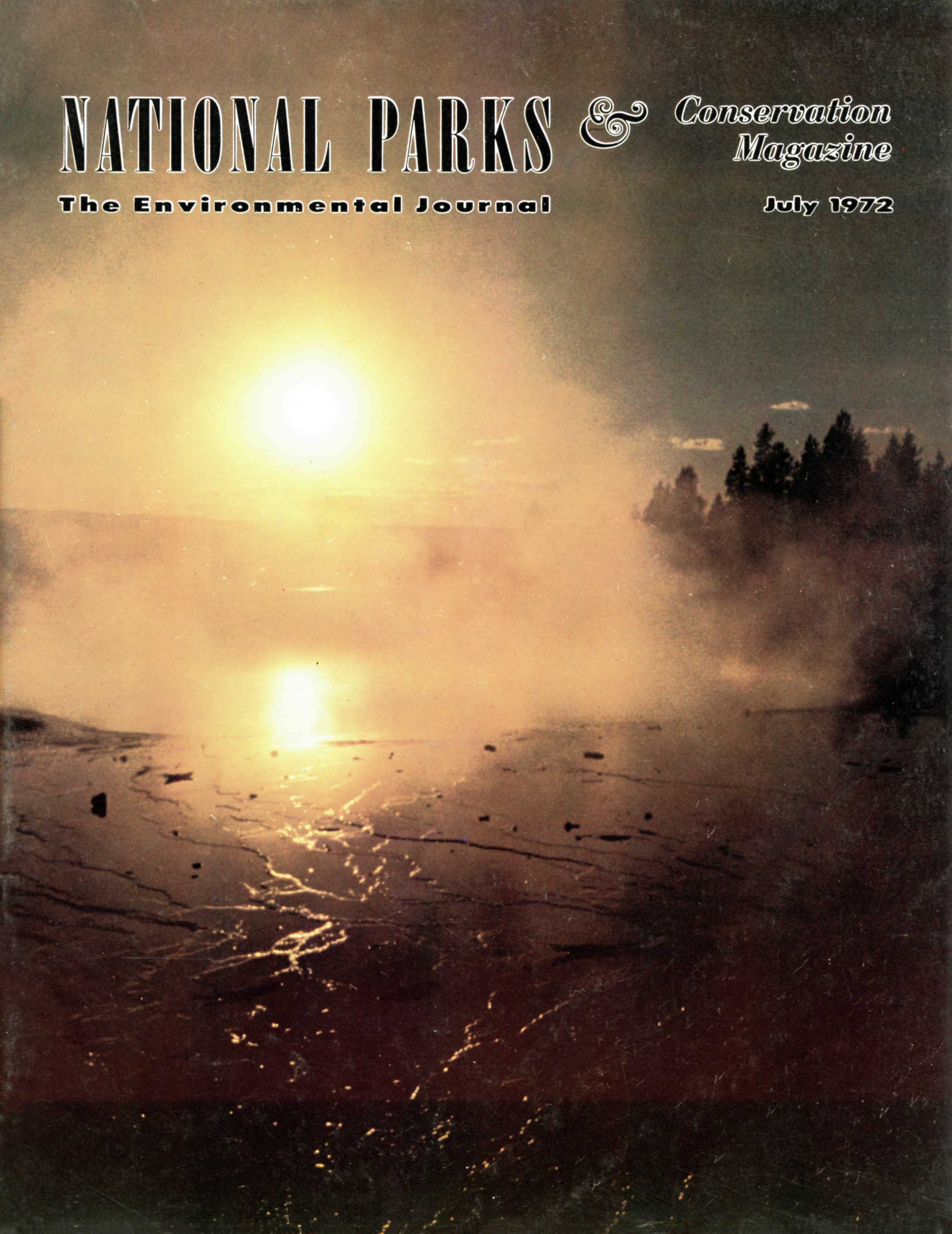
NATIONAL PARKS & Conservation Magazine

The Environmental Journal

July 1972



SILENCE

THE COUNTRYSIDE in summer is alive with sound, but steeped in silence. Earlier in the year the night-choruses of the frogs gave way to the morning-choruses of the birds. There was a clamor of birds all through the spring, but now, as summer deepens, the insects become the music-makers, katydid, cicada. Music and sound and silence are related harmoniously. Noise is the adversary.

Modern society tolerates noise in masochistic submission; only in anger, and for the most part ineffectively, do persons and groups rebel. We are bound up in a false value system: activity and productivity in the frenetic sense are thought to be good in themselves; noise is their inseparable accompaniment, so it is supposed, and a sign of the presence of the good.

Silence, jeweled in the sounds and music of nature, is of the countryside and wilderness; noise is of the big cities. The deep silence which usually lies upon the real countryside, far from the suburbs and the markets, can bring great peace of spirit, too often beyond the urban understanding. Such silence, and the deep sleep which it brings at night, fulfilling their re-creative roles, are essential to the slow processes of human self-integration, which gather their strength and produce their fruit throughout a lifetime.

ONE TEST of the validity of social programs in the future will be the place assigned to silence as a value. Freedom, organic order, locality, the worldview, solitude, community, spaciousness, leisure, sufficiency, quietude, darkness at night, compassion, to gather up a medley of the values which must motivate a new and more lifeward society, will all have their place; and silence will be among them.

A trend toward a new ruralism, and away from the monster cities, has already begun in the industrial countries. Studies of the American temper in these matters reveal a deep discontent with the urban environment, and a desire to return to the farm and the small town.

As barometers of spiritual unrest, the youthful communes are significant. And some of them could point the way in certain respects not only toward a durable communalism, but toward an ecologically more secure economic relationship between men and the surroundings from which they must draw their livelihood tomorrow, as today and yesterday.

Telically sound social planning will base itself henceforth on the small town and the rural environment around it. A return to pristine silence will be part of the process, and purpose and measure of the event.

SILENCE can also be found in cities. You can find silence in Wall Street, in New York, deserted by crowds and traffic on a Sunday. Or in the abandoned residential districts of Washington on weekends. Over the sprawling, ancient cities of the less affluent countries, still not choked with machines, an unfathomable silence falls at night, deeper than that of the countryside, perhaps because unmodulated by the normal sounds of nature.

There are parks in most cities where silence persists, enriched by the songs of birds and the whisper of wind in trees, though traffic may pass but a few hundred yards away. And there are strong old buildings remaining, even in the modern cities, which close out the noise of the streets behind barricades of brick or stone.

A measure of the revitalization of our cities, when rebirth comes, as come it must, will be the restoration of silence within them. Noise is barbaric, not urbane. The true city, when we find it again, will treasure quietude, silence; will import them from the country and the forest, as necessary nutriment for the human spirit. A new and durable urbanity will set itself profoundly in silence.

THE CLAMOR of the contemporary world is an intolerable cacophony; too often one cannot hear oneself think, let alone feel oneself alive. Physical silence, if accepted, can feed psychic repose, and

Continued on page 35

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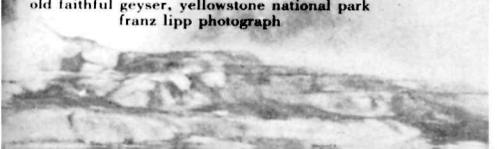

old faithful geyser, yellowstone national park
franz lipp photograph

NATIONAL PARKS & *Conservation Magazine*

The Environmental Journal **July 1972**

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COVER *Fountain Paint Pot Trail at sunset, by Richard Nowitz*

Millions of pictures depicting many different moods and features of Yellowstone National Park have been taken during the past century with many different kinds of photographic equipment—from the simple to the elaborate. But the most important of these photographs—the first ones—were taken in 1871 by William H. Jackson with his cumbersome and primitive wet plate equipment, for they helped gain national park status for the area by demonstrating to Congress Yellowstone's strange and scenic wonders. (See page 11.)

National Parks & Conservation Association, established in 1919 by Stephen Mather, the first Director of the National Park Service, is an independent, private, nonprofit, public service organization, educational and scientific in character. Its responsibilities relate primarily to protecting the national parks and monuments of America, in which it endeavors to cooperate with the National Park Service while functioning as a constructive critic, and to protecting and restoring the whole environment. Life memberships are $500. Annual membership dues, including subscription to National Parks & Conservation Magazine, are: $100 sustaining, $50 supporting, $15 contributing, and $10 associate. Student memberships are $8. Single copies are $1. Contributions and bequests are needed to carry on our work. Dues in excess of $10 and contributions are deductible from federal taxable income, and gifts and bequests are deductible for federal gift and estate tax purposes. Mail membership dues, correspondence concerning subscriptions or changes of address, and postmaster notices or undeliverable copies to Association headquarters in Washington. When changing address, please allow six weeks' advance notice and include old address (send address label from latest issue) along with new address. Advertising rates and circulation data are available on request from the Advertising Manager in Washington.

SETH PIERREPONT

PALAU

EXPLORING THE LIMESTONE ISLANDS

STEPHEN P. JOHNSON

In the first of three articles on the Palau Islands of the Pacific Trust Territory, administration of which was mandated to the United States under United Nations trusteeship at the end of World War II, Stephen P. Johnson described Palau, its peoples, their style of life, and the way in which they have responded to the growing pressures of Western modernization. This second article explores the natural history and scenic beauties of the islands, with particular attention to the unique or endangered species of plants and animals of the region and to the existing nature reserve in the Limestone Islands. The third and final article of the series will discuss the problems and mechanisms involved in establishing a major tropical land and water park in the Limestone Islands with the present reserve as a nucleus.

At one time Palau's southern islands of Peleliu and Angaur were part of one large land mass. In the vicinity of this land lived an enormous clam that unexpectedly gave birth to a human child, a girl, who took up residence on Angaur and there reached womanhood. She in turn bore a son and named him Uab. She was devoted to her son and diligently attended his every need and demand.

Uab was possessed of a voracious appetite, and he grew larger and larger every day. In a few months he was too large for his house, and the entire village generously shouldered the task of feeding him. However, after several months the magnanimity of the villagers gave way to resentment, and they resolved to do away with the youngster before he devoured the entire island. They chose burning as the most expedient way of getting the job done and built an enormous fire beneath his feet. Uab was infuriated, and in his rage he kicked Peleliu away from Angaur. He then collapsed and died. Time passed and his body decomposed; his skeleton became Palau and the maggots that had infested his body became the peoples of Palau.

Countless generations of Palauans have related this legend to their children to explain Palau's physical origin. However, geologists tell a somewhat different tale. They suggest that the islands are summits of one of the many arc-shaped ridge systems of the western Pacific. All the Limestone Islands (the islands south of Koror, composed wholly of limestone) were constructed on the peaks of submerged volcanoes that since have been covered with various limestones. The geomorphologist refers to such islands as "strewn." To the layman they are tiny islands surrounded by a coral reef form within which there is a protective lagoon. With the possible exception of Babelthuap, largest island in the chain, the Palau Islands may all be classified as "low islands," with an almost impenetrable jungle cover. Botanically, their flora is rather monotonous and is largely composed of coconut and endemic palms and pandanus and breadfruit trees. From an airplane circling over the islands at low altitude, however, the deep, rich greens of the forest, in contrast to the electric-blue waters of the lagoon, bring to mind images of the stereotyped island paradise and perhaps a hint of the archetypal Garden.

It was 7:30 in the morning and already 85 sticky degrees when Seth Pierrepont and I boarded the venerable DC6 that would carry us on the last leg of our pilgrimage—Guam to Palau. Two hours later we swung down across the reddish-brown stripe of the outer reef, approached the runway on Babelthuap Island from the south, dropped suddenly to the dirt airfield, and raced for the jungle at the opposite end of the field. Eventually we came to an uneasy halt in front of Customs—a hastily erected card table. Monday, Wednesday, and Friday are "plane days" in Palau; and if one has nothing better to do, it is considered worthwhile to meet the plane and watch the tourists disembark. Descending from the security of their aircraft, visitors invariably look dazed as they view the grass huts before them, with their multitudes of curious, expectant Palauans. Even less expected is the carefully groomed immigration official who questions the tourist about illegal plants he inadvertently may be bringing to the island.

Although Seth and I soon adjusted to the unpredictability of life on a tropical island, our orientation was greatly facilitated by Bob Owen, acting chief conservationist for the Trust Territory, and his staff at Koror's Biological Station. John Kochi, Palau's conservation officer, was delegated to conduct us through the Limestone Islands, introduce us to the native wildlife (including the four saltwater crocodiles in the laboratory zoo), and teach us the basics of subsistence survival.

Shortly after our arrival we left by motorboat for the Ngerukewid Islands Wildlife Preserve (the Seventy Islands Preserve) to look over the existing "park" in Palau, located in the western portion of the Limestone Islands.

Established in 1956 by the High Commissioner of the Trust Territory, the Seventy Islands Preserve is the only wildlife area in Palau that remains unconditionally protected from intrusion. Physically, the Seventy Islands are little different from their neighboring islands; yet the relatively remote location of the area, and its tightly clustered configuration, provides an ideal environment for the animals that inhabit it. Although the Seventy Islands Preserve is more than an hour by small boat from Koror, it is reasonable to suppose that without the protection it now enjoys the preserve would be visited frequently by picnickers and food-gatherers—visits that almost certainly would upset the delicate balance between animals and their environment.

The remainder of the Limestone Islands has retained a relative purity not found in other parts of Palau. Retention of this near-pristine condition is due largely to the islands' inaccessability and to the fact that they are virtually impenetrable. Traditionally the only activities pursued in the Limestone Islands were food-gathering—plants, roots,

Pitcher plant (Nepenthis mirabilis), *a flycatcher commonly found in Palau.*

SETH PIERREPONT

birds, and megapode eggs—and some native lumbering on steep island slopes. However, as Palau becomes progressively more modern and the population of its islands swells, the Limestone Islands have become the logical area toward which to expand, both for recreational lands and for fishing waters. Waters within the barrier reef are necessary for food-gathering; and, as Bob Owen has pointed out, the right to bait-fishing within the Palau lagoon must be conceded to present users. It is doubtful whether today's limited fishing would ever seriously deplete the numbers of a particular species of fish, but regulation of fishing in the Limestone Islands might eventually need to be carefully considered.

