

NATIONAL PARKS



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BICENTENNIAL

BEFORE THESE WORDS are in print, in all probability, Congress will have enacted legislation reorganizing the American Revolution Bicentennial Commission and launching it on new programs.

In the years since the project was initiated, two major plans have been rejected: one calling for a grandiose exposition-type celebration centered on Independence Hall in Philadelphia or a similar locale; the other for an array of local parks, again essentially expositions in character, to be opened on federal lands donated to communities; these projects contemplated multibillion dollar expenditures.

THIS GROUND has lain fallow long enough; there should be a new seed time, looking toward a new harvest. It is not as though good projects had not been proposed to the old Commission; but it was a cumbersome structure and action was difficult, well-nigh impossible.

We suggest that the exposition idea, small scale or large scale, is archaic and inappropriate. By all means let us look back into our history, consider the present, and make plans for the future, as contemplated in the three major aspects of the work of the old Commission. But let the plans turn around substance, not around a costly and tawdry display of wealth and success; for indeed, such displays do not fit the times.

ONE OF THE GREATEST of American heritages is preserved in the national park system: the exemplification of the magnificence of the great open spaces of this continent as they were when the white man first arrived. The deep significance of this heritage resides in its promise for the future, that a high civilization may eventually be founded within a general restoration of the original majestic setting.

We would urge that the new Commission assume responsibility for endorsing a realistic program for the protection of natural conditions in the parks. This means public transit in and into the parks; a freeze on facilities in the parks; the preservation of most of the land in the parks in wilderness or primitive status; the dispersion of recreational vis-

itation more widely into other public lands and out onto private land on the periphery; and the encouragement of good recreational facilities in the surrounding communities.

A protective program of this kind, which has been advocated by the NPCA for many years, with little response, could be initiated by Executive Order tomorrow. The Office of Management and Budget would have to yield on its misdirected budgetary policies to make the order a success. Demonstration operations like the free shuttlebus system at Yosemite National Park could be the center of genuine celebrations in the Bicentennial year, under the auspices of the Commission.

THE FORESTS of this continent also were a spectacular inheritance on which the white man entered with destructive prodigality. After early devastation, a creative forestry emerged, only to be overwhelmed by the large-scale clearcutting which is the hallmark of a ruthless commercial exploitation. The NPCA has undertaken to demonstrate by specific studies of ecological forestry in various regions of the continent that a genuine silviculture, compatible with productivity, will at the same time conserve the forest resources in terms of soil, water, wildlife, vegetation, recreation, and scenery. The Bicentennial might well offer substantial prizes on a yearly basis for the next century to encourage practical commercial operations based on individual and group selection, shelterwood, or small patch clearcutting where appropriate. It could recommend legislation for the federal regulation of timber management on both public and private lands, based on ecological principles.

Related might be a comprehensive plan for the survival of endangered plants throughout North America, or indeed the planet. Such a program would contemplate seed banks, where seed could be frozen and held until the ecological situation improves; or granaries for dry storage and periodic replanting; or the setting aside of areas within which endangered plants could be protected in their natural condition in the open. The economic cost of such projects would be trivial in comparison with the assets to be rescued.

The problem is not merely one of primitive food and feed grains, which are getting some attention, but of the wild flowers, grasses, forbes, vines, and even trees—like the American chestnut—even though in some cases they may have no direct

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COVERS Chaco Canyon National Monument, by J. Y. Bryan
Once inhabited by throngs of people, the ancient cities of Chaco Canyon have lain abandoned and in ruins for centuries—subjects of speculation about their mysterious vanished inhabitants. The most primitive dwellings in Chaco Canyon, built between 600 and 700 A.D. (front cover), were essentially crude pithouses with irregular adobe walls, awkward construction, and unimpressive overall size. In contrast, Pueblo Bonito, built between 1000 and 1100 A.D. (back cover), was an astonishingly large, well-made, well-integrated complex of dwelling rooms, kivas, storerooms, and walled enclosures. Portions of it were three or four stories high. (See page 4.)

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weathered american chestnut trunk
jack jeffers photograph

the ancient cities of CHACO CANYON

article by Daniel Baumann • photographs by J. Y. Bryan

Mystery engulfs like a shroud
the ancient abandoned cities of The Old Ones
in the American Southwest



Light spills from the shallow fire pit, casting an eerie spell before it soaks into the creviced, brown stone wall. A vast, round chamber is enclosed by the wall, and near the center a storyteller has taken his place beside the fire. Skillfully he uses light, sound, and setting to relate a mystery. He talks about the sun, the moon, and the constellations, about their journeys, and about their relationship with this building. Facing him from a coarse stone ledge that runs along the wall is a small audience of adults and children.

The time is August 1972 and the place a great ceremonial kiva built by a vanished people 800 to 900 years ago in the remote high desert of Chaco Canyon in northwestern New Mexico. The storyteller, a retired chemist, is Clarion Cochran, an enthusiastic student of the kiva and a seasonal ranger for the United States National Park Service.

In daylight, the now-roofless Casa Rinconada (Room Without Corners), which is sixty-four feet in interior diameter, is simply an astonishing example of early American architecture. At night, lighted by the stars and a quavering fire, Casa Rinconada is a good place to talk of magical and unknown things.

Cochran raises provocative questions about the great kiva: Did residents from some of the dozen ancient Indian cities located nearby apply a sophisticated understanding of astronomy to determine the location, axis of construction, and other details of Casa Rinconada? Is the kiva, in fact, part of an ingenious timepiece built to record summer and winter solstices of a deified sun?

The ranger's open-air lecture was a high point of our family adventure in this land of antiquities. That day we had driven from Colorado, crossing the Carson National Forest and the reservation of the Jicarilla Apaches in midafternoon. Sixty miles southward we came to Chaco Canyon National Monument, an unparalleled museum containing the ruins of hundreds of ancient Indian settlements.

The final approach to Chaco (pronounced chalk-o) begins as a dusty, rutty road shown on maps as Highway 57 leaves paved New Mexico Highway 44. For

nearly an hour we saw few signs of human life other than an occasional Navajo hogan in the distance. The smoothest stretch of highway in southern San Juan County must be the wooden-floored bridge spanning the dry bed of Escavada Wash. We rolled across and climbed the steep arroyo bank. A few minutes later we slipped through a notch in the sage-covered mesa top and descended 100 feet to a dry river canyon, sparsely planted with cottonwood, tamarix, and willow. We had arrived in Chaco Canyon.

Next we jolted along a Park Service road past a breathtaking Parade of Homes, some of them ancient and most dating from 900 to 1100 A.D. How different the setting was when the Indians who built these communities first arrived. Scattered groves of juniper and pine dotted the mesa top and grew in heavy clumps in the side canyons, some reaching down to the dusty brown bed of Chaco Wash. The area must have resembled the forested canyons we had seen earlier in the day. But city builders stripped the groves of their finest trees, pushing farther out from the canyon each year. They used 100,000 trees for construction alone during the peak building period of the eleventh century. The climate of Chaco is harsh and dry, but the city dwellers faced new complications; an era of unusually dry weather began, and the pattern of precipitation changed. Less moisture soaked into the soil from snow and winter drizzle; more came in the form of summer flash floods. This river cut deeply into its bed, perhaps affecting groundwater tables. And salts washed off the unprotected mesa tops, reducing the ability of the canyon's soil to hold water. To support their agriculture, the Indians built a complex irrigation system. But they could not halt the chain of events that led, finally, to abandonment of Chaco, and the end of Chaco culture, several hundred years before Spaniards arrived in the New World.

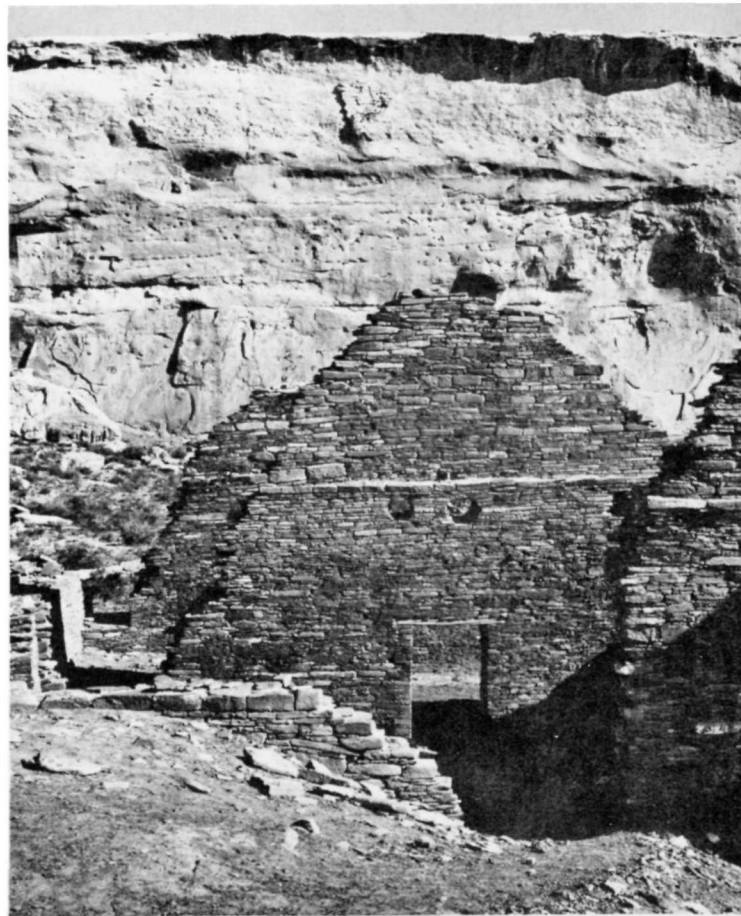
While they flourished, the Chaco pueblos had contact with communities as distant as the Gulf of Mexico and the Gulf of California. Riches imported to Chaco by traders included turquoise, copper bells, shells, and

