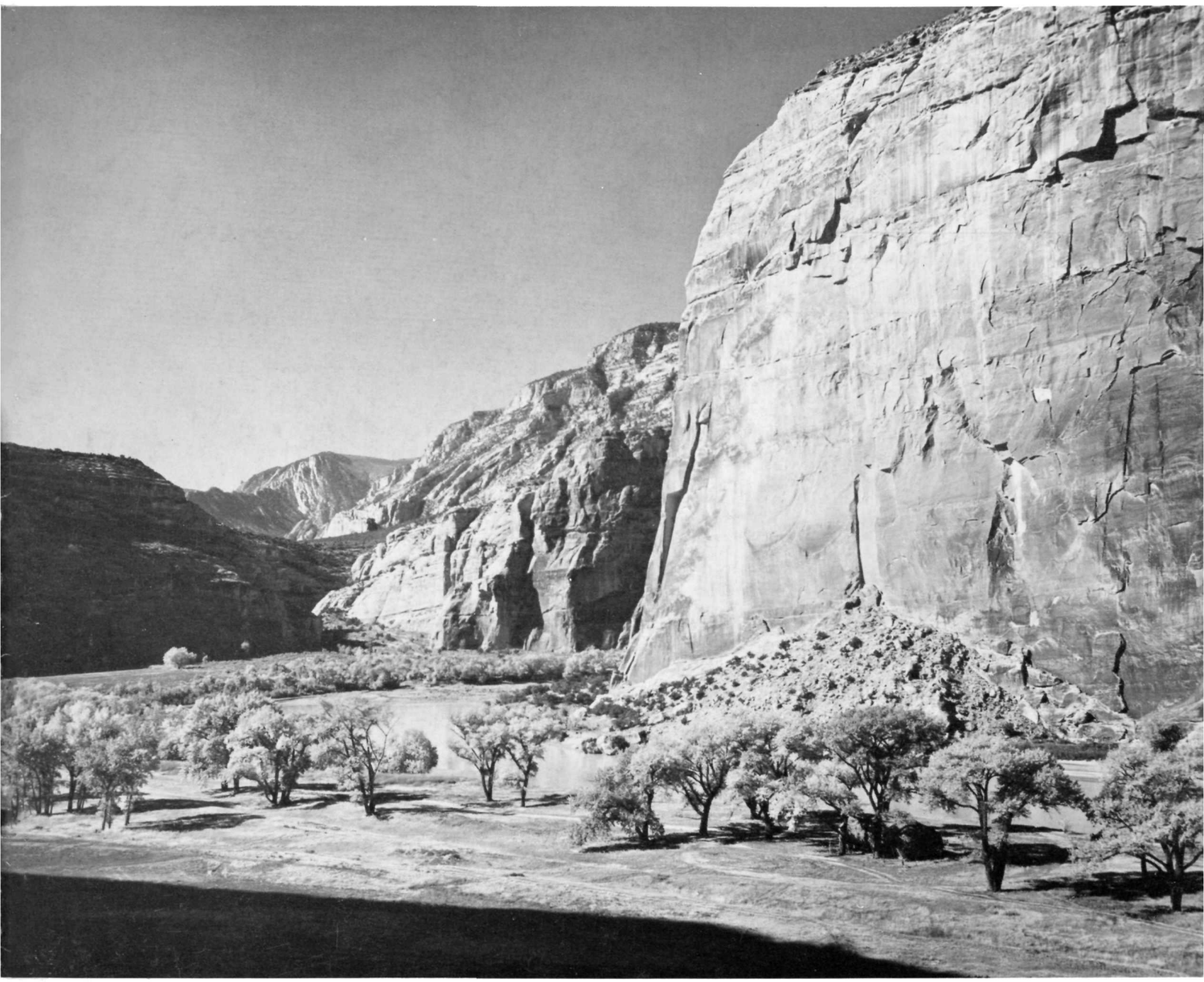
NATIONAL PARKS *Magazine*



Steamboat Rock, in Echo Park:
Dinosaur National Monument, Colorado-Utah

September 1969

FIFTIETH ANNIVERSARY NATIONAL PARKS ASSOCIATION

Alaskan Prospect

THE BREAKOUT OF PETROLEUM IN ALASKA COMPELS AN examination of many resource-management problems of the forty-ninth state.

When statehood was conferred ten years ago, a dowry went with it: the right to select 104 million acres from the unreserved federal public domain. Alaska promptly chose, among other areas, the entire central portion of the Arctic seacoast between the naval reserve on the west and the wildlife range on the east. The region was well known to contain oilfields; this discovery is not new.

The state granted leases, mainly to three large oil companies that have combined to exploit them. The federal government might have held these resources as military reserves or exacted higher royalties. A new administration having come to power, the signals appear to be Go; highly productive wells have now been discovered.

Northern Alaska, for several hundred miles south of the Arctic, is treeless tundra, roamed by large herds of caribou, wolf packs following. The surface is moss, lichen, low-lying vegetation, organic matter a few inches deep—highly fragile. Beneath it lies the frozen subsoil called permafrost, sometimes 1,500 feet deep, heritage of the ice age. When the tundra is broken by machines—tractors, trucks, bulldozers—the heat of the sun during the long arctic days melts the permafrost, and all the world sinks into a morass.

The oil in the pipeline will be hot and must be kept hot if it is to flow. The right-of-way may turn to quagmire, to broad waterways, blocking the caribou migrations, entailing heavy economic burdens for state and industry. Ecological knowledge is limited, but some things are known: Winter roads should be built, if at all, of snow, piled and packed; all-weather roads, of gravel laid on the tundra; the pipeline might best be built on piling, insulating the tundra.

These problems and possible solutions need further analysis; as we write, the permit for the line has not yet been granted; we have urged President Nixon to defer action until after a public hearing at which the advice of scientists would be sought. The people of Alaska, and the American people as a whole, will be demanding such hearings increasingly in the future; the pipeline would be a good place to start.

Oil is a problem elsewhere in Alaska. Around the margins of Cook Inlet, near Anchorage, platforms have been built for drilling and extraction; oil spills and the dumping of chemicals have been reported; salmon runs are said to be declining. The state and federal governments together have power to regulate these operations; they should exercise that power. Nearby, invaluable rookeries of waterfowl are in danger—the coastal colonies of puffins, for example—because oil and feathers do not mix; the state and the nation have a right and a duty to protect this wildlife against irresponsible exploitation.

The gigantic Alaska brown bear is in trouble on the Katmai Peninsula, down toward the Aleutians, for another reason: overhunting. Game managers report that it is now unusual to see a full-grown brown bear at all; when seen, they have usually strayed from Katmai National Monument, where they are protected. If we are talking about wildlife management in any significant sense of the term, the state should protect this resource with a view to restoring and maintaining an abundant population.

The barren-land grizzly, sought by too many trophy hunters, lives under heavy pressure; responsible studies indicate that if shooting is tightly restricted, in view of the probable survival of spacious habitat, despite settlement, the northern races of grizzly may survive in perpetuity. Such protection in our judgment is an obligation of the state and federal governments, on the discharge of which all conservationists should firmly insist.

Alaska provides one of the last refuges for the American eagle. Nests may be seen along the spectacularly beautiful fiord-like inlets that reach into the national forests; loggers are asked to spare the trees in the 600-foot circle around the nests; whether the birds, thus encircled, will survive is doubtful. Because the nesting is usually close to the shoreline, a strip broad enough for genuine protection should be left along the water. The Forest Service has authority to establish and enforce this requirement but has not done so.

And speaking of the national forests, in our view they are being cut too heavily, too fast, and by the wrong methods. In terrain where a good system of access roads for perpetual harvest could easily be built and maintained, permitting small-patch or individual selection, clear-cutting in immense acreages is the standard. The excuse given is blowdown where thinning is done; we doubt that enough thinning has been done to know what results; and blowdown occurs on the margins of the clearcuts. A thorough review of silvicultural practice should be undertaken by an impartial agency.

The economics of the timber-cutting contracts needs investigation. Methods of computing minimum stumpage prices for sale, based on estimated market prices for the finished product at the mill (under monopoly or oligopoly conditions), are calculated; deductions are taken for cutting, hauling, and manufacture; 14 percent is deducted for profit and risk; the result is probably a heavy subsidy to the industry at the expense of all Alaskans and other Americans. There is reason to believe that the data on which the computations are based are quite inadequate; perhaps giveaway, not subsidy, is the proper word; an investigation is in order in the public interest.

The new oil and timber rush differs from the Gold Rush of 1898. The old stampede was a clamor of sourdoughs, lone men out for themselves, enduring hardship and danger, substance of a chaotic but free society. The new development is the work of great corporations within which roughnecks and engineers alike are cogs; to justify these operations, they must be conducted with only a partial eye to profit, with a view mainly to sound public policy. Management and government alike will be called upon by the American people more and more sternly to discharge that responsibility.

Conservationists and environmentalists have a job cut out for them with respect to Alaska. The first item on the agenda is agreement on a program for the protection of all natural resources of Alaska, from puffins, eagles, bears, and other wildlife, to tundra, forests, and river basins—yes, and the mineral resources as well. The second item is to get organized and financed in a way they have never done before, with a view to convincing the corporations and public agencies that we mean business in this matter of protecting the world we all inhabit. —*A.W.S.*

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Cover photograph by Martin Litton

Within the national park system there are a number of so-called nature monuments which possess many of the criteria used in measuring national parks. Dinosaur National Monument, lying partly in Colorado and partly in Utah, is one of these. Remembered by the more mature conservationist as the theater of battle wherein a proposed high dam for the Green River within the monument was defeated after a bitter struggle, as well as for the stark beauty of its colorful rocks and deep canyons, Dinosaur has furnished science with a wealth of information on the remote history of the earth; in particular, on that part of history during which the earth's ruling animals were not men but reptiles.

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The responsibilities of the Association relate primarily to the protection of the great national parks and monuments of America, in which it endeavors to cooperate with the Service, while functioning also as a constructive critic; and secondarily to the protection and restoration of the natural environment generally.

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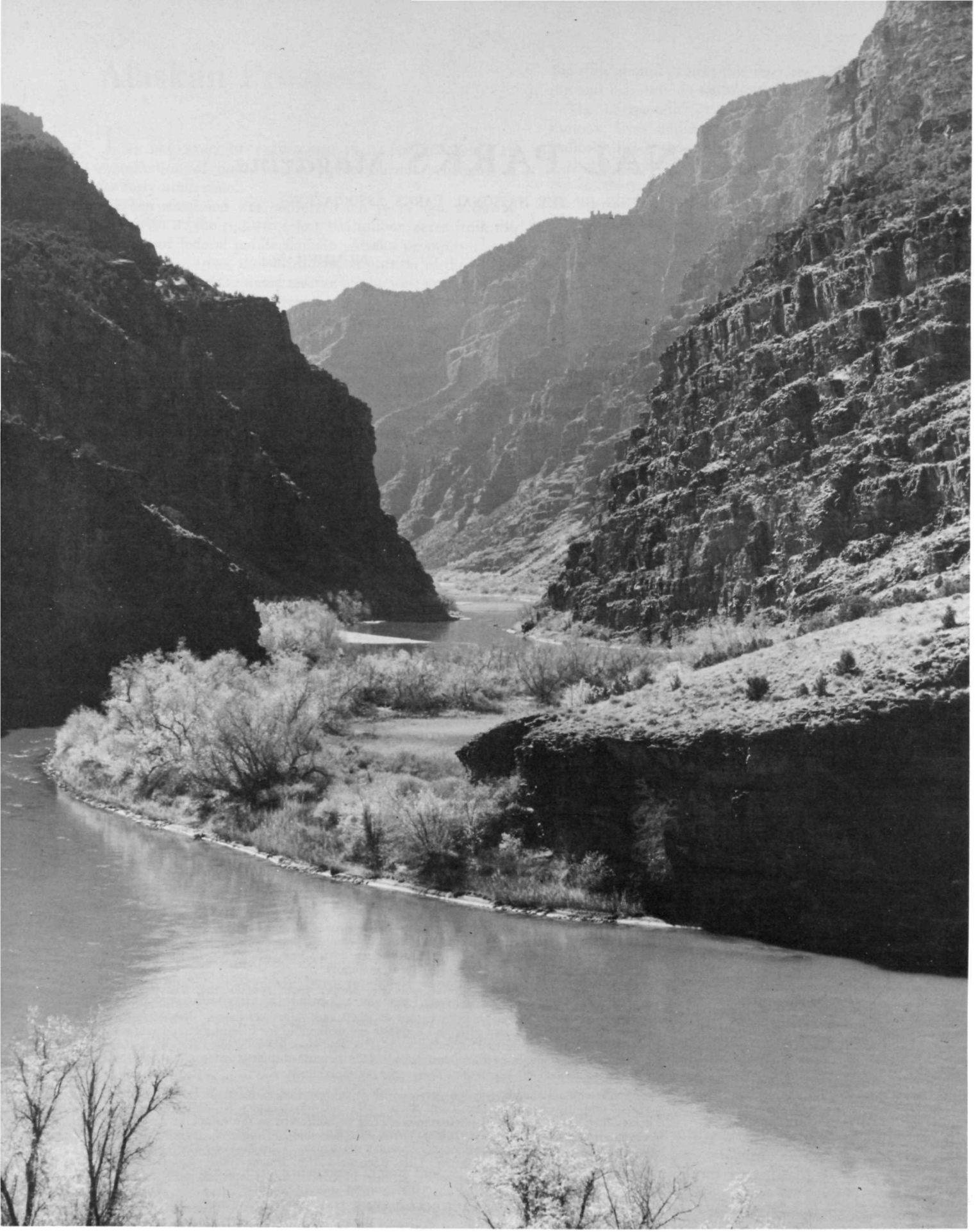

DINOSAUR

MONUMENT TO THE AGE OF REPTILES

By O. F. Oldendorph

DINOSAUR NATIONAL MONUMENT STRADDLES THE UTAH-Colorado state boundary some 30 miles south of the Wyoming line. On a map, the monument has the approximate shape of an inverted T, with its vertical stem centered on the southward-flowing Green River. The eastern half of the cross of the T is split lengthwise by the Yampa River flowing west from Colorado; the western half follows the combined rivers.

