwell in the Union of South Africa, alongside some six and a half million African tribesmen.

Although modern civilization penetrated far into the interior of South Africa, its developers have done much to preserve the abundant wildlife by setting aside the vast Kruger National Park, a stretch of more than 8,000 square miles lying between Johannesburg-Pretoria and Lourenço Marques in Mozambique.

Here elephants, hippopotamuses, black rhinoceroses, giraffes, wart hogs, zebras, blue wildebeests, waterbucks, kudus, lions, many varieties of antelopes, leopards, baboons, crocodiles, and other species live a natural existence.

Some of them, including lions and elephants, wander along the roads in full sight of motorists.

Off the southeast coast of Africa, opposite Mozambique, lies the huge French island of Madagascar, with a population of more than three and a half million.

South African troops invaded Madagascar in May, 1942, to keep it from falling into the hands of Japan and thus becoming a menace to United Nations shipping entering the Indian Ocean by way of the Cape of Good Hope. First objective, attacked by British naval units, was the strategic harbor of Diégo-Suarez, at the northern tip of the island.

The Partition of Africa

In all the continent only three areas, comprising about one-fourteenth of the area of Africa, are independent nations—Egypt, Liberia, and Ethiopia, the last-mentioned released from Italian control by British arms in 1941. Holdings of the various countries, together with estimated populations, are:

	Square Miles	Population
French Africa	3,982,700	42,780,000
British Africa	3,750,400	63,005,000
Belgian Africa	912,600	14,155,000
Italian Africa	900,500	2,980,000
Portuguese Africa	790,000	8,650,000
Spanish Africa	131,450	1,000,000
African Egypt (all Egypt, 373,100)	349,050	16,680,000
Ethiopia	424,700	5,500,000
Liberia	37,125	2,500,000
Tangier (Int. Zone)	225	80,000
Totals	11,278,750	157,330,000

Aside from its rich products of soil and mines, the continent's natives constitute one of the world's great untapped sources of labor.

Global warfare has engulfed Africa and affects every corner of it, directly or indirectly, as it has every other part of the world.*

Boundaries on this map are of September 1, 1939, the day Germany invaded Poland. In war, armies force boundary changes, but they are not officially recognized until negotiation of peace treaties.

Your Society's Map Program for 1943

For 1943 the National Geographic Society announces the issuance of at least five large, 10-color map supplements—biggest map-making program ever undertaken by any educational institution in the world.

Thus The Society will supply directly to its million and a quarter member-families this year nearly seven million wall maps.

These charts, with an aggregate 30,000 place names, and an index to each map, will constitute an unparalleled gazetteer of the global warfare in which millions of Americans now are engaged.

In addition, tens of thousands of extra copies of some of these charts will be run off at the request of the Army, Navy, or Marine Corps, and also of the State Department and other Government branches, for their use in following the geography of the United Nations at war.†

Already your Society's maps hang in ship cabins, field headquarters, and offices of commanders of United States armed forces at sea, on land, and in the air, along every fighting front where American troops are engaged.

* For other Africa articles in the NATIONAL GEOGRAPHIC MAGAZINE, see: "Eastward from Gibraltar," by Cyrus French Wicker, January, 1943; "The Cities That Gold and Diamonds Built," by W. Robert Moore, December, 1942; "Madagascar: Mystery Island," by Paul Almasy, June, 1942; "Busy Corner—the Cape of Good Hope," by W. Robert Moore, August, 1942; "French West Africa in Wartime," by Paul M. Atkins, March, 1942; "Mediterranean Checkerboard," by Frederick Simpich, April, 1942; "War Meets Peace in Egypt," by Grant Parr and G. E. Janssen, April, 1942; "Daily Life in Ancient Egypt," by William C. Hayes, October, 1941; "Timbuktu and Beyond," by Laura C. Boulton, May, 1941; "Old-New Battle Grounds of Egypt and Libya," by W. Robert Moore, December, 1940; "Fez, Heart of Morocco," by Gordon Casserly, June, 1935; "Trans-Africa Safari," by Lawrence Copley Thaw and Margaret Stout Thaw, September, 1938; "Time's Footprints in Tunisian Sands," by Maynard Owen Williams, March, 1937; "Beyond the Grand Atlas," by V. C. Scott O'Connor, March, 1932. For further references see "Cumulative Index to the NATIONAL GEOGRAPHIC MAGAZINE."

† See "Maps for Victory," by Gilbert Grosvenor, NATIONAL GEOGRAPHIC MAGAZINE, May, 1942. Upon request members may obtain a pamphlet listing all National Geographic Society Maps and Indexes still in print for separate sale, from The Society's headquarters, Washington, D. C.



Staff Photographer E. Anthony Stewart

Two Tiny Figures Stand in the Auditory Canal of a Tyrant's Stony Ear

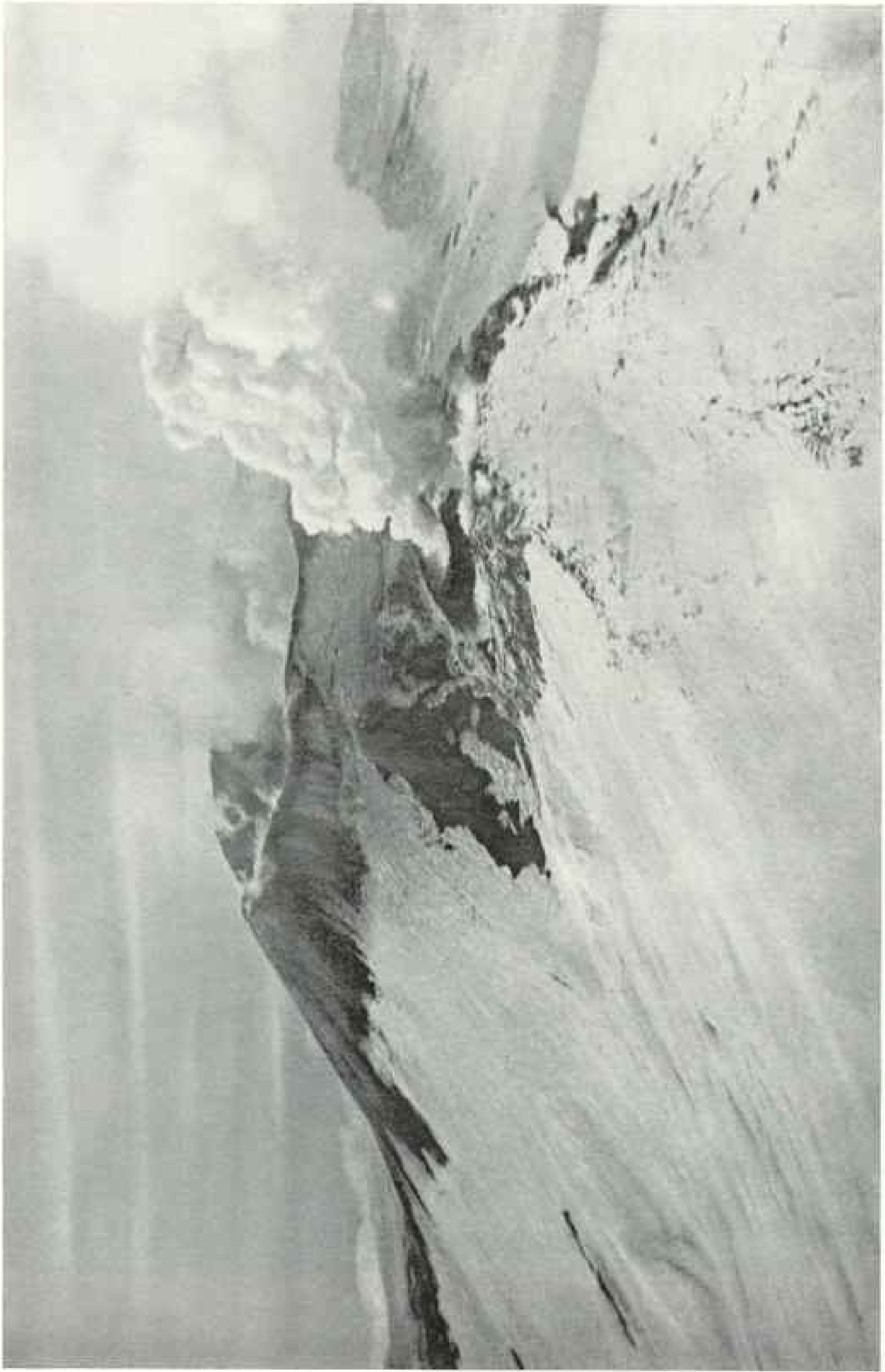
About 400 B.C., 60,000 Syracusean workmen constructed three-and-one-half miles of walls in 20 days with stone quarried from such galleries. A 16th-century painter called the narrow tunnel the "ear of Dionysius." The legend grew that through its speaking tube the tricky Tyrant of Syracuse listened in on the gossip of his prisoners.