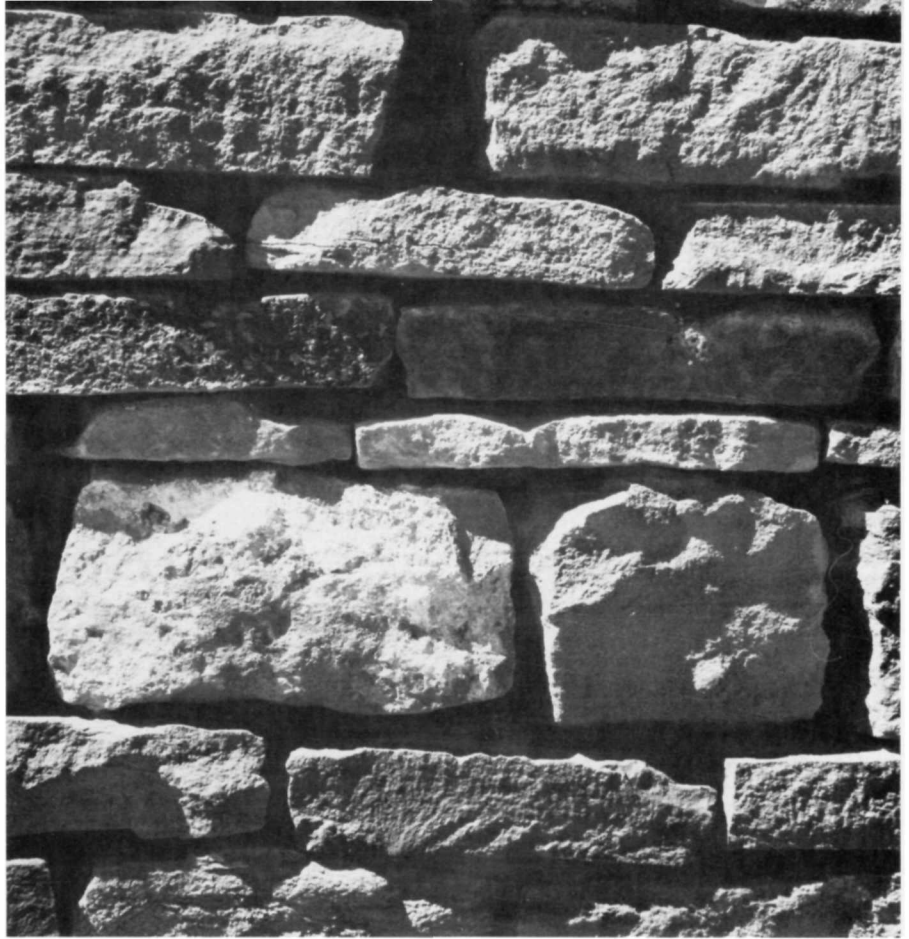


Chaco Canyon is rimmed by sandstone cliffs, with a moderately wide valley along its floor. Pueblo Bonito, the largest city in the canyon, had 800 rooms and probably housed a thousand people. Even from the top of the high cliff behind it a normal camera lens cannot capture the entire extent of Pueblo Bonito. The shot above shows little more than the eastern half. As at Pueblo Bonito, the walls of Chetro Kettle, another pueblo in Chaco Canyon, show careful and skillful workmanship. It too had large rooms, much storage space, and many kivas, suggesting a busy but ritualized life like that at Pueblo Bonito, its contemporary.

exotic birds and may have contributed to the myth of seven cities of gold that centuries later fueled the Spanish conquest of New Mexico.

If Spaniards ever stumbled across the ruins of Chaco, they made no record of it. The ruins were first mentioned by Josiah Gregg in 1844, but Gregg did not actually see them. First official report was made after an expeditionary force of 400 was sent out by the U.S. Army in mid-1849 to explore the year-old American territory of New Mexico (and to intimidate the Indians there into submission). The group stayed in the canyon for four days while a topographic engineer, Lt. James Simpson, sketched ground plans and wrote a description of the major ruins. William Henry Jackson, a mem-





Sophisticated masonry characterizes the buildings constructed during the last period of Chaco Canyon city building. The walls of the more advanced pueblos in Chaco Canyon are made of hewn stone shaped with skill and laid like brick. The stones in each row overlie unions between stones in the row below and were mortared with mud. A peculiarity of pueblo construction in Chaco Canyon is the use of corner windows or access openings. Though difficult to build in sturdy form, several have endured for eight or nine centuries in Pueblo Bonito.

The many kivas in the cities of Chaco Canyon suggest a people living a highly ritualized life with much ceremonial activity. One of the chief structural achievements in Chaco Canyon was Casa Rinconada, whose associated structures included

many small kivas and one of impressive dimensions for major ceremonies. The great kiva at Casa Rinconada (left) has an inside diameter of 64 feet. To build and roof a masterwork so large must have taxed the best talents in Chaco Canyon. As in other large kivas along the valley, this one features anterooms (top center) for entrance of performers, circular bases for pillars to support the roof, rectilinear firepits, stone boxes for ritual display of plants, a stone bench around the entire circumference, and wall niches for deposit of articles credited with supernatural influence. A unique feature was an underground passage (upper left center) by which performers could enter unseen from the anteroom and suddenly emerge in the smoke and mysterious trappings of their rites. The great kiva, though largely underground, crowned a solitary hill—in effect an acropolis dominating that part of the valley.



ber of the Hayden Survey Party sent to Chaco in 1877, attempted to photograph the ruins; unfortunately, he used an experimental film, forerunner of today's roll film, and it didn't turn out. He redeemed himself by writing the first reasonably scientific account of the ruins. In 1897 the Hyde Exploring Expedition began opening rooms at Pueblo Bonito, largest of the pueblo towns of Chaco Canyon.

Arrival of scientists spared Chaco some of the raiding by "pot hunters," ranchers, and townspeople who were looting other southwestern ruins to satisfy the ready market for beautiful clay pottery and artifacts. But archeology was not uniformly the careful science it is today, and one member of the prestigious expedition was responsible for destroying a number of rooms, perfectly preserved for nearly a millennium. This individual took timber and stone from the ruins to build a house, trading post, and horse corral nearby. In 1907 the canyon was declared a national monument by President Theodore Roosevelt. Excavations have been conducted almost continuously since 1921 under permits issued by the Interior Department, and the ruins are carefully protected.

In spite of professional attention, Chaco remains little known and is visited mainly by serious students of the Southwest. Chaco is 120 miles south of Mesa Verde National Park, location of the most famous Indian ruins in North America. At a visit to Mesa Verde a year earlier we were told about masonry at Chaco Canyon that made the Mesa Verde stonework look primitive by comparison and a canyon floor so crowded by towns that ceremonial roads up to thirty feet wide connected them. Even so, Chaco Canyon is a century behind Mesa Verde in terms of public recognition and accessibility. Perhaps because its setting is less scenic than the haunting landscape of Mesa Verde, less has been done to accommodate tourists. Or perhaps it is because an open, unprotected site like Chaco is so vulnerable to overuse, vandalism, and accident. In either case, isolation has been a friend to Chaco, screening out the careless and the casual but making the trip an adventure for those who don't mind a few discomforts. We found two small ruins under the wall of the cliff behind our campsite, perhaps fifty feet from our tent. One was a kiva or perhaps a circular storehouse. The other was a tower, now only one story high, whose tiny windows and doors were thoroughly explored by our children. On the canyon wall above the small tower was a pictograph, an ancient painting that looked like it might have been a rooster or turkey. Nearby were six neatly painted parallel red lines. We learned later that the number six is sacred, representing the four cardinal directions plus up and down.

Chaco Canyon is big and complex enough to befuddle the casual visitor. Structures were built, remodeled, and lived in for a period of 500 years or more. Chaco Indians were part of a larger cultural group (which included the Mesa Verde cliff dwellers) known as Anasazi, Navaio for "The Old Ones." Mystery surrounds the Anasazi. Theory and speculation answer the most basic questions: Where did they come from before settling in the Four Corners area of New Mexico, Colo-

rado, Arizona, and Utah? What brought them here? Where did they go, and why? Archeology must provide the answers; the Anasazi had no literature, and even the names of Chaco communities offer no clues. Mostly descriptive, these names are Spanish, English, Pueblo Indian, or Navajo.

Some scientists break the history of human life at Chaco into five periods, not all of them clearly separated. Sites have been found on the mesa tops dating back before 1000 B.C. These are temporary camps at "kill" sites. Earliest permanent settlements are pithouses, primitive one- and two-room units of mud, brush, and sometimes adobe. The pithouses were common from about 644 to 777 A.D. Built partially underground, they had low stick and mud coverings. During a transition period the Indians began to build mud and stone houses aboveground, next to the pithouses.

The Old Ones traded their single-family compounds for apartment houses, and soon they began building pueblos of more than one story, using rough quarried sandstone blocks chinked with millions of stone slivers. Each stone and each of the thousands of neatly peeled ceiling timbers had to be hand carried, as the Anasazi had neither beast of burden nor wheel to ease their work. Ancestral pithouses had acquired religious and ceremonial importance and the Anasazi took a new form of the pithouse, the kiva, into their pueblo communities. Each pueblo had a number of kivas, large and small, always circular, usually built partly underground and reached through a hole in the roof.

The period of pueblo building began about 828 A.D. and lasted until about 1100 A.D., at which time much of the construction involved remodeling old pueblos. Dramatic improvements occurred in the already high quality of Chaco masonry. Pueblo Bonito, largest of the towns, took the planned shape of a capital "D" even though construction occurred over several centuries.

Abrupt changes in masonry skill show in the walls of additions to Pueblo Bonito. In the late stages of construction the Indians passed over easily obtainable stone in the cliff nearby for more attractive and easily worked sandstone, dense and with nice cleavage planes, on the mesa tops. The exquisite stonework was then plastered over and painted.

In the opening years of the twelfth century satellite pueblos were erected, one as far away as Aztec, sixty miles north. The Anasazi started that pueblo in 1110, apparently sending several waves of colonists from Chaco. In 1125, they completed their construction at Aztec and, for unknown reasons, packed neatly and moved out—possibly back to Chaco.

Events not yet fully understood forced the Anasazi to leave Chaco Canyon. A half-dozen theories have been offered to explain their departure. The adverse effects of deforestation and weather changes seem most reasonable. But that theory fails to explain the abandonment of Aztec. Witchcraft and religion may have played a role. There was systematic sealing and burning of some rooms and other signs of growing suspicion and fear.

In the late 1100s Chaco was deserted as residents left, apparently in small family groups. There is evi-

dence but not conclusive proof that they went down to the Rio Grande area and to the Zuni, Acoma, and other modern pueblos.

Suddenly, Mesa Verde Indians were on the move, too. A century after it was abandoned, the pueblo at Aztec was reoccupied—by the Mesa Verdians. They remodeled extensively, and in some cases clumsily, using blocks cut in the style of their homeland. They moved south into Chaco Canyon, again remodeling and altering, and building several small cliff houses like those we found near the present campgrounds.

Then they, too, disappeared from the canyon, moving south and southeast. Through centuries that followed, sand-heavy desert winds blew through the canyon, burying the lower floor of the great pueblos and crushing their aging roofs. In the early 1600s a new people began drifting into the canyon area. Navajos, in small family settlements, built their distinctive hogans. They were sometimes joined by Indians thought to be refugees from Spanish campaigns against the modern pueblos to the east.

After 1775 and until Chaco became a national monument, only a few Navajos lived in the canyon. Today its residents include park service employees, housed in a small compound, plus archeologists and tourists visiting the campground.

Park Service personnel do a good job of unraveling the Chaco story, or as much of it as the individual cares to learn. Most of the accessible ruins are carefully marked, the period and circumstances of their occupation explained by signs posted for visitors. Marked trails, guided by tour books that can be borrowed or purchased, have been established for three of the most interesting ruins: Pueblo Bonito, Casa Rinconada, and Chetro Kettle (Rain House). Park personnel conduct guided tours of significant ruins, and lectures are offered on a variety of subjects almost nightly.

We tried all three approaches to ruin visiting. At Pueblo del Arroyo (House of the Arroyo) we roamed on our own, viewing unique features such as a tower of three circular walls, one inside the other, and a pueblo that once housed 800 persons, possibly an overflow population from Pueblo Bonito.