The monument reached its impressive size of 326 square miles in two measures that combined areas of different interests. First step in its creation was taken in 1915, when a scant 80 acres was set aside to preserve a deposit of fossilized dinosaur bones. The "bone quarry" visitor center is located about 15 miles east of Vernal, Utah, a town in which one can scarcely escape the dinosaur theme.

At the monument the visitor center is constructed against a natural cliff wall—in fact, the cliff forms one of the longer walls of the building. Entrance is by an external spiral ramp that ascends to the second level of the building where a long inside balcony overlooks the work that is being performed on the cliff wall, which is of gray sandstone inclined at an angle of about 45 degrees. On its face technicians work with a variety of tools, ranging from pneumatic drills to dental picks, to remove the rock that surrounds bones that were embedded in the original sand millions of years ago. This layer of sandstone—more precisely, the Morrison formation—within Dinosaur has been matrix of the greatest concentration of dinosaur bones ever discovered by man.

The Green River, flowing south out of Wyoming, enters northeastern Utah and Dinosaur National Monument by way of the Gates of Lodore, through which explorer John Wesley Powell and his intrepid party passed a hundred years ago on their historic trip down the Green and Colorado rivers.

Photograph by the author

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Dinosaurs, the "terrible lizards" of the geologist past, seem to hold a fascination for twentieth-century man. From time to time Hollywood has revived the theme of a land forgotten by time, where shipwrecked or airwrecked men find themselves pitted against survivors of the Age of Dinosaurs.

Museum exhibits and both adult and children books deal with the life, environment and appearance of the dinosaur, and even kits of plastic parts that may be assembled into models of the creatures have been placed on the market. For serious readers one of the most authoritative yet highly entertaining volumes on the dinosaur was written by Dr. Edwin H. Colbert of the American Museum of Natural History under title of *Dinosaurs: Their Discovery and Their World*, and published in 1961 by E. P. Dutton and Company.

Our knowledge of the dinosaur reached such a sophisticated level, however, only in fairly recent times. In 1842, fossil remains commonly found in Europe and North America were recognized as belonging to a distinct group of reptilian animals, and study revealed that the creatures ranged in size from the 40-ton monsters which reached a length of 80 feet to those that walked on two legs and were about the size of a chicken. Their dominance on earth spanned a period of some 140 million years, and ended perhaps 60 million years ago. Since dinosaurs disappeared long before the advent of man, our knowledge of them comes from preserved skeletons which have been found in places like Dinosaur Monument.

How did the monument become the resting place for so many dinosaur remains?

Photograph by the author

One of the national park system's most unusual visitor centers is found at Dinosaur Monument, where a cliffside of Morrison sandstone, studded with dinosaur bones, forms the far wall of the building.

Studies point to a delta deposit at the mouth of a stream or river. In flood times, dinosaur carcasses (victims of flood, natural death or animal violence) were deposited on the banks and sand bars at the river's mouth. The river apparently gathered remains from a large watershed, just as today our Missouri and Mississippi, at flood stage, carry debris from widely scattered origins. Some of the bodies transported by the prehistoric river sank into the quicksand. Some were torn and scattered by other carnivorous reptiles or by the washing of the stream, and parts disappeared into the quicksand. Some were probably cast up on the relatively dry shores to decay without a trace. Of those buried and sealed in the air-excluding sand, porous bones were saturated by lime and silica bearing waters that substituted permanent minerals for bone—in short, they were "petrified." The sand deposit was eventually itself buried and converted to rock, protecting the transformed bones in a stony vault. In time the horizontal layers were up-tilted by earth-movements, and the erosion of geologic processes once more brought the bones to the light of day. It remained for a knowledgeable man to discover them.

Indians were apparently attracted by the curious "rocks," and they carried away fragments later to be found in old camps among arrow points and other stone artifacts. Father Escalante passed through the Dinosaur Monument area, but did not see the bones. Sheep herders and cattlemen saw them, but were largely unimpressed. Major John Wesley Powell, in 1871, wrote of "reptilian remains" in the region, but they received no further attention at the time. In 1893 a scientist from the American Museum of Natural History discovered dinosaur bones in the Morrison formation south of the present national monument.

It remained for Earl Douglass, a paleontologist from Pittsburgh's Carnegie Museum, to investigate the Morrison formation in 1908. He was searching for fossil bones in what is now the monument and, on August 17, discovered eight tail bones lying exposed in perfect juxtaposition. Developments proceeded at a rapid pace. A cut 100 feet long was soon made along the face of the uptilted sandstone layer. Rails were laid and mine carts were used to carry out the rock cuttings. By 1921 the cut had been deepened to 60 feet, and was 400 feet long. Skeletal remains were exposed and were removed in blocks of the stone matrix. After being wrapped in protective layers of burlap soaked in plaster of Paris, the blocks were shipped to the Carnegie Museum and to other institutions for study and mounting.

In 15 years, 350 tons of bone were removed. There were parts of 300 reptilian individuals; but only one nearly complete skeleton was found. From assorted parts, however, two dozen reasonably complete skeletons were assembled. Fourteen different species of dinosaur, three turtles and two crocodiles were represented in the finds.

In 1953 the National Park Service undertook a new approach to the recovery of the fossil bones; one that would allow the public to see the bones, to note their locations and orientation, and to appreciate the painstaking work required to recover such natural treasures. It was decided that no more bones would be removed from the cliff wall, but that the surrounding material would be largely removed, allowing the fossil bones to stand in high relief. Since then technicians have worked at the task and today a large area of the cliff wall is studded with remains of the reptiles that found this region their last resting place, millions of years ago.

SUCH IS THE SCENE that greets today's visitor as he walks the second floor balcony of the visitor center. Recorded messages tell the geological story of the bone quarry, of its discovery and its development. The Morrison Formation here is eight to 12 feet thick, and estimates are that present operations can be carried on for about 15 years before the known bone deposits have all been brought to view.

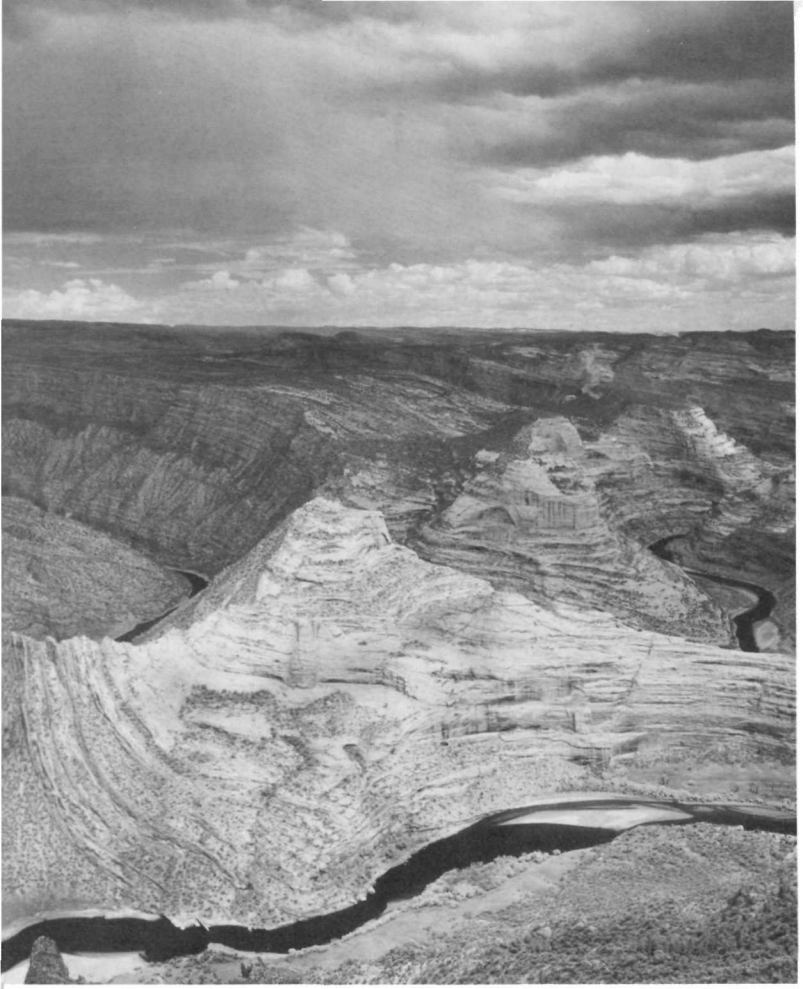
The ground floor of the building contains complete laboratories and shops for studying fossil remains and for necessary maintenance work. Interpretative displays and further recordings explain the features of this unusual unit of the national park system. Dinosaur Monument not only allows a glimpse into the prehistoric past but lets visitors see the science of paleontology in action—a rare opportunity indeed for the average vacationing American.

My wife, Martha, and I had known of the bone quarry at Dinosaur Monument for a number of years. We had assumed that the entire monument was devoted to the removal of fossil bones, or at least to the preservation of

Photograph by National Park Service

At the visitor center two of the earth's youngest inhabitants marvel at the size of a thigh-bone which once helped carry Apotosaurus louisae. *Below, a technician works with the utmost care and patience uncovering fossil bones in full view of the visiting public.*

Photograph by the author



Photograph by Gene Ahrens

Aside from its world prominence as a locality for fossilized dinosaur bones the monument possesses other phenomena of great geological interest. The Mitten Fault, developed along a line of downwarping in the plateau country of the region, stands out in remarkable detail at lower left in the picture, upturned sedimentary beds towering over the Green River. The Yampa, near confluence with the Green, is at far right.

fossil sites. It was with a degree of surprise that we found the monument administrative offices located at Dinosaur, Colorado, almost 30 miles from the bone quarry. We were further surprised to find that this was the southern gateway to a vast expanse of beautiful but rugged and primitive canyon and river country. Most of Dinosaur's 205,000 acres fall into this category; the original monument of 80 acres encompassed all of the known fossil areas. The two dissimilar areas of the monument were joined into one administrative unit for economical management.

We left the administration building in mid-afternoon in a four-wheel-drive vehicle and headed north into the monument on a paved road. After 10 miles we came to a dirt road and a sign "Echo Park" that pointed off to our right. The road was twisty and steep, and a sign near its beginning warned "Impassable when Wet." Our weather outlook was good and we started down the hill. About a thousand feet below we could see the dark red line of our road as it made its way across several miles of open sage-dotted country. We dropped steeply; not much later, we had crossed the sage country and started another descent that paralleled a little creek that was making its way to the Green River below.

Echo Park was 10 miles from the paved road. We reached it in late afternoon as the sun was ready to dip below the edge of the higher country we had left behind. Fine old cottonwoods with the golden leaves of October covered the level area of the park that was edged on the right by steep rocky hills. The Green River murmured on our left at the bottom of a sloping bank. The 700-foot wall of Steamboat Rock made a backdrop on the opposite side of the Green River above a narrow sandy beach at the water's edge.

It did not take long to discover why this delightful camp area had been named Echo Park, for when we slammed the Land Rover's door the sound came back to us from Steamboat Rock in a couple of seconds. We found that if we were quick about it we could shout a sentence of four or five words before the first word was clearly echoed.

We explored on foot in the gathering dusk. Echo Park was several hundred feet long, and extended back from the river perhaps two hundred feet. We found a small ranger station, closed for the season; a large pile of logs for firewood, and a hand pump for drinking water. A fence around the pump kept cattle from its immediate area. We had already discovered the camp tables and fireplaces, and had set up camp at one of the sites before setting off on foot.