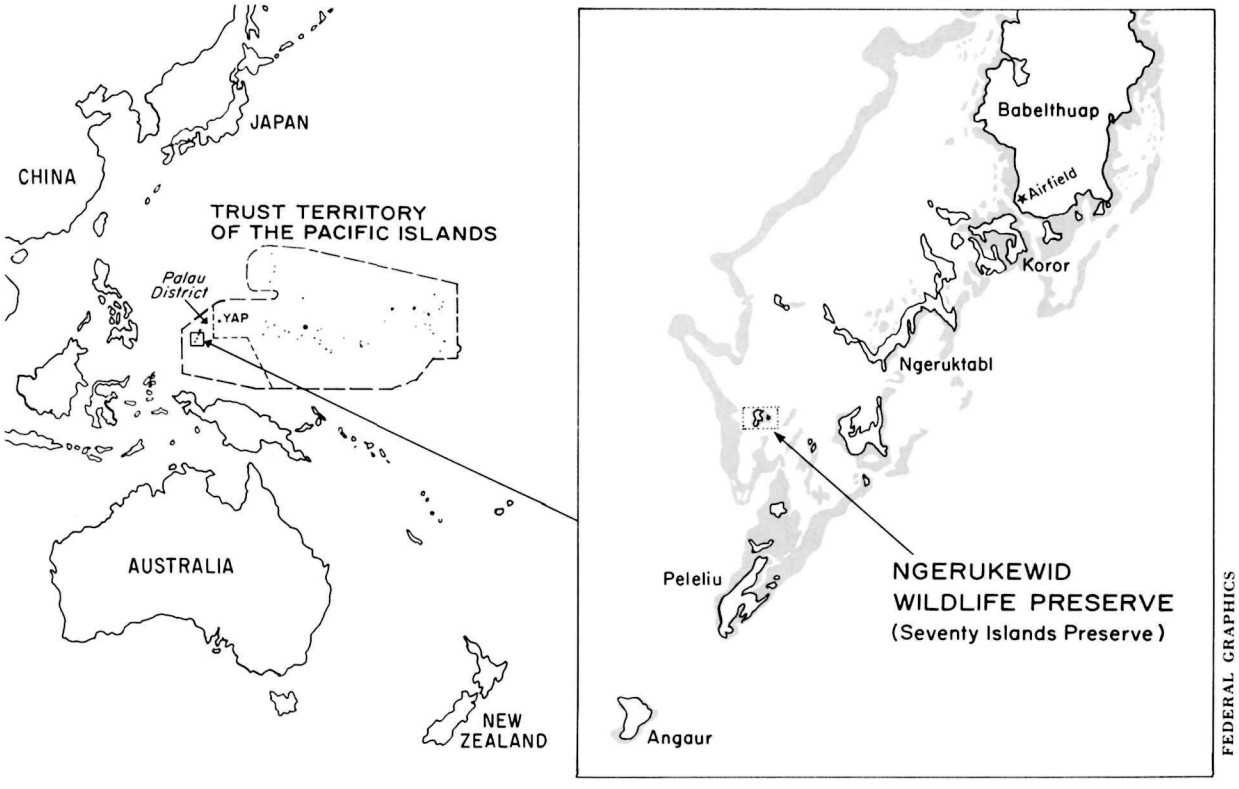
The Limestone Islands constitute a most desirable recreational area. There are some twenty-five beaches in the islands suitable for camping, and some of these already are being used regularly as weekend retreats. Commercially, too, the islands are invaluable. Roland Force, anthropologist and a member of the Social Science Foundation, has said in a review of the changing culture of Micronesia that "only tourism can be viewed as a potential industry of promise." If Force is correct (and there is much evidence that he is), then the Limestone Islands soon will become Palau's most valuable asset.

The Limestone Islands possess a rich historic background. Some of the hottest battles in the Pacific Theater of World War II raged through these islands, and their sites are clearly marked by wrecked airplanes and discarded artillery and ammunition. Perhaps even more significant—certainly more esthetically pleasing—are the many sites of anthropological interest. In the Limestone Islands alone are twenty-five sites at which the natives of Yap (a neighboring island group) dug and carved stone money that sometimes approached eight feet in diameter. On ledges high above the lagoon one may find ancient Palauan burial sites; graphic paintings cover the walls of nearby caves.

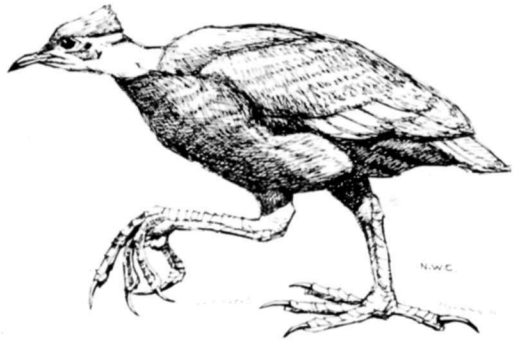
Now and again in the course of our explorations Seth and I would slip over the side of our boat into a cool, silent world of brilliant colors and rich textures. Dragonets, green and red against the dark red of the acroporas coral, drifted by in the heavy tides. Clownfish peered from the protective shelter of stinging anemones. Moray eels often slithered along the bottom of the lagoon, and a barracuda usually was not far away. Yet, with the exception of large sharks, the parrotfish was the most awesome of the sea-dwellers we saw. Once I lifted my eyes from a large tridacna clam I was inspecting and was amazed—and briefly terrified—as a school of six-foot, deep-blue parrotfish swam by in a leisurely fashion.

Our underwater work was pure enjoyment; yet we left the ocean with a sustained sense of wonder. Our serious work was on the surface.

A most valuable asset of the area, and that which most clearly justifies protection, is its wildlife, land-based and marine alike. Shortly after our arrival John Kochi guided us to a small island in the vicinity of the Seventy Islands Preserve and pointed out several enormous mounds of mixed sand and plant debris. We learned that these large piles were the nests of the Palau race of the Marianas megapode, called *bekai* by Palauans. The megapode is a bird, approximately the size of a gull, that incubates its eggs by depositing them in mounds (which sometimes measure fifteen feet in diameter and five in height), where



STEPHEN P. JOHNSON



Wildlife in Danger (IUCN), p. 208

A megapode nest and, right, a megapode (Marianas race, La Pérouse's megapode). Decomposing plant matter produces heat to hatch the eggs, which are considered a delicacy in Palau. The gull-sized megapode seems headed for extinction. The mound above is fifteen feet in diameter, and the entrance hole can be seen in the upper right portion of the nest.

they are hatched by the heat generated by the decomposing plant materials. Incubation may take thirty to forty days. Unfortunately for the megapode, its nest invariably is located on easily accessible beaches, with eggs usually at a depth of two and a half feet below the surface of the mound. Although the Palauan bird survives in relatively large numbers as compared with those of the rest of its habitat, where it is close to extinction, even in Palau megapode numbers are dwindling. Unfortunately for the bird, the Palauans consider the raw, ten-to-fifteen-day-old embryo of its egg to be a delicacy. In the distant past primitive conservation laws regulated the taking of eggs, usually allowing only village chiefs that luxury. The majority of Palauans abided by these laws rather than face the severe penalties levied against offenders.

Hawksbill turtles, historically an important source of natural tortoise shell, are common in Palau. The Trust Territory Code prohibits the taking of hawksbills on land, but like many protective laws the ordinance often is ignored by hunters eager for both turtle eggs and valuable shell.

The case of the dugong, a rare marine inhabitant of the Palauan Islands, is similar. Remote islands often serve to protect animal species that have been nearly eliminated on major land masses. This has been true in the case of the dugong. Reduced to frighteningly small numbers elsewhere in the world (the dugong, like the megapode, is on the endangered species list), it has managed to survive in Palau. For many years the dugong was hunted extensively by native Palauans eager to make magical anklets and wristlets from dugong vertebrae. In 1967 the Palauan legislature passed a measure to protect the dugong from further exploitation. Enforcement over the past few years has been reasonably effective, but chief conservationist Owen supposes that some poaching still continues. The dugong is rarely seen during daylight hours, choosing instead to feed on eelgrass and sea-cucumbers after sunset. The Limestone Islands are an ideal environment for the big mammal, offering protected, deep-water coves into which it can retreat during daylight. Without proper protection, however, the dugong is probably doomed.

Of equal concern to Owen is the decline of a local subspecies of the Nicobar pigeon, *Caloenas nicobarice pelewensis*. In Palau the bird occasionally is seen on Garakayo Island, perched on high cliffs. It, too, is considered a delicacy by Palauans. The Palauan subspecies is "subspecifically different" from other Micronesian and Melanesian populations, apparently having no close relatives. Some ornithologists have suggested that it is the last remnant of an ancient pigeon group. An increase in fines levied against those who still poach this bird, combined with a prohibition on possession of firearms other than small-caliber rifles and shotguns, have been effective in protecting the pigeon from further decimation. The Palau owl and Palau ground dove are among the sad entries on the endangered species list of the International Union for the Conservation of Nature, although little is known about the reasons for their decline.

Four species of palms are endemic to Palau: *Heterospathe elata palauensis* (rare in the Limestone Islands), *Pinanga*

The dugong, like the megapode, is listed as an endangered species, and the sea-dwelling mammal exists in relatively large but declining numbers in Palau. A 1967 Palauan law forbids hunting of the animal.

E. P. GEE, COURTESY WORLD WILDLIFE FUND

The Limestone Islands silhouetted at sunset.

STEPHEN P. JOHNSON

insignis, *Galubia palauensis*, and *Ptychosperma palauensis*. Despite the partial destruction of palm forests by a parrot and a cockatoo introduced by the Japanese, these trees are still a potential source of lumber for Palau's growing building needs. With proper conservation and management Palauan forests will serve as a source of logs into the future.

These species of plants and animals are notable in the natural history picture of the Palauan Islands; but there are other interesting species as well. In the Limestone Islands lives a small, endemic frog that bears live miniature young—a reproductive scheme seldom found in the world of amphibians. A rare saltwater crocodile inhabits Babelthuap and the Limestone Islands. Until recently it was present in large numbers, but several years ago a native fisherman was killed by a large crocodile, and an extensive slaughter that followed eliminated half of the big reptiles, perhaps endangering their population in the islands.

Even before we had arrived in the Palaus we had heard stories of a bright blue sea-snake, poison of which is said to be more deadly than that of the cobra. For the first few weeks of our stay in the Limestone Islands we expected to meet a blue sea-snake behind every coral outcrop, because the animal often comes ashore to sun itself. Finding this not to be the case, we began a concerted search to catch at least a glimpse of one; and we went on several expeditions in an attempt to photograph a specimen. When we talked about our efforts, the Palauans always laughed and told about the six-foot blue sea-snake they had played with only the week before, but for us the snake remained chimerical.

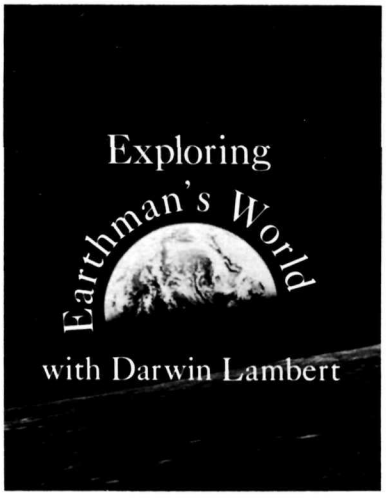
As important as wildlife is in the Limestone Islands, it is only one facet of a natural area that radiates beauty. Indeed, natural beauty may well be the area's greatest asset.

Sitting on a secluded beach in the Limestone Islands, miles from another human being, watching the sun's watery descent into an island-laced horizon, Seth and I were deeply impressed by the intense loveliness of these islands. As the sun set, stars began to materialize from a blue-black sky to provide a backdrop for the moon, which bathed the beach in green light. Seabirds wheeled overhead in the night sky, invisible but highly audible. The rain often came before the sun rose, rinsing the beach and racing across the lagoon to meet a dawn heralded by misty, tropical cumulus clouds that floated gently with islands on the horizon.

Whether from an economic, historic, biologic, or purely esthetic perspective, the Limestone Islands are a valuable asset to Palau. It is essential, both for the sake of existing animal and plant species and for Palauans to come, that a sizable portion of the Limestone Islands be protected from the effects and byproducts of modernization, undesirable yet often unavoidable. The Seventy Islands Preserve was an admirable first step in this direction. Perhaps through the establishment of similar though perhaps less restricted areas, a harmonious and functional relationship between the Palauan and his environment may be effected.

Toward this end environmentalists and scientists are suggesting a very substantial enlargement of the existing reserve, which could, perhaps, continue as the closely protected nucleus of a much larger and somewhat less restricted area that might be known as the Seventy Islands Tropical Park. ■

Stephen P. Johnson and his coworker Seth Pierrepont spent several months during the summer of 1971 researching the human and natural history of the Limestone Islands in the Palau District of the Pacific Trust Territory with a view toward establishment of a sizable portion of those islands as a biological and scenic preserve.



A series of essays examining man's relationship to nature

Green Music

by Alan Watts

IF I LET MY MIND RUN TO FANTASY, I find myself basically in search of a Paradise Garden—somewhere a courtyard with a fountain, set about with roses and magnolia trees, cypresses and willows—as may be seen in Persian miniatures, and with round arches through which one can look down upon an ocean fondling jagged islets with foam. And in this garden the point to which I drift, like a bee bewitched, is some flower—an iris, a jonquil, a crocus, or a morning-glory. Indeed, I have sometimes wandered in such paradises with a magnifying glass to gaze deeply into these translucent coronas of yellow and purple, ivory and coral, with a contemplative devotion which is surely mystical. As my mother put it—when once showing me a morning-glory—"Doesn't it make you feel jazzy inside!" Indeed, so many people have dreamed of this Paradise that poets and literary people fear to seem trite in trying to evoke this beatific vision of the bee.

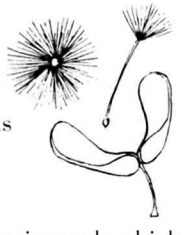
Yet don't we all want to pass into it through the eyes, to integrate consciousness with its ecstatic center of energy, and so enter the point where all nerve currents flow back into the place from which they come, where the individual is the universal and the moment eternity? This is a fascination so widely spread that it must have some unexplored connection with our whole psychophysical structure, and perhaps with the very design of life. For it is curious that when human features seem an insufficient symbol of the divine, we resort to the stelliform face of the flower in mandala, aureole, and sunburst, as in the rose windows of cathedrals, the Celestial Rose in Dante's vision of Paradise, the Rose Garden of Our Lady, and the Lotus Throne of Mahavairocana—the Great Buddha of the Sun. To try to explain this as a symbolism of the generative "flower" of the vagina seems to ask more questions than it answers. Indeed, it raises the most basic question of all: what is so great about sex, about reproduction, about the very survival of a species? For if, as my father once told me, nature makes sex so delightful that we are thereby lured into procreation, one is still left wondering. Is sex the point of existence, or continued existence the point of sex? Is mere survival a value at all? Or are the ecstasies of copulation and mastication the real ends for which we live? Putting it that way is, of course, like asking what is so great about listening to Heifetz scraping cats' entrails with horsehair.

Or *is* this the most basic question?

What puzzles me more is why human beings raise such a question as "What is the point of life?" Why do we feel that "nature," on the one hand, has to lure "us," on the other, with the goodie of sex so that we will generate offspring? To ask about life having a point shows that we are constantly missing the point, that we have some defect of perception which prevents us from realizing that WHAT IS WHY, that, as in music and dancing, the point of life is accomplished at every moment of its unfolding.

There is a clue to this problem in our characteristic attitudes towards flowers in particular and vegetables in general, for though we use the flower-form as a symbol of the divine, we actually despise the whole family of plants as very low and unintelligent forms on the evolutionary scale, and so speak of a hopelessly decrepit person as "a mere vegetable." And—perhaps rightly—we assume that because flowers do not rush around on legs they must be unconcerned with time and history so as to live, as Emerson supposed, entirely for this day.

Yet a being which is rooted in the earth is not necessarily to be compared with a cripple, for I am ever amazed at the intelligent ingenuity with which plants fertilize themselves and propagate their kin—how they use, and are mutually used, by bees and other insects for pollination, and how they send out their seeds by marvelous contrivances of aviation and engineering. There are winged seeds which spin through the air like helicopters, seeds which float on diaphanous fibers, seeds with burrs to cling in the fur of animals, seeds enclosed in fruit to be swallowed and excreted by birds, and seeds to be scattered by explosive pods which, when ripe, snap open and jolt themselves into corkscrews. I marvel, again, at the multiplicity of designs whereby they absorb water, air, and light, beguile bees, protect themselves from enemies, and constitute themselves as laboratories for botanical alchemy.



I am making a visible dance on paper resonate with an invisible dance in my head, to entertain myself and you, the reader, with thoughts and feelings which may be followed in the same way as patterns of music or choreography.

But the more I think about plants, the less do these utilitarian, engineering metaphors seem applicable. For in such terms every discernible part of a plant seems to be an instrument for the survival of the plant, and I can find no chief or ruling part which these instruments serve. Survival mechanisms are simply working for survival mechanisms to go on working. A plant does not therefore seem, as we do, to eat and propagate in order to amuse its head with religion, art, and science. We assume, therefore, that it has no "higher life," and is therefore wholly preoccupied with the mundane concerns of biological survival.