We took the self-guided trail through the Casa Rinconada complex and found a showplace kiva, built on a promontory apart from the pueblo towns. The kiva's religious use was apparent in the secret rooms under the entrance stairs and in a passage that enabled ceremonial dancers literally to leap out of the earth. Nearby, a small pueblo of forty-five living rooms and six kivas demonstrates the evolution of Chaco civilization: Partly exposed, directly under the pueblo, are the walls of a pithouse built 200 years earlier.

At Pueblo Bonito, we followed ranger David Siegel on a professionally guided tour through the queen city of Chaco Canyon, largest excavated ruin in the Southwest, representing the highest level of Anasazi development. Reaching five stories, the pueblo had approximately 800 rooms and 32 kivas. The great pueblo was home for 1,200 Anasazi. Its last use was by Mesa Verdians, who modified some rooms, added T-shaped doorways, and remodeled kivas.

If the Bonitans needed any reminders that their life in the canyon was tenuous, they had only to look back of the pueblo at the cliff wall. A huge section of rock, 30 feet thick and 100 feet high, broke loose from the wall and threatened to tumble on top of "Beautiful Pueblo." About 1058 the Bonitans tried to prop the rock with timbers and built a masonry wall to prevent further erosion at the base of the cliff.

Threatening Rock, as it was known in modern times, was still hanging there when Chaco became part of the national park system. While local superintendents pleaded for help to stabilize the rock, Washington turned a deaf ear. In January 1941, following a heavy rainstorm, tons of rock crashed against Pueblo Bonito, destroying twenty-three ground-floor rooms and more than 100 feet of the pueblo's back wall. "Threatening Rock threatens no more," ranger Siegel wryly quoted a report of the disaster as he began our tour of Pueblo Bonito.

Too soon, we were heading back down "Threatening Road" toward Blanco Trading Post, the first part of our long journey home. Before leaving New Mexico, we stopped at one of the living pueblos—the pueblo at Taos, occupied almost continuously for the past 600 years. Structurally reminiscent, in some respects, of the smaller pueblos at Chaco, the rambling Taos structures permit a glimpse at how a modern pueblo society runs.

But it is risky to find too many parallels between modern Pueblo Indians and the Anasazi, whose advanced culture was destroyed in the exodus from Chaco. There is still much digging to be done in the canyon.

Somewhere, under the dust of the canyon floor, is a graveyard. In all the excavations at Chaco, only a few hundred burials have been found, almost none from the classic pueblo period. There is no indication of where the Anasazi buried tens of thousands who lived and died during centuries of pueblo civilization. The burial ground, when it is found, may help solve the mysteries of the life and death of The Old Ones. Or the answer may be found in the abundant rock art, which has not yet been systematically studied.

For those who are mystically inclined, the disappearance of the Anasazi could be explained by a Navajo belief that the ancestors of the Navajo came into this world by climbing up a ladder through a hole in the roof of an underworld where they had lived. Perhaps The Old Ones, guilt ridden for the obvious disharmony of their culture with the world of Chaco Canyon, found a ladder of escape somewhere out in the desert. ■

Dan Baumann is editor and publisher of a chain of community newspapers in suburban Chicago. Enjoyment of family camping, preference for the remote over the accessible, and enthusiastic appreciation of American Indian culture have led Baumann and his family to visit and study several ancient Indian ruins in the American Southwest. J. Y. Bryan's photography has taken him to Asia, the Middle East, and Mexico, where he sees intriguing comparisons with the architecture of our Southwest. His exhibit of photos from the Orient called "Perspectives Eastward" recently completed a three-year tour of the United States, and a new *Sunset* book on Mexico contains many examples of his work.

THE AMERICAN CHESTNUT

1973



Eyvind Thor



A genetic selection program may offer the best hope for an endangered native tree

THE EAST TENNESSEE farmer had taken me into his woodlot to show me an American chestnut tree. He was an old-timer, and he started talking about past years when, as a child, he had collected bushels of chestnuts for the family to enjoy during fall and winter. Standard procedure for opening the burrs was to give them a good lick with the heel of the bare foot, a formidable procedure for the unhardened or the sensitive.

This particular chestnut tree was only about four inches in diameter and perhaps thirty feet tall. It had started growing twenty years before our visit, long after the chestnut forest in this region had been killed by the blight. Since the roots of the American chestnut may stay alive for many years after its trunk has been killed by the blight, the young tree could have originated from the stump or roots of a deceased parent. In some locations in the southern Appalachian Mountains I have observed more than a hundred chestnut sprouts to the acre, usually occurring in clumps with three to four sprouts per clump. The average height of such sprouts is only two feet; most soon are infected by a

blight fungus from the Orient, *Endothia parasitica*, and usually are killed back to ground level before they reach sufficient size to produce flowers. However, enough carbohydrates are produced to keep root systems alive, and new sprouts appear to nourish the hopes of environmentalists that the American chestnut may one day make a comeback.

Occasionally a sprout may, for one reason or another, persist for several years and start flowering. Burrs develop normally, but seeds are usually empty and shriveled inside deceptively magnificent burrs. The reason for this is that chestnut trees are self-sterile; they require pollen of a different genotype to develop normal, fertile nuts. Cross-pollination was no problem when the chestnut was one of the most common trees of the eastern woods; but today chestnut pollen is scarce and while it may be carried for long distances, the chances are slim that cross-pollination will occur. Thus today there are few American chestnut trees starting from seed; most originate from roots of trees that were killed years ago.

Although no old stump could be found near the

young tree we examined, it probably originated as a root sprout and not through sexual reproduction. Its genetic makeup was likely identical to that of its parent, killed long ago by the blight; and its breeding value thus would not be promising. On the other hand, if a mutation had occurred—endowing this tree with some degree of resistance—then we could use it in the breeding program at the University of Tennessee.

The tree we examined was too young and too small to give a strong indication of potential breeding value, but I made and recorded a series of measurements on a tree selection form and told the farmer that we would contact him again in five years to find out if the tree were still living. "It will be," he said with confidence, "but you and I may not."

As I drove back to the laboratory, I could not help thinking about that parting remark. Statistically, I had a better chance of staying healthy than that particular tree; but the tree had the ability to resprout and maintain itself for a long time. And so, too, our breeding program does not depend on a single person; young scientists are continuously being prepared to carry out the three aspects of our work: basic research, radiation breeding, and selection breeding.

EARLY CHESTNUT BLIGHT research was concerned with identification of the fungus and spread of the disease. Later, breeding work was initiated by crossing the blight-resistant Chinese chestnut with the American species. Unfortunately, the genetics of the two species appear to be such that a highly resistant timber-type tree that could prevail in the forest cannot be produced by species hybridization, even if this approach were desirable. The inheritance of resistance probably is not a simple one; but further conclusions now are highly speculative, since we do not yet know the genetic factors involved in resistance or susceptibility to the disease.

Thanks to Dr. Paul Barnett, who toiled for years in the tree-breeding laboratories of the University of Tennessee and the Tennessee Valley Authority, we are now a few steps closer to an understanding of the chemistry involved in this problem. Dr. Barnett extracted the inner bark of individual trees, using four organic solvents; this process resulted in twenty crude extract groups. Each group was investigated by thin-layer chromatography and more than 225 phenolic components were located. Since phenolic compounds have been implicated in disease resistance of many plants, it was encouraging that he found considerably qualitative and quantitative variation among individual American chestnut trees. This variation indicates that blight resistance within the species also varies, and that progress may be made by selection breeding.

Safiva Samman is now carrying on the work initiated by Dr. Barnett. Using chromatography and infrared spectroscopy, she is trying to purify and identify the specific compounds found in the bark extracts. When this has been accomplished we may, using bioassay methods developed by Dr. Barnett, determine which compounds inhibit growth of the fungus. The value of this type of basic information should not be underesti-



EYVIND THOR

mated; one obvious payoff is that a selection index based on inner-bark chemistry may be used to identify selections with the highest potential breeding value. Chemical characteristics of the inner bark also may provide a means by which trees from our breeding program may be evaluated at an early age, and thus substantially reduce our investment in time and money.

FOLLOWING THE DISCOVERY that ionizing radiation may be used to induce variation in plants, radiation breeding seemed to some plant breeders to be a panacea in the case of the American chestnut. Alas! Most mutations are deleterious, and relatively few useful varieties of plants have been produced from radiation experiments. Even with high radiation dosages the chance of finding a plant with the "right" mutation is not great. For small plants like the cereals, tens of thou-

scientists at work

At left, George Rink puts sausage casing bags over female flowers to protect them against stray pollen. When the female flowers are receptive, bags are removed, hand pollination is carried out with male flowers from other grafted trees in the orchard, and the bags replaced. Below, radiated nuts and nuts resulting from crosses in the University of Tennessee breeding orchard are germinated in the greenhouse.



FRED BERGGREN

sands of radiated seeds may be sown per acre; the largest cost is in screening for plants with promising external characteristics. Radiation breeding with the chestnut is much more cumbersome and expensive.

First, the nuts are difficult to obtain; only a few locations have escaped the blight, and nut production is tied up by organizations that are better funded than state universities. At the University of Tennessee our present supply consists of small shipments—often less than a pound of seed—from faithful and enthusiastic people who often go to considerable trouble to collect nuts from surviving trees. Other problems are space and time; only a couple thousand trees can be grown per acre, and several years are required to evaluate each tree. Thus the cost per thousand plants is disturbingly high, probably several hundred times that for small annual plants.

The first irradiated nuts of American chestnut were planted on our Oak Ridge test site twelve years ago. Since then several thousand trees have been planted. Most nuts receive a dosage of 3,000 roentgens from a cobalt⁶⁰ source. We determined that this dose would reduce germination by 50 percent; but it was expected that the surviving seedlings would have a relatively high frequency of mutations. As expected, we observed a number of odd-looking seedlings; most of them died in the nursery. To date not a single tree has been discovered with unusual resistance to the chestnut blight.

I am now in a position similar to one I found myself in about twenty years ago after having deposited several dollars worth of dimes in a Nevada slot machine. The sensible thing to do is to quit before you go broke; on the other hand, you may hit the jackpot with the next dime. Occasionally a tree will grow well for some years and reach a height of more than fifteen feet, but invariably our hopes have been dashed as the saplings are killed back to the ground.

That day in Nevada I became disgusted with the slot machine and looked around for a more profitable way of investing my limited funds. A few hours later I walked away from the roulette table with my pockets full of silver dollars. Of course, I was lucky; but the odds were more in my favor at the roulette table.

Chances of success in a slow and methodical selection breeding program probably are greater than hitting the jackpot in a radiation program. Consequently, we have invested more time and money in selection and propagation of mature, surviving American chestnut trees found in the southern Appalachians. Over the past twelve years we have evaluated hundreds of trees reported to us by interested citizens. Most of them could not be used, because they were not American but rather some exotic species—usually Chinese. Other trees proved to be hybrids. Many American trees were recorded, but were not used in the breeding program because they were too young to offer much evidence of blight resistance.