Near the far end of the park the Yampa River, flowing from the east, joined the Green coming from the north; and the actual confluence was barely out of sight of our camp. As we followed a wide opening between the cottonwoods on our way back to camp, we heard a swish-swish-swish overhead. The noise had a rhythmic beat and a gentle softness that was difficult to identify immediately. We looked up to see a compact group of 10 or a dozen large birds flying below the tops of the cottonwoods but following the same wide space between them that marked our path. They disappeared into the dusk.

NEXT MORNING we found they were Canada geese, and that they had "camped" on the beach at the foot of Steamboat Rock on the other side of the river. They were a bit upstream from us, but close enough that we could watch them without binoculars. They were in a group and all but two were crouched on the sand with their heads hidden from view. At each end of the group stood an alert bird, head held high, so that we could see the white cheek patches and their black necks. They seemed to be sentries watching over their resting com-

panions. There was no motion in the group while we watched for 10 minutes, but then one of the sentries uttered a series of honking calls that aroused the others and, within seconds, there were answering honks. Martha suggested "It sounds as though they are saying they are ready for take-off." They may have been doing just that; for, within a quarter of a minute, they were led into the air by the bird that had aroused them. They flew downstream and climbed to 20 feet above the river. When we last saw them they had assumed their characteristic V, and had swish-swish-swished out of sight past the vertical edge of Steamboat Rock. They had been our only camp companions at Echo Park.

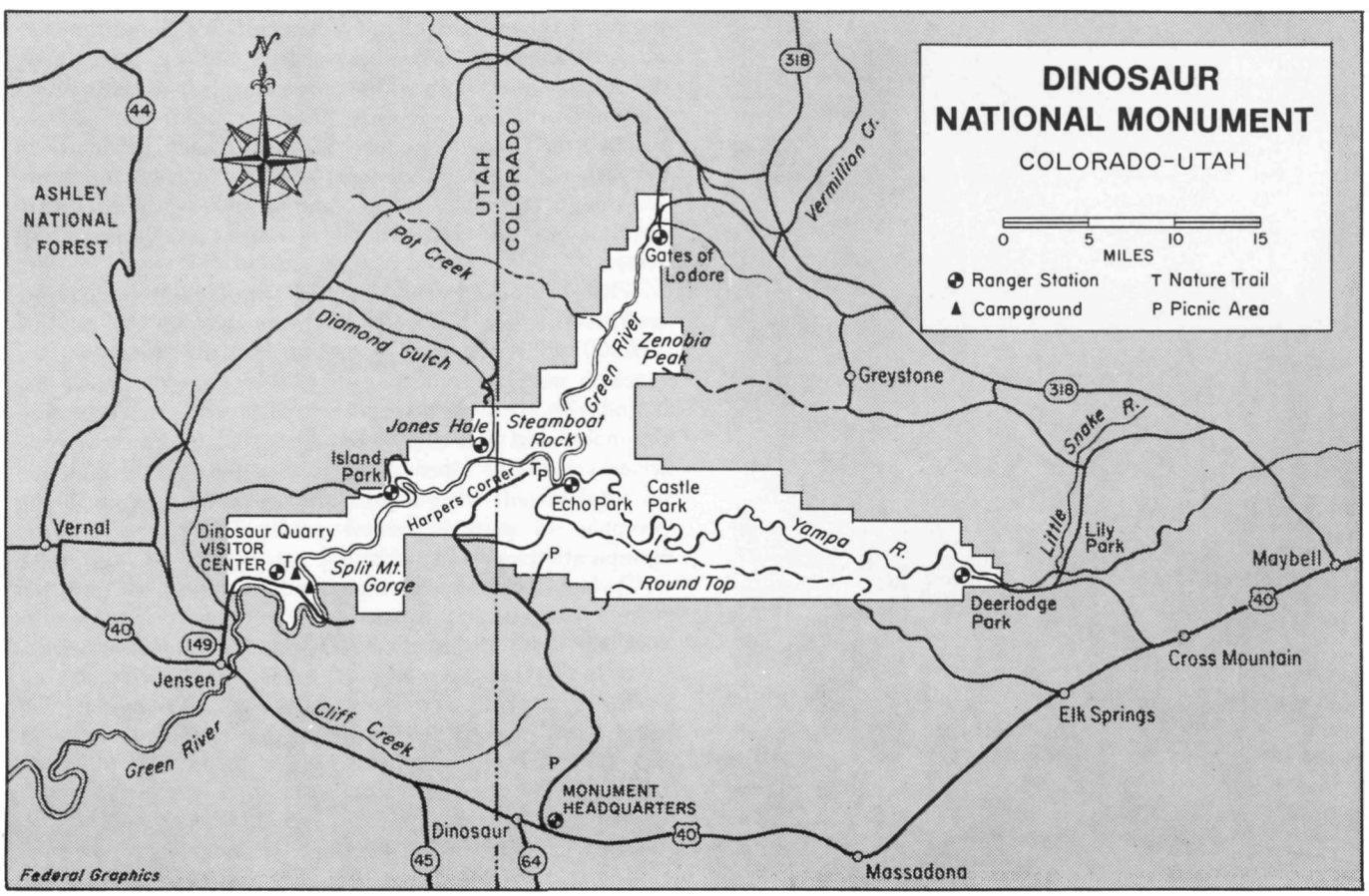
JOHN WESLEY POWELL is best known for his explorations of the Grand Canyon a century ago, but he also explored the Green River country. We were interested in reading his description of Echo Park later. He said that it was just the right size for a farm but was accessible only by way of the Green and Yampa rivers, except for an Indian hunting trail that led down through a side canyon. The jeep trail we had followed was undoubtedly the outgrowth of that hunting trail.

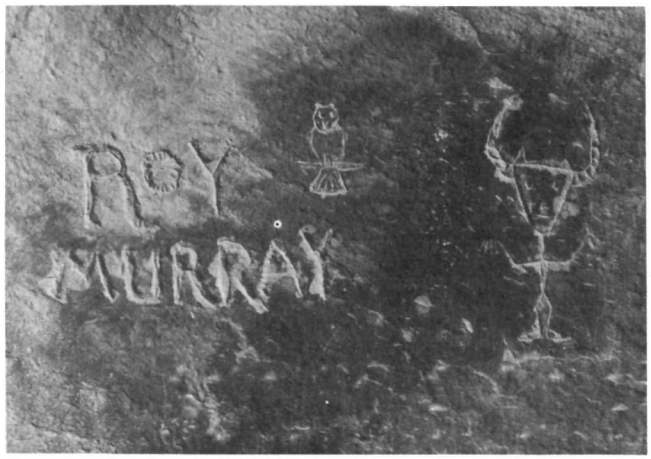
Later, when we were again near the bone quarry, we questioned a ranger concerning Indian petroglyphs in the monument. He directed us to the road to Island Park. In the morning we drove about 15 miles on dirt road, almost all outside the monument; but soon after recrossing the boundary we paralleled high red-brown cliffs on our left. Though they were a couple of hundred feet away we could make out the lighter outlines of prehistoric petroglyphs that had been pecked into the dark face of the cliff. The figures were scattered over a considerable length of the cliff; some were immediately above the talus slope, but some required a climb over large rocks to reach them. They were a fascinating group and included a number of kachina-like figures, many of them almost life-size.

It was distressing to discover that some of the pictures had been disfigured by rifle bullets. Some one had probably fired at the figures from the road and had not minded that he left these prehistoric works of man permanently cratered. There were also names and initials among the petroglyphs. "Inconsiderate and unthinking" were the most charitable terms that crossed our minds as we viewed the senseless and juvenile vandalism.

About 10 miles past the petroglyphs our trail offered a view of Island Park from several hundred feet above the river. The Green made a wide, swinging loop and divided around large islands. Golden cottonwoods reminded us of

Mr. Oldendorph, free-lance writer and photographer of Coronado, California, is at home in the "back country" of the American west. His by-line has appeared many times in this Magazine over articles on the western national parks and monuments.





Inevitably there appears the "artwork" of more recent times. . .

On the road to Island Park there are groups of prehistoric Indian petroglyphs, an example of which is shown below. Pictures were pecked into the dark, discolored surface of the rock and appear in light outline. Author's wife here surveys a tall, kachina-like figure which was drawn to near life-size.

our camp in Echo Park, and so did the half-dozen groups of Canada geese that we were able to identify on the sandy banks or in the water. Using the binoculars, Martha spotted a large buck deer wading through the water toward one of the islands.

That afternoon our wanderings took us back to the campground, near the bone quarry, for the night. Then there was one night in camp in Ashley National Forest in the Flaming Gorge country and another night in Brown's Park, camped on the banks of the Green River. The latter two camps were outside the monument, and during the night at Brown's Park the temperature dropped to 20° F.

Our next objective was the Gates of Lodore, located in the far northern part of the monument. We found that our maps of this area were inconsistent and incomplete; we drove for three hours without knowing just exactly where we were or where we were heading; but eventually we reached the Gates of Lodore. Here the Green River passes between rocky walls that must be close to 1000 feet high. We found a ranger station and a well equipped campground, but the cottonwoods were past the peak of fall color.

When we looked at the map of Dinosaur Monument we realized that we had seen but a few details in its vast 205,000 acres. We were impressed that the points we had reached were, except for Echo Park, barely inside the boundaries. There is a wealth of spectacular scenery within the monument that cannot be seen except from the rivers. River trips and river camps are popular, but must be undertaken only with administrative permission or in the company of an experienced guide. The Green and the Yampa are tricky and swift.

We had definite misgivings about a proposal to pave the primitive road that traverses the monument in an east-west direction to intersect Highway 40 at Elk Springs, Colorado. A network of paved roads would surely destroy much of the primitive nature of Dinosaur. We liked it very much—just the way it was during that October. ■

"There had to be a good deal of wandering away from the shortest distance between two points"

in

FINDING A ROUTE FOR THE BLUE RIDGE PARKWAY

By S. HERBERT EVISON

THREE YEARS BEFORE THE FIRST STEPS WERE TAKEN TOward creating the Blue Ridge Parkway, in Virginia and North Carolina, the National Park Service had faced, on a comparatively small scale, problems of route-and-land selection similar to those it would face on a grander scale in the Blue Ridge. The small-scale prototype is known as the Colonial Parkway, which is just 22 miles long and extends from Yorktown to Jamestown in Virginia. Because it was so short and because Congress had required it to go near or through Williamsburg, at about the midway point, there was some, but not much, leeway in choice of route. However, where there were choices, the Service seems to have used excellent judgment in making them, and the result was a travel route of exceptional beauty, variety, and charm.

The Blue Ridge Parkway started out to be simply a scenic highway. It ended up, instead, as a long park that was to be traversed from one end to the other by a road. Decisions as to where this ribbon of park and its road were to go posed problems of land selection and subsequent acquisition with an almost unlimited field of choice. No parkway project on any such scale as this had ever been planned or undertaken up to that time, the fall of 1933.

For the whole parkway-to-be, connecting two national-parks-to-be, there was just one point fixed at the start—the place where Shenandoah's Skyline Drive ended and the parkway was to begin. The other end was to be at some point on the north, east, or south border of Great Smoky Mountains National Park, about 350 miles away as the crow flies. In between lay millions of acres of wild, rough country. An astonishing amount of this vast area was then unmapped, and the maps for much of the remainder were inadequate and inaccurate. This was before the adoption of stereo photography, which has done so much to simplify the task of mapping and road location. Adequate exploration required, in the aggregate, thousands of miles of travel through little-known country over crude backwoods roads, along foot-trails, and into places where no trails existed. In addition, much of this searching for a route was through backwoods communities where all strangers were suspect and where, for reasons chiefly connected with moonshining, there were few people who had any affection for an employee of the federal government.

Until then, areas selected for inclusion in the national park system had been chosen to protect for public enjoyment some outstanding natural feature or assemblage of features, or some site of exceptional scientific, historic, or prehistoric importance. Here was a very different task of selection. The end product—a park with all its appurtenances, including a road—was expected to reveal a great variety of natural beauty, a kind of cross section of the Southern Highlands. It would afford intimate glimpses and sweeping panoramas. It was also, at the same time, to show the traveler, in motion or stopping, the historical and cultural aspects of mountain communities that for 200 years had been cut off from the mainstream of American life. And it was to offer opportunities for such kinds of outdoor recreation as could be provided without damage to the natural scene or to the physical reminders of a long-established way of do-it-yourself-or-go-without existence.