Why not suppose, instead, that the survival of plants is merely incidental to the pure fun of existing in so many amazing shapes and orders? That their tubes, fibers, and cells transport nutritive chemicals is only to say that these formations exist. My pen would not write unless it were transporting ink, but I am not writing for the simple purpose of conveying ink from one place to another. I am making a visible dance on paper resonate with an invisible dance in my head, to entertain myself and you, the reader, with thoughts and feelings which may be followed in the same way as patterns of music or choreography. That the ink-flow goes on is both essential and incidental. My purpose, if any, is to provide a theme for your variations, and I would like you to enjoy the dance, now, as you are doing it. Just get lost in doing these visual, intellectual, and esthetic wiggles, as when a flute-player really grooves with the quality of a note he is blowing.

Why else do artists persist in copying the forms of plants? Why decorate the margins of holy scriptures with twirling vines? Why go about in garments depicting flowers and leaves? Why doodle fronds?

As yet we know little of the complex networks, streams, tides, and pulses of electrical vibrations with which plants may resonate, having only just begun to study them with the electroencephalograph. Can we be so bold, or rather unimaginative, as to say that their obvious responses to light and temperature are not forms of awareness, having interior aspects which might correspond with our own sensations of color and rhythm? Without moving from their rooted positions they may thus be responsive to and informed by processes covering enormous distances upon which our conscious attention has never yet been focused. These electrical patterns and rhythms could well be as exquisite as the very forms of ferns would themselves suggest, and thus be as important and "spiritual" to plants as the sonatas of Beethoven are to us. I can find no reason for dismissing these ideas as fanciful projections of the "pathetic fallacy" other than that human beings are astonishingly conceited. Has it ever occurred to anyone that the angels and spiritual presences "above" us may be growing in our window-boxes? Not, perhaps, in modern times—but when followers of Shinto aver that every tree has a *kami* or spirit, we might think twice before dubbing it "primitive animism."

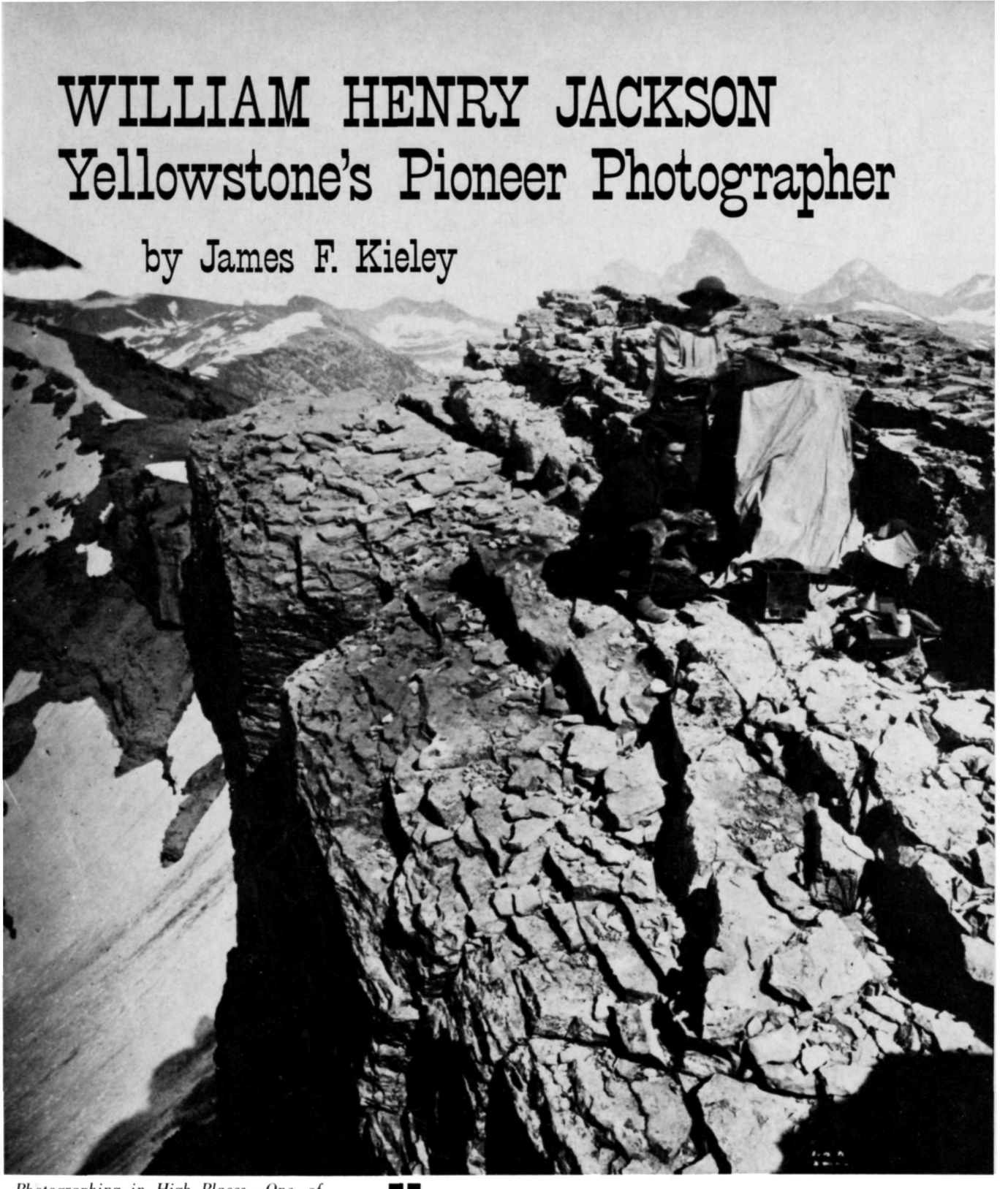
I do not know how seriously I should take these speculations, for the same reasonings might be extended, not only to birds and beasts, but also to insects, microbes, and viruses—perhaps on to rocks and rivers, mountains and stars. Possibly the bell thrills inwardly with some equivalent of DONG when I strike it, and it may be using my ears for its consciousness as the flowers use bees for their love-making.

I am sure, however, that we are mistaken in our ways of delimiting the boundaries of individual life-forms. Bees and flowers constitute a single organic process just as much as the brain and the heart, the flesh and the bones, and it must not be forgotten that the atoms of our bodies float in enormous spaces, relative to their size, and are not tied together with strings. What unites them is the way they organize or pattern themselves, as the figure 4 is not merely a summation of dots. Similarly, we ourselves are human beings only in the context of the universe around us, for it takes this to be for us to be.

For decades now Alan Watts has been writing philosophically and poetically of man's identity with nature, helping us to feel at home and to find fulfillment in the organic unity of earth and life. He holds a master's degree in theology and a doctorate of divinity and recently completed a two-year research fellowship in the Department of Social Relations at Harvard. He has produced eighteen books that include refreshingly original interpretations of Chinese and Indian philosophy, of Christianity, and of the psychology of religion; and he has been a guest lecturer at most of this country's principal universities. In the process—perhaps almost incidentally until the past few years—he has set forth a reality-based view of the human condition from which solutions of the world's environmental problems could naturally and pleasantly grow. "Green Music" is reprinted with permission from a facsimile manuscript in Alan Watts Journal, *September 1971.*

WILLIAM HENRY JACKSON
Yellowstone's Pioneer Photographer

by James F. Kieley



U.S. GEOLOGICAL SURVEY

Photographing in High Places—One of only a few early photographs of William H. Jackson himself, this particularly good one was made in Lincoln County, Wyoming, in 1872, the year after the Hayden expedition. Jackson is squatting over some of his wet plate equipment with an assistant standing by. Another man made the exposure after Jackson had set up and focused the camera.

YELLOWSTONE, the oldest, largest, and most dazzling jewel in the nation's chain of national parks, was established a hundred years ago. During most of the century that followed, generations of Americans and foreign visitors have shot millions of pictures within the area's 3,348 square miles of unsurpassed landscapes and natural wonders. But it was the work of a pioneer photographer who lugged his bulky wet plate equipment into that remote and little-known wilderness that helped clinch an appeal to Congress in 1872 to set aside the wonderland as the first unit of a nationwide conservation and recreation system.

The official photographer of the U.S. Geological Survey's expedition of 1871 to explore the mysterious Yellowstone country in the northwest corner of Wyoming was William Henry Jackson, a young Yankee Civil War veteran whose imagination was fired by the promise of rewarding adventure in the postwar winning of the west. As photographer, artist, bullwhacker, and business man, he traversed the mountains and plains west of the Missouri for over thirty years by foot, horseback, wagon train, stagecoach, and rail, photographing and painting the aboriginal environment of the American Indian and its penetration by the relentless thrust of transcontinental railroads from east and west. Among more than 30,000 negatives he assembled throughout his career are many preserved in the archives of the U.S. government as priceless records of scenes and events from a lusty period of America's past.

I became personally acquainted with William Henry Jackson three years before he died in 1942 in his ninety-ninth year. As an information officer of the National Park Service, I worked with him to arrange an exhibition of his photographs and paintings of the early west for the Interior Department's museum. On several memorable occasions he told me of his exploits, first during a visit to his apartment in New York, and in subsequent conversations, usually over lunch at my home or at the Cosmos Club in Washington. Even at ninety-eight he showed little evidence, either mental or physical, of his advanced age. He would ring me up at the office and say, "Mr. Kieley, this is W. H. Jackson. I've just arrived from New York. How about lunch?" On one occasion when we were leaving our apartment building to drive him back to his hotel, my wife touched his elbow as we approached a short flight of steps. "Oh, no," he said, quickly taking her arm instead. "Let *me* assist *you*."

Jackson's interest in the graphic arts originated in his childhood home environment. His mother was a watercolor painter, and his father experimented with Daguerre's recent invention of photography. Consequently their child, born in 1843, grew up with both cameras and paints always around him. Responding to Lincoln's call for "300,000 more" volunteers in 1862, he sketched military subjects during his army service, and after the war worked in a gallery in Burlington, Vermont, before striking out for the far west "in an unpremeditated way," as he put it, in 1866.

A SEASONED TRAVELER and photographer, Jackson was operating his own studio in Omaha in 1870 when Dr. Ferdinand V. Hayden, first head of the U.S. Geological Survey, invited him to join an expedition into the newly established Territory of Wyoming. Leaving his wife in charge of the business, Jackson joined the Hayden party in Cheyenne as a free lance, but later was put on the government payroll as the expedition's official photographer. This foray of two months took him through familiar territory, but the following year a second expedition headed for the fabled Yellowstone country to prove or disprove stories told by Indians and occasional white travelers from early times about geysers, hot pools, and strange topographic formations. So fantastic were these tales that few people believed them; and some doubted whether, taken as a whole, the fabulous land they described actually existed at all. But the Hayden expedition of 1871 brought back not only reliable eyewitness accounts corroborating the wildest of these reports, but also actual photographs—hundreds of them—of the phenomena themselves.

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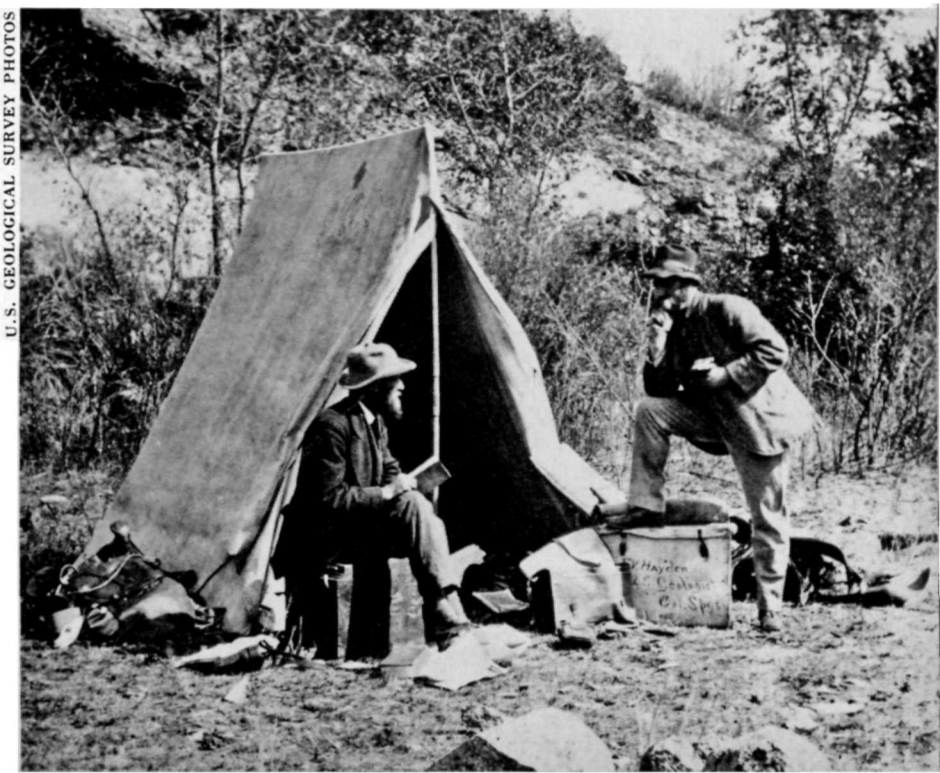
Left, members of the 1870 Hayden expedition into Wyoming pause for a meal at Red Buttes, Wyoming. Dr. Ferdinand V. Hayden (1) is seated in the background; William H. Jackson (15) stands at right. Apparently the hunter (13) had recently provided fresh game. Above, the 1871 Geological Survey pack train on the trail to Yellowstone. Lt. Gustav O. Doane, guide and leader of the military escort, heads the line, followed by Dr. Hayden. The fifth man pulls the odometer. Below left, Thomas Moran, William H. Jackson's good friend and fellow artist, was a guest of the Hayden expedition. His paintings, as well as Jackson's photographs, later helped persuade Congress to establish the fabled Yellowstone area as a national park. Below right, Dr. Hayden, left, and Walter Paris at the camp study on the Yellowstone expedition.

U.S. GEOLOGICAL SURVEY PHOTOS



The 1871 expedition got organized at Ogden, Utah, in June. Accompanied by a detachment of U.S. cavalry for protection against possible attack by hostile Indians, the party of thirty-four approached its objective from the north and established a base camp at Botelers' Ranch on the Yellowstone River. Jackson took along three cameras—an 8-by-10, a 6½-by-8½, and a stereo for making the stereoscopic views with their three-dimensional effect so popular in the late nineteenth and early twentieth centuries. He also took a complete traveling photographic laboratory, because his glass plates had to be coated, exposed, and developed on the spot for each shot. His equipment, including the cameras, 400 plates, a portable darkroom, and a full stock of chemical supplies, weighed about 300 pounds and was hauled in two ambulance wagons.

For each day's shooting Jackson loaded his cameras, tripod, portable dark box, chemicals, keg of wash water, and supply of plates on a fat little pack mule he called Hypo. In preparation for each picture a glass plate was flowed over with collodion, then immersed in a bath of silver nitrate, and placed in a plate holder. After exposure the plate, still wet, was developed with iron sulfate and fixed with cyanide of potassium in solution. It was then washed, dried, and placed temporarily in a grooved box for holding negatives. At the end of the day each plate was varnished before being packed away.

This early type of emulsion was, of course, very slow. Exposures were judged by experience and were usually made without any type of shutter simply by removing and replacing the lens cover. For his Yellowstone assignment, however, Jackson rigged up a drop shutter actuated by a rubber band, because he found that he could shoot a certain amount of action at high noon with a one-tenth second exposure. Most of his pictures, however, required at least five seconds exposure, and to avoid blurring they had to be made without any kind of movement, even of leaves or branches stirred by the wind. Normally his exposures were longer than the minimum, because he liked to close down his aperture for maximum depth of field and definition.