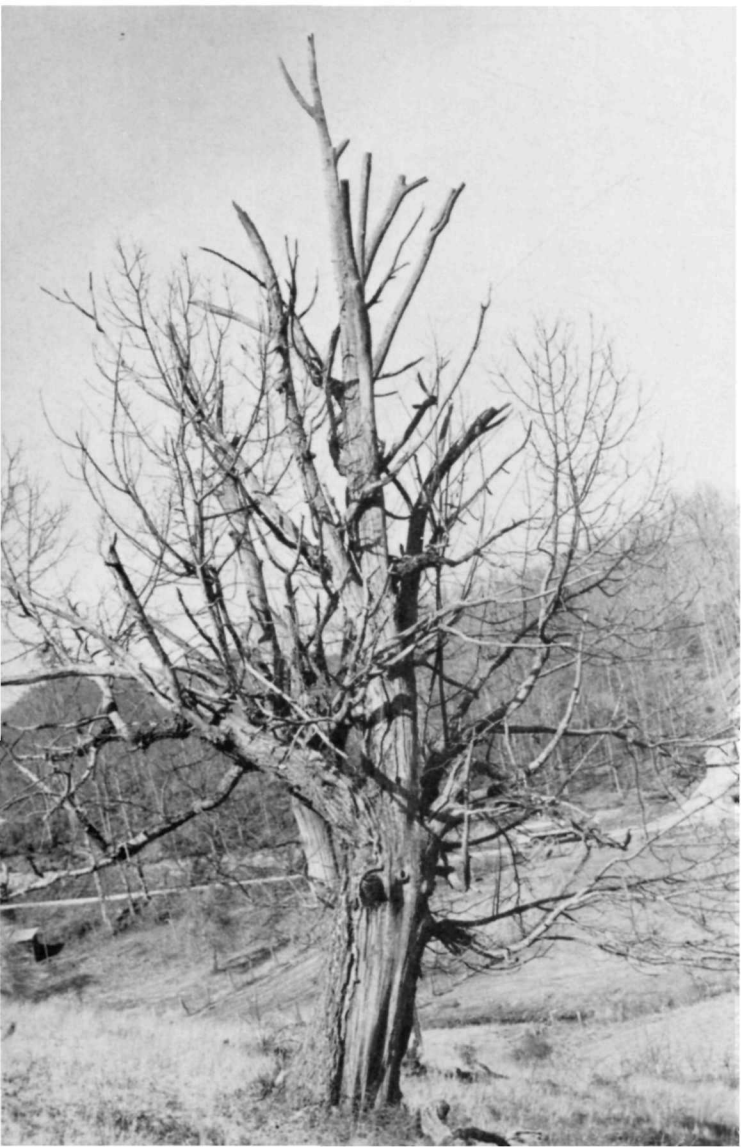
A total of forty American chestnut trees larger than ten inches in diameter at breast height have been accepted in our breeding program. Unfortunately, many of these trees are not alive today; some evidently were killed by the blight, while others were cut. It is difficult to understand how anyone would deliberately cut an American chestnut tree, and probably most of the cutting has been accidental; timber markers, especially younger men, have difficulty in recognizing the species in winter. Since older trees have been attacked several times by the fungus, they are usually not a pretty sight; commonly old cankers are evident, wide strips of dead wood often extend up and down the stem, and a large proportion of the branches may be dead. The timber marker certainly must feel that cutting this "cull" will improve the quality of the stand.

Our selected American chestnut trees have only two valuable characteristics: they are alive, and they have survived several attacks of the blight. Probably they have that mysterious "something" that may be used in a breeding program.

Since there is evidence that blight resistance is not inherited through a single gene, or a very few genes, we should not expect instant results in breeding for resistance. If many genes, acting in an additive fashion, are involved, we may make some progress, generation after generation, until trees with an acceptable degree of resistance are produced. The first step in such a selection program consists of bringing together in one location all the trees selected for blight resistance so that they may cross with each other. Such crossing seldom takes place in nature, because most of the trees are miles apart in the forest.

During winter live twigs, called scion wood, are collected from the tops of our selected trees. Usually a single shot with a high-powered rifle will bring down enough scion wood to make a couple of dozen grafts. Grafting is done in spring with dormant American chestnut scion wood, and actively growing, well-established Chinese chestnut understock. Since a graft union often fails to develop, we graft several pieces of scion wood on each understock, hoping that at least

An example of an older American chestnut tree is pictured below. The wide strip of dead wood up the stem and the numerous dead branches are results of repeated attacks by blight fungus from the Orient. Through efforts of scientists like those at the University of Tennessee a blight-resistant strain may some day be developed.



PAUL BARNETT

one will survive. In this manner we have, over the past ten years, established sixteen of our selected American chestnut trees in the breeding orchard. Other selections have been successfully grafted, but every year we lose some grafted trees as a result of graft incompatibility, blight infection in the graft union, or death of the Chinese understock.

Some grafted trees are now twelve or fifteen feet tall, and are flowering profusely. During the past year we collected nuts from these trees, and grew the seedlings in our greenhouse. In addition, George Rink, a Ph.D. candidate in tree breeding, made controlled crosses among several trees and was rewarded with a fine harvest. Although American chestnut progeny-testing is not his principal assignment, George is now watching with some pride our first seedlings from controlled crosses among selected American chestnut trees. One may wonder what it is that makes some people excited about the American chestnut. Although at one time a major forest dominant in the eastern United States, it has been replaced by other valuable species such as oak and pine. Younger people do not even recognize the species when they see it. On the other hand, many Americans deplore the loss of the passenger pigeon and at least four other native birds, even though their habitats today are utilized by other species. A few species of plants probably have also become extinct or endangered since Europeans entered this country; but these species had a very small range to begin with, and were adapted to highly specialized habitats.

The American chestnut may be unique in being the only endangered native plant species adapted to a wide variety of sites and possessing a wide range. In this respect it is similar to the American bison; but the important difference is that the small remaining herds of bison are mainly healthy, and given a chance by man would, in relatively short time, again dominate the prairie.

Considering the present concern for our environment, and for endangered species of plants and animals, it is disturbing that Americans do so little to save a species that has been of such great economic and esthetic importance in their past. At the University of Tennessee three immigrants—from Palestine, Latvia, and Norway—have formed a team with a native-born American to save this species. We have made some progress, and we have had some setbacks. But setbacks must be expected in working on a problem that has defied solution for more than half a century! Given sufficient funds—and this is a serious current problem—we mean to find an answer to the riddle of the chestnut blight. ■

Eyvind Thor is a professor of forestry at the University of Tennessee, Knoxville. He was the first faculty member in forestry there when the university commenced a forestry research program some fourteen years ago; for nearly twelve years he has been engaged in research on methods of saving the endangered American chestnut.



HOHE TAUERN

Austria's first national park

article and photographs by
Russell D. Butcher

The Grossglockner, Austria's highest peak at 12,460 feet, rises above the crevasse-patterned Pasterzen Glacier.

a miraculously surviving enclave of wilderness amid the great
population centers of Europe recently took its place among
the outstanding national parks of the world

A visit to Austria is exciting under any circumstances. It is a beautiful land of picturesque villages and historic cities; green countryside and huge forested mountains; friendly, cheerful people; the sound of music and colorful marching bands; delicious Wiener Schnitzel, brook trout, and Knödeln; and the feeling that you could explore forever and never tire of the scenery.

We had made a point of coming to the eastern Alps of central Europe not only at the urging of friends back in the United States, but because a vast area of the Hohe Tauern Mountains, covering nearly half-a-million acres, was about to be declared Austria's first national park.

Our first glimpse of Austria's highest mountains came as my wife and I were having breakfast in the lakeside town of Zell am See. Since our early morning departure from Lofer, up near the Bavarian border, we had driven for miles along the Saalbach Valley—the scenery around us obscured by a thick ground fog. Suddenly, the great snow-capped peaks appeared through an opening in the disappearing mists. How unbelievably high these mountains were, towering 10,000 feet above us!

There was no trace of fog left as we reached the toll station at the north end of the famed Grossglockner-Hochalpenstrasse (high alpine highway), and the deep blue, cloudless sky and warm sunshine promised a perfect day. The highway (which is normally closed by snow from November to May) began climbing from the pastoral scenes of fields and villages in the Fuscher Valley, up through stands of luxurious Norway spruces. At every viewpoint, we stopped to admire the great mountains, sheer cliffs laced here and there with rib-

bons of cascades. Just below timberline, ancient wind-swept larch trees dotted the grassy slopes, their graceful, spreading branches now a magnificent October gold.

The switchbacking road, a marvel of engineering, climbs into a rugged, even austere world of brown grass, gray rock, and patches of snow. At the end of a short spur road atop 8,451-foot Edelweiss-Spitze, we could see for miles—ridge after ridge of alpine wilderness. Except for the serpentine road and several old weathered buildings, there was no trace of man.

We looked for wildlife, but only a curious flock of alpine choughs, small crowlike birds, hovered overhead, while from somewhere far down the slope came the piercing whistle of a marmot. We had hoped to spot a group of chamois, a variety of fleet-footed antelope we had seen elsewhere in the Alps, but apparently they had already moved into the lower valley ahead of winter.

The highest point on the Grossglockner road passes through a short tunnel on the border between the provinces of Salzburg and Carinthia. From there, it descends in easy turns to the junction with a spur road which we followed up to the Franz-Josefs-Höhe. At the beginning of this drive, we got our first unobstructed view of Austria's highest peak, the 12,460-foot Grossglockner. We recognized its sharply pointed summit from photographs, but were unprepared for the breathtaking impact of seeing this great, jagged sentinel, rising out of a glacier-filled valley.

As we approached the Grossglockner, a few scattered clouds began forming around the summit, and we realized how wise the advice had been to start out early. After a delicious lunch of Bratwurst and Sauerkraut, topped off with Apfel Strudel, at a restaurant at the road's end, we struck out on the path that hugs the side of the valley opposite the peak. Far below, we could see hikers working their way cautiously across the crevasse-riddled surface of Pasterzen Glacier, while high up on the snow fields of the Grossglockner, we barely made out tiny dark specks of mountain climbers.



Left, the Grossglockner-Hochalpenstrasse switchbacks far above timberline, with 11,600-foot Gr. Wiesbachhorn rising to the north. Right, the view upstream from Krimml Waterfall encompasses the sparkling stream and beautiful forests and the great peaks along the Italian border.





By now, the clouds were gathering thickly, casting dark shadows across the scene. We wondered if the climbers would make it down in time or climb to a hut farther up the peak. Before another hour passed, the mountain-top was hidden from view—as we watched from several miles down the valley in the village of Heiligenblut. There is a beautiful church there, whose incredibly tall steeple was silhouetted against the distant peak. This was such a peaceful place that we hated to leave it behind.

Another day in the Hohe Tauern brought us to the village of Krimml, accompanied by a Canadian couple we had met earlier while climbing in the Karwendel Mountains north of Innsbruck. Arriving after dark, we spent the night in the home of one of Austria's famous skiers. You'll find excellent accommodations throughout much of Europe in private *pensions* (rooming-houses) such as this—a delightful way to meet the local people and find good and inexpensive lodgings with breakfast. That night we seemed to have the tiny village almost to ourselves, as we enjoyed Wiener Schnitzel in a small local inn.