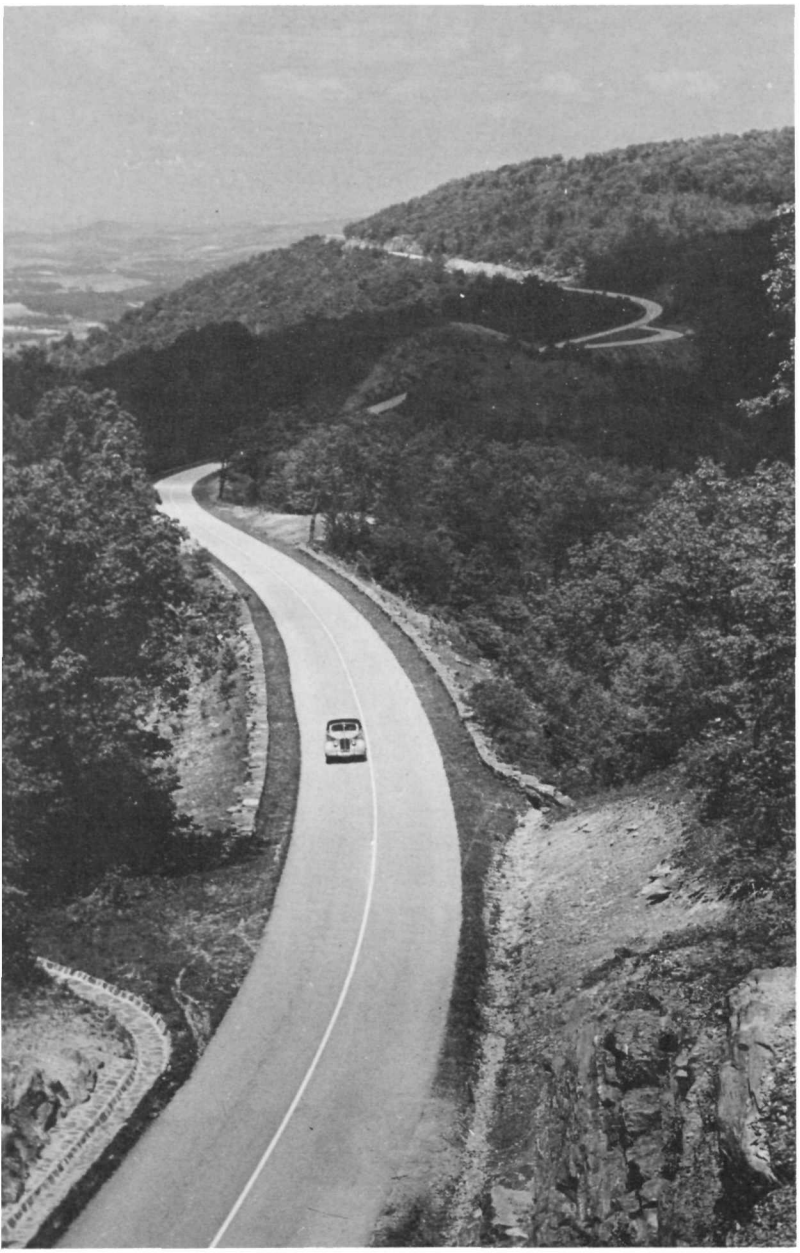
The planners, playing it somewhat by ear, gradually developed a more definite philosophy as to route, the kinds and quantities of land desired for this extra-long park, and how it could best be developed.

THE PARKWAY was to connect two national parks. Fortunately, nobody in authority had ever said, "Keep it short; make it direct, or as direct as you can." Also, the land to be taken or controlled was to be wide enough to protect the traveler's view against undesirable intrusions—billboards, for example—so far as humanly possible. He was to travel a magic carpet that would soar in places considerably more than a mile high.

Of first importance among those who had much to do with scouting out the country for the parkway and with determining its character, including the nature of its development, was Stanley W. Abbott, a landscape architect of skill and imagination. Abbott had been with the Westchester County, New York, Park Commission for three years when the parkway was conceived. In view of the task he was called on to perform, it is significant that he was

"The Blue Ridge Parkway set out to be simply a scenic highway. It ended up . . . as a long park that was to be traversed from one end to the other by a road."

Photograph courtesy National Park Service



working in the commission's public relations office at that time. At the start, after Secretary Ickes had allocated $16 million of Public Works Administration funds to the project, with $6 million immediately available, Abbott was assigned to it as resident landscape architect. In that capacity he represented Jay Downer, the Westchester parks chief engineer, and Gilmore Clarke, their landscape architect, who had been called in as consultants because Westchester had been building parkways for some years.

When Downer and Clarke were in Secretary Ickes' office and while the project was still very new, the Secretary told them he thought their consulting charge of $75 a day was excessive; whereupon they walked out, never to return. However, their resident landscape architect remained on; and as associates, from the Bureau of Public Roads, he was fortunate to have Engineers William M. Austin and Col. W. I. Lee, both of whom had had experience in locating roads and railroads in the west. Also, Austin had "located" the Skyline Drive in Shenandoah National Park.

Abbott, Austin, Lee, and Edward Abbuehl—who was with the parkway more than 30 years—were dealing with a project that differed in many basic ways from the kinds of parkways that Westchester County and the State of New York—the only progenitors—were building through rather heavily populated areas. They promptly adjusted their sights to the different conditions under which they were called on to operate. For example, Clarke, having the Westchester experience in mind, had recommended an average parkway width of 250 feet! And when Virginia began meeting its promises to obtain the land needed in that state, it obtained fee-simple title to a strip only 200 feet wide. This width, somewhat less generous than the rights-of-way usually obtained today for interstate highways, was supplemented by scenic easements on lands beyond those limited boundaries.

Virginia also started out by turning over a good deal of land encumbered with road-access easements, to the point where Ickes finally refused to accept them. Many easements accepted during the early years have since been canceled by providing paralleling collection roads and reducing the number of access points. Some remain, however.

It took some time and considerable persuasiveness to convince the Virginia highway authorities—principally the commissioner—that if the parkway road were really to be protected against unsightly intrusions, the parkway had to be much wider than 200 feet. The amount finally decided upon was 100 acres to the mile, which means an average width of about 825 feet. North Carolina dealt with this matter legislatively; generously and foresightedly, she set a figure of 125 acres to the mile, or about 1030 feet wide.

As IT WORKED OUT, there were many places where the topography or the bordering cover was such that the 1030-foot width was not needed. The state has consistently made use of such savings to buy land to a greater width than 1030 feet where the Park Service has considered this desirable. Its willingness to do this has proved very valuable in several places, particularly in the Linville Falls area and at Grandfather Mountain, not far away, where

For many years before his retirement Mr. Evison was Chief of Information with the National Park Service and was well acquainted with the people who had guided the Blue Ridge Parkway during its early years.

the needed parkway land was only recently handed over to the Service.

What Abbott calls "directionality" was a factor in the choice of a route for the Blue Ridge Parkway; after all, it did, ultimately, have to connect the two parks. It is fair to say, however, that this was a very minor and general factor. If the parkway was to reveal the countryside, close-by and distant, in the best possible way, there had to be a good deal of wandering away from the shortest distance between two points—if half a million acres of Great Smoky Mountain country could be called a point. The process of route selection meant reaching scores, even hundreds, of decisions as to just where the road should go and where the parkway boundaries should lie. Should we cross through this gap in the ridge line? Which side of the mountain is the more scenic? The more reasonable in engineering cost? The less subject to construction scars? Some of these decisions affected only a few hundred yards of road; others affected many miles. And in a few instances decisions were forced on the National Park Service and the Bureau of Public Roads by higher authority or by outside pressures.

How difficult and complicated some of the problems of route selection could be was indicated to me several years ago by Abbott. He offered as an example the fact that, extending southwest from Roanoke, there are seven main ridges of the Blue Ridge. A choice had to be made as to which of these, or what combination of them, should be followed. The way finally chosen—the easternmost, which offers broad vistas of mountain and piedmont, forest and upland meadow and farm—was not by many miles the shortest, but most parkway travelers will probably agree generally that it was a good one.

When the Scenic—as it was and still is widely known among the mountain people—was launched, Tennessee was one of the states in which a part of it was expected to lie, and adequate assurance was given that the Volunteer State would supply the land needed for it. However, the major decision as to route that was forced on the parkway planners resulted in freezing out Tennessee. Park Service and Bureau of Public Roads had agreed on a route down into North Carolina—now in one state, now in the other—to a point near the northeast corner of Great Smoky Mountains Park.

When the people of North Carolina—the governor, the highway department, the Chamber of Commerce of Asheville, and other interested individuals and groups—learned of this proposal, they expressed emphatic opposition; they wanted the parkway to stay in North Carolina and not go wandering into Tennessee. Late in 1934 Secretary Ickes held an all-day hearing on the matter; at this the two governors, the highway officials, and other political and commercial powers-that-were from both states had their rather heated say.

A short time later the Secretary announced his decision in favor of the general route that North Carolina had advocated. Henceforth, Tennessee was just an interested and not very happy onlooker; but later she got her own Foothills Parkway which, when completed, will parallel much of the north boundary of Great Smokies Park, separated from it far enough to offer an almost continuous panorama of its striking heights.

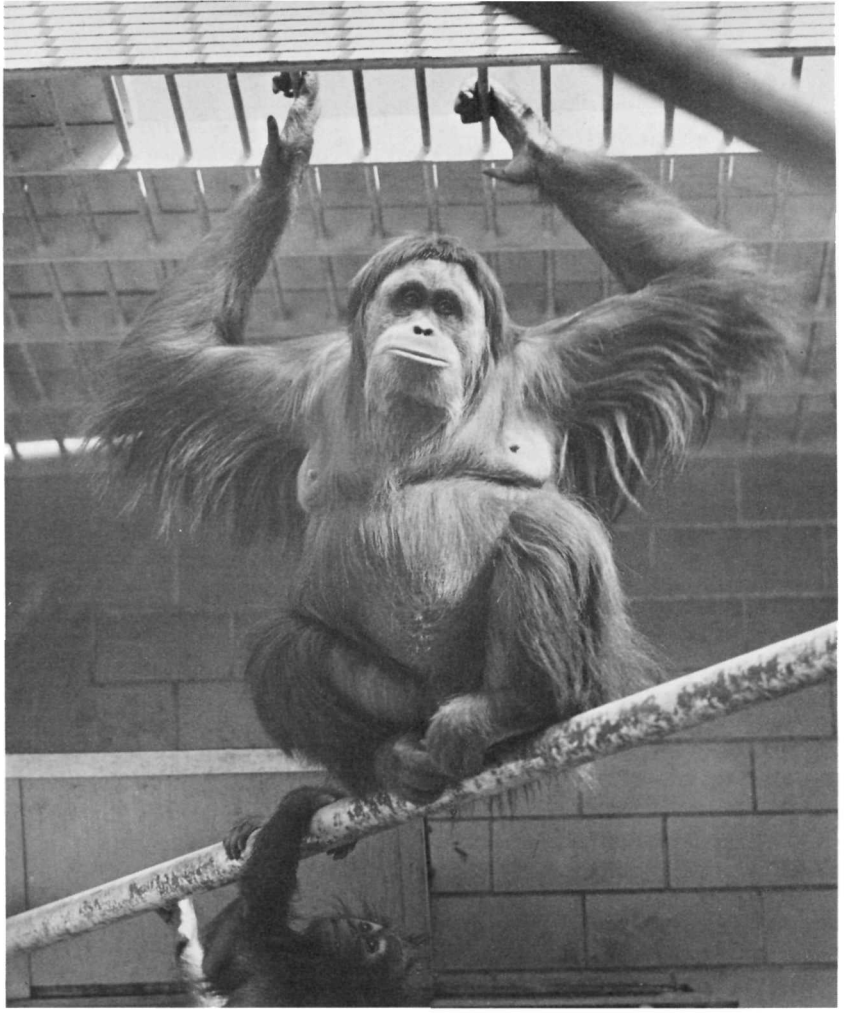
A combination of political pressure and land costs brought about an important change in route from that tentatively proposed, this time in Virginia. Beyond the James River, toward Roanoke, Abbott was especially anxious to have the parkway drop down off the ridge just beyond the striking and beautiful Peaks of Otter over to and including Virginia's famous Natural Bridge. This widely known landmark was then, at the height of the Great Depression, not doing well financially and could probably have been bought at a rather modest price.

The Virginia Highway Department could not quite see this route. Traversing lower country to Natural Bridge would have meant that land costs to the state would have been much greater than those for a course that stayed along or near the summits of the ridge. An added cost consideration in favor of the high line was the fact that much of the mountain land was already in national forest and federally owned. In any event, parkway and road started climbing toward the Blue Ridge summit immediately after crossing the James, and they stayed with it to the outskirts of Roanoke.

FINAL LOCATION of the parkway would have been much more difficult if the U.S. Forest Service had not been so cooperative. Such national forest land as has been needed has always been turned over to the National Park Service readily. Indeed, the Forest Service has leaned over backward to be helpful and has safeguarded the scenic character of lands beyond the parkway in sight of the road. Perhaps its major single contribution was in working out arrangements for acquisition of the Peaks of Otter area—one of the most scenic of the subsidiary parks—and turning it over to the Park Service. It is doubtful that this property could have been obtained at all had it not been for this cooperation.