Staff Photographer H. Arthur Stewart.

Four Kings and Four Saints Overlook the Quattro Canti, Palermo's Times Square

Here Philip III of Spain and St. Oliva decorate one cut-off corner at the city's chief crossroads. Through this octagonal center in the busy metropolis, daily crowds lighten the façades. In Palermo's architecture, Arab, Byzantine, Norman, and baroque styles are combined in strange harmony.



WIDE WORLD

Through Etna's Mantle of Snow, Smoke Billows up from the Infernal Fires of Pluto's Realm

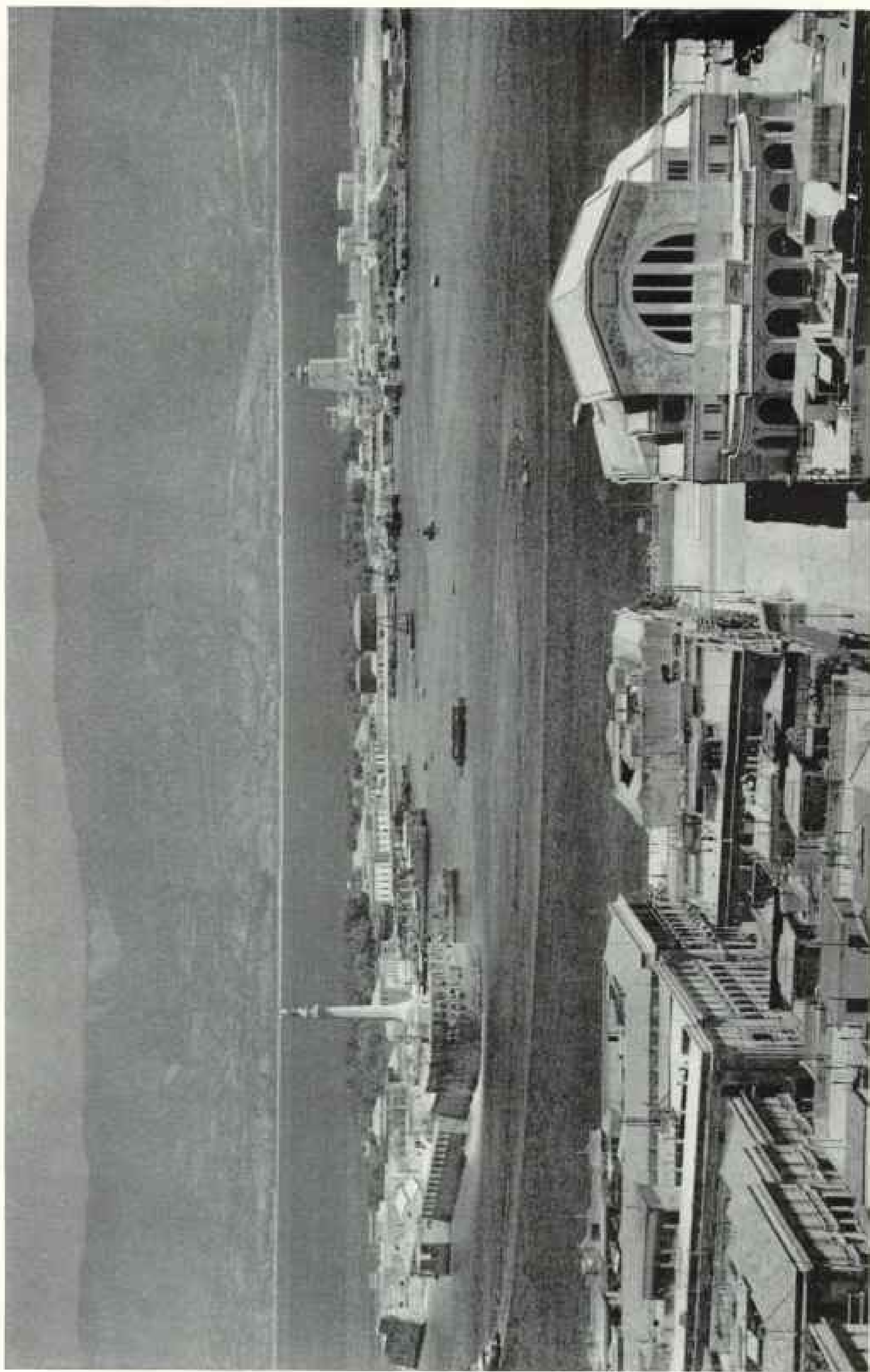
Neither earthquake nor molten lava can drive Sicilians from the fertile lower slopes of their deadly mountain. Volcanic soil around the 10,741-foot peak ranks with the richest on earth, sometimes yielding five crops a year. The "lord of Hades" also endows the island with sulphur and asphalt from his subterranean stores.



Palermo De Gou from Ealing Gallery

From Monte Pellegrino Visitors Look Down on Palermo, One of the Fairest Cities on Earth

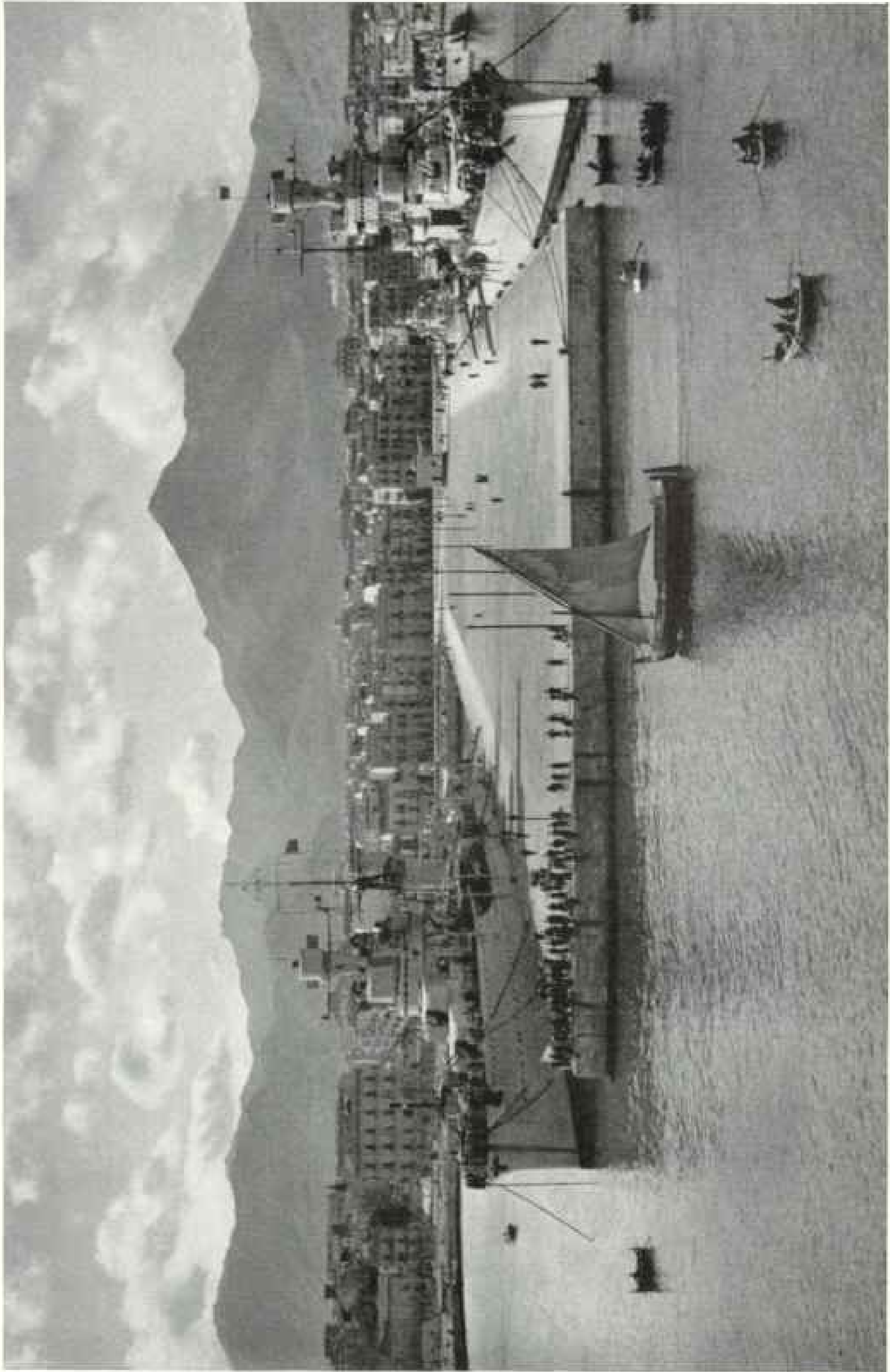
Cradled by mountains and accented by orange groves, the Sicilian metropolis once bore the name of Panormus—"all harbor." To the right is the fruitful plain and valley of the Conca d'Oro, rich with groves of the citrus fruits for which Sicily is famous.