The next morning was an invigorating, crisp October day. After outfitting ourselves with excellent Austrian hiking boots, we followed the path from the village to

the Krimml—Europe's third highest waterfall, plunging 1,300 feet. We climbed up the mountainside, beneath tall spruces, stopping time and again at viewing places, and were thrilled by the sight and sound of the tons of leaping, thundering water as it plunged into veiled pools and raced on through foaming cascades. At each of the three major stages of the fall, we were refreshed by the cool dampness of mist. But we wondered . . . if this was the season of low water, what must the torrent of late spring and early summer be like?

Just over an hour's walk finally brought us to the crest of the fall. Looking back, the houses and steeped church of Krimml in the valley far below appeared as a mere child's toy town, all neatly arranged on its hillside of green fields. From the top of the fall, a beautiful forested valley extends southward, up to meet high snowy peaks along the Italian border. In the midst of this wilderness, we found a patch of grassy meadow by the dashing stream, and shared our Austrian liverwurst, cheese, and homemade bread.

You can hike on farther from this point. There are miles of trails with mountain huts scattered along the way, and we have promised ourselves a return to Krimml some day so we may explore some of this Hohe Tauern wilderness.

It is hard to believe that there had once been an engineering proposal to harness this great waterfall. Nationwide opposition began in 1951, when the Austrian National Trust appealed for public opposition to the scheme. The following year, the legislature of Salzburg instructed the governor of the province to do all in his power to block the project. Finally, in 1958, provincial authorities named the waterfall the Krimml Achental National Trust, followed by its designation as a "national monument."

In 1967, in recognition of the international significance of the Krimml and of the efforts to save it, the Committee of Ministers of the Council of Europe, in Strasbourg, France, awarded the European Diploma for nature protection to the great waterfall. It was then only the eighth nature reserve in Europe ever to receive this coveted tribute.

The idea of protecting a large part of the Hohe Tauern Mountains dates back many years. It was first inspired by the national parks of the American West and began modestly with a number of smaller nature reserves. In 1913, the first part of a 12,000-acre Tauern Nature Protection Park was purchased by the Nature-Protection Park Association (Verein Naturschutzpark) of Stuttgart, Germany. Another reserve in the western Tauern, of nearly 50,000 acres, was set aside in the late 1930s by the Austrian Alpine Club (Österreichischer Alpenverein). And the Grossglockner itself has been part of a 9,000-acre nature protection area, administered by the province of Carinthia since 1935.

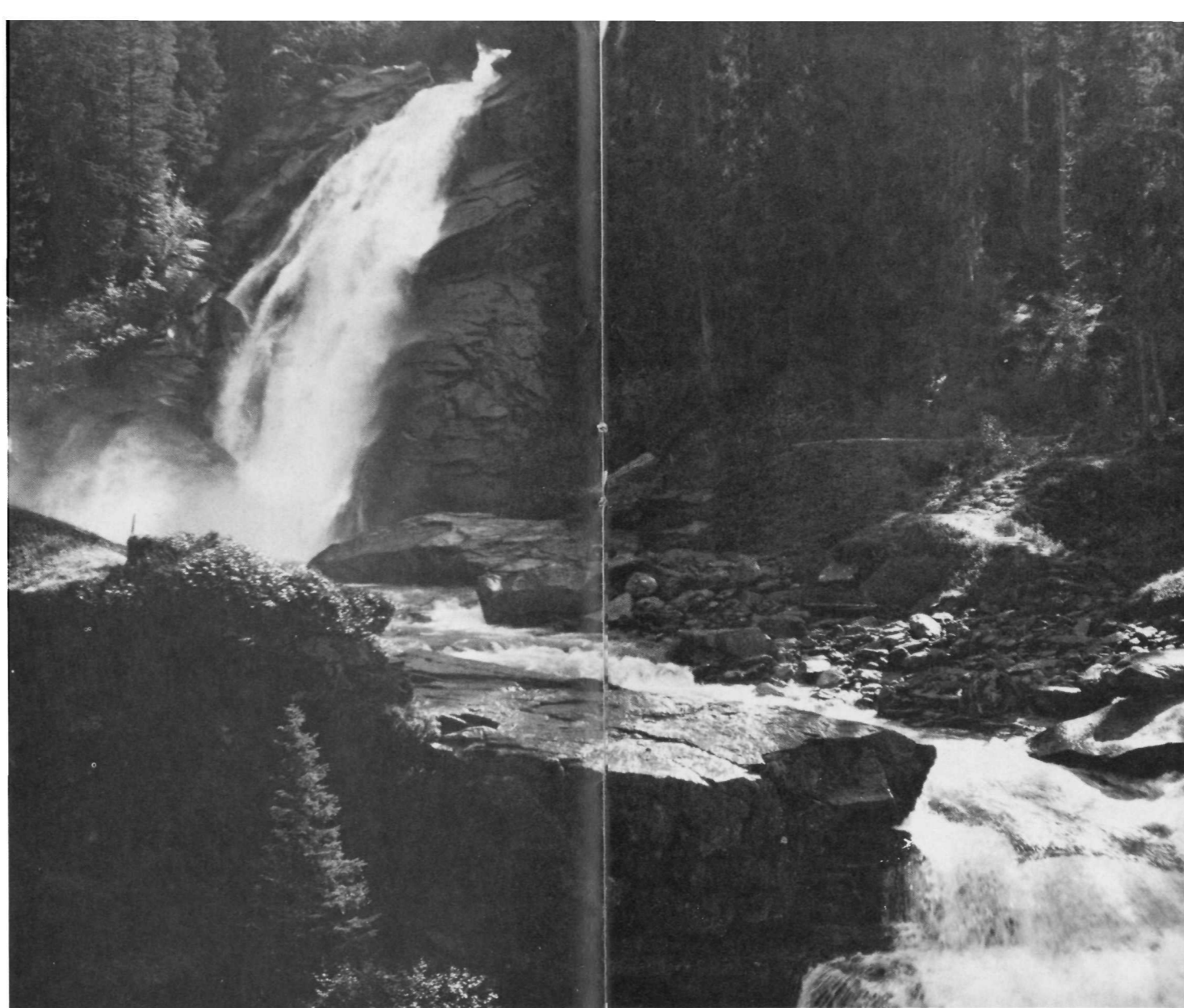
In 1951, the Austrian Nature Protection Society (Österreichischer Naturschutzbund) offered a plan for a national park. Then followed a study of the complex legal aspects of such a proposal—for, in Austria, it is the province, not the national government, that has jurisdiction over land management and nature protection.

Three years later, officials of the Carinthian government urged that an agreement to establish a national park in the Hohe Tauern be signed by the provinces of Salzburg, Carinthia, and the Tyrol, but this idea was defeated by strong opposition from industrial and hydroelectric power interests.

In 1967, Dr. Kurt Conrad of the Salzburg land administrative office; Dr. Hugo Hansely of Carinthia's land agency; and several others, proposed establishing the Hohe Tauern National Park as Austria's major contribution to the European Conservation Year 1970, and Dr. Conrad produced a plan for achieving this goal. The Austrian Conference of Officials in Nature Protection agreed, and appointed Dr. Conrad to head the negotiations leading toward an agreement between the three provinces.

At the same time, the federal government in Vienna indicated a willingness to make financial contributions to the project. And representatives of industry, at long last, expressed their support for the park, declaring that the protection of nature is an integral part of the national economy.

Finally, on October 21, 1971, government officials of Salzburg, Carinthia, and the Tyrol gathered at the village of Heiligenblut and signed the agreement founding 450,000-acre Hohe Tauern National Park. It thus



Above, the middle stage of Krimml Waterfall is framed by tall spruces.

becomes one of the largest parks in all of Europe, second only to a complex of Lapland national parks in northern Sweden.

Major landowners in the Hohe Tauern are the Austrian Federal Forest Service, the German and Austrian alpine clubs, and the park society of Stuttgart. Specific boundaries are still being worked out, along with a master plan that will include the designation of several categories of protection, following the pattern in a number of other European national parks. There will ultimately be three main zones—ranging from a peripheral landscape conservation area to a completely protected central core.

Still to come is final approval by the Federal Parliament to assist with funding the project. Also, Italy's South Tyrol may set aside an adjacent area of mountain

Right, beyond an ancient larch rise the 10,000-foot Sonnenwelleck and Fuscherkarkopf peaks.

wilderness—thus, creating an international park, much as France and Italy have done at the Vanoise-Gran Paradiso national parks.

More than 170 miles of marked trails enable hikers to explore nearly all parts of the Hohe Tauern, and there are many mountain huts or chalets located at a day's climb from each other where food and lodging are available. Alpine mountaineering experience is, of course, a prerequisite in the high country. Hotels and inns are available in nearly every village and town surrounding the park.

Among the wildlife are chamois, red deer (related to the North American elk), roe deer, marmot, varying hare, ptarmigan, nutcracker, and alpine pipit. Rarer species are golden eagle, eagle owl, griffon vulture, capercaillie, and black grouse. In addition, the beauti-

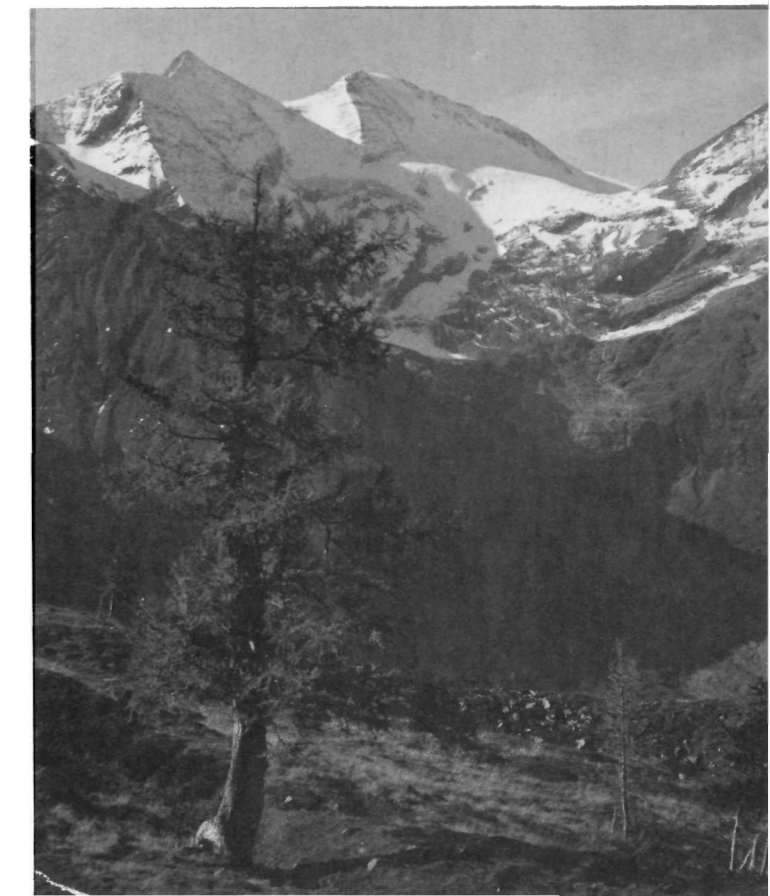
ful ibex or Stemböck, a kind of long-horned mountain goat, has been successfully reintroduced to an area near the Grossglockner.