Almost certainly, in all three instances, the routes first recommended by the planners were at least as good as those on which the decisions went against them. Yet it is a happy fact that none of the substitute routes recommended by local politicians can be very seriously faulted. By dropping occasionally to lower elevations, past millponds and flowing streams and backwoods farms, the Blue Ridge Parkway avoids the most serious shortcoming of the Skyline Drive in Shenandoah Park, which clings so close to the summit of the Blue Ridge that it never offers a glimpse of a stream—except for the Shenandoah far below—from one end to the other. It would be hard to imagine a travel route offering a greater variety of near and distant views, or one better laid on the land to encourage leisurely travel.

The Blue Ridge Parkway is a work of art, which means that it is a work of imagination. Its design shows the highest regard for the works of nature at the same time that it reveals a unique region and a unique way of life. ■



Atlanta's Grant Park Zoo houses several species of primates whose chances for survival in the wild are currently considered dubious. Among these are the Indonesian orangutan, a female of which is shown here with her youngster at the zoo's primate house.

Photograph by Deborah, Atlanta

ATLANTA ZOO:

WHAT IS A ZOO? TO MANY OF US, IT IS A DEPRESSING place: a sun-baked ribbon of concrete jammed in the center of an urban conglomerate, dotted with fences and wires and cages that imprison bored, lonely, and often neurotic animals. Dr. Desmond Morris, the London zoologist who became famous last January with the publication of his best-selling book *The Naked Ape*, abhors zoos as they exist today.

"Zoos turn most of their charges into pathetic neurotics," he remarked dryly in a recent interview in *Life*. "From what we have learned by studying wild animals in their natural habitats, we know now that even the best zoos deprive animals of almost everything they need for normal behavior. The modern zoo is so barren it is nothing more than a naked cage; this mental cruelty is only one part of man's inhumanity to the world's wild creatures."

Enlightened conservationists—and sensitive laymen—feel the same way. They know that wild animals should be free to pursue their own life patterns; they know that zoos cause not only ill health among their inmates but contribute to the further depletion of endangered wild species from their natural habitats.

Most zoologists agree, however, that zoos are here to stay. Even Dr. Morris says, "If zoos disappear, I fear that our vast urban populations will become so physically remote from animal life, they will cease to care about it." The challenge, then, is not to do away with our zoos, but to make them better.

One place where this challenge is being met is in Atlanta, Georgia, at the city's Grant Park Zoo. Tucked neatly into 20 acres of rolling greenery near the periphery of Atlanta's metropolis, the zoo has vast potential for becoming more than just a prison for animals.

The zoo's new director, a smiling young man named John Roth, is making the most of that potential. He believes that one of the primary functions of a good zoo is to preserve and breed animals in danger of extinction, and to provide as natural a habitat as possible for all species so they will want to breed. Accordingly, Roth likes to think of his zoo as a "survival center" for endangered species. And, in the short year he has been in Atlanta, he has come a long way toward achieving that goal.

"I don't believe in just putting an animal in a tiny cage for people to stare at," Roth declared. "It's cruel. It shows lack of funds or just plain short-sightedness. And it utterly destroys the animal."

One group of animals which has almost been "destroyed" by the demands of zoos and scientific research centers, and obliteration of their natural habitat, is the primates—animals closest to man in looks, intelligence, and evolutionary development. Roth has a special interest in primates, and it is toward the survival of this group that he turned his energies as a first step in the establishment of the Grant Park Zoo as a survival center for endangered species.

The zoo now houses four species of primates considered by the International Union for Conservation of Nature to

Photograph by Deborah, Atlanta

Another endangered primate is the ringtailed lemur of Madagascar, shown here in its rather stark cage at the Grant Park Zoo. Director John Roth hopes for funds to improve conditions for the zoo's primates.

SURVIVAL CENTER FOR ANIMALS

By Maxine Rock

be in danger of extinction: the ringtailed lemur of Madagascar; the Celebes black ape; the lowland gorilla of equatorial Africa; and that auburn-haired "old man of the forest," the Indonesian orangutan.

It is with the orangutan that the first exciting step toward the beginnings of a survival center at the zoo began just a few months ago.

"One of the reasons I came to Atlanta is because I saw the possibilities of saving the orangutan here," Roth explained. "I knew that the nearby Yerkes Primate Research Center of Emory University had the largest collection of captive orangs in the world—34 in all—and was having some success in breeding them. I thought we might work out an arrangement whereby Yerkes placed some of its orangs in our more spacious facilities and allowed us to care for them, while it observed the primate's social behavior in a group setting."

EARLY IN 1969 ROTH OUTLINED HIS PLAN TO YERKES. The directors there had already been thinking along these lines; arrangements were soon made to transport three young female orangs and their infants to a special group facility at the zoo. A large male was added shortly thereafter. When he entered the cage with the females, the animals formed a natural family unit.

"This was a terrific experience for the animals," beamed Roth. "They had never been together as a group. For the scientists, it was also a great experience—they collected a wealth of valuable information from having the animals together."

The orangs occupy two large, connected cages at the zoo's primate house. The cages are glass-enclosed and have a network of interlocking chains and pipes on which the orangs slowly make their way around the facility. It is not ideal; the inevitable bars are still there, and the setting is far from natural; but these are cage-born creatures and their zoo house is better than what they had before.

The orangs seem delighted to be together. The females hold their young with great care, kissing and caressing them, while the male watches with a paternal grin. On Sundays the orangs draw quite a crowd, but the animals just stare serenely at their gaping visitors and go quietly about their monkey business. Roy Pinney, in his book *Vanishing Wildlife*, says the orangutan, *Pongo pygmaeus*, is probably in danger of extinction, but adds that "its population is not known."

The capture of wild orangutans for export to American and European zoos and circuses began about 1946. Their numbers dwindled quickly, and the trade was made illegal; no orang can be exported from Indonesia now without a permit. But, according to Roth, a few poachers still find it profitable to smuggle baby orangs into Singapore.

"At the peak of the smuggling, hunting methods used on these animals were horrible," said Roth. "At night, Chinese traders looking for fast money would paddle over from

Both photographs by Deborah, Atlanta

At left, the interior of the new reptile house at Grant Park Zoo, where ideal simulated natural conditions are conducive to breeding of the endangered American alligator and crocodile. Last April the alligators built a nest and the female deposited many eggs. If the hatch is successful, this first attempt will prove the value of re-creating natural habitat in a zoo. Below, an African black rhinoceros, endangered mammal, seems occupied in that common vertebrate pastime, scratching.

Singapore harbor to Sumatra, where some orangs still live. They shot the mother orang and snatched her baby away. They crowded the infants into wet, dirty crates and smuggled them back to Singapore, where they sold the ones which managed to survive."

A "black market" baby orang fresh off the boat used to sell for about $200. In order to shut off the market—and thereby hopefully stop the poaching—the American Association of Zoological Parks and Aquariums has asked its members to pledge not to buy even the few animals which may still be obtained by such illegal methods.

Orangs are not Roth's only concern. He has set aside a spacious outdoor area for a pair of newly acquired African black rhinos, which he considers to be "on the brink of extinction," and hopes they will mate soon. He has also just completed building a remarkable new reptile house which simulates natural habitat, and hopes to breed endangered American alligators and crocodiles there.

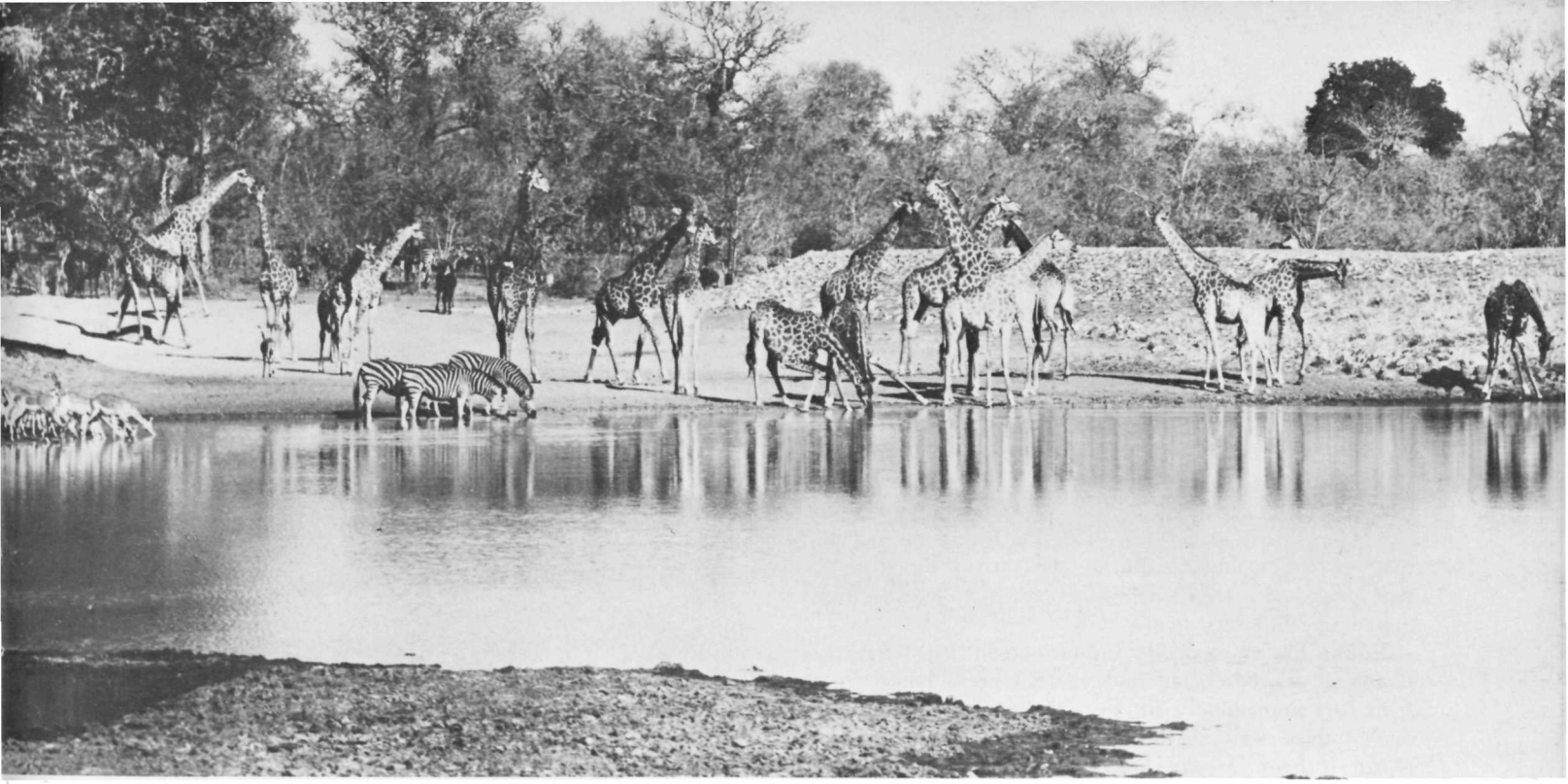
Roth believes that by putting animals in as natural a setting as possible he can encourage them to breed successfully. This is especially important where endangered species such as the orangs are concerned. But if the animals do breed, what will become of their offspring?

"The orangs, for instance, will remain the property of Yerkes," said Roth. "I'm not sure of Yerkes' plans, but I know its directors are conservation-minded. Our obligation is to try to assist the conservation aspect of the experiment in any way possible," he added.

Roth may be thinking of the possibilities of releasing zoo-born endangered species into the wild. It is best to return these animals to their native lands, but where this is impossible, it might be worth a try to release them in this country if they had no detrimental effect on the ecology of an area. This type of release was successfully accomplished not long ago at the Albuquerque Zoo in New Mexico. (Before he came to Atlanta, Roth was director of that zoo; under his guidance the zoo bred African and Asian ungulates and, with the cooperation of the State Game Department, turned the offspring loose in the New Mexico desert.)

"Now we know you have to keep an animal in as much of a natural environment as possible," said Roth. "If zoos don't start doing this, they're in trouble—it will be the end of zoos, because we are eventually going to run out of animals. We must create environments where an animal can act the way he would naturally. We can't just pen him up and let him go to pot.

"We have to change our zoos, and we have to do it fast," Roth added emphatically. "The old ideas just aren't good enough." ■



Mixed herds of game form especially at drinking holes. Thus the method of defense of each type of animal supplements those of the others—a natural combine for their common safety.

KRUGER NATIONAL PARK

South Africa's Prime Game Sanctuary

By PETER HOLZ

OF ALL OF AFRICA'S GAME RESERVES NONE HAS REACHED the unrivaled fame of the 7,340-square-mile Kruger National Park in the Eastern Transvaal, Republic of South Africa.

Countless visitors from all over the world have come to the park to see its multitude of animals. Here truly is a part of Africa practically as untouched by civilization now as it was in the days of the early explorers, pioneers, and settlers. Only 280 miles from Johannesburg by road, the park, almost the size of Massachusetts, abounds with the fauna and flora of Africa.