Huff Photographs, H. Anthony Stumm

A Curving Peninsula, Providing a Harbor from Wind and Whirlpool, Gave Messina Its First Name: Zancle, or "Sickle"

Across the stormy strait, about two miles away, lies the rock Scylla on the top of the Italian boot. Near the foot of the slender stud at the tip of the curve is Charybdis, famous whirlpool. Ancient mariners, including Odysseus, had to steer between the two dread hazards on the stormy Strait of Messina.



Bernard F. Rogers, Jr.

Two Italian Light Cruisers Frame Palermo, Sicily's Biggest City and Air and Naval Base

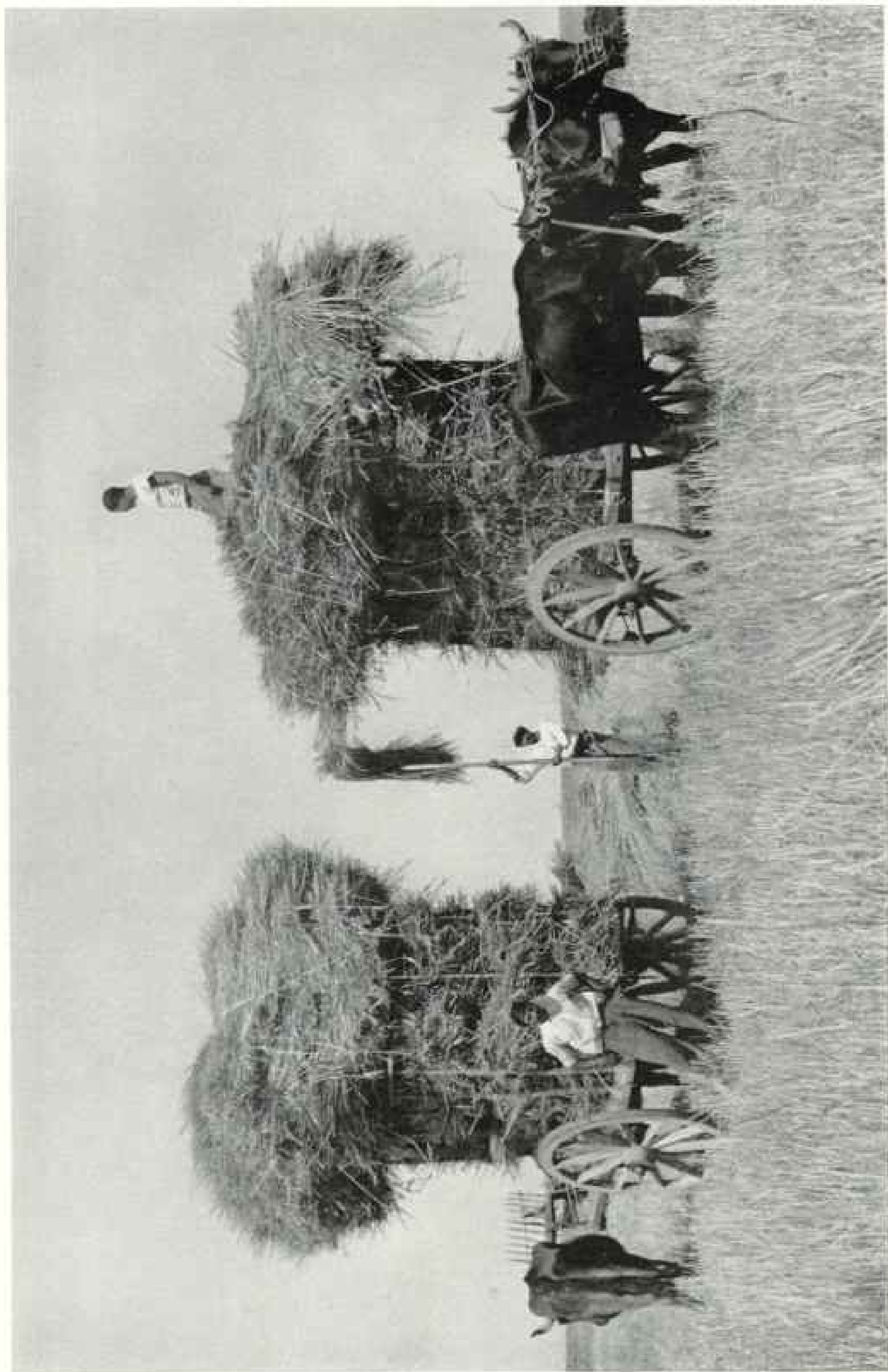
In its protected modern port scaplanes landed, and at well-built piers Italian warships berthed after maneuvers in the Tyrrhenian Sea. Behind the gray and tuberculous city rises 3,448-foot Monte Cuccia, looming above the plain of Conca d'Oro, gilded with oranges (page 269).



Paul J. Rowley

Bawling and Kicking, the Child Star of an Easter Baptism at Pianna de' Greci Doesn't Like His Part

Since the richest costumes were seen at Greek Orthodox weddings, nuptials were sometimes arranged, to suit visitors who added their fee to the bride's dowry. Visitors flock up from near-by Palermo to attend church services, to picnic on the breezy hillside, and to watch Albanian girls model such bright dresses as their ancestors brought to Sicily four-and-a-half centuries ago.



Staff Photographer B. Anthony Moretti

Loads of Grain, Like Upended Bales, Dot the Catania Plain Where Sicily's Largest Airfield Lies