Along with spruce and larch, there are mountain cembra, and dwarf pines, mountain maple, birch, mountain elm, alder, and mountain ash. During summer months, wildflowers fill the tundra grasslands and valleys with Edelweiss, crocus, several varieties of gentian, Alpenrose (a rhododendron), Turk's-cap lily, and alpine clematis, to name just a few.

In the words of Dr. Conrad, "It is the objective of the Hohe Tauern national park . . . to appreciate at last the all-Austrian and European significance of an alpine landscape which developed decades ago and is of a representative character by awarding it the title of 'national park' and protect it against further denaturation . . . it marks the successful termination of a century-long development where we realize that a long-term utilization of this magnificent alpine world is only feasible if we leave its stock capital—the alpine virgin country—untouched to the greatest possible extent."

The Hohe Tauern has thus taken its rightful place among the outstanding national parks of the world—a miraculously surviving enclave of wilderness amid the great population centers of Europe. It is a lasting tribute to Dr. Conrad and Dr. Hansely, and their colleagues and predecessors, whose vision and perseverance finally saved this natural heritage for the inspiration of all mankind. ■

Russell Butcher has long been a contributor to this Magazine. His new book, *Maine Paradise: Mount Desert Island and Acadia National Park* (illustrated with color photographs by the author and Marie Ivey Menziatti), was just published in August 1973 by The Viking Press. A resident of Mount Desert Island, Russ Butcher formerly held editorial and writing positions with the National Audubon Society, the Save-the-Redwoods League, and the Sierra Club.



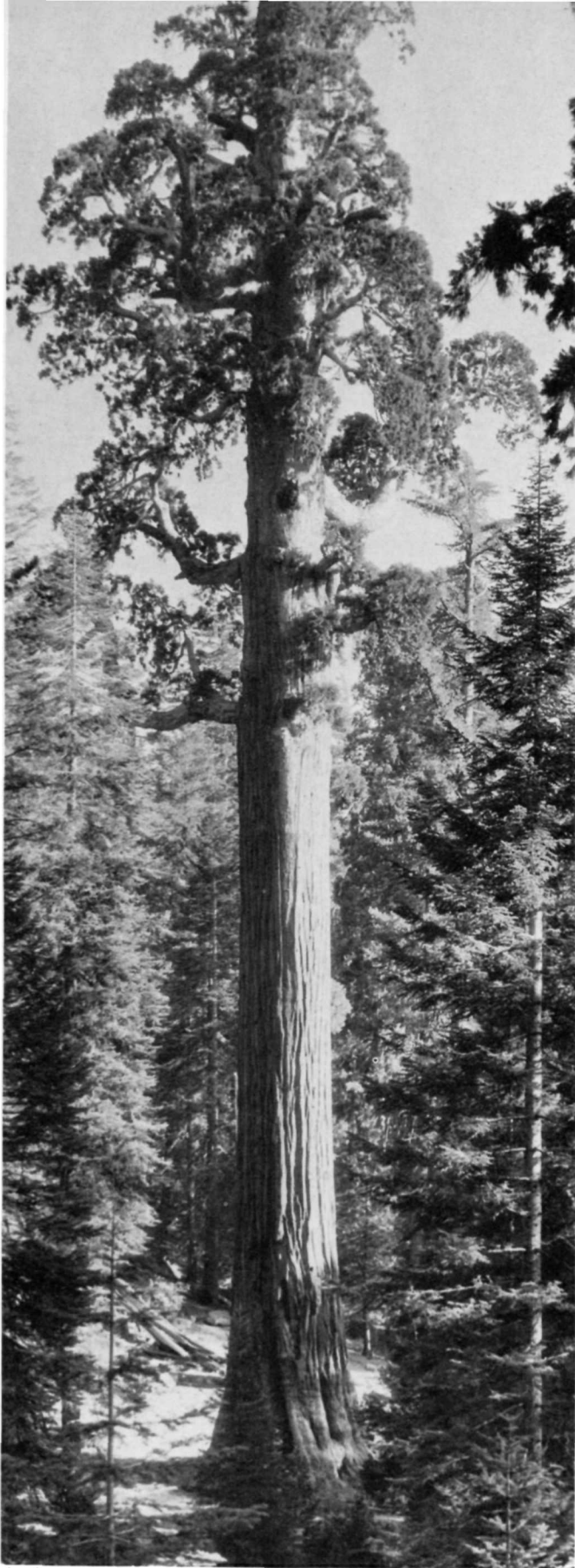
HERITAGE OF THE WORLD

the two species of *Sequoia*
have sharply contrasting
characteristics in
appearance, habitat,
and reproduction

PERHAPS THE MOST CELEBRATED of all trees on earth, the majestic, towering coast redwood, *Sequoia sempervirens*, grows only along a 450-mile foggy strip of beautiful, mountainous Pacific Coast. The redwood region of hushed cathedral groves and splendid red and green forests centers near San Francisco and embraces the oceanside area from Monterey County in central California on the south through Curry County in far southwestern Oregon on the north. The coast redwood rarely ventures inland out of the Pacific fogs more than twenty or thirty miles; nor does it grow at an elevation of more than 2,000 feet. Heart of the three thousand square miles of redwood country is in northern California's Mendocino, Humboldt, and Del Norte counties. Here the giant coast redwoods flourish, with great curling buttress roots and giant fluted trunks luxuriously massed, young trees standing in the shade of their parents, dominating every other living thing.

There are two living sequoias in this ancient botanical line of trees, which botanists assign to the family Taxodiaceae. Brother of *sempervirens* ("ever-living") is the Sierra redwood, *Sequoia gigantea*—also called the California Big Tree—growing at elevations of from 3,000 to 8,000 feet in some seventy groves scattered from a point west of California's Lake Tahoe south along the Sierra Nevada for 270 miles. Most of these thick-trunked, cin-

At left is the General Grant Tree, a fine example of Sequoia gigantea, or the California Big Tree. These thick-trunked trees grow at elevations of from 3,000 to 8,000 feet.



GEORGE A. GRANT

THE ETERNAL REDWOODS

Bonnie Newton

namon-red-barked trees are in Yosemite and Kings Canyon national parks; but all are protected in either state or federal reserves.

The Big Tree, called "wawona" by the Mokelumne tribe, is majestic, awe-inspiring, and graceful. It reaches gigantic proportions, the famous General Sherman Tree weighing in at an unbelievable 2.5 million pounds. The coastal variety, taller but more slender, grows to 350 feet under good conditions and may reach twenty to twenty-seven feet in diameter. Cones of the two species vary also, with the mountain tree bearing a yellowish three-inch cone in contrast to the surprisingly minute one-inch cone of the coastal redwood. The Sierra tree has tiny, scalelike blue-green leaves; those of the coastal variety are small, pointed, and flat-green. Coastal foliage is bilateral—a single layer of needles grows on each side of a central stem, and branches look flat, like fern fronds.

One of the great differences that distinguishes the two redwoods lies in their method of reproduction. Whereas the Sierra redwood reproduces only from seed, the coast redwood grows either from seed or by sprouts, which may propagate from stumps, roots, burls, or even fallen logs.

The drama of the redwood began millions of years ago when Asia was covered with a forest of magnificent

The coast redwood (Sequoia sempervirens) is usually taller and more slender than Sequoia gigantea. It does not grow at elevations of more than 2,000 feet.



REDWOOD EMPIRE ASSOCIATION

trees that were the ancestors of the present Sequoias. This forest extended across the ancient land bridge that connected Asia and America at Bering Strait and covered the western half of North America. Fossils bearing the flat, sharp-pointed needles of the genus have been unearthed in Texas, Pennsylvania, and elsewhere; Yellowstone National Park has the remnants of a standing petrified redwood ancestor with a twenty-eight-foot-thick trunk.

At present *sempervirens*, in spite of destructive logging practices, is much more flourishing than is its mountain brother, which is threatened by man-caused changes in its habitat, although the coastal tree is having its problems too. The first literate viewer of the coastal redwoods may never be known. It could have been the Chinese explorer Hui Shan, who sailed the Pacific in A.D. 458 and mentioned American forests having "tall trees of red wood." It may have been Captain Juan Rodriguez Cabrillo, who in 1542 called Alta California's wooded shore "the coast of pines." Later in the century captains Francis Drake and Sebastian Cermeño both landed in the coast redwood region. On October 10, 1769, Brother Juan Crespi, a Spanish chaplain, became the documented discoverer of the coast redwoods when he wrote in the diary of Don Gaspar de Portola's party of Spanish colonists: "In this region there is a great abundance of these trees and because none of the expedition recognizes them, they are named *palo colorado*, from their color."

Normal life span of the coast redwood is from five hundred to eight hundred years, with the greatest age so far determined by an actual count of annual growth rings just over 2,200 years. Among California trees it is outlived only by the bristlecone pine, western juniper, and the related Sierra redwood. However, the coast redwood is the tallest tree in the world, many specimens reaching the height of a thirty-story building. Nature has endowed these extraordinary trees with a unique and remarkable regenerative ability, and in proper conditions—rich alluvial soil, abundant moisture, and protection from wind—they are the fastest growing of all American conifers. Thus the dark and shadowy-cool, mystically beautiful redwood forests themselves are truly everlasting.

The tallest verified redwood, measured in 1963 by the National Geographic Society on land bordering Redwood Creek in northern Humboldt County and now within the new Redwood National Park, was computed to be 367.8 feet high with a circumference of 44 feet. Other distinctive trees are Chandelier "drive-through" Tree in Mendocino County, the Corkscrew Tree in Humboldt County, and the General Custer Tree in Del Norte County. A so-called "perfect" example of coast redwood is the Stout Tree, in Jedediah Smith Redwoods State Park east of Crescent City, which is 340 feet tall and twenty-one feet in diameter. The great size of the coast redwoods can be better realized, perhaps, when one learns that an entire church was built from the lumber of a single tree! This sizable structure is located at Santa Rosa, north of San Francisco, and is called, appropriately, the Church-Built-From-One-Tree.



One reason for the tree's long life is its ability to grow vigorously where sunlight is less than one percent of full intensity; other western conifers require an abundance of light for the photosynthetic process, whereby plants manufacture food through the green chlorophyll of their leaves. The redwood does this nearly twice as fast as its nearest competitor. Carbohydrates are produced as leaves take the sun's energy and carbon dioxide from the air; these are mixed well with soluble materials that roots extract from the soil. This process adds new layers of wood fibers on the outside of the old. As most of the growth takes place in spring and early summer, the fall periods of slow growth are marked by dark, hard lines in the wood.

The coast redwood does not have a waterseeking central taproot, as many trees do. Instead it has several stubby main roots, never deeper than six feet, fed by a maze of filaments that rise to a foot or two from the ground surface. This part of the tree's waterworks, always struggling to satisfy the redwood's lifetime need for a thousand tons of water per ton of its weight, is a continuously dividing network and may fan out as far as a hundred feet from the trunk.