Having myself made hundreds of stills and motion pictures in national parks and recreational areas in many parts of the country with the modern equipment we have come to take for granted, I can well appreciate the disadvantages under which Jackson worked. I recall, for instance, standing at a high point in the Cascade range in the state of Washington and within minutes shooting a series of superb scenes through a 360-degree turn with my Leica loaded for thirty-six exposures. Compare this with Jackson's description, in his autobiography, *Time Exposure* (G. P. Putnam's Sons, New York, 1940), of his experience at Tower Creek where it drops into the gorge at the Yellowstone River, presenting a magnificent view:

"After setting up and focusing my camera at the bottom of the gorge, I would prepare a plate, back the holder with wet blotting paper, then slip and slide and tumble down to my camera and make the exposure. After taking the picture, I had to climb to the top carrying the exposed plate wrapped up in a moist towel. With Dixon to help, cleaning and washing the plates, I succeeded in repeating the procedure four or five times. The end of the day found us exhausted but very proud; and we had reason to be

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One of Jackson's assistants holds Hypo the mule, aptly named for the chemical solution used in photo processing. Hypo was a good trooper, at times carrying as much as 350 pounds of equipment; he never held his breath and puffed up his belly while being loaded so the pack would fit loosely and slip later, as other mules and horses are wont to do. At left, the view of the falls where Tower Creek drops into the Yellowstone River. Each time Jackson made an exposure, he had to scramble down and back up a steep, rocky incline to the top with the wet glass plate while preventing it from drying out.

U.S. GEOLOGICAL SURVEY PHOTOS

Two views of Mammoth Hot Springs that Jackson photographed in 1871. Above, Thomas Moran at Diana's Bathing Pool. Below, N. P. Langford, who later served as Yellowstone National Park's first superintendent, at the Upper Basin.

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Above, Jackson's photograph of the impressive Grotto Geyser made on the Hayden expedition in 1871. Although Jackson caught the geyser erupting, the action is blurred because of the long exposure required by the slow emulsion of his wet plate. Most of his shots needed at least five seconds—and much longer when he stopped down the camera aperture to increase depth of field and to improve definition. A shutter of his own design, powered by a rubber band to measure a one-tenth-second exposure, sometimes could be used to catch a little action under maximum lighting conditions at high noon. Below, Jackson made this shot of the Grand Canyon of the Yellowstone River, one of the most spectacular views in Yellowstone country, from the left bank of the canyon in 1871.

U.S. GEOLOGICAL SURVEY

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HUGH F. ALEXANDER

Left, a near view of the Lower Falls of the Yellowstone River, not far from the bottom of the canyon, in 1871. Above, William H. Jackson in 1939 at the age of 96 when he was in Washington, D.C., working on an exhibition of his paintings in the Department of the Interior museum. He is shown consulting with James F. Kieley, author of this article, before the start of a radio broadcast.

pleased with ourselves for not a single one of our plates had dried out before being developed."

There were two other photographers on the forty-day expedition into the Yellowstone. One was J. Crissman of Bozeman, Montana, who disposed of his pictures to a strictly local market. The other was T. J. Hine of Chicago, who was attached to a separate party of the Corps of Engineers. Hine's pictures were totally destroyed in the Chicago fire of 1871. Only Jackson's official photographs of the Hayden expedition reached Washington. These photographs, along with the paintings of Thomas Moran, also a member of the Hayden party and a close friend of Jackson's, constituted one of the most convincing and persuasive exhibits placed before the Congressional committee considering legislation for the establishment of Yellowstone National Park.

Jackson revisited the Yellowstone country several times, using an 11-by-14 camera in 1872. On another trip he used a 20-by-24 size (!) wet plate camera to photograph the Rocky Mountain area. From 1879 to 1898 he was a traveling photographer for transcontinental railroads, making his headquarters in Denver and using, of course, the newer, more compact cameras and dry plates. He topped off his career in field photography with an eighteen-month round-the-world trip for *Harper's Illustrated Weekly* in 1896 and 1897, then settled in Detroit in the color printing business. In 1924 he "retired" at eighty-one but still kept busy with his photography and painting. In 1935 the Secretary of the Interior called him back into government service at the age of ninety-three to paint pictures for the National Park Service, and he found himself flying over the land he had first crossed by covered wagon nearly seventy years before.

One of William H. Jackson's fondest hopes was to live to be one hundred. He very well might have made it had he not had the misfortune to slip and fall in his bathroom, suffering a broken hip, only months before he would have marked his one-hundredth birthday. He was buried with full honors in Arlington National Cemetery. He is also honored in his beloved West. Mount Jackson, a prominent peak in the Colorado Rockies adjoining Mount of the Holy Cross, is named for him, as are Jackson Butte in Colorado and Jackson Canyon near Casper, Wyoming. But Jackson's most appropriate monument is his matchless record of a land hardly better known than the surface of the moon until he photographed its incredible features with technical skill and artistic appreciation. ■

James F. Kieley, who lives in Washington, D.C., recently retired from federal government service after thirty-six years as an information officer in several agencies. Before that he was a news writer and broadcaster. He is author of two books, *U.S. Naval Academy: The First Hundred Years* and *West Point: The Key to America*.

Flavio Bazán
Carlos F. Ponce del Prado

VICUÑA

Endangered 'Camel' of the Andes

CARLOS F. PONCE DEL PRADO

The vicuña, one of the graceful wild creatures of the world and an inhabitant of the altiplano—the high plateau country—of Peru, Bolivia, Argentina, and Chile, still exists in spite of a long history of unmerciful and illegal hunting. Once the South American vicuña herds may have numbered 400,000 animals. Today there may be 20,000 vicuñas left, 75 percent of which are in Peru, most of the rest in Bolivia, and possibly a few in Argentina and Chile. At the rate of decrease in the past few decades the vicuña faces extermination in the none-too-distant future, and the International Union for the Conservation of Nature has listed the animal in its Red Book of the world's endangered species.

Why the relentless hunting of the animal? The answer is simple. Its wool is the finest in the world, unique in its softness, color, and texture. Although the animal is protected by law in the countries in which it still occurs, fashion demands in many countries have created a steady demand for vicuña wool, which in turn has led, particularly over the past twenty years, to an increase in the activities of both poachers and illegal merchants of vicuña products. As a result vicuña populations continue to decrease at an alarming rate.

The vicuña, the domestic alpaca, and the llama are sometimes called "the camels of South America," for they do, indeed, belong to the camel family. The animals live in herds of around twenty females and youngsters with a male leader. The leader, called the *jainacho*, chooses the feeding grasslands, looks after the herd, and plans its escape when danger threatens.

The ancient civilization of the Incas seems to have known better than present generations about the conservation and management of the vicuña. Vicuña herds were not persecuted then; instead, they shared their wool with the Incas. Periodically the herds were surrounded by thousands of men who sheared the animals to obtain their wool, from which the finest of garments were woven. The vicuñas were then released. Later, during three centuries of Spanish colonialism, unlimited hunting was permitted; and vicuña populations began to decline sharply.

The first government regulation concerning the vicuña dates to 1825. Then, the liberator of Peru, Simon Bolivar, issued a decree prohibiting hunting of the vicuña and encouraging its protection and domestication. Subsequently, regulations and laws were enacted by both Peru and Bolivia that prohibited both vicuña hunting and trade in its wool and hides. Severe penalties were prescribed for offenders, but unfortunately the decrees and laws about the animal have never been strictly enforced and the slaughter has continued.

Experience obtained from a private farm and a national reserve in southern and central Peru has proved that if protected the vicuña herds could easily be restocked and managed for both economic and esthetic purposes.

Since 1920 Francisco and Emma Paredes, of the Kala Kala hacienda at Puno in the altiplano of southern Peru near Lake Titicaca, have devoted much of their lives and money to raising vicuñas under conditions of semicaptivity. A description of the vicuña and its habits is given by Emma Paredes. She says: "The vicuña is a nice-looking, delicate creature, shy, elusive, yet extremely curious. From a distance the vicuña challenges the hunter by pounding the soil with its feet. With a kiss the females impart the first sign of life to their offspring. But they are also too suspicious; if somebody touches their young, they abandon them."

The Paredes learned much about the behavior of the animal, how to protect it from its natural predators—mainly foxes—and succeeded in raising around 1,200 vicuñas within the limits of the ranch.

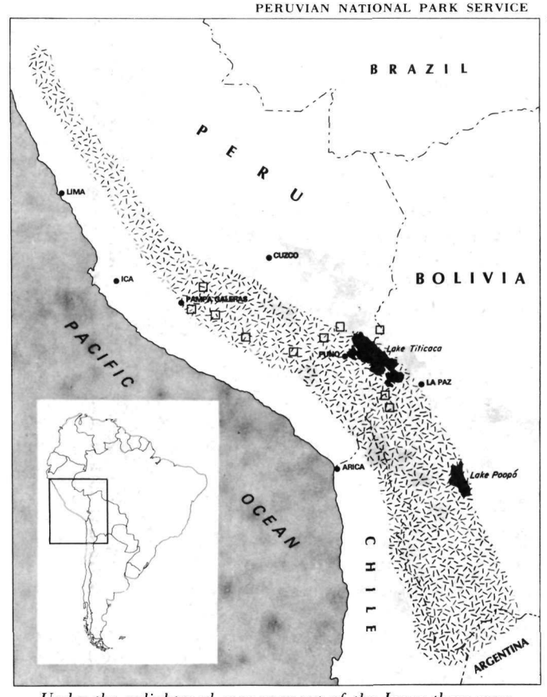
During the survey in the central sierra of Peru in 1957, I visited and studied the Pampa Galeras region and came to the conclusion that it was one of the best vicuña habitats of the country. Here, also, poachers and smugglers were still decimating the remaining vicuña herds. I felt then that the establishment of a national vicuña reserve in Pampa Galeras, with effective police-guard control and with the full cooperation of the local population, would be the only way to put an end to the vicuña destruction in this vital area of habitat. (Pampa Galeras is located 270 miles southeast of Lima at an elevation of 13,000 feet and is accessible by a road that connects the coast of Peru with Cuzco, the old capital of the Incas.)

Finally, in 1966 the Pampa Galeras National Vicuña Reserve was established at the conclusion of a series of negotiations with the *communidad* of Galeras (an Inca-style community government), which consented to give 16,000 acres of its land to the central government for the development of a vicuña project, a decision in which Galeras should certainly take great pride.

The reserve is under the jurisdiction of the Peruvian Forest, Wildlife and Land Service of the Ministry of Agriculture. It has received technical support from a number of national and international governments and institutions, among which are the Agrarian University at La Molina, Peace Corps, Food and Agricultural Organization, World Wildlife Fund, Government of Belgium, Zoological Society of Frankfurt, Peruvian Zoological Society, University of Utah, and Foresta Institute for Ocean and Mountain Studies.

Two counts made on vicuña within the reserve have shown an extraordinary increase in its numbers. Over a four-year period vicuña numbers rose from 1,753 to 4,664 animals, certainly a great achievement and one that indicates very clearly what the region could expect if a sound program were developed to restore vicuña numbers. Such a program would manage a renewable natural resource that has been sadly neglected—indeed, almost destroyed. There is no doubt that effective protection and management of vicuña could be more easily achieved if the countries immediately concerned made a concerted effort toward implementation of a vicuña program on a regional basis.

PERUVIAN NATIONAL PARK SERVICE



Under the enlightened management of the Incas there may once have been as many as 400,000 vicuñas within the habitat range indicated by stippled pattern on map. With the coming of the European the mammals' numbers commenced a sharp decline, and today the vicuña is listed as an endangered species. Shown is the location of Peru's recently established Pampa Galeras National Vicuña Reserve; squares indicate areas believed to offer great potential for reintroduction of the animal. Land area shaded in gray has an altitude of 10,000 feet (about 3,000 meters) or more.

FRANKLIN

A group of vicuña, alert to the cameraman, in Peru's recently established Pampas Galeras National Vicuña Reserve. At the time this article was written 4,664 of the animals were present on the reserve, which is located near the Inca-style community government village of Pampas Galeras in the Peruvian altiplano.

CARLOS F. PONCE DEL PRADO

The first international meeting on the conservation of the vicuña took place in Arequipa, Peru, in 1964, for discussions at the technical level. It was attended by representatives of Argentina, Bolivia, and Peru; and it laid the groundwork for the agreement signed in 1969 by the governments of Bolivia and Peru. Under terms of this binational agreement each country would pass legislation prohibiting hunting of vicuña and would place a ten-year ban on any kind of trade in vicuña products. The agreement also allows Argentina and Chile to join a regional program for the conservation of vicuña.

In 1970 the United Kingdom and the United States banned imports of vicuña wool and hides. If other developed nations of the world in which there is a demand for vicuña wool would join in the ban, it is very likely that both potential producers and the consumer countries would benefit.

It should be mentioned that the Committee on National Parks and Wildlife, in one of its sessions at Quito, Ecuador, in November 1970, recommended a regional program for the protection and development of vicuña herds. More recently the First International Scientific Conference on Vicuña Conservation, held at Lima, Peru, in December 1971, declared that "the vicuña is a legacy of mankind and that it is imperative that efforts be made to obtain maximum efficiency from present and future legislation, not only in the countries concerned but also with the consumer countries, since the latter, through their demand, exert pressure on the vicuña."

The recommendations that came out of this conference contained a well-considered outline of strategy for the conservation and development of the vicuña, including policy, legislation, ethnosociological studies, tourism, international cooperation, and negotiations with consumer countries.

It is, then, in the best interests of both the vicuña and the countries of the region where the animal occurs naturally to go ahead with a joint binational or multinational protection and development program; to engage at full scale in the activities mentioned above to build up the vicuña herds; and finally and most importantly, to attain the best economic use of the resource that allows the species to be perpetuated. ■

Ingeniero Flavio Bazán is a former director of the Forest, Wildlife and Land Service in the Ministry of Agriculture of Peru. He presently is Senior Forester for the Office of Regional Development in the Organization of American States, headquarters of which are in Washington, D.C.

Carlos F. Ponce del Prado is chief of the Division of National Parks and Equivalent Reserves in the Peruvian Forest, Wildlife and Land Service.

The United States State Department has helped prepare a draft of a treaty that would forbid international commerce in a number of endangered species—including the vicuña. Readers who want to urge continued U.S. support for a strong treaty should write *Donald L. McKernan,* Special Assistant to the Secretary, Department of State, Washington, D.C. 20520, and *Keith M. Schreiner,* Chief, Office of Endangered Species, Bureau of Sport Fisheries and Wildlife, Department of the Interior, Washington, D.C. 20240

THE APPALACHIAN TRAIL is the world's longest continually marked footpath. But the trail is unique for the way it has been built and maintained, not for how long it is. As a project the Appalachian Trail is symbolic of American ingenuity and perseverance: people working together to build something they felt needed building. The trail project was like an immense barnraising in which scores of volunteers from all parts of the east coast spent over fifteen years to build more than 2,000 miles of trail. Maintenance of the trail was and continues to be a cooperative endeavor.

Anyone who has walked on this amazing footpath knows of the special gift we have inherited in the Appalachian Trail—the heritage of exploration and self-discovery through communions sacred to the forest and the mountains. Hopefully the gift will be a lasting one.

The Appalachian Trail is a mountain footpath that travels the various ranges of the Appalachian Mountains for over two thousand continuous miles from Georgia to Maine. The trail passes through fourteen states and varies in elevation from tidewater at Bear Mountain Bridge over the Hudson River in New York to 6,648 feet at Clingman's Dome in the Smoky Mountains of North Carolina.

The trail had its origins in the vision of Benton MacKaye of Shirley Center, Massachusetts. In 1921 MacKaye published an article in the *Journal of the American Institute of Architects* called "The Appalachian Trail, A Project in Regional Planning." The article, encouraged and collaborated on by editor Clarence Stein, proposed a backbone trail linking the wilderness areas of the Appalachian chain that would be suitable for recreational use and accessible to the metropolitan centers of the east.