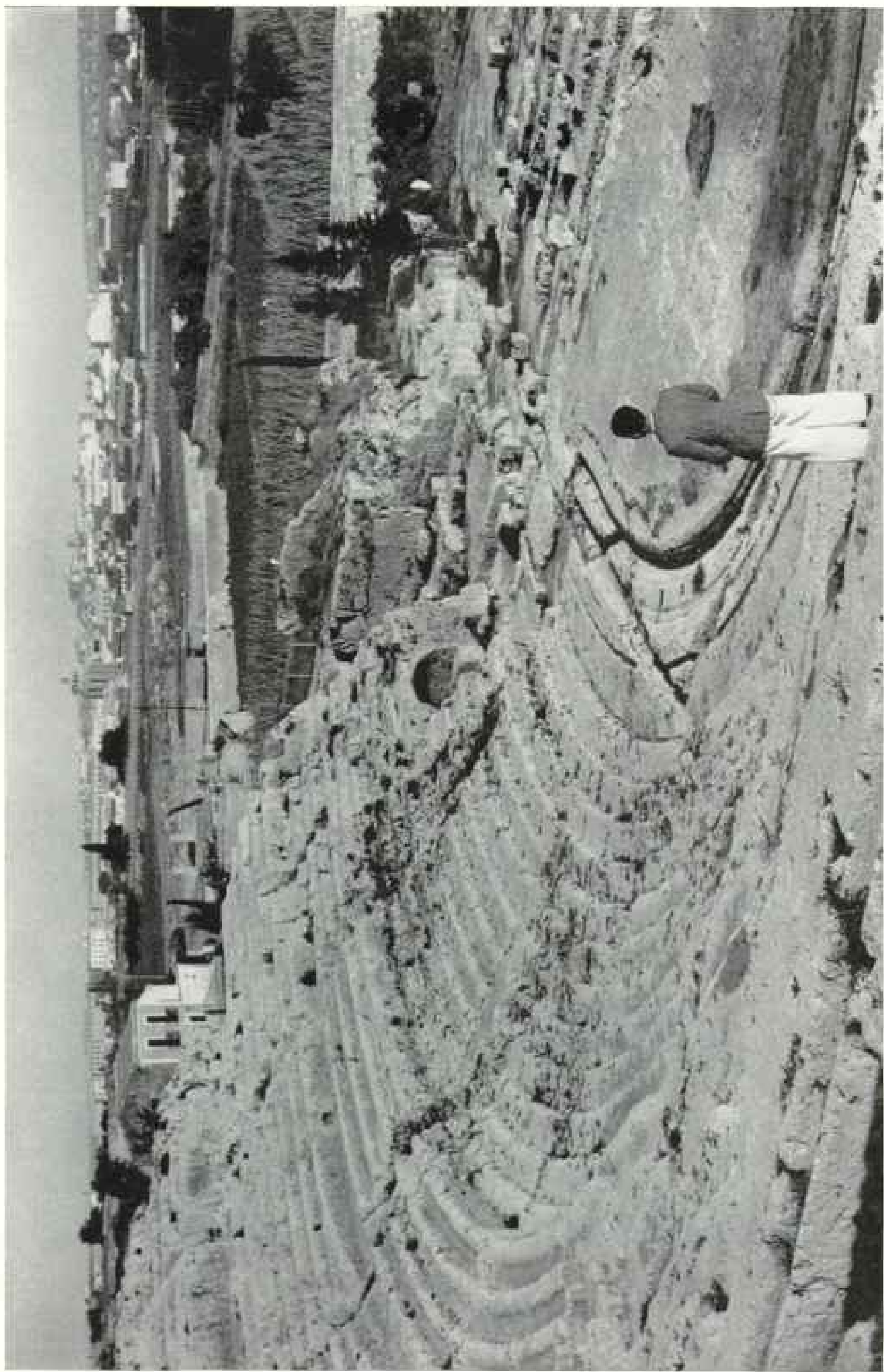
In 1939, new cottages were being built here for 20,000 families settled on small farms carved from large estates. War, with its demand for manpower and widely dispersed airfields, rudely interrupted this peacetime program. The Catania field has been repeatedly blasted by R. A. F. planes based on Malta.



© H. Harbus

On Balestrate's Narrow Beach along Sicily's Rocky North Shore, Fishermen Mend their Nets after a Haul of Tuna.

Fishing is both big industry and moving spectacle. Like sheep entering a fold, tuna follow their leader into the inner death chamber of nets. Then, moving to the rhythm of a fishing song, strong arms pull in the net and harpooners drag in their flopping prizes.



Staff Photographer B. Anthony Stewart

Sicily's 1943 Drama Is Enacted in the Skies above the Greek Theater Where Aeschylus Saw His "Agamemnon" Performed

Now the 2,400-year-old "horseshoe" at Syracuse lies open to airplanes flying over the mythical homeland of Dardalus, first legendary flyer. His son, Icarus, "flew too close to the sun," melting the wax on his wings, and crashed in the same sea where Axis planes now fall.



Filippo Ciarciafara

A White Angel on Messina's Cathedral Marks Time on the Perpetual Calendar

Kronos (Father Time), Sicily's first god, granted long life to Messina. But on December 25, 1908, two out of every three people were killed by an earthquake which laid the city in ruins. Twenty-five years later an elaborate timepiece was dedicated. Only the calendar is here pictured, but on other levels the days of the week ride a merry-go-round, life's four ages follow one another, a cock crows three times at midday, and a lion roars.

Your Society Aids War Effort

DR. GILBERT GROSVENOR, President of the National Geographic Society, in opening The Society's fifty-fifth annual series of lectures in Constitution Hall, Washington, D. C., November 20, 1942, summarized The Society's comprehensive activities which aid the war effort.

Because these diverse contributions toward victory are made possible by all of The Society's 1,250,000 member-families, Dr. Grosvenor's summary of the ways your Society is helping win the war is here reprinted:

You are all contributing to America's fight for life in every way that you can: your sons and daughters, your husbands and wives to the Army and Navy and to the Marine Corps and Merchant Marine; your blood to the American Red Cross for plasma; your money to the United States Treasury for bonds.

Because of your great donations to our country in other ways and because of the small fee you have been paying as dues to the National Geographic Society, the fact may escape you that your foresight and the foresight of more than one million other members in supporting this institution through the years has provided our Nation in its hour of peril with maps, photographs, and data unobtainable from any other source, and that these are proving of great value in military operations.

Photographic Album of Mother Earth

When the United States troops were ordered out into global warfare, our Government found that our world-famed institution possessed the foremost photographic album of Mother Earth in existence.

Long before Pearl Harbor, Army and Navy officers were given access to The Society's more than 350,000 photographs of the entire family of nations.

These pictures had been taken for peaceful educational purposes; yet overnight they became a veritable gold mine of factual values to the intelligence sections of our armed services. Some were guideposts to enemy industrial or water-front targets; other sets, besides reconnaissance photographs, were capable of unmasking camouflage.

Twenty-five thousand prints from photos selected by Government experts from your collections have been made in your photographic laboratory and presented to your Government.

In the study of your Commander in Chief, on the wall directly behind his chair in the White House, for the past eleven months has been fastened a rack containing every Na-

tional Geographic map of the continents and oceans.

The maps are mounted on rollers so conveniently arranged that President Roosevelt can pull down the map of any area of the world that he wishes to study.

By request of the Chief of Staff of the United States Army, General Marshall, a similar rack of National Geographic maps has been installed in General Marshall's new office in the Pentagon Building; and by request of Admiral King, Commander in Chief of the United States Fleet, one rack is being placed in his office and a second rack in the adjoining room where the strategic planning is made.

Hundreds of thousands of National Geographic maps have been requisitioned for use by our officers and men, on land, on sea, and in the air. Millions of National Geographic maps are studied daily by persons following in their thoughts the movements of their loved ones on the battle front.

President Roosevelt in his superb speech to the Nation on November 17 said: "Our battle lines today stretch from Kiska to Murmansk, from Tunisia to Guadalcanal."

All that immense area is shown with extraordinary detail and clearness in the last ten-color map of Asia, Europe, and North Africa, included as a supplement to the December number of your NATIONAL GEOGRAPHIC MAGAZINE mailed to you several days ago.

I can assure you that no map of this area has been published for public use comparable with yours.

The National Geographic maps, concise, convenient in size, accurate, represent many years of research in computations, in compiling of data, and in devising new methods for delineating the world's surface so that the maximum of information can be given distinctly.

Geographic Maps on Every Front

The Society's maps, enlarged to ceiling height, stand in the Navy operational centers to show the location of every unit in the Fleets. Six hundred maps were en route to the gallant U. S. *Lexington* when that carrier went down in the Coral Sea.

Returning travelers tell of having seen The Society's maps pin-dotted on the walls of newspaper, radio, and diplomatic offices over all the Allied world.

The British War Office requested and were given gratis permission to reproduce unlimited numbers of seven Geographic maps of the continents and oceans for its armed forces.

A prized exhibit in the reception room of



National Geographic Society Maps Supply a Backdrop for the Historic Meeting of President Roosevelt and Soviet Commissar Molotov

Other national leaders who have working sets of The Society's 10-color wall maps are Admiral Ernest Joseph King, Gen. George C. Marshall, Lieut. Gen. H. H. Arnold, Lieut. Gen. George H. Brett, and Coordinator of Inter-American Affairs Nelson A. Rockefeller, to name only a few. Constantly consulted are the series of these charts hanging in the office of Speaker Rayburn at the United States Capitol, and in the lobbies of the Senate and House of Representatives. Convenient indexes listing nearly 100,000 place names serve also as guides to correct spelling. All of the 1,250,000 members of The Society receive all maps as they are issued as supplements to their NATIONAL GEOGRAPHIC MAGAZINE.

the National Geographic on Sixteenth Street is a well-penciled Caribbean map which Lieutenant General Arnold, commanding U. S. Army Air Forces, used for two round trips to the Panama Canal and which he returned with the remark that "It is pretty badly messed up and I thought I might trade it to you for a new one."