Perhaps if you have strolled among the redwoods—and you must *walk* to appreciate these cathedrals of nature—you have been awed and humbled by the giant columns, with their ponderous strength, reaching toward the sky like pillars of a temple. With the mystic beauty and stately magnitude of the sun-filtered towering forms, the almost infinite variety of light and shade and color, and the unfolding life and beauty of the forest, the big redwoods are not looked at; they are experienced. As you advance into these splendid, silent forests, the arches of lacy green foliage narrow above



DRAWINGS COURTESY OF U.S. FOREST SERVICE

At left is a drawing of the foliage and cones of *Sequoia sempervirens*. Pictured above are the foliage and cones of *Sequoia gigantea*. *Sempervirens* grows small, one-inch cones, in contrast to the three-inch cones of *gigantea*. The leaves of the coast variety are small, pointed, and flat-green. Those of its mountain brother are tiny, scalelike, and blue-green.

you, and shade deepens into twilight. An awe-inspiring element of time pervades these living relics of the ages.

If you particularly observe the red-brown bark, you will note that it is fibrous and "asbestos-like"; it may be a foot thick and is highly resistant to disease, insects, and fire. The black, hollowed-out trunks of old trees, called "goose-pens" by pioneers who sometimes used them for that purpose, demonstrate that although 85 percent burned away, the redwood is able to add new growth over the charcoal and to survive on a slender layer of sapwood. A redwood with a large goose-pen is located 193 miles north of San Francisco in Mendocino County; here, a long-ago fire fashioned a room fifty feet high in the interior of the 250-foot tree.

Most constant companion of the huge trees is the Douglas fir, a conifer sometimes attaining rather great size. You will also find the tan oak, with chestnutlike leaves and woolly acorns, and the madrone, with shiny green leaves and rich red limbs, imparting a fine, colorful glow to the woodlands. On the ground lies a rich layer of leaf mold, soft and spongy as any carpet, created by centuries of falling dead leaves, and giving off a pleasant earthy smell. This humus is covered with small flowering plants and ferns. In the lowland groves these plants include the cloverlike pink-lavender-blossomed sorrel. By far the most common fern of the redwood groves is the sword fern, a rather large, two-ranked, rough-edged plant, often growing on decaying logs and stumps, as well as in the rich humus soil. Many other ferns also find the coast redwood forest an ideal habitat, among them the tall chain fern, the delicate California maidenhair and five-finger fern, and the gold fern with fronds golden-powdery beneath. In shaded forest the western bracken thrives.

You may see at times as many as fifteen acres of forest level covered with an almost pure growth of the frail sugar scoop, its white flowers in great profusion, offering a delicate contrast to the stately redwood giants in their midst. In springtime sunny upland forests provide cream-colored aralia blossoms, azalea, and rhododendron. Later in the year edible berries such as huckleberry, thimbleberry, salmonberry, blackberry, and elderberry lend their pinks and purples. Showiest of all shrubs in the redwood forest is the California rosebay, which makes so fine a spectacle that travelers journey for hundreds of miles to see it in the height of its rose-purple bloom. You will see the same wildflowers found elsewhere in the state; in addition, you may come across tiny stream orchids and rain orchids growing among creekside shrubs.

Faith paths ramble across the floor of the forest, lazily twisting and turning. These are the "roads of the bush" and are followed by all its inhabitants. Besides man who comes to visit, travelers include deer, squirrels, chipmunks, raccoons, and even an occasional bear in the rugged areas.

The seventy redwood parks total about 175,000 acres, of which nearly half is in dense, old-growth coast redwood. The remainder is in young growth, mixed stands of redwood and fir, or in open areas. Most of the fifteen counties of the redwood region are joined by a highway that begins with Monterey County's State 1, runs north into the San Francisco Peninsula, and becomes the 350-mile-long Redwood Highway from the Golden Gate into Oregon. Tourists entering the Redwood Empire from the south obtain their first view of the massive trees at the Muir Woods National Monument and in Samuel P. Taylor Park. Farther north, in Sonoma County, more of the majestic trees tower in Armstrong Redwoods State Park. To the north of Sonoma County, in Mendocino County, are thousands of acres of state redwoods parks in Humboldt County. These include Richardson Grove, Grizzly Creek Redwoods, Humboldt Redwoods, and Prairie Creek Redwoods. In Del Norte County are two state parks containing nearly 15,000 acres of redwoods: Del Norte Coast, and the park named for the noted explorer Jedediah Smith.

Today, the Big Tree of the Sierra Nevada is relatively safe in its federal reserves. Not so, however, the coast redwoods lying outside the California redwoods parks and the new federal park. As for many years past, their greatest enemy is the kind of lumbering known to foresters as clearcutting, which is particularly ruinous to both forest and land in the coastal kingdom of this tree, and which proceeds steadily despite the pleas of environmentalists all over the country that better ways of forestry be used here. If they are not, the coast redwood forest will be a heritage of destruction rather than a heritage of natural beauty for the nation and the world. ■

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MAN'S PSYCHIC NEEDS

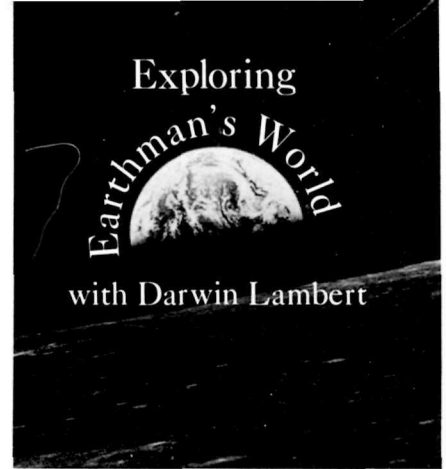
for NATURE

Edward Stainbrook

MAN HAS RECENTLY APPEARED so successful as thinker, inventor, and builder that he has conceived of himself as outside of nature. In Western civilization especially, he has considered nature an opponent to be conquered and changed to serve himself. He has seemed determined to eliminate himself as natural man and to ignore, disguise, transform, and despoil unconcernedly the earthly space in which he lives. But now multiplying voices warn against this war on nature. There is deepening concern about its effects not only on the environment but on man himself, concern that is far more profound than a mere romantic agony over the loss of natural man and of natural nature.

Adverse physical effects of the urban-industrial environment—such as sickness from air and water pollution and hearing damage from prolonged high-decibel noise—are widely recognized. Less well understood are the adverse psychological effects. Having evolved through eons of living with nature, organisms including man are genetically programmed to biological rhythms paced by sun, moon, and seasons. Hence, we are often out of phase with modern situations—with artificial lighting, central heating and air-conditioning, with work organizations and other social institutions structuring wakeful activity around the clock, with a distressingly high and insistent daily input of complex information demanding sleep-disturbing attempts at mastery, with rapid travel through time zones. Fatigue and inefficiency—and perhaps more subtle impairments of adaptation and biological responsiveness—may be the price we pay for the disharmony between the body's innate rhythms and the artificial surroundings and demands that press upon us.

Noise and congestion may contribute to destructive patterns of individual behavior and social interaction by overstimulating the brain and emotions and thus putting a strenuous load on other organs, particularly the heart and the blood vessels. When such overstimulation is sustained—especially when the person is also disturbed by individual troubles as so many are—the irritability with which one reacts to noise may intensify, sustain, and increase the frequency of such body responses, which may contribute to the appearance of physical disease.



A series of short articles examining the kind of man-earth relationship that will lead to creative ecological harmony, thus operating and preserving our planet as a physically and mentally healthful abode for all life.

Noise may also contribute to human stress in another way. Recent studies of sleep and dreaming indicate that a certain period of deep sleep and dreamtime each night is necessary for mental well-being as well as for refreshment of the body. Dreaming helps us deal with unsettled and unsettling feelings and problems at the unconscious level. If sleep is interrupted by noises, dreamtime may be lessened or disturbed and the vital dreamwork interfered with. We are left less capable of coping.

Results of recent studies on congested rat populations have been cited as containing warnings concerning human congestion. But it is a mistake to extrapolate the results of studies of animals to congested human beings in cities, because man is a very resourceful symbol user and has tremendous capacity for organizing—or failing to organize—himself socially. However, urban congestion does have adverse psychological effects.

Cities are filled with noises, signs, lights, people, buildings, and vehicles. People cope with this constant barrage partly by learning not to respond—to other people as well as to these diverse stimuli. Failure to respond leads to a learned indifference to others as a protection against the density of human encounter. By generalization it also leads to a failure to see and respond to other people even when seeing and responding is appropriate—a big step toward cold and dehumanized man. And just as city dwellers and workers come to conceive of the people they encounter as faceless and anonymous, so too some people come to feel anonymous because of others' lack of response to them.

Although the anonymity, freedom, and privacy of life in the city offers many psychological and social advantages, the impersonal environment cannot be managed if one feels completely anonymous. Many people in the city are alienated from close relationships that enhance self-esteem and help avoid loneliness and despair. In

fact, many newcomers migrate to the city primarily because they have lost or moved away from significant supporting people in their lives. Many of these people, feeling anonymous and defensive, are unable to find and establish the enduring close relationships so necessary to emotional well-being.

Thus it is not congestion alone that creates the hostility, the lack of love, the lack of mutual respect, and the psychological degradation that may exist in crowded inner city residences. Such crowding was common in large families in our own society not long ago and still is common in other countries with minimal adverse consequences. An important destructive factor in crowded city residences today is the failure of the social organization of the people who live there. Lack of kinship ties and other socially enforced obligations and responsibilities in many situations keep such people a crowd, not a cohesive group. Their inability to escape from the situation intensifies the problems.

Not only do man's physical surroundings indicate how he feels about those surroundings, but they affect the way he feels about himself. Examples of this phenomenon can be seen in psychiatric hospitals, where the environment of the hospital itself has contributed substantially to the impairment of long-time residents. The patients are desocialized and their self-esteem diminished simply by the way in which their life experience is structured within the hospital's social and physical space.

The implications of this realization for the broader environment are great. An environment of ugliness, dilapidation, dirtiness, overbuilt space, and lack of natural surroundings confirms the negative self-appraisal a person may have developed through other contacts with society. Self-esteem is the keystone to emotional well-being; and poor self-appraisal, among other factors, determines how one treats his surroundings and how destructive he will be toward himself and toward others. These reactions set up a vicious circle difficult to break. Although individuals vary a great deal in how dependent they are on other people and their surroundings for their own self-esteem, usually the people who are least confident and most dependent on external appraisal for other reasons—such as poor education and low economic and social status—and therefore most vulnerable to it are those who live in the greatest numbers in the most unaffirming and demeaning parts of the city, in terms of physical conditions and social relationships.

It should be clear by now that man needs a natural environment for many good reasons. We are familiar with the need to "get away from it all" periodically. Many of us seek a tranquil natural setting for its restorative qualities, which enable us to cope again with our complex world.

It is no accident that some of our metaphors that indicate our basic feeling about nature are "Mother Nature" and "Mother Earth." Such phrases indicate a regressive need for the nurturing mother; that is, an unconscious longing to return to infancy, when one was dependent and passive without guilt or self-castigation and experienced effortless pleasure and unconflicted satiation. Although regression sometimes

operates to avoid development and responsibility, it can also operate for self-enrichment and growth. For example, when we lie on a tranquil, sun-drenched beach, we are regressively enjoying a basic human gratification as well as experiencing replenishment by nature. Even people born in the city who have no early contact with the natural environment seem to have this symbolic yearning for a return to the supreme nurturing "Mother Nature."