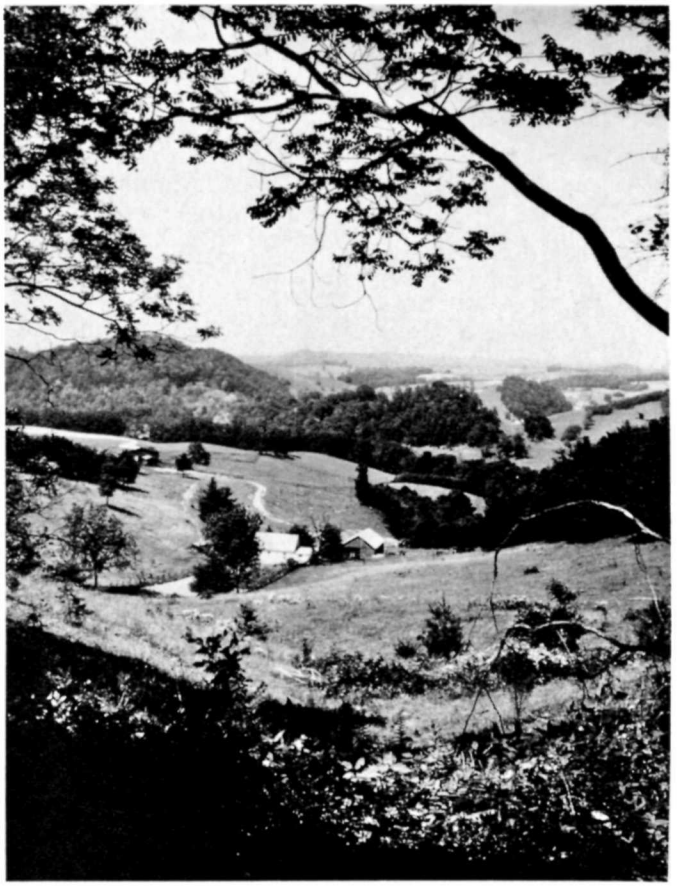
This was a vision that realized the importance of frontiers to the energies of a growing nation, particularly important because that nation had grown up with the idea of an endless frontier. The Appalachian Trail offered horizons to a country that had expanded to the extent of its territorial boundaries; it was an offer to preserve the pioneer potential.

MacKaye's extraordinary idea, so far in advance of its vogue, became the dream of the Appalachian Trail Conference, a volunteer organization founded in 1925 expressly to build the Appalachian Trail. The ATC was a conglomerate of local clubs and individuals held together by their mutual interest in seeing the trail established. The membership roster of the first ATC meeting was 18; today it is over 5,000. In 1925, 350 miles of trail existed on which to build the AT. By 1937 a 2,000-mile wilderness footpath from Georgia to Maine was completed.

The federal government became officially involved in the project in 1938. Before this time the Civilian Conservation Corps project and, sporadically, the National Park Service and the U.S. Forest Service had contributed much work on sections of the trail. But there was no formal agreement through which federal agencies could justify continuous effort on the trail.

Such an agreement was signed with the Appalachian Trail Conference by both the National Park Service and the U.S. Forest Service in 1937. The agreement called for establishment of the "Appalachian Trailway." Akin to the greenbelt idea, the trailway concept created a new kind of recreational area on federal lands administered by the Park or Forest services, a protected zone extending one mile on either side of the trail. Within this zone no new

Damascus Valley in Virginia from the Appalachian Trail.



PHOTOGRAPHS BY PETER H. DUNNING

through wilderness and real estate
THE APPALACHIAN TRAIL
Peter H. Dunning

roads or incompatible developments were permitted. The agreement also called for relocation of the portions of the trail that lay within one mile of paralleling roads.

The following year (1938) the Park Service extended the trailway protection zone to state-owned land by making separate agreements with each state through which the trail passed. The only difference between the state agreements and their federal counterpart was that the protection zone within state lands would be a quarter mile on either side of the AT rather than the full mile of federal lands.

Thus footpath became trailway, and in places the primeval environment of the AT became a national recreational area. But the trailway agreement made no provision for money to carry out the new AT policy. The concerned agencies were expected to use "available funds which can be devoted to these purposes and are not necessary for work of higher priority" (Appalachian Trailway Agreement, section II).

The years from 1952 until 1968 brought improvements to trail facilities and new standards for trail maintenance. A system of shelters by 1968 totaled over 300, and the ideal of a complete chain a day's walk apart from Maine to Georgia lacked only four or five sections to be complete.

From the beginning the Appalachian Trail has had a weak spot—in fact, 866 miles of weak spot: the 866 miles where the trail crossed private lands. A breakdown of land ownership along the Appalachian Trail according to 1970 Department of Interior figures reads as follows: federal land, 682 miles (34 percent); state land, 452 miles (23 percent); and private land, 866 miles (43 percent). There did not seem to be any way to ensure protection of the trail where it crossed private lands in a manner similar to the trailway protection on publicly owned lands. In most cases where the AT crossed private land, it did so only at the discretion of the owner under tenuous word-of-mouth agreement revocable without notice. For this reason over 40 percent of the AT has been in a constant state of limbo.

In the early years of the trail this situation did not pose much of a problem. After all, the land the trail crossed was, in most cases, wilderness accessible only on foot. And, more often than not, landowners were delighted to have the trail pass over their land.

BUT TIME BROUGHT CHANGES: much of what was wilderness in 1930 became real estate by 1970. Urban sprawl and the increased demand for second homes in the country altered the country's land use patterns and greatly increased the rate of land consumption. In the early sixties the editors of *Fortune* estimated that three thousand acres of land a day were being bulldozed for developments of all kinds.

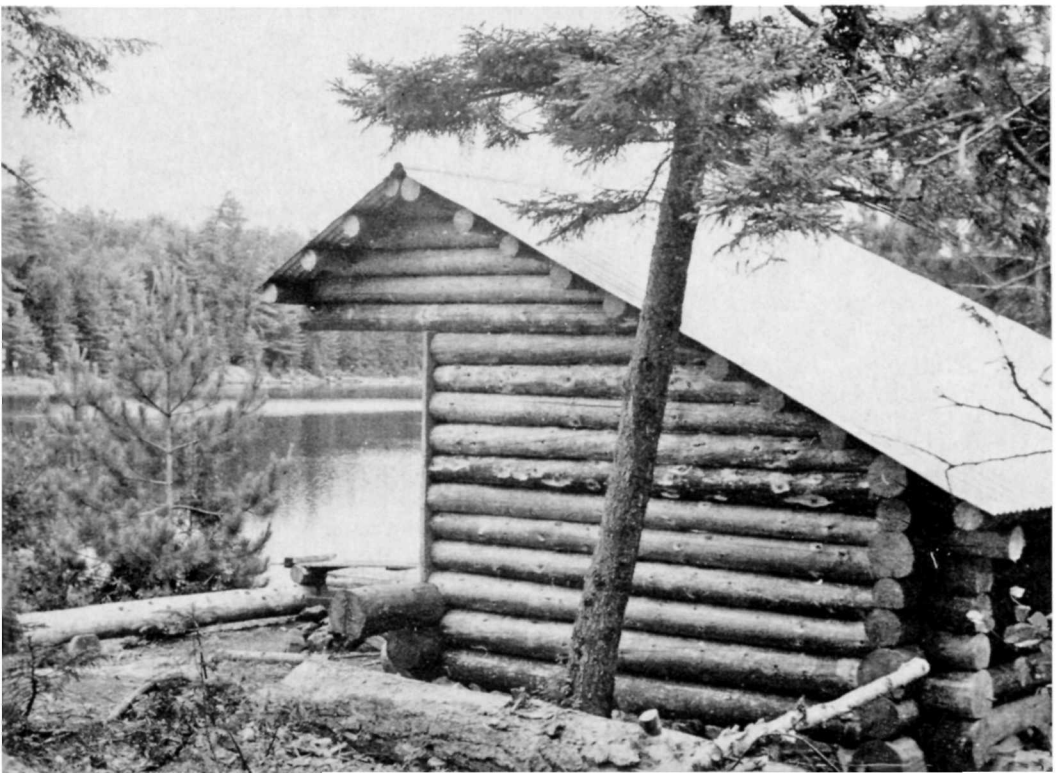
In the past fifteen years real estate speculators began to focus on mountain and forest lands, particularly in the northeast as the land between the big cities was smothered with suburbias. The Appalachian Trail's problems with private land crossings grew proportionately as land values soared.

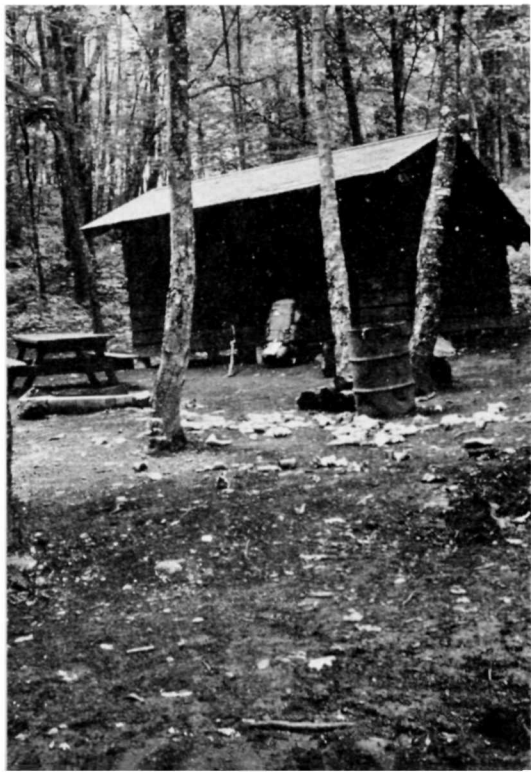
It began to seem that the 866 miles of private land crossings might indefinitely block completion of the trail. When a private property problem occurred, the trail could be kept open only through a frenzy of eleventh-hour maneuvering by local ATC members, which often resulted in rerouting the trail over yet another section of private land. In a short time the same problem could occur again.

The answer to the AT's private land dilemma came with passage of the National Trails System Act on October 2, 1968. The National Trails System Act named the Department of the Interior as the administrator of the trail, in consultation with the Department of Agriculture. The Department of the Interior subsequently appointed the responsibility to the National Park Service, which has become the administrator of the Appalachian National Scenic Trail.

Before the new act could function to preserve the AT, the actual route of the trail had to be established. Though the AT existed as a path, was well marked, and even was delineated in the guidebooks and maps of the Appalachian Trail Conference, it did not exist in law. October 1971

By 1968 over 300 simple shelters had been built along the Appalachian Trail. Left is the Pierce Pond Lean-to in central Maine. Right, litter left by inconsiderate campers mars the grounds of Wiggins Lean-to in Virginia.





set in motion the legal machinery of the National Trail System that was meant to deal with the portions of the trail that passed over private land. In establishing the AT as a national scenic trail, the trails act gave state and local authorities ample opportunity to work out suitable agreements for the protection of the trail. After the official route was published in the Federal Register in October 1971, the various states through which the trail passes were given two years to initiate studies within their borders and to enter into agreements with all agencies and individuals necessary to preserve the trail's environment and to ensure continued access to the right-of-way.

To date, only five of the fourteen states have passed corresponding trail laws: Massachusetts, Connecticut, Maryland, Virginia, and Tennessee. It is likely that most of the remaining nine states will pass some form of trail legislation, as it is to their benefit to do so. Matching funds for trail projects are available to the states from both the Land and Water Resource Fund and the Bureau of Outdoor Recreation. Also, most states will want to retain control of "their" portions of the trail.

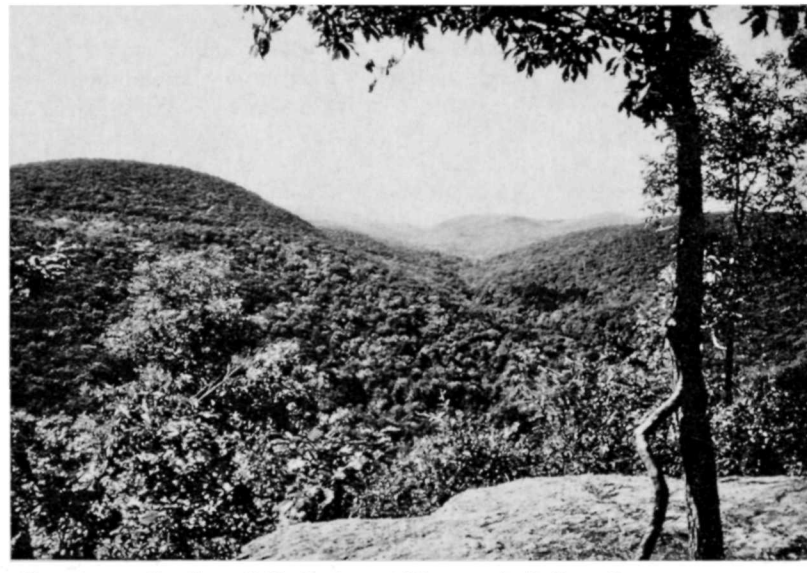
The trails act leaves no doubt as to what will happen if the states fail to respond: "The Secretary [of the Interior] may utilize condemnation proceedings without consent of the owners to acquire private lands or interests therein . . . only in cases where . . . all reasonable efforts to acquire such lands or interests . . . by negotiation have failed. . . ." The act directs the Interior secretary to acquire only such interest as is "reasonably necessary to provide passage" and limits the amount of land he can take to "no more than twenty-five acres in any one mile." It further limits condemnation acquisitions to "the most direct or practicable connecting trail right-of-way."

The Appalachian National Scenic Trail will be different from the old Appalachian Trail. The trails act substitutes the word "scenic" for "wilderness" and talks about the trail's environment as "areas more remotely located" rather than primeval. The law is not changing the trail, of course, but it is recognizing a basic change taking place in the country as a whole: the population is expanding and the open space left is diminishing.

THE THREAT NOW FACING the Appalachian Trail is that unless its environment is protected, as is guaranteed by law, we will have a footpath through the backyards of urban sprawl. Protection of the AT may require establishment of a comprehensive national land use policy, a step that goes far beyond the boundaries of the National Trails System Act.

The Appalachian Trail is also threatened by changing patterns of recreational and leisure activities. The effects of private recreational developments on trail environment are frightening: a ski slope development can wipe out wilderness for fifty miles in all directions almost overnight. Witness Big Bald in North Carolina, Sugarloaf in Maine, and Killington, Bromley, and Stratton in Vermont, to name a few. Other developments like summer homes, mobile home and trailer campsites, and even country clubs have encroached on the trail, although none have had the impact of ski developments.

One aspect of the booming recreational industry more harmful than is apparent is the use of trail motorbikes and snowmobiles. These machines make remote areas of the forests available through a flick of the wrist and a gallon of gasoline—areas that once required a day's hard hiking and a real love of the outdoors. Nothing is so disheartening as to have a peaceful moment in the woods destroyed by the intrusion of snowmobiles roaring through a glade like internal combustion harpies, spewing beer cans and exhaust. I am not a hunter, but at times I think that an open season on snowmobiles might not be such a bad plan. Of course, all motorized traffic is prohibited on the AT, but the ban is difficult to enforce.



Scenes near Pawling, N.Y. (top), and Housatonic Valley, Conn.