The Answers to Wartime Questions

The Society's archives of unpublished manuscripts and surveys and its library containing 15,000 volumes and hundreds of thousands of newspaper clippings answer a stream of queries ranging from "What about mosquitoes in Darwin, Australia?" to "How strong is the wind in Iceland?"

The Society's reading room frequently is thronged with Government research men. One day recently, an entire Army medical class was there studying its destination in the Tropics.

Thirty-five members of the staff have been honored by acceptance by the Army, Navy, and Marine Corps.

Your staff strives to give the members useful and timely geographic information: first, in the NATIONAL GEOGRAPHIC MAGAZINE; second, through frequent news bulletins written on places suddenly made prominent by world events and sent to 550 newspapers and press associations; and, third, in school bulletins mailed to 26,000 public-school teachers each week with one lesson for each school day.

The membership, notwithstanding large loss abroad, has had a net increase of 65,000 in 1942 and now exceeds 1,250,000, the largest total in the history of our organization.

I have ventured to give you this information tonight, believing you would like to be advised of how your fees, small individually but large in the aggregate, have made possible the wide range of work carried on by your Society during these critical times.

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Associate Editor of the National Geographic Magazine

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded fifty-five years ago, the National Geographic Society publishes this Magazine monthly. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

Articles and photographs are desired. For material The Magazine uses, generous remuneration is made.

In addition to the editorial and photographic surveys constantly being made, The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to achieve their objectives.

The Society's notable expeditions have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic. By dating the ruins of the vast communal dwellings in that region, The Society's researches solved secrets that had puzzled historians for three hundred years.

In Mexico, The Society and the Smithsonian Institution, January 16, 1909, discovered the oldest work of man in the Americas for which we have a date. This slab of stone is engraved in Mayan characters with a date which means November 4, 291 B. C. (Spinden Correlation). It antedates by 200 years anything heretofore dated in America, and reveals a great center of early American culture, previously unknown.

On November 11, 1933, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, *Explorer II*, ascended to the world altitude record of 72,395 feet. Capt. Albert W. Stevens and Capt. Orvil A. Anderson took aloft in the gondola nearly a ton of scientific instruments, and obtained results of extraordinary value.

The National Geographic Society-U. S. Navy Expedition camped on desert Canton Island in mid-Pacific and successfully photographed and observed the solar eclipse of 1937. The Society has taken part in many projects to increase knowledge of the sun.

The Society cooperated with Dr. William Beebe in deep-sea explorations off Bermuda, during which a world record depth of 3,028 feet was attained.

The Society granted \$25,000, and in addition \$75,000 was given by individual members, to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees in the Giant Forest of Sequoia National Park of California were thereby saved for the American people.

One of the world's largest icefields and glacial systems outside the polar regions was discovered in Alaska and Yukon by Bradford Washburn while exploring for The Society and the Harvard Institute of Exploration, 1938.

A M E R I C A M A R C H E S T O V I C T O R Y O N T I M E



Every noon he brings the bridge some nice fresh time!

JUST before noon this chief petty officer opens the ship's chronometer.

It's a giant watch, kept in a box and hung so the ship's motion won't affect it. It's always accurate to a tiny fraction of a second!

The chief petty officer takes the time from the chronometer and reports to the bridge. The captain uses this time to fix the exact position of his ship. The chronometer *must* be right. One minute's error and a ship could be 15 miles off its course!

But chronometers—as America builds them—don't tell lies.

And it's fortunate they don't. For a chro-

nometer is the heart of a ship. Everything that happens aboard—even the firing of the big guns—is timed by it.

That's why we're proud the government turned to Hamilton to make these vital chronometers and many other precise timing instruments.

It means that we can't stop to build many watches for civilians until this war is won. But when that day comes, this wartime experience promises new Hamiltons even more precise than those now famed as "the watch of railroad accuracy." Hamilton Watch Company, 324 Columbia Avenue, Lancaster, Penna.

COPY, 1943 BY HAMILTON WATCH COMPANY

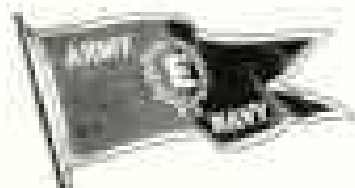




Filming and FIGHTING for Freedom!

Precision does it! The precision of Bell & Howell equipment—the craftsmanship that made “*what you see, you get*” an honest slogan for Filmo Motion Picture Cameras in peace, is proving itself indispensable in America’s fight for freedom.

And Filmo Motion Picture Cameras and Projectors *are* fighting for freedom. In the training camps, motion pictures are showing men *how to fight to win*. They learn faster and more thoroughly—because “*what they see—they get.*” In combat, motion pictures prove achievement and point the way to improved weapons and tactics.



BUY WAR BONDS

Bell & Howell craftsmanship is devoted, *all out*, to supplying our fighting forces with unsurpassed motion picture equipment and sighting devices—so that “*what they see—they get!*”

Filmo

Bell & Howell Company,
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She never thought her world would change so much . . . but there she is, like millions of her sisters, fighting on the home-front . . . and what a job she's doing!

EVERYTHING'S CHANGED NOW



Remember the Top-Quality, long mileage and extra safety you came to take for granted in a General Tire? The rubber and skill that gave you these are now going into numerous rubber products our armed forces must have to win as well as to save their lives.

Meanwhile . . . our job at home is to conserve to the utmost the tires we have or buy. Not a mile of precious rubber can be wasted.

Yet, as we work and sacrifice, we know that one great day we will see still more change . . . *for the better.*

New materials, new compounds, new methods being developed now . . . plus General's ability to get *the most* out of rubber . . . and its 25-year strict adherence to *Top-Quality* . . . are your promise of the finest General Tire ever built.

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WHAT WOULD YOU GIVE TO LOOK UNDER THE WRAPPER?

A tire that may last as long as your car? That won't blowout? That is far stronger, yet lighter? That is not affected by heat? That rides on less air? Synthetics, rayon, nylon? Coming from General? *Just wait and see!* Because, as General's technicians discover new ways to make rubber fight better . . . they are discovering, also, how to bring you a Top-Quality General even farther ahead of ordinary tires than the famed Generals of the past.




The
GENERAL
TIRE

"FIRSTS" A ZENITH HABIT

A GOVERNMENT official was being shown a new idea in the Zenith laboratories. In passing, he commented upon the outstanding manner in which the radio industry was effecting the rapid and continuous changes necessitated by war requirements. A Zenith official replied—he said:

"... the answer is easy. Radio is a trigger-quick, fast moving business. Concerns that couldn't 'change overnight' are out. In this industry, we're used to fighting with new

ideas—only—now we're 'fighting' Japs and Germans instead of each other."

In that statement is evidenced the condition that made possible Zenith's attainment of industry leadership. Ever increasing public acceptance of Zenith name and product resulted from a never ceasing stream of Zenith "firsts"—new features—new devices and new sets which enabled us to truthfully say to the public "Only Zenith Has This"—

"ONLY ZENITH HAS THIS"

Today you find as commonplace—essentials—of most radio sets—features first introduced to the public by Zenith—such as—

"FIRST" PUSH BUTTON TUNING

Years—yes, years! ahead of the industry—(1928) a Zenith set embodied push button selection of the station desired. Our slogan in 1928 was "Push the button—there's your station."

For over seven years, Zenith Radio Corporation has advertised on our short wave sets—"Europe, South America or the Orient Every Day or your money back." It has never been called upon for a refund.

BELOW—A FEW NEW ZENITH "FIRSTS"—"FROZEN" BY ZENITH CHANGEOVER TO WAR PRODUCTION

"FIRST" LONG DISTANCE PUSH BUTTON PORTABLE

1942 saw the national introduction of a revolutionary new portable—the Zenith Trans-Oceanic. Without increase in size or weight it gave push button operation for foreign and U. S. short wave stations—tuned in the same way as locals—and standard broadcasts too. It contained a disappearing fish pole antenna plus dual Wavemagnets—operated from battery or house current—was born of Zenith pioneering in LONG DISTANCE RADIO RECEPTION.

—AND THESE ARE JUST A FEW OF THE MANY ZENITH "FIRSTS"—

"FIRST" HOUSE CURRENT SETS

"Way back when" (1926) home radios were operated from storage batteries until Zenith offered the first set run by house current.