The Kruger National Park as well as a number of other national parks is under the jurisdiction of the National Park Board of Trustees. Entrusted with the control, management, and maintenance of national parks by the National Parks Act, the Board of Trustees consists of twelve members who are elected by the State President for a term of five years. Seven members are nominated for appointment to the Board by the Minister of Lands; one from each of the four South African provinces (Transvaal, Natal, Cape Province, and Orange Free State) is nominated by each province administrator; and one is nominated by the Wild Life Protection Society of South Africa. The headquarters of the Board is in Pretoria.

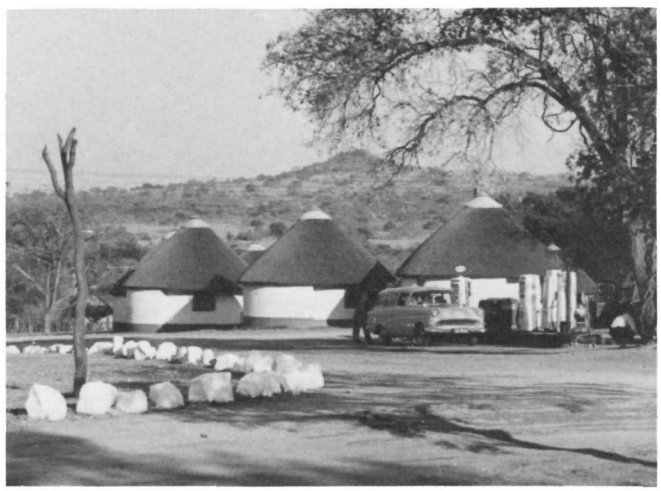
The area of the park was originally envisaged as a game reserve in the last century. Development was delayed by the Anglo-Boer War, and it was not until 1904 that the area was given its first warden. In order to give many almost exterminated animals a chance to multiply, the park was not open to the public until 1927. Only three cars entered the vast territory that year. Forty years later a quarter

million people visited the park during 1967, arriving in more than 65,000 automobiles.

Obviously, various regulations must be enforced to protect visitors as well as the animals. For example, only enclosed cars are permitted in the park, and visitors are continually warned not to get out of their cars except in rest camps situated strategically throughout the area. All visitors must reach one of the rest camps by nightfall. Camp gates are locked at night and no one is permitted to leave until daybreak. Meanwhile the visitor can rest in a comfortable bungalow listening to the roar of lions or the brushing of an elephant against the camp fence.

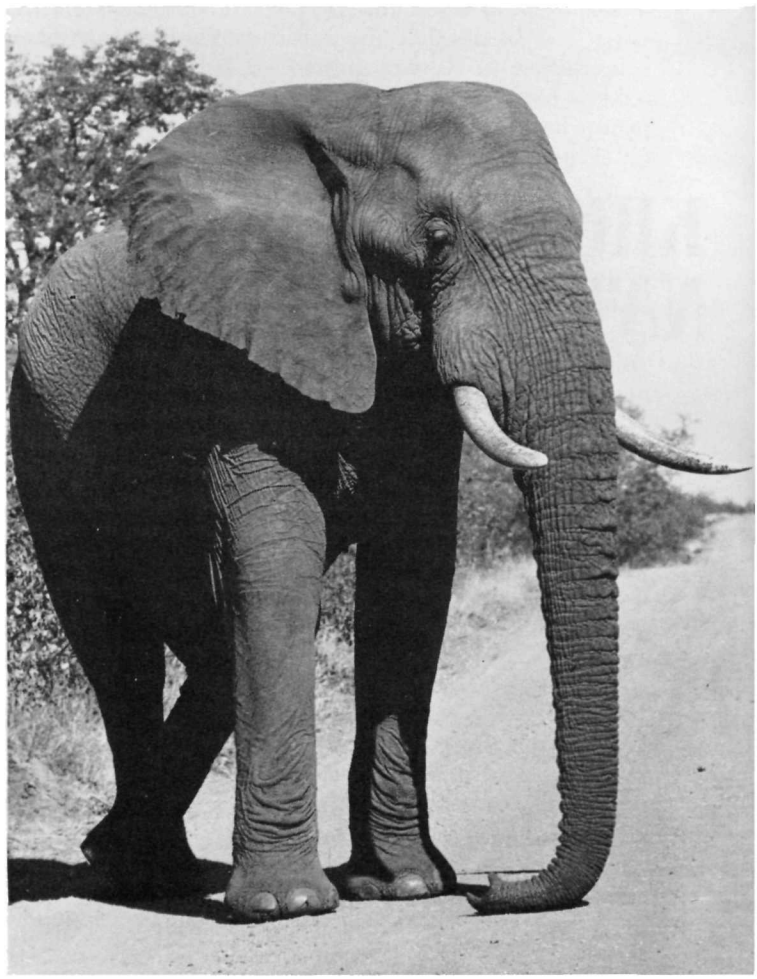
The best months for viewing game are August, September, and October, when the animals become more concentrated as the dry season advances. On the roads the visitor may encounter almost anything at a turn of the road, from the small rockrabbit to the largest of all living land mammals—the African elephant.

Unlike his more docile Indian cousin, the African elephant is unpredictable, and visitors are advised to stop their cars immediately and keep the engine running should one of these walking battleships decide to cross the road ahead of them. Despite their bulk, elephants are capable of quick movements and are competent in overturning a motor vehicle. At one time almost exterminated by ruthless ivory hunters in this area, elephants have multiplied rapidly in the "safe years" they have enjoyed since the establishment of the park. On occasions they have become a serious problem and have broken down camp fences to feed on young tree shoots outside visitors' huts. Occasionally an elephant will attack a visitor's car. In 1965 a couple driving a Volkswagen was attacked by an enraged bull, who lifted



Above, Pretorius Kop Rest Camp in Kruger National Park. Other rest camps bear such musical native names as Satara, Shingwedzi, Skukuza, and Malopene. Below, an elephant crossing one of the many good sand roads in the park. These great beasts are particularly common in the northern section of the park. Despite their bulk they can charge at about 25 miles an hour.

Photo by South African Tourist Corporation, Pretoria



Vervet monkeys in Kruger National Park. These little animals never fail to amuse children. Sometimes they come right into the car to beg for morsels of food.

Photo by South African Information Service, Pretoria

Two relaxed male lions return the stares of inquisitive visitors. The male lion truly is the "king" of the veld; his mate does the hunting and brings her kill to him. Then she steps back and waits until he has finished gorging himself before she begins to eat.

the car three times with its tusks and finally pushed it into the bush. Apparently the bull had led a herd of cows and calves across a road, when an impatient motorist hooted. The bull immediately attacked the nearest car, damaging it badly. The occupants escaped injury, but understandably they were badly shaken by the incident.

A few years previously a couple from East Africa had a similar unpleasant experience. They had stopped and watched while elephants climbed out of a river and crossed the road in a slow procession in front of their car. Suddenly a cow, followed by a calf, started trumpeting and waving her big ears. She charged the car and thrust one tusk through the hood. Aided by the calf, she started pushing the car and jerking it up and down. After pushing the car 60 feet, the two elephants stopped their attack as suddenly as they had begun it and moved off, leaving behind them a badly damaged car and a couple of frightened people.

ALTHOUGH THE GREAT MAJORITY of visitors to the park obeys the rules established for their own benefit by the park's Board, there is always the occasional tourist who insists on tempting fate. Many years ago one man traveling with his family in the park stopped his car by the side of the road in order to take photographs. His wife and children got out of the car and posed in front of a thick cluster of bushes. A few days later when the film was developed, the snapshot showed, in addition to the family, a fully grown lion licking its paws in the shade of the bush in front of which they were standing.

If seen by the park's rangers, offenders are charged under the Parks Act. Between November 1964 and October 1965, for example, 1,182 visitors were charged for exceeding the park's 25 m.p.h. speed limit, 83 were charged with having been found outside their cars, and 52 more were charged for driving off the road. Others were charged for feeding animals, poaching and setting snares, chopping down trees, cutting off reeds, and other similar violations.

No firearms are allowed in the park, and the only shooting permitted is that done with a camera. That photography is big business in the Kruger National Park and other game sanctuaries in South Africa is evidenced by a recently published report by the Standard Bank of South Africa entitled "Wild Animals Have Become Big Business." According to the report, one of the largest film processors in Johannesburg claims that depending on the time of the year, between 25 and 65 percent of the films developed in their laboratories were taken in the national parks.

Because of the popularity of the park, accommodation has to be booked in advance. Each camp is expertly supervised, and most of the camps have modern family bungalows complete with kitchen, bedrooms, and bath. At the larger camps are restaurants, garages, and shops. There are also caravan sites and camping sites where visitors may pitch their own tents.

On the average, each visitor spends four to five days in the park. This means that annually one million beds have to be made up and three million meals must be provided. In addition, personnel whose job it is to look after the park must maintain more than one thousand miles of road. Some

Giraffes are the "skyscrapers" of the bushveld. These two feed on the leaves and shoots of thorn trees—their favorite diet.

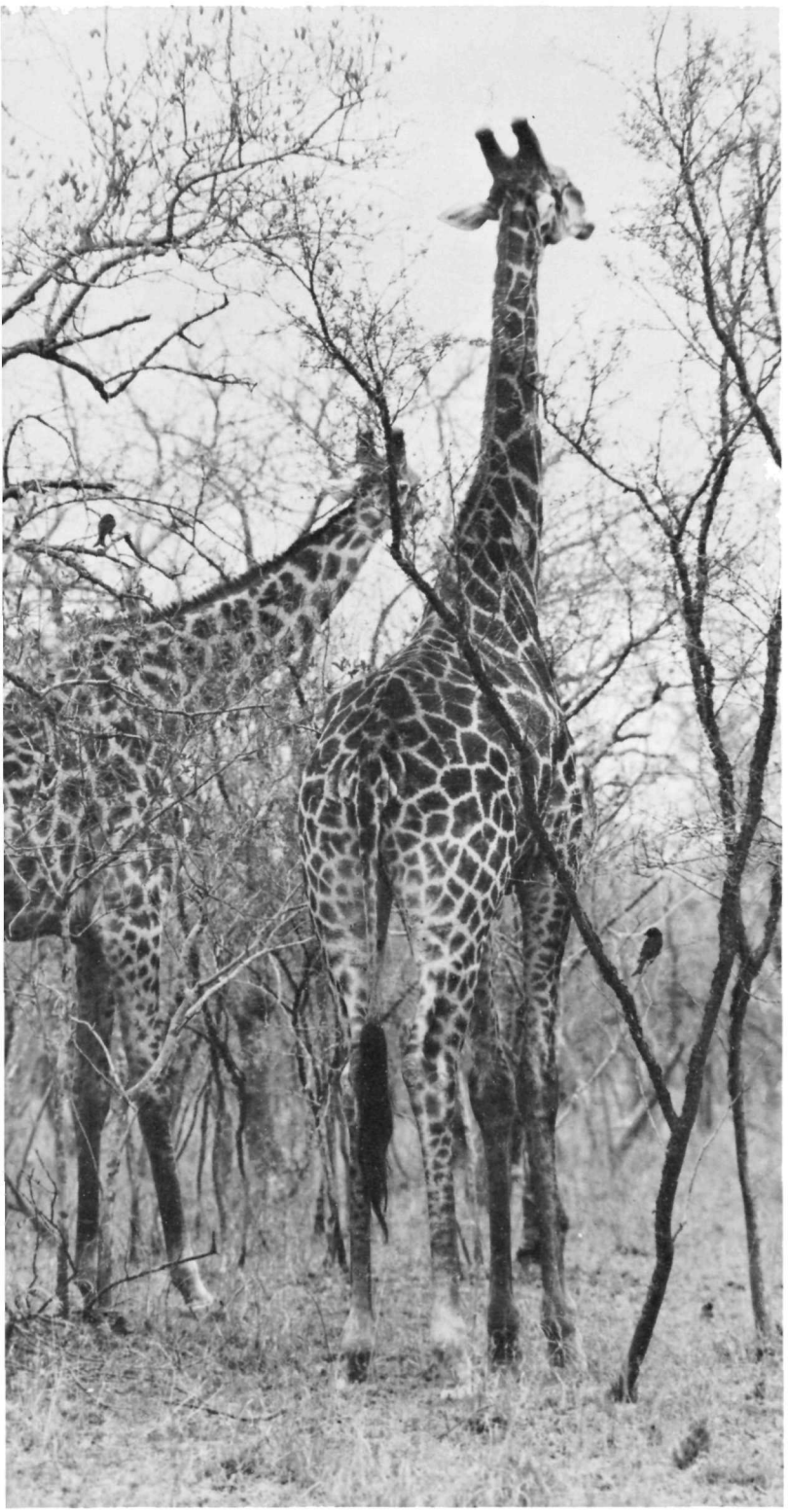
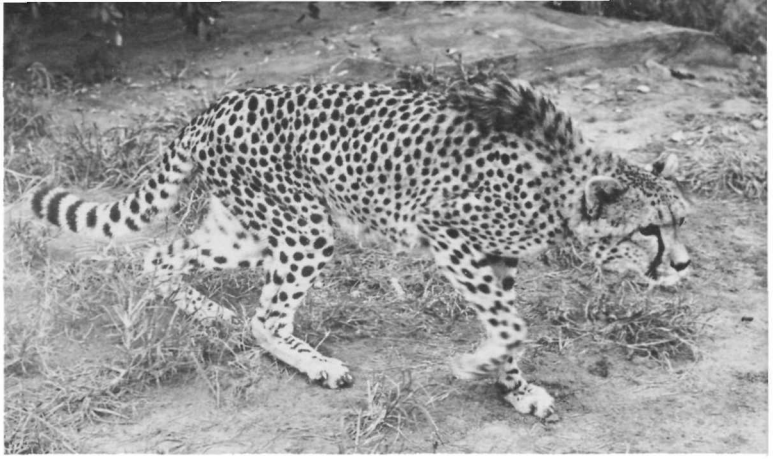


Photo by South African Information Service, Pretoria

Peter Holz is a free-lance writer in Johannesburg, Republic of South Africa.