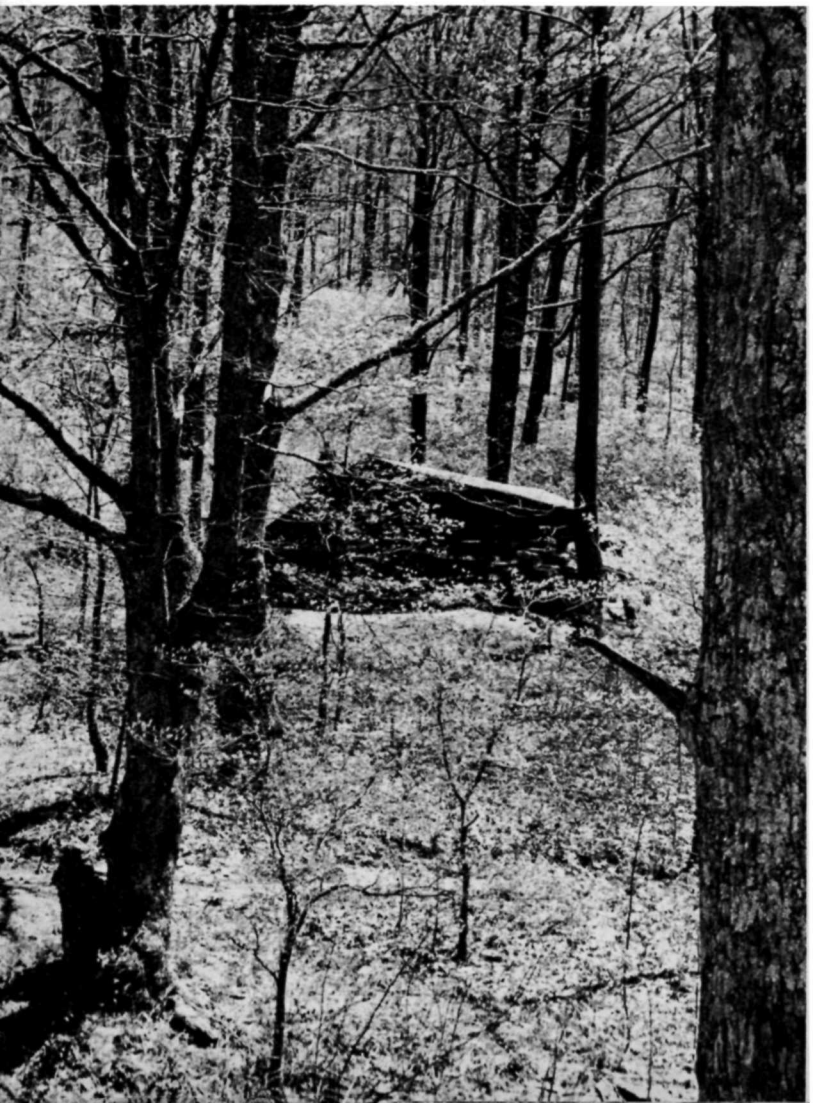
Finally, the growing popularity of outdoor recreation will bring increased usage to the AT. The Appalachian Trail is within one day's travel of half the people of the United States and half the people of Canada. The Bureau of Outdoor Recreation compiled a recreational trend survey in 1960 and 1965: by the year 2000 participation in the major forms of summertime outdoor recreational activities will be four times greater than it was in 1960. "Walking for pleasure has increased faster than any other major outdoor recreational activity," the report disclosed. People walked for pleasure 566 million times in 1960 and 1,030 million times in 1965 for an increase of 82 percent. It is estimated that people will walk for pleasure 1,539 million times in 1980, an increase of 172 percent, and 2,581 million times in 2000, an increase of 356 percent. The

bureau, bless its heart, goes on to say that camping will increase 78 percent by 1980 and 238 percent by 2000; hiking, 78 percent by 1980 and 218 percent by 2000; and nature walks 48 percent by 1980 and 134 percent by 2000.

Already some parts of the trail are being overused, according to Lester L. Holmes, executive director of the Appalachian Trail Conference. A sensor device installed at a point along the trail in Great Smoky Mountain National Park tallied, on the average, one hiker every twenty seconds. Increased usage brings a host of management problems to the Appalachian Trail: vandalism, litter, waste disposal, facility overload, and trail misuse and abuse, to mention a few. However, these are problems with which the Park Service has had some experience and hopefully can provide valuable administration. To counter the trend toward increasing use, the Appalachian Trail Conference is encouraging each state to develop a statewide trail system that would include loop trails and side trails leading off the Appalachian Trail.

The best hope for the future of the AT is reflected by recent actions of the National Park Service as guardian of the trail. The agency has been directly involved with the AT since the trailways agreement of 1937 discussed earlier. The Park Service recently published a 100-page manual, *Guidelines for Planning, Design, and Management of the Appalachian Trail*, which clearly demonstrates an awareness of the complexity of the problems that face the future AT and offers sound insight into how best to administer to this complexity. If words can do the job, the AT seems to be in good hands.

The Tesnatee Gap Lean-to in northern Georgia was one of the first to be built.



The trail was conceived and built on cooperative effort; it has survived to this day through cooperative effort; and the only way the trail will succeed in years to come is through cooperative effort. The Park Service is sensitive to this: "It is the intent of the Service that the development, management, and maintenance of the trail has been and should continue to be a cooperative endeavor, utilizing the resources of the states and local governments, the trail clubs, other organizations and individuals including landowners, as well as the federal agencies concerned" *(Guidelines*, page 3). To this end, the Park Service's first act—drawing up the *Guidelines* manual—was a cooperative endeavor with the U.S. Forest Service and the Appalachian Trail Conference.

When the National Trails System Act was passed, landowners in northern Virginia pressed to have the trail moved completely off their land and into West Virginia, a relocation of some 135 miles. The situation soon came to a standstill: the landowners were angry, the trail clubs were angry, nobody was speaking, and the Park Service inherited the problem and was told to make everyone happy.

The Park Service consulted landowners and trail backers and then donned hiking boots to investigate the landowners' suggested route as well as one on the west slope of the same ridge on whose east slope the existing, contested route ran. The west slope was found ideal: good water supply, lovely vistas, and completely undeveloped. The Park Service opted for this route.

What is the future of the Appalachian Trail? To some extent the AT must ride the fate of its environment; and this nation's traditional pattern of laissez-faire land use, if allowed to continue unchecked, portrays a bleak future. Great plenty of land has been a determining force in the formation of this country, but the days of great plenty are numbered and in some places over.

There is need to channel the constructive energies of the nation into activities that will enhance rather than imbed our lives. As cities expand and open spaces diminish, we need a national land use policy to preserve "areas more remotely located" from the cities (National Scenic Trails Act) as well as to promote healthier land uses within the cities.

However, opposition to federal involvement in land use control traditionally has been strong, and without a national land use policy a national system of trails will have to compete for land with the private sector and with higher priority government projects. Without a national land use policy we will continue to use land as the demand arises, guided only by the principle that the best use of land is the one that yields the most profit. Under these conditions prospect for success of a system of scenic trails is small.

The threat to the Appalachian Trail is that wilderness is becoming real estate. Unless we want a footpath through the alleys and backyards of an urban east coast, we must preserve the trail's environment now. The National Trails System Act cannot do this; and there is serious question whether anything can unless it is within the framework of a comprehensive land use policy. ■

Peter H. Dunning is a free-lance writer and photographer, raised in New England and living in Texas. He spent five months during 1971 walking the Appalachian Trail.

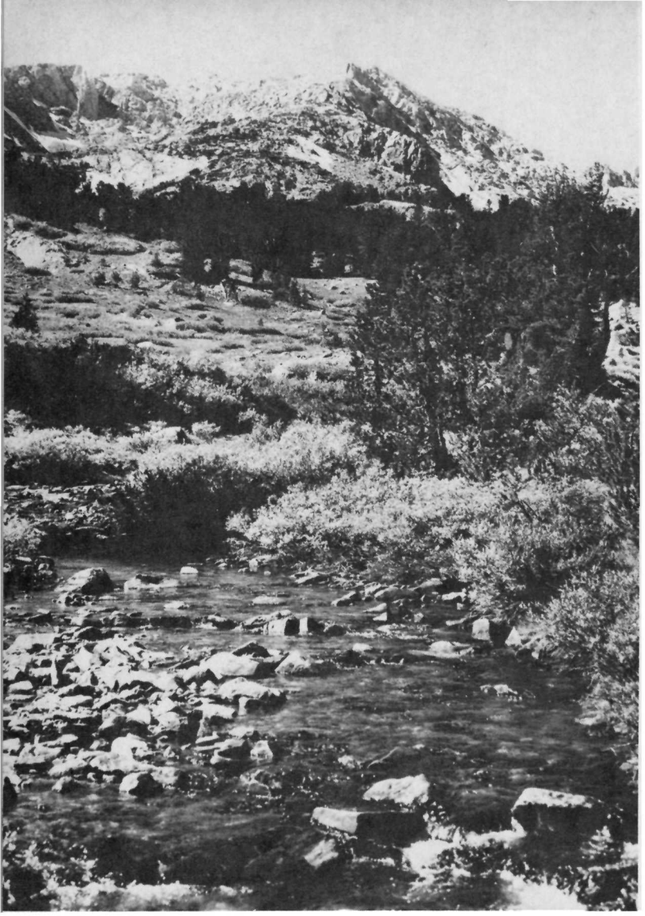
the Harvey Monroe Hall RESEARCH NATURAL AREA

Louise Parker

IN REMOTE PARTS OF THE LAND at the end of twisting back roads and trails are some of our most interesting and least known natural preserves, the research natural areas. Maintained by several agencies of the federal government and some private organizations, the natural areas serve a unique purpose. They are solely for scientific study and research.

The natural areas preserve typical or outstanding terrestrial ecosytems, aquatic communities, and geological features, and provide locations for scientists to study ecology, successional trends, and other aspects of the natural environment. They also serve as gene pools and preserves for rare and endangered species of plants and animals. And they may be the only places left where scientists can compare relatively undisturbed natural ecosystems with those that have been significantly altered by man.

At the summit of California's Sierra Nevada in the Slate Creek drainage, just north of Tioga Pass in the Inyo National Forest, is one of these areas, the Harvey Monroe Hall Research Natural Area. It is a natural landscape of



U.S. FOREST SERVICE PHOTOGRAPHS

Snow-fed Slate Creek, above and right, provides niches for many water-loving plants. Below, harsh climate dwarfs trees at timberline.

grand scale and a superb location for scientific research. Cut and molded out of rock by wind, water, ice, and the natural processes of mountain building, the Hall area is a living laboratory with the forces of nature still at work.

Its beginnings lie far back in geologic time. Granite and highly metamorphosed sediments reveal a history of mountain building. Later glaciers worked the rock smooth, cut out cirques, built up moraines.

It is a land of contrasts. In the winter, snow piles as much as 15 feet deep, and the temperature drops as low as −22°F. There are extensive permanent snowfields and a glacier still works the north face of Mt. Conness, the highest peak at 12,596 feet. Summer comes and goes in a hurry. Snow melts into clear lakes and bright streams. Alpine and subalpine forests soften the edge of naked rock. Blue sky and warm sun encourage plants to grow and bloom in a quick profusion of color.

All these natural features combine to produce an area unexcelled for studying the effect of extreme climate on native plants. Botanists and geneticists with the Carnegie Institution of Washington have conducted research in the 4,240-acre preserve for many years. The first was Dr. H. M. Hall, for whom the area was named, a botanist with the Institution's Department of Plant Biology at Stanford. Hall conducted the first research in the area and was instrumental in getting it designated as a natural area by the U.S. Forest Service in 1933, a year after his death.

Dr. Hall was associated with both the Carnegie Institution and the University of California at Berkeley. His main interest was in improving methods of plant taxonomy and in studying the ability of plants to adjust to their environment.

As early as 1910 Hall made a number of excursions to Tuolumne Meadows in nearby Yosemite National Park searching for an area to conduct experiments in the alpine and subalpine life zones. Instead he found the Slate Creek drainage several miles to the northeast of the park. Through Hall's influence and correspondence with A. E. Weislander of the Forest Service's Pacific Southwest Forest and Range Experiment Station in Berkeley and W. M. Maule, supervisor of the Mono National Forest, the area was set aside for research purposes.

When Hall first visited the area, it had been grazed by sheep. The vegetation was not severely damaged, however, and the native plants came back quickly after the natural area was established and grazing excluded. In 1941 Jens Clausen, a geneticist with Carnegie Institution, wrote to Supervisor Maule: "I was impressed by seeing how much richer the flora is within than outside the area. There has been a very noticeable comeback of species after grazing was excluded. For instance, I recall vividly how in 1932 there were only two or three poor specimens of the alpine tiger lily, *Lilium parvum*, above our cabin. During these few years there had been a steady increase in this population, and it has spread in all directions."

THE WIDE DIVERSITY OF PLANT LIFE in the area makes it of special interest to scientists. About 350 species of flowering plants and ferns grow naturally in the Hall area—an unusual number for such a high altitude. A diverse geology and varied topography are responsible. Rocky areas, lakes, streams, and moraines provide suitable environments or "ecological niches" for many types of plants.

Twenty-eight of the species native to the Hall area are thought to be survivors of the prehistoric glacial periods. These plants probably grew thousands of years ago on the few peaks and ridges that stuck above the glaciers. The remaining species probably immigrated from surrounding areas over long periods of time as the ice melted.

The dwarf mountain juniper, *Juniperous communis*, and two pines dominate the subalpine forest. The pines are white-bark pine, *Pinus albicaulis*, and lodgepole pine, *P. murrayana*. Mountain hemlock, *Tsuga mertensiana*, is also common. The trees in particular show the effects of severe climate. In the Slate Creek valley the subalpine forest occupies eleven distinct terminal moraines left by glaciers that retreated up the mountains. The trees tend to be smaller than their low altitude counterparts, and more stunted. During especially severe seasons portions of the trees may die out entirely, leaving dead wood among live branches—a kind of natural pruning. In the cold, dry atmosphere of the mountains dead trees may stand like bleached skeletons for many years.

Timberline marks the boundary between subalpine and alpine regions. In this transition zone the trees change their growth patterns radically. Those that have a single trunk in the subalpine region become shrubby and develop several trunks. To enable them to survive higher up on the mountains, each of the three major conifer species has also developed an "elfinwood" form that grows low and matlike above timberline.

Into this rugged region nature has also seen fit to put some of its most delicate wildflowers, grasses, and grasslike plants. Many appear to have evolved from the vegetation of the coast. There are purple and red pentstemons, yellow and white cinquefoils, a purple shooting star, gentians, columbine, the brilliant pink of rock fringe, alpine tiger lily, lupine, monkey flowers, and aster. Some grow in mountain meadows, and some cluster near moist streambanks. A few grow at elevations over 12,000 feet in the Hall area.

A large number of plants native to the Rocky Mountains and semiarid Great Basin also have evolved races that find the natural area's environmental niches to their liking.

W. M. Hiesey and Jens Clausen in the greenhouse at Stanford station.

These include sagebrushes, rabbit brush, and Indian paintbrush.

Special adaptations enable all these species of plants to survive in the high altitude and rigorous climate of the Hall area. Annuals must respond quickly to spring and summer, flower, and set ripe seed before the first frost. Perennials must be able to resist moderate frosts and store enough food for winter. But what makes the plants behave this way? Scientists are interested in the hereditary and physiological mechanisms by which plants adjust to climate and in the role that genetics and environment play in plant evolution.

In studying the hereditary mechanisms of wild plants, scientists gain much of their information from transplant experiments. In the natural area, at an elevation of about 10,000 feet, they have set up a small transplant garden known as Timberline Station. It is one of three gardens maintained by the Carnegie Institution along an east-west line in California from the Pacific Coast to the summit of the Sierra Nevada. There is a lowland station at Stanford near San Francisco Bay and a mid-altitude station at Mather. The climate at each is remarkably different, ranging from a full year's growing season at Stanford to a two-month season at Timberline (mid-July to the middle of September). In only a few places in the world do the climate and vegetation change so rapidly over such a short distance. Scientists have an ideal opportunity for research.