"FIRST" SAFETY AUTO RADIO

The only auto radio you can operate WITHOUT TAKING YOUR EYES OFF THE ROAD—or—YOUR HANDS OFF THE WHEEL—the Zenith Safety Foot Control Auto Radio. This remarkable new radio was on the FORD, NASH, MERCURY, LINCOLN-ZEPHYR, HUDSON and WILLYS. Owners of these cars will gladly demonstrate their Zeniths—give you a "preview" of "tomorrow's radio today."

"MILITARY SECRET"

Today all Zenith production enters on war needs. What we are making is a military secret. But three things we can tell you. First... we are dealing with the thing we know—radio—and radio exclusively. Second... we are learning every day—gaining new knowledge which will reflect itself in Zenith civilian products when the time arrives. Third... we now know—by first hand experience—that our Army and Navy are more than "up-to-date"—they are alert and progressive in thought and action—almost unbelievably so. This fact is a great reassurance to us here at Zenith—it commands our complete confidence as it would yours if you knew what we know.



PROPHECY

Four great industries are destined to lead this country back to normalcy after victory is won.

Planes and radio are two of the four. Radio—never a necessity on ship or train—is as essential as the engine itself to that great new form of individual and mass transportation—the airplane.



BETTER
THAN CASH
U. S. War Savings Stamps
and Bonds

ZENITH
RADIO
RADIO PRODUCTS EXCLUSIVELY—
WORLD'S LEADING MANUFACTURER

—a Zenith Radio Dealer near you is giving reliable service on all radios—regardless of make.

ZENITH
RADIO CORPORATION
CHICAGO

"Buy U. S. War Bonds—They Identify You"

AIR MAP

NOTE



Reprints of this advertisement available upon request. Address American Airlines, Inc., Dept. "H," New York Airport Station, New York.

BUY WAR BONDS

THE WAR is forcing great changes in the lives of people all over the earth. Some are temporary; others will remain.

The greatest permanent change will result from the increasing use of air as a realm for transportation. Therefore unnumbered millions of persons are re-studying geography.

But there is no map of the invisible air.

The land and sea miles that separate places remain the same. But airplanes cancel the surface barriers and change the proximity of places. Inevitably, as all peoples continue to become closer neighbors, they will have a more direct influence upon each other. No phase of our lives will be immune to the effects of this new propinquity.

The air map above shows nothing but the names and locations of places. As our guide we use a polar projection map.

Next, we remove all surface "pictures" of lands and waters, in order to emphasize the essence of what aviation means. Air is not divided into many different parts as are continents and oceans. Air is one unit, boundless and universal.

Air is much larger than all waters and lands combined, and is available, alike to all inland and coastal places, everywhere. Therefore we believe air is the dominant realm for transportation. We know that there will always be need for ships, trains and motor vehicles, but we believe that the relative value and effectiveness of all surface methods will be determined according to how well we use what only air transportation makes possible.

Fortunately for our nation's war effort, the United States has the world's greatest system

of Airlines. As one part of their war-work, they are operating numerous new routes to many foreign lands. Another part is the maintenance of an even better air transportation service on the home production front. Great as are these contributions to date, in order to win, Air Transportation must shoulder much more of the war burden.

But our air efforts must not relax with victory. Immediate development and expansion of America's aviation is necessary also in order to protect our nation at the Peace Conference. Then, either we will be dominant in the air—or we will be dominated in the post-war, air-world.

A. N. KEMP

President, American Airlines, Inc.

ROUTE OF THE FLAGSHIPS UNITING CANADA, U. S. A. AND MEXICO

AMERICAN AIRLINES Inc.



TO EVERY MOTHER IN AMERICA

Somewhere in America, tonight, a young man sits in a railroad car . . . bound for a destination unknown. He wears the olive drab of the Army, the blue of the Navy, or the forest green of the Marines.

He may be your son.

We know how you feel about that boy. We know what was in your heart when you said goodbye.

We know . . . because that boy is our son, too. And wherever he's going, we promise you this:

That to the very limit of our abilities, where he's concerned, it will never be "too little and too late." Because . . . it can blow or storm or sleet or rain . . . we'll get the supplies through. The guns he needs to do the job. The food to sustain

him and give him strength. The medical equipment, the winter clothing, the mail from home . . .

That every hour of every passing day will see a million freight cars rumbling across the land . . . carrying raw materials to factories, steel mills and refineries . . . rushing the finished cargoes of war to the ships waiting in the harbors . . .

And that with us, the men of the railroads, *your son will always come first!*

For he is the hope of America.

Tonight, mothers of America, remember these things, and listen for the whistle of the trains as they go thundering in the dark. Listen . . . and you'll hear the voice of a nation's fury . . . the battle-hymn of free men working together, fighting together, until Victory is ours.

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HE'S GOT THE "DROP"

ON EVERYTHING UNDER THE AXIS SUN!

OUT OF THE BLUE of the stratosphere he comes—a lad from the U. S. A. in a sleek silver bullet.

Wee to any Jap or Nazi that tries to slip away! This new Navy fighter has "got the drop" on everything under the Axis sun—

The blazing, blasting sock of a mighty tank—on wings that fly it higher, faster than any Navy fighter now known!

That's the Corsair—and the 2,000 horses that are its fighting heart—a Pratt & Whitney supercharged engine—are a Nash-Kelvinator war responsibility.

If, as it is said, the victory will be won by the ships that outfly the Axis—then the men of Nash and

Kelvinator can take particular pride.

For their colors have long been flying there. Swarms of British and American bombers that have been blasting the Axis are equipped with Nash-Kelvinator propellers. Yes, made by the men who yesterday built the refrigerators and automobiles for America at peace.

In this blood-bond of men at machines and men at the battle fronts is the strength of America.

They shall not fail, any more than our gallant flyers shall falter, until the last shot is fired—the last bomb finds its target in blazing Tokio.

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Now Devoted 100% to the Job of Making America Supreme in the Air.

A Case of **LESS SCRAP, MORE FIGHT**

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By changing the forging method, Buick found a way to get the same results from a steel bar weighing only 165 pounds.

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BUICK DIVISION OF **GENERAL MOTORS**

Some good news about Tin we think you should know

IT'S NO SECRET that the Japs are camped on 80% of the world's tin supply and that America is facing a critical tin shortage.

You have been asked to salvage every single tin can you use—to save every possible ounce of this vital war material. But, today, there is *good* news about the tin you salvage—and we believe you should know that news.

This is it: A new electrical process makes the tin used in tin cans go 3 times farther now than it did before.

Tin plate was formerly made by dipping thin steel sheets in molten tin. It produced a satisfactory coating, but used more tin than was really necessary.

American engineers devised a new method—*electroplating* the steel with pure tin—and the result was a coating that required only *one third* as much tin.

But the new tin plate had disadvantages. It was porous and did not provide complete protection against the acids in certain kinds of food.

Then Westinghouse stepped in.

Our research men and engineers, in co-operation with engineers of the steel industry, found a way of using *radio waves* to *heat* the dull, imper-



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Naturally, this does not mean that there is less need for you to salvage your old tin cans. On the contrary—*more than ever, tin* is needed to protect the food supplied to our fighting men all over the world.

Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa.

Westinghouse

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The railroads have a part in that job—a big part.

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Office of Defense Transportation



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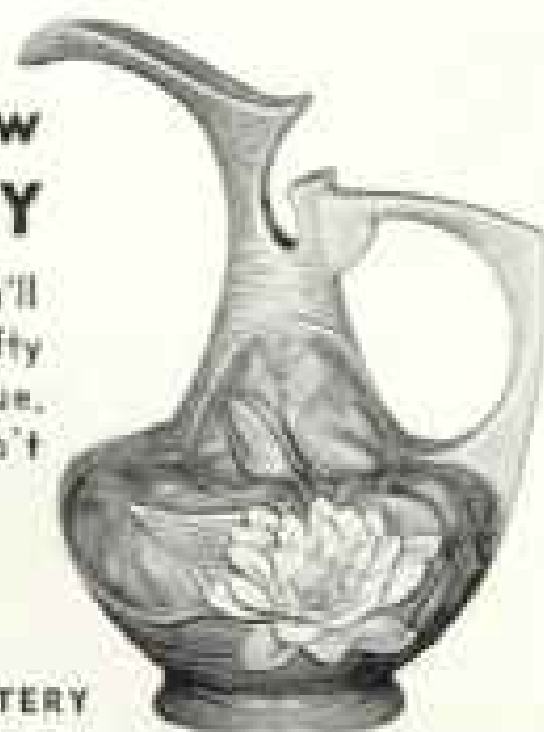
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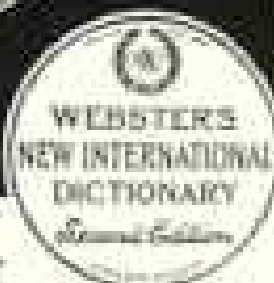
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PLAY SAFE..SOAK THEM CLEAN IN POLIDENT

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DON'T DO THIS

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DO THIS EVERY DAY

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First-class fighting pilots are made — not born.