The cheetah, or hunting leopard, can run about 70 miles per hour and captures its prey by running it down.

of this road system is now being tarred. Water holes and dams have to be provided for the animals, poaching must be prevented, veld fires must be curbed, sick and injured animals must be healed or destroyed, and a foot-and-mouth-disease control fence that now encircles the park must be patrolled and kept intact. Funds for all this maintenance are obtained from visitors' entrance fees and accommodation charges, from profits from the sale of goods and souvenirs in the park's shops, and from donations.

In addition to being a major tourist attraction, the park is also a research center for South African and foreign scientists whose interests vary from archaeology to zoology. Animals such as zebra and giraffe are sometimes captured for translocation to other game parks, and some animals that have not been seen for many years in the Kruger National Park are reintroduced into the park from other game reserves. For example, several square-lipped rhinoceros were brought to the park from Natal Province.

ALTHOUGH MUCH BLOOD, both human and animal, has flowed in Africa during the past and many game parks have been sacrificed on the political altar, some nations have recognized the potential of game reserves; and through sound and humane management, nations such as South Africa, Rhodesia, and Malawi are reaping a rich harvest today.

One hundred years ago the idea of setting aside valuable land for the preservation of wild animals would have been ridiculed. Throughout Africa animals roamed in what then seemed inexhaustible numbers; but a combination of greed, blood-lust, and stupidity has brought us to the stage where, for the privilege of seeing an elephant, a lion, or a giraffe, man will travel hundreds—sometimes thousands—of miles.

To many South Africans the park is a place where he and his family can "get away from it all" for a short while. But the value of the Kruger National Park far transcends this use. Without this park a great number of animals, birds, and reptiles would be extinct by now. The enjoyment and educational benefits that the many visitors derive from the vast game park has been made possible only by the foresight of a small number of men and women who many years ago recognized the need for a park to preserve for posterity the fauna and flora of South Africa. ■

FOREST SUCCESSION IN YELLOWSTONE NATIONAL PARK

By DUNCAN T. PATTEN

A lodgepole pine forest with little invasion of shade-tolerant conifers. Most of the trees are self-pruned; however, the large lower branches on the tree to the right indicate that once it grew in a much more open forest stand. The straight trees around it may be its progeny.

As one drives through Yellowstone National Park, the continual stands of lodgepole pine forests seem never ending. Fortunately for the visitor, the forests are interrupted by lush meadows that may harbor elk or by drier areas of grassland or sagebrush that also may contain grazing animals. There are also the obvious geyser basins that prevent establishment of dense vegetation because of carbonate deposits, heat, chemicals, and high water tables.

The extensive stands of lodgepole pine are a record of the recent past history of the Park. These forests, many with little or no understory of vegetation, are the result of extensive fires that have swept the area during the past 200 years. The pines, now maturing, are part of a normal successional pattern of vegetational recovery after fire. Various stages of this succession can be observed throughout the park. In the few areas where there have been very recent fires (5 to 15 years ago), young lodgepole pines can be seen emerging from between the burned remains of the forest. Lodgepole pine is well suited to fire recovery because many of the cones are serotinous (i.e. they require heat to open and disperse the seeds). Lodgepole pine also prefers to establish in areas with much sunlight and little competition from other plants. Obviously, an area that has been recently burned offers these requirements. Depending on the intensity of the fire as well as on the abundance of seed sources, the young pines might establish themselves in a very dense stand in an area where a few trees survived the fire and continue to create some shade and competition.

One other tree, the quaking aspen, is known as a typical fire successional tree in the Rocky Mountains. It also prefers open areas with little competition as long as there is adequate moisture. However, there are only a few extensive areas of aspen in Yellowstone National Park that can be considered fire successional stands. Other stands of aspen are commonly found invading rockslide areas or on hillsides where the water table is near the surface.

During the period from pine establishment to mature pine forest, the stage of many of the forests in the park, there is increasing competition among trees for light and moisture and a gradual changing of the environment within the developing forest. If the pines established after the fire in a dense stand, then the forest becomes a "pole patch" as it matures. Pines 150 years old may be no bigger than 2½ to 3 inches in diameter. In dense forests the pines maintain only a small crown of green foliage, the lower branches being self-pruning. Pines that establish in a relatively dispersed pattern can be 12 inches or more in diameter at 150 years and may have abundant lower branches, especially when there is little competition for light.

As the forest develops, the internal environment becomes more moderate, there is a reduction in evaporation, and more soil moisture is available. This environment is suitable for the establishment of many shrubs found in the

forest such as Canadian buffalo berry, Utah honeysuckle, and huckleberry. In addition to the shrubs, other conifers that are shade tolerant invade the forest floor. They require a cooler, more moist environment than found in the open after a fire. These conifers include subalpine fir, Engelmann spruce, Douglas fir, and limber pine. At elevations above 8,500 feet white bark pine can also be found. The gradual maturing of these new conifers increases the competition on the aging lodgepole pines. When an old lodgepole pine dies, the increase of light on the forest floor stimulates the growth of the new conifers. Only when the hole in the forest canopy is very large might lodgepole pines reestablish in the forest. Eventually, as spruce, fir, and others mature, the forest becomes a mixture of conifers with a ground vegetation including herbs, shrubs, and young shade-tolerant conifers. This final stage is not commonly seen from the highways throughout Yellowstone National Park but can be found in isolated areas in the back country where recent fires have missed small areas of forest.

Stages in the typical pattern of forest succession can be observed throughout the park; however, there are other types of forest succession. One is very common and is due to man's attempt to ease his travels through the forests. The other is less common but can be observed when one looks for it. The first is the establishment of trees on the roadcuts. Within 2 or 3 years after a roadcut has been abandoned by highway crews, there is the establishment of a dense stand of young lodgepole pine. In the southern parts of Yellowstone National Park aspen also may invade the roadcuts similar to that found in the Colorado Rockies. Obviously the environment of the exposed road banks fits the requirements of the pine and aspen (i.e. little competition and full sunlight for part of the day). Except along the very old roads of the park, the pines are still at a young stage. Some of these trees are cut by mowers or sprayed by herbicides to allow visibility along the highways. Those farther from the highway will continue to develop into a mature forest.

Dr. Patten, Associate Professor of Botany, Arizona State University, Tempe, has spent 10 years doing ecological research in Yellowstone National Park and the area to its northwest.

The other type of succession is found where lodgepole pine is invading sagebrush-covered areas. The first stage includes establishment of a few pines in sagebrush areas that have a high percentage of bare mineral soil showing among the shrubs. As these trees mature, they become the seed source for a more dense invasion of the sagebrush by pine. This statement does not imply that all sagebrush areas will become forested. On the contrary, only a few sagebrush areas are giving way to pines. Sagebrush areas with a dense herbaceous ground cover create too much shade and competition for young pine seedlings. The pines that do invade the sagebrush will then mature, and the normal succession to a mixed conifer forest will take place.

Large areas of the lodgepole pine forest of Yellowstone National Park seem to maintain essentially no shrub or herbaceous understory, just needle litter. The environmental shift within the forest enabling establishment of shrubs and shade-tolerant conifers may take a long time, and the litter layer of needles is not very compatible to seed germination. The forest ecosystem then becomes relatively sterile and will not support the diversity of animals and plants found in the mixed conifer forest or sagebrush areas.

FIRE IS A NATURAL ENVIRONMENTAL FACTOR of the past and will have to be a forest management tool of the present and future. Controlled burned areas will respond with young pines, herbs, and shrubs, thus creating more diverse habitats for the many creatures that call Yellowstone National Park their home. ■

The two mature lodgepole pines growing in a sagebrush area are the probable seed source for the younger pines invading the sagebrush.

News and Commentary

Interior Department Pollution Conference

A National Executives' Conference on Water Pollution Abatement will be held in Washington, D.C., October 23 and 24 under the sponsorship of the Department of the Interior. The theme of the meeting will be the practical, economic factors involved in the abatement of industrial water pollution.

The chief executives of six major U.S. firms and six international businesses will address the conferences. They will discuss the recognition of pollution abatement responsibilities by industry; abatement decisions by management involving considerations of costs, sales efforts, public relations, stockholder relations, and engineering plans; the development of tight timetables for abatement; and government-industry relations while these timetables are being drawn up.

Interior Secretary Walter J. Hickel will be chairman of the conference. Hickel has named Carl L. Klein, assistant secretary for Water Quality and Research, as conference director. Klein, David D. Dominick, and Under Secretary of Interior Russell E. Train will serve together on a committee responsible for setting up the meeting. (Klein is reported currently involved in an imbroglio with Dominick, commissioner of the Federal Water Pollution Control Administration, about where the power will lie in running the administration's fiscally hamstrung program.)

Attendance will be by invitation only. Hickel's office says that invitations will be sent to a cross section of executives from U.S. industries, the heads of several trade associations, members of Congress, and federal, state, and local officials involved or interested in water pollution abatement.

Osprey Refuge Planned

One of the largest concentrations of active American osprey nests in the nation will be given protection by the U.S. Forest Service.

The osprey, a fish hawk, has suffered a severe decline in numbers in recent years. Its possible status as a rare or endangered species has not yet been determined by the U.S. Fish and Wildlife Service, but the outlook is considered to be poor at the moment. It is believed that the osprey, as most predatory American birds, is particularly susceptible to the almost universal pollution of the environment by DDT and other chlorinated hydrocarbons. This susceptibility is thought to have played a large part in its decline. Other factors have been shooting and loss of habitat to development.

The Forest Service plans to establish the nation's first osprey management area at Crane Prairie Reservoir in Oregon's Deschutes National Forest. The preserve will include the reservoir and a 5,300-acre marginal strip around it. In a survey last year the Service discovered 50 osprey nests in this area, 27 of them in use at the time.

Victimized as the osprey has been by man, it is appropriate that man's works should have resulted in a habitat so attractive to the hawks. The reservoir was created by a Bureau of Reclamation Dam. Trees killed by the rising water were left in place, forming ideal osprey nesting snags as an incidental benefit. By accident a "trash" fish, the Tui chub, was introduced to the new lake. The fish is not sought by anglers, so it has become a plentiful food supply for the birds.

Osprey (right) on nest at reservoir. Nest below is hemmed by dead trees.

U.S. Forest Service

The Forest Service's management program will seek to preserve existing snags as far as possible. They will be supplemented with artificial nesting poles. Discharging of firearms will be prohibited in the area from April 1 to September 30, the nesting season. No other restrictions will be placed on hunting, fishing, and camping at the lake.

The osprey, a large bird with a wingspan of 4½ to 6 feet, is migratory, spending the winter in Central and South America. Two to four eggs are laid when the birds return north in the spring, and the young are reared by the end of summer.

Valiant Effort

What everybody wishes for and nobody expects—the total banning of private automobiles with gasoline internal combustion engines—actually had a few minutes in the sun the other day. The state senate of pollution-strangled California voted 26 to 5 to outlaw gasoline-powered automobiles on state roads in less than six years. By Jan. 1, 1975, Detroit would either have to provide Californians with a smog-free power plant for their cars, or do business elsewhere.

The noble gesture obviously was foredoomed to be nothing more than just that. The automobile lobby, apparently believing at first that the bill was too ridiculous to warrant attention, didn't watch it slide through the California assembly. In that body, as cynics might have anticipated, the measure died in committee.

In the meantime the National Air Pollution Control Administration awarded two contracts aimed at providing just such a pollution-free power source envisioned by the California senate. Emphasis is now on a revival of the steam engine, an erstwhile very satisfactory

system for driving cars that appears to have been the victim more of poor publicity than of any inherent fault or technological obsolescence. The steam engine proposed most seriously for cars today is usually called the Rankine cycle engine, maybe in an effort to give it some measure of glamor.