By comparing plants of a given species grown in a series of environments at different altitudes, the transplant experiments have shown more clearly the nature and subspecies composition of plant species and their relation to environment. The pioneering work of three scientists, Jens Clausen, David D. Keck, and William M. Hiesey of the Carnegie Institution, serves today as a basic reference on the effect of varied environments on western North American plants.

The research also has helped to establish the existence of races of plants which are genetically adapted to different climates. Subsequent work by Forest Service scientists at the Institute of Forest Genetics near Placerville, California, has shown that forest trees develop climatic races that are adapted to growing at different elevations.

The process of mountain building in the Sierra Nevada has had a large effect on the vegetation of the area. Scientists believe that the mountains of the region were probably lifted in stages, carrying some of the present plant species with them as they rose. This long process allowed time for evolution to change subalpine to alpine races. Research by Clausen and Hiesey has shown that plants need two kinds of adaptability in order to survive environmental change. One is a short-term flexibility, which enables plants to adjust to local variations in climate. The other is a genetic variability within a species, which enables its members to adapt through natural selection to changing conditions over a long period. This genetic diversity enables species or races of plants to survive environmental stresses such as mountain building. The alpine cinquefoil and yarrow in the Hall area illustrate the immense evolutionary potential that can exist within natural populations. Both plants show a wide variety of characteristics, even in the same environment—small differences which might be missed by untrained observers.

Clausen and Hiesey also have found another principle important in the evolution of climatic races. Studying the semi-woody perennial of the rose family, *Potentialla glandulose*, they came up with the first real proof of a theory of "genetic coherence" proposed earlier by American and British geneticists. This is the idea that sets of characters distinguishing climatic races tend to be inherited together. This helps preserve the essential identity of races, at the same time allowing for sufficient variability to permit natural selection under the stress of changed environments.

Scientists believe that the survivors throughout geological periods have been those organisms that have a fair degree of inherited coherence balanced against potential variation that can be made available through interracial crossing. It is the device of coherence that enables ecological races to function as reservoirs for potential variability.

The Harvey Monroe Hall Research Natural Area was one of the first to be established in California, and is today part of an extensive system of natural areas on federal lands in the United States. Similar areas have also been set aside on state and private lands.

IT SEEMS ALMOST INCONCEIVABLE that in the short 350 years since this country was settled we have succeeded in endangering even the most isolated of wild regions. Yet this is exactly what has happened. During the past few decades scientists and educators have become increasingly disturbed about the rapid disappearance of natural areas that are relatively free of the influence of man. This growing concern has resulted in steps to develop a more complete system of research natural areas. Many federal agencies now are reviewing and designating additional areas.

A federal committee on research natural areas was established in 1966 with representatives from the Forest Service, Bureau of Land Management, Bureau of Sport Fisheries and Wildlife, the National Park Service, the Department of Defense, Atomic Energy Commission, and Tennessee Valley Authority. These agencies administer most of the federal lands that have potential for natural science research. A directory of the areas, published by the committee and the Smithsonian Institution in 1968, lists more than 300. The list serves both as a directory and as an inventory for determining what other areas may be needed for a well-rounded system. It is also an announcement to scientists and educators that the areas are available for research. The International Biological Program is also interested in natural areas and is developing an inventory of the areas worldwide.

In the long run our survival on this planet may well depend on our ability to learn to live within the framework of a natural ecosystem of which we presently have limited understanding. Some of the necessary research may well be carried out in this country's very important research natural areas. ■

Louise Parker is an information specialist with the U.S. Forest Service's Pacific Southwest Forest and Range Experiment Station in Berkeley, California. She is a journalist and during eleven years with the Forest Service has written many newspaper and magazine articles about forestry-related topics.

NPCA at work

On seed banks For a number of years environmentalists and scientists have been deeply concerned over the potential dangers of a burgeoning modern agricultural phenomenon, the tendency over a large part of the world toward planting of vast acreages of particular food plants that share similar genetic characteristics. Productive and important as such plants may be, they inevitably are open to mass disaster by appropriate races of plant funguses and viruses, either already present or newly evolved. (The evolution of races in this micro-world can be extremely rapid by the standards of the macro-world.)

A corollary danger is the potential, and in some cases actual, loss of the world's more primitive food plants that possess genetic diversity sufficient to survive an ever-hostile environment. In a very real sense these plants could be basic to human survival in the long run.

A third consideration, and one of particular interest to environmentalists, is the matter of species of plants endangered in the more usual sense of the word. Daily one reads accounts of endangered species of animals and the efforts made to save them, but not much on the fortunes of their counterparts in the plant world, more numerous by many orders of magnitude.

Genetic diversity in the natural world: the seldom seen white bloom of heal-all.

With these several considerations in mind NPCA recently has been in correspondence with the botany departments of many universities requesting information on rare or endangered species of American plants, whether valuable economically or not, to provide new information on such plants for the Red Book on Angiosperms of the International Union for the Conservation of Nature on plant seeds that need protection in seed banks such as that of the Department of Agriculture at Fort Collins, Colorado, or others that might be established. Response to NPCA's requests has been highly encouraging to date. One state alone (Texas) has furnished names of some 220 endemic plants in need of protection, and the Association looks forward to a valuable contribution in this relatively new field of conservation and environmental work.

Hunting from airplanes The intent of recently enacted Public Law 92-159, which prohibits shooting of animals from aircraft, apparently is being evaded by at least one state, Alaska, which NPCA understands may be planning to issue "permits" to airborne hunters under the guise of "state administration of wildlife." The Association has written the Secretary of the Interior, the Assistant U.S. Attorney General for Land and Natural Resources, and the Director of the Federal Aviation Administration protesting such evasions. The law, NPCA wrote, clearly was intended to protect wildlife from this kind of "sport" hunting, and there would seem to be no justification for allowing states to believe that it could be distorted in such a fashion.

NPCA requested in its letters that the concerned federal agencies "address correspondence to each of the states indicating that the law will not permit aerial sport hunting under the guise of 'administrative duties,' and that such hunting and administrative ploys to permit it will be met with rapid enforcement procedures."

Tonto Forest cut The Southwestern Region of the U.S. Forest Service recently produced a draft environmental impact statement for its proposed allowable timber cut in the Tonto Working Circle of the Tonto National Forest of Arizona. (A working circle in forester's language is a forest area capable of supporting an industrial production unit, as, for example, a sawmill.)

NPCA has analyzed and commented on the draft statement and has made suggestions as to how it might be improved. "The major failure of this statement," said NPCA through its administrative assistant, forestry, "is that it does not do what it is intended to do—namely, to state in detail what environmental impacts will take place due to a particular allowable cut, and what will be the impacts of alternatives." Rather, it was noted, the statement appears to be an analysis of alternatives in forest management. For example, NPCA said, the document merely states that lumbering in the working circle will create environmental impacts which generally will not be adverse. NPCA pointed out that such a description does not meet criteria of the Council on Environmental Quality for such documents. "None of the alternatives . . . describe or compare environmental impacts or indicate that environmental considerations were part of the decisions involving the choice of allowable cuts. The choice of alternatives apparently was made . . . on the basis of timber and multiple-use considerations," the Association said.

NPCA urged that consideration of allowable cut impact on wilderness, soils, vegetation, and wildlife be given greater weight in planning for the Tonto Forest.

Great Dismal Swamp In May the Senate Subcommittee on Parks and Recreation of the Committee on Interior and Insular Affairs held public hearings in Washington on a measure (S 2441) that would authorize the Secretary of the Interior to study the Great Dismal Swamp in southeastern Virginia and northeastern North Carolina to determine its best future use and how to preserve its unique ecosystem. On invitation NPCA testified that it fully supported the aims of the measure. The Association made two suggestions that it believed would be helpful in securing the swamp for the future.

The first suggestion: Since the Interior Secretary would study the swamp with a view to preservation, he should be empowered to stop pending drainage for farm and other purposes immediately. The second: Too much emphasis on recreational boating seems built into the study bill, which might well be oriented more toward protection.

The Association noted that the Army Engineers, primarily responsible for water use in the huge swamp, have not taken steps to halt drainage or to minimize their own use of water there. An old leg of the Intracoastal Waterway, with locks at each end, passes through the swamp and is supplied with water from 3,000-acre Lake Drummond in the heart of the swamp. Vast amounts of water are drained from the lake yearly to allow passage of boats still using the obsolete waterway.

In summary, the Association testified that the floral and faunal resources of the Great Dismal Swamp are outstanding, and its historical features important. Both, NPCA said, ought to be protected.

Park maneuvers NPCA has joined Mr. William Knowland, of the Environmental Studies Center, Antioch College, in a protest to the Secretary of the Interior over use of Great Smoky Mountains National Park as a site for military maneuvers. The maneuvers have involved company-sized hikes over the mountains from Cades Cove to Greenbriar Cove by personnel from Fort Campbell, Kentucky, and apparently have been taking place for several years past.

The Association has written Secretary Rogers C. B. Morton that "with all the other land available for such maneuvers and the need to protect natural conditions in the park, it seems to us that these activities should be carried on elsewhere, and we urge that your department take steps toward that result."

Bat eradication? With all the talk going on nowadays about endangered species of animals, and all the work that has been done in the past decade and more to prevent further losses in the world's variety of animals, it is a little surprising in 1972 to encounter official advocates of programs for exterminating species.

Yet NPCA has had to write a letter of protest to the administrator of the Agency for International Development in Washington on the matter of its plans for a program aimed at extermination of the vampire bat in Central America by poisoning.

In its letter the Association characterized AID's projected program as surprising in light of the President's recent executive order banning use of poisons for predator control by federal agencies. NPCA has stated on many occasions that it recognizes the need for animal damage control in clear cases involving human health and welfare. "We do not believe, however, that these apparently scattergun techniques aimed toward wholesale elimination of a species are likely to be necessary or desirable," the letter said. "We recommend, in absence of compelling reasons to the contrary, that AID continue to support development and use of the vaccine that is currently used, and other less destructive techniques."

NPCA said that the executive order recognizes in effect that such all-out eradication programs are antiquated. It recommended that more effort be directed to a search for effective vampire bat deterrents, and in addition requested a copy of AID's environmental impact statement on the matter, if one has ever been prepared. The Association further requested that, if no statement has been prepared, the agency proceed with one to evaluate all alternatives to its proposed poisoning program.

Seashore proposal The June Magazine reported NPCA's testimony on invitation before a House subcommittee on the proposed Cumberland Island National Seashore in the Sea Islands of Georgia, long identified by the National Park Service as a most desirable addition to the park system.

A companion measure, S 2411, is being considered by the Senate Subcommittee on Parks and Recreation. NPCA's views on the Senate measure, presented on invitation at Washington public hearings in mid-May, were generally similar to those of its earlier statement before the House subcommittee: that the island and its ecosystem are well qualified for protection by the Service for the public, and that the Service's plans for management of the proposed unit seemed highly commendable, particularly in regard to visitor access. The Association recommended that Cumberland Island be managed as a natural rather than recreational area. As presently proposed the island would be managed under principles applying to a recreational area, one of the three official park system categories adopted in 1964.

On Golden Gate NRA The proposed Golden Gate National Recreational Area in the San Francisco Bay region was the subject of May public hearings in Washington by the House Subcommittee on National Parks and Recreation. Several bills to create the area were under consideration of the subcommittee, and on invitation NPCA presented its views on the matter.

The Association testified that it fully supported the concept of such a reserve. In particular, it felt that the bill HR 9498 seemed most comprehensive of the several measures, and the one most likely to realize the full recreational potential of the area. NPCA did, however, suggest that this bill could be strengthened in several ways.

Certain lands under jurisdiction of the Army would become part of the recreational area, and NPCA suggested that a maximum acreage of such lands be transferred to the Interior Department, including all lands of the historic Presidio. NPCA also said that a strengthening of protective language would be desirable, particularly in respect to parts of the proposed area that are rich in natural history interests.

HR 9498 provides for a master plan for land and water use at Golden Gate that NPCA found most commendable. The Association suggested, however, that a comprehensive transportation study might well be made a part of master planning. An important part of the study would deal with regional public transportation connections. "The Department of Transportation could contribute greatly to this regional concept of public mass transit with innovative ideas that would avoid environmental damage to open-space areas of unique scenic worth," NPCA said.

Wilderness hearings A number of National Park Service plans for wilderness in the parks and monuments have reached the stage of Congressional consideration in recent weeks. Thus, public hearings in Washington have been held on wilderness plans for Isle Royale, Sequoia-Kings Canyon, Shenandoah and North Cascades national parks, as a group, in S 2453. On invitation, NPCA submitted testimony to the Senate Subcommittee on Public Lands on its views regarding Park Service plans.

The general thread woven throughout NPCA's comments on these park system units was that wilderness in the country constantly diminishes while public use of wilderness constantly increases; therefore the Park Service should be making every effort to designate maximum wilderness in its natural areas.

At Isle Royale NPCA originally recommended that waters of Lake Superior within park boundaries be included in wilderness, and that a maximum acreage of the island itself be designated. While the Service has added a small acreage to its original wilderness plans, it has designated no park waters. In fact, many wilderness deletions have been made on the island itself for additional visitor facilities.

Again, at Sequoia-Kings Canyon, NPCA long has advocated inclusion of all eligible park lands as wilderness. In its original proposal the Service made some concessions to this concept; but in the final plans it has taken a large step in the opposite direction, with actual withdrawal of two large potential wilderness areas. One of these, in Sequoia, is designed to accommodate ski-lift facilities, a restaurant, camping facilities, and other visitor use structures related to development of the proposed Mineral King ski complex on adjacent national forest lands. The other deletion is designed to allow more extensive automobile use of Sequoia around the Giant Forest. NPCA pointed out that the national parks and monuments already suffer under excessive automobile use—though not necessarily actual visitor use—and that encouragement of more private cars is not in order, in any natural area.

Service plans for wilderness in Shenandoah Park also fall far short of total eligible lands, the Association testified. NPCA proposed that so-called management roads in the park should be closed and power lines placed underground. The Service's final plan includes the usual ⅛-mile "management zone" around wilderness and "buffer strips" along roads.

In North Cascades Park NPCA again recommended inclusion of all eligible lands. In its testimony the Association commended the Service for abandoning two of three proposed aerial tramways and urged that the third be dropped also, with inclusion of associated land in wilderness.

conservation news

Trans-Alaska oil pipeline The trans-Alaska oil pipeline from Prudhoe Bay to Valdez has received the green light from the Administration. Construction of the pipeline has been opposed by conservationists and environmentalists in both the United States and Canada on the grounds of extreme environmental hazards and available alternative routes; the matter has occupied much space in this Magazine over the past several years.

The Administration's decision was announced May 12 by Interior Secretary Rogers C. B. Morton despite many outstanding questions on the economic and environmental aspects of the project and a final environmental impact statement considered by conservationists to contain serious flaws. No public hearings on the final statement were ever held. An offer by Canada to make up possible shortages in U.S. oil supplies while an alternative Mackenzie River route could be worked out—a route favored by environmentalists both in the U.S. and Canada—was put aside by Secretary Morton as "impractical at this time."

The Environmental Coalition for North America, based in Washington, reacted to the announcement in the following letter to Secretary Morton:

"Please allow us to express our deep regret with respect to your unfortunate action in issuing a permit for the construction of a Trans-Alaska pipeline by the Valdez route.

"The extensive environmental impact statement which your department itself issued makes it clear that the Valdez line is ecologically unacceptable. The continuing opposition which this route will have from organized environmentalists will result in a long delay in the delivery of oil from the North Slope, and it is not in the interests of the American people.

"We are doubly regretful of these developments in view of the many excellent steps which you have taken as Secretary of the Interior to protect the life environment of the American people in other ways."

The letter was signed by the chairman of ENCONA, A. W. Smith, who also is president of the NPCA. ENCONA is a public service, non-profit organization established to promote consultation and cooperation among environmentalists.