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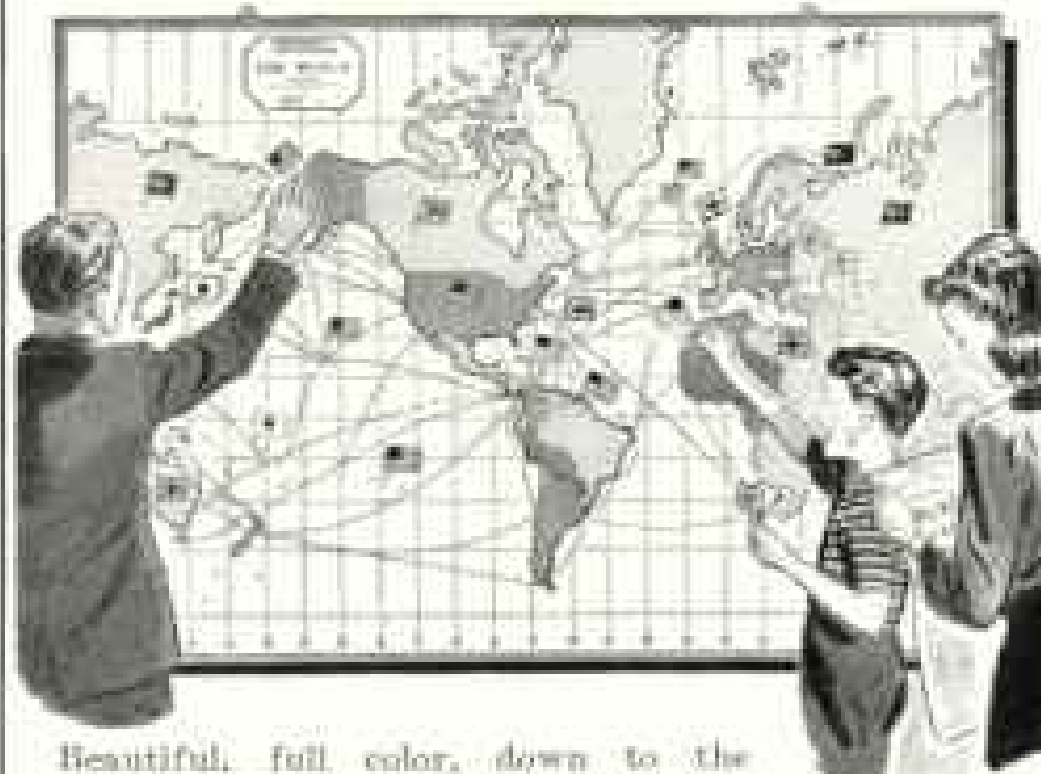
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To my fellow Americans:

One of the first duties of our people in wartime is to avoid, so far as possible, sickness and disease. Venereal diseases are such a serious threat to our military and industrial efficiency that their control is especially important. It is largely a community responsibility.

By using their influence to see that existing laws operate effectively, public-spirited citizens can do much to clean up local conditions which favor the spread of these diseases. Other steps to take are the organization of educational programs to acquaint every man and woman with the facts about venereal diseases—how to avoid them, where to go for diagnosis and treatment; and a community program of recreation and leisure-time activities for service men, industrial workers, and others.

Let every American do everything possible to defeat this enemy within our gates.



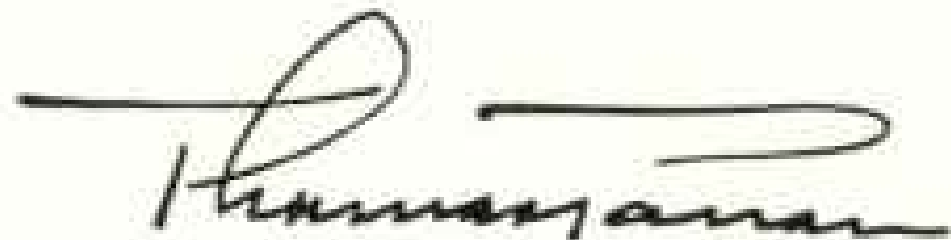
THOMAS FARRAN, Surgeon General,
U. S. Public Health Service

To the People of America:

Every community must organize its health forces against the venereal diseases. They can be controlled like other epidemics.

For the individual, the solution of this problem is a personal matter of basic clean living — of avoiding the sources of infection.

If every person in our country accepts full personal and community responsibility, we shall have tremendously improved national health and greater strength in prosecuting the war.



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Metropolitan Life Insurance Company
(A MUTUAL COMPANY)

Frederick H. Eckert, CHAIRMAN OF THE BOARD Leroy A. Lincoln, PRESIDENT
1 MADISON AVENUE, NEW YORK, N. Y.



Seventh National Social Hygiene Day is being observed on Wednesday, February 3rd, 1943. The American Social Hygiene Association headquarters, 1790 Broadway, New York City, will gladly send you literature and full particulars.

... and we made a Sapphire!

YOU'RE LOOKING at a sapphire being made in the incandescent heat of a specially designed furnace... a synthetic sapphire... better than the natural gem. It takes hours to grow one of these sapphire boules.

What's so wonderful about it? Sapphire is necessary for the security of this country. Out of this jewel stone are made hard, long-wearing bearings for precision instruments. The various precision devices of a modern battleship require more than 4,000 jewels; about 100 more are needed in fire-control mechanisms. Modern pursuit planes and bombers require up to 100 sapphire bearings in their instruments.

In 1940, this country was completely dependent upon Europe for sapphire jewels. The call went out for American-made sapphire to meet this nation's needs.

Because we at Linde are experienced in the production of gases and in the accurate control of high temperature gas flames, we volunteered to try to make sapphire. After two years of experimental research, we learned how to produce the high-purity raw materials needed and also how to make sapphire from those materials. Today, we make more synthetic sapphire than this country ever imported from Europe... enough to meet all industrial and military needs. Thus America need never again be dependent upon an outside source.

Right now, we make colorless sapphire because colorless jewels make harder bearings. No sapphire is available for anything but war production. In the future we stand ready to make ruby and other gemstone materials for the jewelry trade... and for you.

This research development by The Linde Air Products Company is paralleled by other recent achievements of Electro Metallurgical Company, Carbide and Carbon Chemicals Corporation, and National Carbon Company, Inc.—all of which are Units of Union Carbide and Carbon Corporation.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation



GENERAL OFFICES: NEW YORK, N. Y.

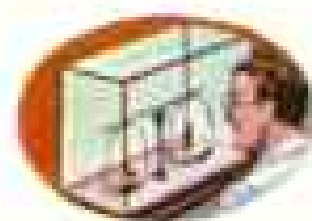
Offices in Principal Cities



HIS BEARINGS ARE RIGHT
—Chronometers, compasses, and other navigational aids must be rugged as well as precise. Sapphire bearings can "take it."



FLYING JEWELS—Pilot's lives and the success of their missions depend upon accurate instruments. Sapphire bearings assure accuracy.



LABORATORY WARRIORS
—Delicate balances, fine instruments, and other important precision equipment of the research worker need sapphire jewels, too.



YOURS IN THE FUTURE—Flawless gems... such as rubies, sapphires, and spinel... made by this same Linde process... will be available for jewelry in the future.

**BUY UNITED STATES WAR BONDS
AND STAMPS.**

That Extra Something!

...You can spot it every time



Of course the Armed Services get Coca-Cola just as they get all the good things that are wanted and needed to do each job.

Coca-Cola has that extra something to do the job of complete refreshment. It has a taste that's uniquely satisfying—a quality that's unmistakable. And there's a real reason for that. Coca-Cola holds an original secret of unique refreshment... a finished art in its making... a blend of wholesome flavors that sets it apart.

Your experience has discovered this special something in Coca-Cola... delicious taste with no cloying after-taste... refreshment in the finest form. The only thing like Coca-Cola is Coca-Cola, itself.