Thermo Electron Corp. of Waltham, Mass., was awarded a one-year, $174,000 contract by NAPCA for the design of an integrated, Rankine cycle propulsion system that can be mass produced and sold in competition with today's poisonous vehicles. The contract calls for a complete set of plans and specifications from which a steam car could be built.

A second one-year contract with a price tag of $96,683 went to the Marquardt Corp., appropriately of Van Nuys, Calif., for studying the combustion characteristics of Rankine cycle burners. Most of the pollution from today's automobiles results from the inherent fact that fuel is burned inside the engine where there is never enough oxygen for complete combustion. Some of the fuel is converted to carbon monoxide instead of non-toxic carbon dioxide, and some of it shoots out the exhaust essentially unburned. In a steam engine combustion occurs outside the engine; with proper burner design it can be complete, producing carbon dioxide and water almost exclusively if given the correct fuel. The Marquardt contract will yield data needed to design an efficient burner.

Dieldrin Spraying Halted

A joint program of the Department of Agriculture and the Air Force to spray Kelly Air Force Base in Texas with three pounds of dieldrin per acre has been halted.

The President's new Environmental Quality Council prevailed upon the principals in the operation to hold it in abeyance until the council can complete its comprehensive review of pesticide use and effects in the United States. Dieldrin is one of a group of chlorinated hydrocarbon poisons that because of their great persistence in the environment have been called "hard" pesticides. Evidence is mounting that this persistence coupled with these agents' potent pharmacologic activity has resulted in ecological havoc.

In a letter to President Nixon in his capacity as chairman of the council, Anthony Wayne Smith, president of the National Parks Association, called for a halt in particular to the Kelly operation and in general to the use of environmentally destructive practices by government agencies. In a reply from the office of Dr. Lee A. DuBridge, the President's science advisor and executive secretary of the council, NPA was informed of the suspension of the Kelly program and of the council's pesticide review.

The superficial objective of the Air Force program was to control the imported fire ant, a nuisance because of its painful bite and the hummocks its nests make in lawns. The larger purpose was to sterilize the ground on the Kelly air base so that any foreign, potentially pestiferous insects arriving in the United States on an Air Force plane would be killed on landing. What conservationists questioned was not the laudable desire to prevent the importation of exotic pests, but the use of this type of poison over a large part of a watershed, in an effort that some ecologists believe would be fruitless anyhow.

Can Man Survive?

See "The Time of Man," CBS TV, September 18, 8 p.m. EDT for a special about man's interaction with his environment.

Ralph H. Dwan

Ralph H. Dwan, 68, general counsel for the National Parks Association for the last 10 years, died August 27 after a heart attack.

A native of Two Harbors, Minnesota, Mr. Dwan earned law degrees from the University of Minnesota and Harvard, subsequently serving for 10 years on the Minnesota law faculty. He came to Washington in 1936 to join the Treasury Department in the general counsel's office. In 1939 he became chief counsel for the U. S. Bureau of Customs, and in 1941 assistant counsel of the Internal Revenue Service. He entered private practice in Washington in 1954. He was an officer of the St. Thomas More Society, a trustee of the National Newman Foundation, and a member of many law organizations. Mr. Dwan was a sincere and close friend of the association, its members and the cause of conservation. His interest in our organization was evident from the unselfish commitment of time and effort that he gave to national park and general conservation matters. His loss will be felt deeply.

A Welcome Gift of Coastal Redwoods

The Nature Conservancy, national conservation organization headquartered in Washington, D.C., has announced the donation by Georgia-Pacific Corporation, one of the nation's largest forest products companies, of a $6 million stand of prime redwood located on the Van Duzen River in Northern California. The gift, which the Conservancy termed one of the largest in the history of the American conservation movement, embraces two redwood groves totaling 390 acres situated 12 miles southeast of Fortuna, California. Included in the gift are some 206 acres of old growth redwood. Many of the trees are between 400 and 800 years old, and a number are 15 or more feet in diameter.

The gift tract includes two groves and a connecting strip of land. The groves will be named after Robert B. Pamplin, current president, and Owen R. Cheatham, founder of Georgia-Pacific. The land has been held for park use since the turn of the century, first by the Hammond Lumber Company, and for the past 14 years by their successors, the Georgia-Pacific Corporation. The Conservancy has turned the land over to the California State Park system, which will administer it from the nearby Grizzly Creek Redwoods State Park.

REVIEWS

WILDLIFE IN DANGER
By James Fisher, Noel Simon, and Jack Vincent

The Viking Press, New York, 1969, 368 pages, 32 color plates, 111 black and white drawings, endpaper maps. $12.95.

Reviewed by John W. Aldrich

With the increasing number of animal species which are in danger of extinction has come an increasing popular sympathy and interest in preventing such scientific and esthetic losses. People are now clamoring for action before it is too late, and governmental and private conservation organizations are both attempting to implement protective measures.

Perhaps no team of authors is better qualified to outline this important subject with worldwide perspective and scientific authority than the three writers of this book. James Fisher, scholarly and popular writer of natural history books and producer of TV nature programs in England, has the knack of dramatizing even dull technical subjects. Noel Simon and Jack Vincent, responsible for assembling the tremendous body of facts about the status of endangered species for the Survival Service Commission's *Red Data Book*, published by the International Union for the Conservation of Nature and Natural Resources, are certainly unsurpassed in the knowledge on which this book is based.

Authors Fisher, Vincent, and Simon have an amazing faculty for crowding a tremendous amount of information into a single sentence. It makes one's head swim to try to absorb it all. Yet they tell the story in *Wildlife in Danger* in such a fascinating way that it holds one's interest. The result is an encyclopedic amount of information packed into a relatively slender, attractive volume that enables the reader to obtain a broad perspective of this complicated field as well as the most important details which must be understood before intelligent action may be taken.

Endangered wildlife discussed includes species and subspecies of mammals, birds, reptiles, amphibians, fishes, and plants selected from the data in the files of the IUCN at its headquarters in Morges, Switzerland. The writeups are extraordinarily informative, giving a well-balanced picture of the appearance, taxonomy, habits, ecology, and reasons for endangerment. The analysis is particularly effective in showing how important it is to recognize an endangered subspecies when the more inclusive species to which it belongs may not be in danger of extinction. Notable examples are the key deer and Columbian white-tailed deer. Although listed in the *Red Data Book* as endangered subspecies, the species to which they belong, the white-tailed deer of North and Middle America, comprises a wide-ranging group, some of whose subspecies are common. Many people greatly concerned about protecting endangered species question the value of paying attention to what they consider to be insignificant subspecies. These people apparently do not realize that, if such philosophy prevailed, many of the well-known endangered populations such as the southern bald eagle, eastern timber wolf, Florida Everglades kite, masked bobwhite, and American peregrine falcon would have low priority in their claim for

EMBASSY OF JAPAN

Itsukushima Shrine, eighth-century Shinto shrine built over sea

special attention, because they are races of species which have other nonendangered races elsewhere. In short, the inclusive species are not endangered. The endangered lists of both the IUCN and the U.S. Department of the Interior are soundly based on the subspecies (race) category.

Extinction of species is a perfectly natural phenomenon that in the evolutionary process permits better adapted organisms to replace the less well adapted. However, one species, man, has evolved to a state where he alters the environment for all other species—for some of them, to an intolerable degree. Thus these creatures have become extinct faster than new adapted forms can be evolved. In the introduction to *Wildlife in Danger*, James Fisher gives an excellent history of extinction based on the fossil record and on what we may guess happened after primitive man came on the scene. The beginning of man's influence on the extinction of his fellow creatures was thought to have occurred in the Pleistocene. Overkill of the large mammals of that period by man is thought by some to have taken place, although there is no conclusive evidence on the point.

Considering the tremendous number of facts crowded into this book, it might be expected that a few inaccuracies would crop up. Among those noted is the statement (page 15) that only 20 California condors are left. The correct number is approximately 50, as determined by the annual cooperative condor survey during the past few years. Also, the Everglades kite is not found mostly at Lake Okeechobee, Florida, but south of there in Loxahatchee National Wildlife Refuge and its vicinity.

Conservation successes as well as failures are pointed out by the authors. Success stories can now be written for some species formerly endangered which have come back in response to successful conservation measures. These include the American bison, trumpeter swan, Hawaiian goose (*nene*), Japanese crane, and Hudsonian godwit.

Among the discouragingly endangered forms seem to be the Japanese crested ibis (only eight or nine left), the short-tailed albatross, the Eskimo curlew, the ivory-billed woodpecker, and Bachman's warbler. The status of the last three is virtually unknown.

For some species that do well in captivity the authors recommend a "zoo bank" of stock for repopulating suitable habitat from which the species has been eliminated. The Hawaiian duck (koloa), Japanese crested ibis, and Laysan teal are considered good subjects for such treatment. In the case of plants, it was pointed out that the ginkgo, native to China, is partically extinct in the wild, but common enough in cultivation. The danger inherent in the propagation of endangered species for future replacement of extinct wild populations is that domestication can and has altered both plants and animals so that, unlike their wild forebears, they may be no longer suited to life in the wild.

The illustrations in the book are many and vary greatly in quality and effectiveness, as would be expected in view of the large number of artists involved. Some are very good. Color plate 29 of North American passerine birds by J. F. Lansdowne is exquisite. The endpaper maps showing the general geographic location of endangered species encompassed within blocks of varying sizes and shapes are not particularly effective. They do not give a satisfactory impression of the distribution of the species included within the much-too-generalized boundary lines. In some cases the species, such as the dusky seaside sparrow, do not even occur within the boundaries indicated; and to include the southern sea otter and the American bison in the same block is meaningless.

Despite its few relatively unimportant shortcomings, *Wildlife in Danger* is a magnificent job of reporting the significant facts about the species of plants and animals about which we should be most concerned. We must not let them slip forever from existence, to alter, no matter how subtly, the conditions of the interplay among all living things.

John W. Aldrich is Research Staff Specialist, Bureau of Sport Fisheries and Wildlife, Department of the Interior.

PARQUES NACIONALES DEL PERU

By Salomon Vilchez Murga

Ediciones Cajamarca, Lloque Yupanqui 1082, Lima, Peru, 1968. 130 pages with 16 maps, color plates, and black and white illustrations. (In Spanish.) Paper cover, $3.50 including postage.

Reviewed by Dra. Maria Buchinger

Some years ago, Salomon Vilchez Murga, a dedicated Peruvian teacher, decided that the biologically and archeologically interesting area of Cutervo should be the first national park of Peru.

To reach his goal he began a political career, became elected Diputado Nacional, prepared and introduced law No. 13694 to establish the Cutervo National Park which was passed on September 20, 1961. Salomon Vilchez Murga saw no point in further pursuing his political career; rather, he volunteered to become the superintendent (and for a time, sole employee) of the newly established park. Later on he officially joined the Forest Service, which at that time was responsible for the management of wildlife and natural parks.

Recently, this remarkable man has published a book on the Peruvian National Parks which he intends in his dedication to be "An homage to the forthcoming centennial of Yellowstone, the first National park of the world, and to Cornelius Hodges, the genius who inspired its foundation." The example given by the U.S.A. encouraged the establishment of national parks all over the world, and the author states in his foreword, "saving thus from destruction and from selfish and speculative use the most precious manifestations of Nature. . . . The civic and moral calendars of all nations will commemorate this event." According to Vilchez Murga, Peru has taken the initial steps to establish its network of national parks, but there is still much more to be done. In the profusely illustrated text, there are brief comments on the conservation movement throughout the world, followed by a detailed description of the Peruvian situation. Data on legally established parks and on others where legislation is proposed are given; the author also mentions areas that were suggested for parks by scientific and conservation associations and reputable individuals.

The second part of the book is dedicated to park planning. In it, he elaborates his ideas on how Cutervo National Park and its surrounding areas should and could be studied and developed to protect and restore the autocthonous flora and fauna and to teach the visitor how to make his stay profitable, enjoyable, and relaxing.

The noted conservationist Felipe Benavides Barreda, in his introduction to the book, states, "It is our hope to see translated into other languages an expanded edition of this brief and enjoyable first effort by Salomon Vilchez Murga, who presents in his work, *Parques Nacionales del Peru*, an outstanding contribution to the better understanding and prestige of Peru."

Dra. Buchinger is head of the Latin America Desk of the Nature Conservancy.

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Pine marten peers from the snow-laden branches of a spruce in Grand Teton National Park. The marten, as many of its family (the Mustelidae), tolerates man only sparingly even if unmolested. But possessed as it is of rich fur, the marten has been trapped out of existence in most of its range, and its survival is a matter for question. Yet it is still trapped much and protected little. Martens are symbolic of the many wild creatures which have faded tragically before man's onslaught, often in only a few decades. One ray of hope is the zoo-bank, philosophy of which is discussed on page 14 of this issue.

Photograph by Fred A. Blackburn