Indian campgrounds The National Park Service has initiated a new training program during the past spring designed to teach the financial and technical aspects of tourist-oriented campground management to members of American Indian tribes desiring development of their recreational resources. The program consists of two four-week sessions at the Albright Training Center in Grand Canyon National Park, with 24 trainees at each session. Graduates will return to their tribal homes to develop and manage campgrounds on Indian lands.

The program is a cooperative effort between the Bureau of Indian Affairs, which is furnishing financing, and the National Park Service, which is offering training personnel and facilities.

Environmental agreement One of the results of President Nixon's recent visit to the Soviet Union was the signing of an environmental agreement between the two nations designed to provide long-term cooperation in eleven specific areas of mutual interest and concern. The agreement stemmed from informal exchanges between representatives of the two nations over the past several years that led finally to draft proposals which materialized into the new agreement.

The eleven environmental areas covered in the agreement are: air pollution, water pollution, environmental pollution associated with agricultural production, enhancement of the urban environment, preservation of nature and the organization of preserves, marine pollution, the biological and genetic consequences of environmental pollution, the influence of environmental changes on climate, earthquake prediction, arctic and subarctic ecological systems, and legal and administrative measures for protecting environmental quality.

Implementation of the agreement will be through a joint US–USSR committee that will meet once a year alternately in Washington and Moscow. Representation for the United States will be drawn from the various federal agencies involved in particular subject areas.

In announcing the agreement the Administration stressed its importance to other nations also. "The agreement has practical importance to the rest of the world because it underlines the significance the two major powers place on the importance of environmental issues," it was stated. "It may very well lead to other kinds of bilateral agreements between countries who share similar kinds of problems."

The agreement was signed in Moscow on May 23.

Park tram service An encouraging park transportation note comes from Everglades Park in Florida, where the Park Service has initiated a free open-air tram bus service for park visitors in Shark Valley to provide an alternative to the private automobile. Secretary of the Interior Rogers Morton says that the Shark Valley project is modeled after the highly successful shuttle-bus service now offered visitors in Yosemite Park. "We are now expanding this concept of mass transportation systems so that visitors can enjoy other parks free from the disruptions and pollution caused by heavy traffic," reports the secretary.

The rubber-tired trams at Shark Valley, equipped with a voice tape program describing the natural history of the area during the tour, start from a parking area just inside the park entrance and take visitors into the Shark Valley wilderness region of Everglades Park south on the Tamiami Trail. The trams are driven by members of the Miccosukee Indian Tribe, whose tribal lands lie north of the park.

A CITIZEN'S VOICE IN GOVERNMENT

Organizations like the National Parks & Conservation Association, which enjoy special privileges of tax exemption, may not advocate or oppose legislation to any substantial extent.

Individual citizens of a democracy, however, enjoy the right and share the responsibility of participating in the legislative process. One of the ways citizens of a democracy can take part in their government at state and federal levels is by keeping in touch with their representatives in the legislature; by writing, telegraphing, or telephoning their views; by visiting and talking with their representatives in the national capital or in the home town between sessions. Every American has two senators and one congressman with whom he may keep contact in this manner.

The best source of information for such purposes is the official *Congressional Directory*, which can be bought through the Government Printing Office, Washington, D.C. 20402, at the price of $5.50. It tells you who your senators and congressmen are and lists the membership of the various Congressional committees. It also gives full information on the personnel of the various executive bureaus of the government whom one may contact about administrative programs and policies.

conservation docket

Legislative measures introduced in the Congress are referred to an appropriate standing committee, which in turn may assign initial consideration to an appropriate subcommittee. Public hearings, either in the field or in Washington, may then be called. Any interested member of the public may write the chairman of a committee or subcommittee and request notification in the event of hearings. Copies of bills may be obtained from the House Documents Room, Washington, D.C. 20515, or from the Senate Documents Room, Washington, D.C. 20510. In the legislative listing below the abbreviations HR and S indicate House and Senate bills respectively.

New bills in the land preservation field, or bills on which legislative action has been taken since the last appearance of the Conservation Docket, are:

HISTORIC PRESERVATION: S 1152, as amended, to facilitate the preservation of historic monuments; approved by subcommittee for full Interior and Insular Affairs action.

LOWELL CULTURAL PARK: HR 14629, to provide for establishment of an urban national park to be known as the Lowell Historic Canal District National Cultural Park in Lowell, Massachusetts. To House Committee on Interior and Insular Affairs.

GRANT–KOHRS SITE: HR 9594, to authorize establishment of the Grant-Kohrs Ranch National Historic Site in Montana. Favorably reported by House Interior and Insular Affairs Committee.

CLARA BARTON HOUSE: HR 14575, providing for establishment of the Clara Barton House National Historic Site in Maryland. To House Interior and Insular Affairs Committee.

C&O CANAL: HR 14515, to amend the Chesapeake & Ohio Canal Development Act to suspend use of eminent domain within any part of the park in any county which has in force a valid zoning bylaw. To House Interior and Insular Affairs Committee.

BIG SOUTH FORK: HR 14765, to authorize establishment of the Big South Fork National River and Recreation Area in Kentucky and Tennessee. To House Interior and Insular Affairs Committee.

GULF ISLANDS SEASHORE: S 3153, amending Public Law 91-660 establishing the Gulf Islands National Seashore in Florida and Mississippi, was signed by the President as Public Law 92-275.

ERIE–OHIO CANAL: HR 14838, to deauthorize the Lake Erie–Ohio River Canal. To House Committee on Public Works.

ST. CROIX RIVER: HR 14844, to amend

the Wild and Scenic Rivers Act by designating a segment of the St. Croix River in Minnesota and Wisconsin as a component of the National Wild and Scenic Rivers System. To House Interior and Insular Affairs Committee.

Measures affecting American forests or forestry practices recently introduced or acted upon:

FOREST RESTORATION: HR 14903, to authorize the Secretary of the Interior to institute programs designed to reforest and restore the quality of public and private forest lands. To House Committee on Agriculture.

KLAMATH INDIAN FOREST: HR 14840 and S 3594, providing for federal purchase of the remaining Klamath Indian Forest in Oregon. To House and Senate Interior and Insular Affairs committees.

CLEARCUTTING: HR 14888, to establish a commission to investigate the current practice of clearcutting American timber resources on federal lands. To House Committee on Agriculture.

TREE PLANTING: HR 13089, accelerating programs for tree planting on national forest lands. Passed by the House.

New bills and actions on bills relating to fish and wildlife matters:

CEDAR KEYS: HR 736, designating wilderness in Florida's Cedar Keys National Wildlife Refuge. Passed by the House.

FISHERY ZONE: HR 14937, to establish a contiguous fishery zone of 200 miles beyond territorial waters of the U.S. To House Merchant Marine and Fisheries Committee.

SHOOTING FROM AIRCRAFT: HR 14731, to amend the Fish and Wildlife Act of 1956 to provide effective enforcement of regulations against shooting wildlife from aircraft. To House Merchant Marine and Fisheries Committee.

WILDLIFE CONSERVATION: HR 14654, amending the Act of May 1948, regarding the use of real property for wildlife conservation purposes. To House Merchant Marine and Fisheries Committee.

WILDLIFE PRESERVATION: HR 14654, establishing wildlife and fish and game conservation programs on lands under jurisdiction of various federal agencies. To House Merchant Marine and Fisheries Committee.

POLAR BEARS: House Joint Resolution 1179, calling for a moratorium on the killing of polar bears. To House Committee on Foreign Affairs.

WETLANDS: HR 14669, amending the Internal Revenue Code of 1954 to encourage preservation of coastal wetlands, open space and historic buildings, and to encourage preservation and rehabilitation of all historic structures. To House Committee on Ways and Means.

Legislation on general conservation matters:

OIL SHALE: HR 14691, regulating the mining of oil shale and providing for the conservation and reclamation of shale lands. House Committee on Ways and Means.

DEEP SEA BED: HR 14918, providing the Secretary of the Interior with authority to promote conservation and orderly development of mineral resources of the deep sea bed pending adoption of an international regime for the purpose. To House Committee on Merchant Marine and Fisheries.

NEPA: HR 13752, amending the National Environmental Policy Act of 1969 to provide interim licensing for operation of certain thermoelectric generating plants. Passed, as amended, by the House.

Continued from page 2
genuine purpose and personal reassurance can follow.

The violence of noise in most large industrial plants unravels the lives of the workers. The uproar of noise on the highways makes travel a misery. The racket of noise on our city streets makes a nauseous mix with the foul vapors of automobile exhausts.

The bedlam of noise at our airports, the assault upon nerves and ears which is mounted from the approach-patterns over the cities, and which trails across farmlands and forests, and even over our national parks, is a shame and a disgrace.

Our helplessness as moderns against this chaos which we ourselves constantly foster, reflects a powerlessness against the monstrous economic, political, and military machines we ourselves have created, an impotence which we must speedily overcome.

THE NIGHTMARE will be ended when enough persons, each acting from his own isolation, turning against the false values rooted deeply in their minds, and among other things the belief in their own powerlessness, affirm the essential counter-purposes and find the will and the courage to act upon their change of heart.

A return to quietude and silence is feasible. The monstrous trucks on our highways can be eliminated by law. The excessive speed of highway travel, with its ensuing noise, can be regulated. The supersonic transport, with its intolerable sound effects, has already been rejected in America; it must never be revived; it should be banned worldwide by treaty.

The private car can be excluded from the heart of our cities; it must be cut back from our national parks, and from our urban parks as well. The muffler cut-outs can be policed if we wish; noise as a power-symbol is ridiculous. The electric motor can replace the internal combustion engine in the auto, lawn mower, hedge trimmer, chain saw, freeing us at once from racket and pollution.

And for the long pull, we can begin moving out of the mega-cities where the inevitable noises of the crowd will always persist, into communities of livable size where first attention can be focused on the quality of personal and communal life once again. Within settlements of moderate size, self-contained within their own economic and cultural resources, silence, among other treasures, can be rediscovered.

A USEFUL EXERCISE in the enjoyment of silence is the all-night vigil in the open country, on a mountain trail, or by the sea. The shepherds of old understood it, and the Psalms of David emerged from it. The navigator on the night watches of an ocean liner, the pilot on the night flight of a trans-Atlantic plane, seeing the stars, recaptures it. The countryman, stepping from his dooryard, and the wilderness hiker and camper, share in the experience.

You may find an old stump to sit on, or prop yourself on your bedroll, watching the succession of the constellations as they appear above the eastern horizon. No act or thought of yours can hasten the succession. The persistent, powerful, unhurried forces of the universe display themselves at work, in utter silence.

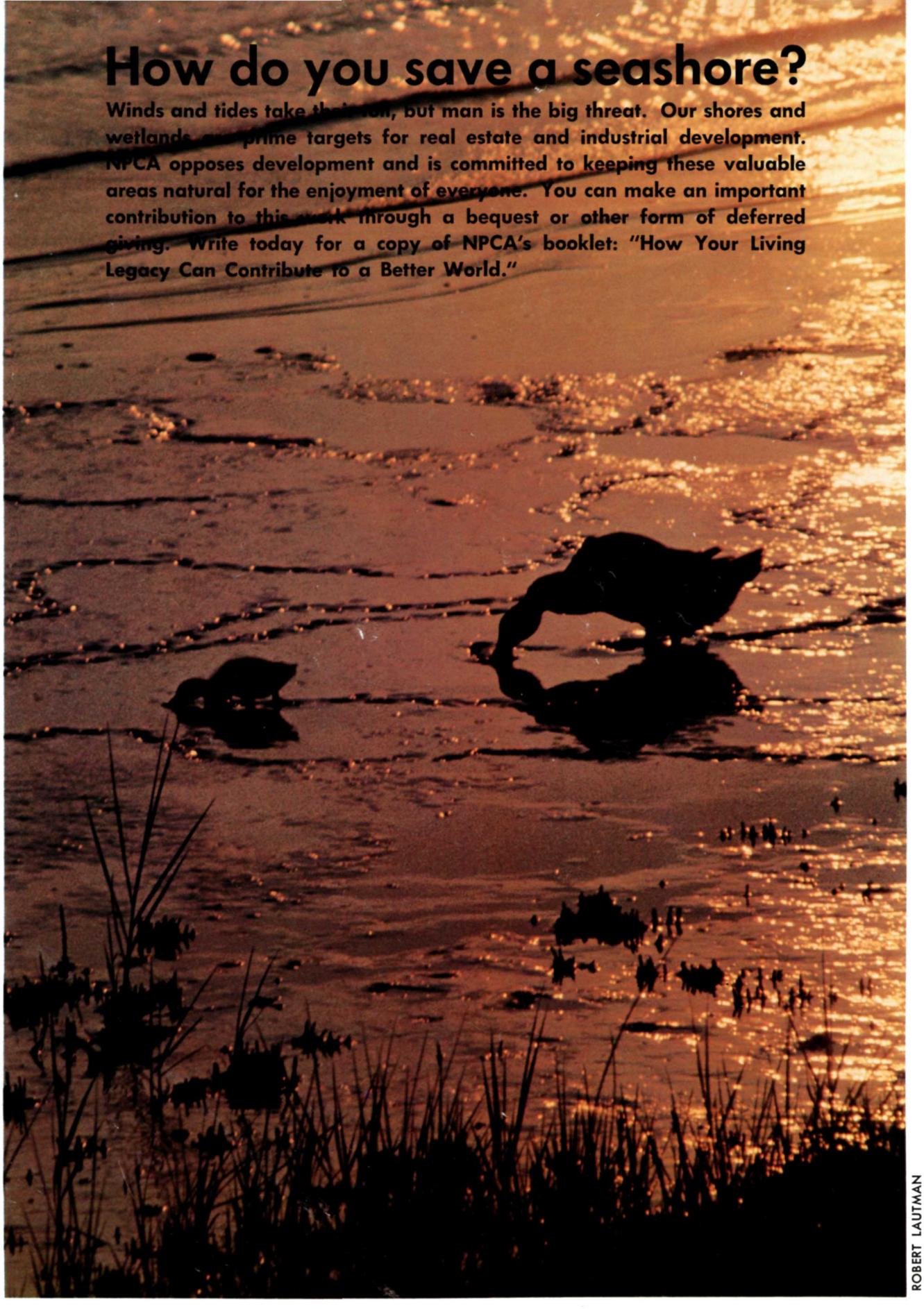
The earth turns on its axis in silence, descending beneath the moon. The land, the hills, the rivers, fly eastward, speeding close to the velocity of sound in the temperate latitudes, yet soundlessly, and you are carried along with all of it, noiselessly, swiftly, along with the countless other creatures inhabiting this planet, as all life has been carried from the beginning of earthly time.

A GARDEN with a flowing fountain containing the sound of rippling water, the bird-songs, the music of the insects, encloses itself in silence.

A quiet house, set in a quiet world, is a blessing. A civilized person rediscovers himself constantly in a quiet room; reading, writing, reflection, the enjoyment of genuine music, the appreciation of true conversation, these riches require a background of silence: a foreground of quietude, a wide setting of stillness, felt and known as enfolding the walls of the house.

Within the new cities we shall build, people will treasure the rhythms of mature conversation, the small talk of children, the voices of violin and piano from the windows, even the modulated echo of travel in the streets, all within the ultimate security and benediction of silence.

—Anthony Wayne Smith



How do you save a seashore?

Winds and tides take their toll, but man is the big threat. Our shores and wetlands are prime targets for real estate and industrial development. NPCA opposes development and is committed to keeping these valuable areas natural for the enjoyment of everyone. You can make an important contribution to this work through a bequest or other form of deferred giving. Write today for a copy of NPCA's booklet: "How Your Living Legacy Can Contribute to a Better World."

ROBERT LAUTMAN

NATIONAL PARKS *and Conservation Association*

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