It's natural for popular names to acquire friendly abbreviations. That's why you hear Coca-Cola called Coke. Coca-Cola and Coke mean the same thing... the real thing... "coming from a single source, and well known to the community".



No matter where fighting men get together, at home and abroad, it won't be very long before they'll connect with Cokes. In long days crowded with work and dimes, they know that ice-cold Coca-Cola offers energy-giving refreshment.



The best
is always
the better buy!



From musical amateur to England's greatest conductor is the success story of Sir Thomas Beecham. Early exposure to good music was his inspiration . . . the spark which kindled his genius. Man of fine education, in music he is largely self taught.

So marked was his early natural ability that at the age of ten he conducted an amateur orchestra. Next came a wide professional experience . . . first in opera, then as conductor of his own symphony orchestra.

His profound versatility is evidenced by his long

list of successes . . . as operatic impresario . . . as director of Covent Garden . . . as symphonic conductor . . . and as founder of the London Philharmonic Orchestra.

Like many another great artist he finds renewed inspiration and pleasant relaxation in listening to his Magnavox radio-phonograph.

For in its rich, mellow tones he hears musical reproduction lifelike and true.

You, too, will thrill to its realistic clarity and fidelity whether you select radio or record programs.



MAGNAVOX



The fine craftsmanship which won for Magnavox the first Navy "E" award and White Star Award Citation among instrument maker factories has made these radio-phonographs the first choice of discriminating buyers.

"Where shall we stay?"

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Bismarck Hotel. Randolph at LaSalle. Chicago's exclusive hotel. Renowned for famous cuisine. Convenient central location. Stairway rooms.

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NEW YORK

New York City

The Biltmore. Madison Avenue at 43rd St. All that is best in atmosphere, appointments, service. Special Rates for Service Men.

The Commodore.—Right at Grand Central and Air Lines Terminal. Near all attractions. 100% comfortable, outside rooms all with private bath.

Hotel Edison.—48th to 47th Sts. at B'way. One of New York's Newest. 200 Choice Outside Rooms, Bath, Radio, Circulating Ice Water. From \$2.00.

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Hotel Lincoln.—48th to 46th Sts. at 6th Ave. 140 Rooms—\$2.50 Up. Four Fine Restaurants. Direct Subway Entrance to All Points of Interest.

Park Lane Hotel. Park Ave. at 89th. Convenient, distinguished. Single rooms from \$3; double from \$5; suites from \$12. Apartments, permanent occupancy.

The Plaza. A traditionally famous hotel. Facing beautiful Central Park. Single from \$5; double from \$8. Henry A. Ross, President.

Hotel Seymour. 37 W. 44th St. Near Fifth Ave. A fine small hotel with a personal welcome, side-street quiet, midtown convenience. Single \$4; Double \$7.50.

The Waldorf-Astoria. Park Ave., 89th to 100th. "Much more for little more. So large a difference in the hotels... so small a difference in the bill."

*DUES: Annual membership in United States, \$1.50; Canada, \$4.50; abroad, \$4.50; life membership, \$100. Remittances should be payable to National Geographic Society. Those from outside of continental United States and Canada should be made by New York draft or international money order.

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PLEASE FILL IN BLANK BELOW. DETACH, AND MAIL TO THE SECRETARY

1943

To the Secretary, National Geographic Society,
Sixteenth and M Streets Northwest, Washington, D. C.:

I nominate _____

Occupation _____

(This information is important for the records)

Address _____

_____ for membership in The Society.

Your Red Cross was ready!

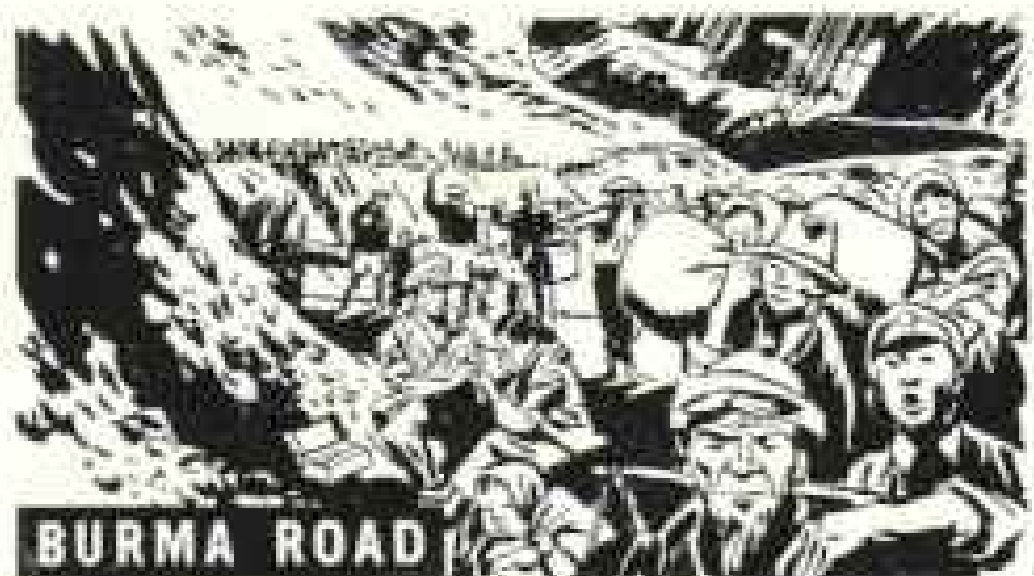
Here are a few examples of how the American Red Cross meets every crisis of Peace or War, wherever it occurs.



When the first bombs hit Pearl Harbor, Red Cross workers headed by Alfred Castle opened emergency hospitals. Blood donors were enlisted, 10,000 in all. Information centers helped anxious service men to find their families.



Even before the Philippine invasion, Red Cross field man Irving Williams helped prepare Manila for evacuation and saved many lives by staging practice alerts and chartering a ship which later took out 1,200 refugees.



During the Japanese invasion of Burma, Walter Wesselius of the Red Cross traveled up and down the crowded Burma Road, giving food and medicines to Chinese soldiers and civilians.

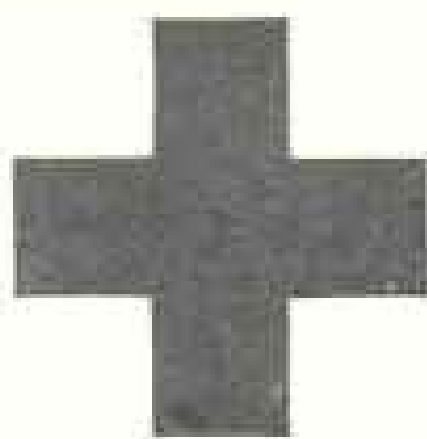


After working day and night to help Americans escape air raids in Yugoslavia, Paul Thorn, Red Cross worker, was finally captured by the Nazis in Greece while aiding those trapped by swiftly advancing Panzer divisions.

The demands upon the Red Cross are being multiplied daily. A year has passed since the American people were asked for financial support. Red Cross funds are getting low. March is Red Cross month. Give generously!



When three U. S. cruisers were sunk off the Solomons, Red Cross Field Director Alfred Campbell distributed clothing and kit bags containing cigarettes, soap, razors and other comforts to half-naked and exhausted sailors who had lost everything.



**AMERICAN
RED CROSS**

"AN URGENT CALL FOR YOU"

"Please do not make Long Distance telephone calls to war-busy centers unless it is really necessary."

That helps keep the lines open for war messages and war's on the wires these days. When we can get telephone materials again we'll give you all the wires you desire. Many thanks.



BELL TELEPHONE SYSTEM





Call it Lightning! **- SAY THE PILOTS**

Nobody had time to name this Lockheed fighter plane when it was born. They just called it by a number, P-38.

Then the pilots sent it climbing over eight miles straight toward the stratosphere, up where even the highest-flying bombers couldn't go. They brought it screaming down out of the clouds like forked vengeance. They jammed down the throttle and it flew faster than any fighter ever flew before. They pressed the trigger-button and saw how *concentrated* fire-power from its cannons and machine guns could rip apart anything on wings—and there was only one name for it: *Lightning*.

So that's its name, a name it earned from British and American pilots alike, a name to watch: Lockheed *Lightning*. Lockheed Aircraft Corporation . . . Vega Aircraft Corporation . . . Burbank, California.

**for protection today, and
progress tomorrow. look to**

Lockheed

FOR LEADERSHIP

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