Another subtle human need for the natural environment has to do with the experience of permanency and change. To support his unconscious striving for immortality (because of his fear of death), man needs the sense of security provided by the timeless duration of nature. As changes in contemporary society accelerate and multiply, the need for natural surroundings becomes increasingly important. Moments of crisis are reduced to manageable dimensions when seen from the perspective of enduring nature.

Living in time with biological rhythms; freedom from noise and congestion; clean, uncluttered, beautiful surroundings; tranquil open space in cities with living, growing plants and opportunities for supportive social interaction; parklands and wilderness to provide opportunities for relaxation, pleasure, re-creation, and a sense of permanence—these are real human needs. These needs should be taken into consideration by urban planners and designers as well as by wilderness planners; by health and social welfare institutions as well as by conservation organizations; by employers as well as by governmental agencies. Cities could be designed to eliminate vehicles, cut down on noise, and provide sensually stimulating open space and pathways that invite people out of their enclosed spaces. And if enough accessible resources for social contact are provided, people will be invited out of their pathological situations into a self-confirming environment with opportunities for establishing necessary supportive relationships.

Of course, redesigning cities will not solve problems of poverty, poor education, discrimination, crime, and violence; these are complex social problems with no simple solutions. But it could contribute to a more natural and healthy urban environment that provides for some of man's basic psychological needs, supplementing other attempts to solve these problems.

Having recognized these basic psychic needs as well as the physical need for an unpolluted, more serene world, we must use our reason to ensure a physically and mentally healthy abode for all life. We must decide not only *whether* we shall survive, but the quality of the life we shall lead. We must decide what new values need to be accepted as directives for action. We must decide to work harmoniously with nature, not against her. Otherwise we may mindlessly follow the Pied Piper of our materialism and technology to the desperate edge of our increasingly synthetic existence. ■

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ANIMAL AIRLIFT

Los Angeles has an unusual program for airlifting wild animals out of the city to a new lease on life in the open country

Most cities owning a helicopter save the “red-carpet” treatment for politicians and visiting dignitaries, but not Los Angeles. On any busy morning in the skies over the city, one of the choppers beating its way northward may contain a dozen wild animals on their way to the forest and a new lease on life. Those animals and the two city officials flying them away from shopping center, skyscraper, and smog are part of Los Angeles’ progressive new urban conservation program called “Animal Airlift.”

The city of Los Angeles has tripled in population in fifty years. Its homes and industries spread across the 500-square-mile basin, clawing into hillsides, tumbling over the foothills, swarming through the canyons. Unchecked and unplanned, the metropolitan area has pushed right up to the edges of two national parks and surrounded thousands of acres of woodland spaces.

For five decades, continuing outward surge has brought ever more imbalancing destruction of Southern California wildlife. Though homeowners fled dense urban areas to savor the rolling foothills, paradoxically the same refugees planted carefully cultivated gardens, adorned their homes with expensive domestic animals, and then howled in frustration as wildlife invaded their gardens and terrorized, or, worse, made dinner out of their pets.

Until three years ago, woodland creatures sparring with Los Angeles’ periphery homeowners could find attitudes ranging from hostility to encouragement awaiting them. There were occasional inhumane shootings or poisonings. Kinder citizens, charmed by the more mischievous creatures, often learned to live with them,

with the result that a significant number of emboldened raccoons or opossums ventured into traffic or other mechanized disaster. The only remaining alternative, to call L.A.’s Animal Regulation Department, was a step many were reluctant to take because the animal would have to be destroyed if the department couldn’t place it in a zoo.

All that has changed since the city of Los Angeles instituted the first project of its kind, the unique “Animal Airlift.” Conceived by Robert I. Rush, dedicated conservationist and head of L.A.’s Animal Regulation, “Airlift” has saved the lives of over 2,000 animals since its inception. A remarkably simple and inexpensive answer, Airlift requires only a few hours per week from regular department personnel and costs only the price of fuel for transport.

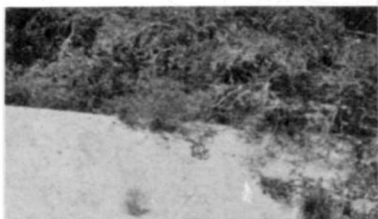
Airlift swings into action when a resident calls the department to report he has a visitor foraging among his roses or licking its chops over his small dog. A trained animal shelter employee is dispatched to the caller’s home to identify the woodland creature and to set a trap. “We use what we call a visual trap,” explains Wes Mason, twenty-three-year veteran of the Animal Regulation Department and Airlift coordinator. “This enables the homeowner to see when the wild animal is captured, and also if the trap was accidentally sprung on his neighbor’s cat.” Officials warn homeowners not to try to handle the captured wildlife, but to call the shelter as soon as they see the animal has been caught. Because the department only uses humane “box traps,” the only thing the captive will suffer is frustration.

JANE NEVINS



PHOTOS COURTESY OF THE LOS ANGELES DEPARTMENT OF ANIMAL REGULATION

A raccoon, a brown fox, and a redtailed hawk are released to find new homes in Angeles National Forest. Note that the airlift helicopter has been shut down to prevent further frightening of the wildlife, and also that Wes Mason, airlift coordinator, keeps an eye on the hawk before releasing his other wildlife.



Captured animals are taken to a shelter on the west-end of the city, where they are held for only a few days. "We leave them alone as much as we can," says Mason. "With wild animals, too much handling can kill them. A deer, for example, can batter himself to death from fear just running around his cage."

Calls come in from all over the sprawling city limits, and within any week, it takes only about three days for Airlift to accumulate a fair-sized cargo. The weekly flights usually transport about a dozen animals, and the variety of wildlife that has been carried back to the forest from the bursting metropolis is startling: red foxes, opossums, raccoons, hawks, owls, rabbits, squirrels, deer, mountain lions, a golden eagle or two, ocelots, even nonpoisonous snakes.

Transport for most of the animals is by a small, city-owned helicopter, with the creatures in individual ventilated boxes fastened to the outer frame of the chopper. The city uses a van to carry larger or more delicate wildlife back to the forest. This method is used for deer and the occasional mountain lion, whose release site has sometimes been as many as 300 miles away.

Angeles National Forest's 690,000 acres, where the animals are relocated, run the gamut of habitat—cactus at sea level, chapparal, thick pine woods, and 7,000-foot snow-capped peaks. And all are only an hour north of the city. Forest sites for freeing the animals are selected by Larry Forbis, U.S. Forest Service wildlife biologist and member of the Forest Planning staff.

"We designate sites based mainly on the requirements of the animal, and probably the most important are the riparian areas which contain long, exposed streams for their water supply," Forbis explains. "These areas suit the needs of most animals brought in by Airlift because many of them are omnivores, like the opossum, and will find their food requirements in and around the water."

Airlift coordinator Wes Mason, who has flown with almost every flight, explains the precautions that have been developed for the last moments with their soon-to-be-released charges. "We try to set the helicopter down a little way from the exact place where we intend to free the animal. We also shut down the 'copter to spare them any more noise. Then we unfasten the boxes and carry them some distance from the helicopter."

Release is a simple matter of opening the boxes and standing back—far back. "Sometimes they'll come right up out of the box at your face," Mason laughs. This is nearly always the last the city officials see of their liberated friends; but, on occasion, the animals add a new wrinkle. One bright morning, two raccoons leapt from their transport boxes, looked around, looked at each other, and then ran straight back to the helicopter to hide behind the seats. Mason and the pilot found the raccoons had done a good job finding a defensive position. After a few busy minutes, the two men were able to get the nervous specimens back into the open whence they sped off into the wilderness, and, presumably, a better life.

The "presumably" is the only area both Larry Forbis and L.A.'s animal officials would like to improve, ideally by a thorough-going scientific study. "We have a pretty good idea of the population situation in areas where we relocate the animals," says Forbis, "but we worry about disproportionate increases in a given animal population. Ideally, we could mark the new animals and then study what becomes of them, but marking involves puncturing their ears or clipping a toe. And, so far, we've had too much resistance from humane groups. It doesn't harm the animal, but people find that hard to understand."

Follow-up notwithstanding, Forbis and others praise L.A.'s Airlift as a humane and progressive approach to serious wildlife depletion problems caused by unplanned urban intrusion on wildlife lands. "In this area," says Forbis, "I see a continuing problem. People want to live in houses on the boundaries of open spaces, with all the benefits and none of the headaches." Almost as if to bear him out, Los Angeles' Animal Regulation administrators have begun receiving an increasing flow of inquiries about how such a program as Airlift can be started. Most of the questions have come from around the United States, but some have arrived from as far away as Australia, Germany, and Canada.

The perfect answer, all agree, would be for cities, including Los Angeles, to use the services of a wildlife biologist or wildlife management expert to address those aspects of city planning which would include ecological management of open spaces in and around urban growth. But financial and political realities tend to put such efforts on a back burner.

Nevertheless, a successful program like Airlift, drawing praise and creating official pride, is thought by some to be a necessary step in paving the way for greater commitment. A plan so simple in approach and so inexpensive in execution, Airlift has made an acknowledged impact on the city's interest in open-space planning. Los Angeles City Councilman Gilbert Lindsay, who initiated council action for Animal Regulation Chief Rush, put it this way: "Things are changing in all our planning. We have lots of open spaces and environment is very important now. We ought to be able to include wildlife in our planning, if for no other reason than its benefit to our children. It's not in our programs now, but I see it as not far removed either."

Buoyed by paternal pride in Airlift, Chief Robert Rush intends to continue carrying a "conscientious-raising" torch for urban conservation. Rush sums up his commitment soberly: "Wild animals are an integral part of our existence, and they're fast disappearing because of man's short-sighted evaluation of a precious commodity." And, if Rush has anything to say about it, the city of Los Angeles will show that Animal Airlift is just the beginning. ■

Jane Nevins is a free lance writer who lives in Los Angeles. Among the publications to which she contributes are *Los Angeles Magazine*, *The Washington Monthly*, and the *Los Angeles Times' Calendar*.

Big Thicket of Texas Many NPCA members know that there have been various proposals over the years for some kind of national protection for the remainder of the Big Thicket country in southeast Texas; also that, to the present, none of the proposals ever has borne fruit.

Now there are proposals in the House of Representatives (House Resolutions 4270, 5941, and 9051) that would create a Big Thicket National Biological Reserve, and in July the House Subcommittee on National Parks and Recreation held public hearings on the matter. On invitation, NPCA presented its views.

The Association testified that it was in basic agreement with all the proposals to protect 100,000 acres or more of the Big Thicket as the only currently potential park system unit that might be established in the southern mixed forest community, with the reservation that the area, if authorized, be classed as a natural area. Elaborating on this point NPCA said that in its view there seems no compelling reason for adding another category of unit to the nineteen already existing in the park system; that Big Thicket is a natural area, with categories already existing, and that another category could only invite more confusion.

NPCA particularly commended HR 9051, by Congressman Steelman of Texas, for its "redwoods provision," so-called, that would allow land acquisition at the time of congressional authorization, since lumbering in the Big Thicket is moving forward rapidly while the preservation opportunity shrinks correspondingly.

In regard to hunting in a Big Thicket preserve NPCA strongly urged that it be excluded as a general rule. "As has been amply pointed out," the Association said, "this area is unique; it is the home of endangered and threatened species; and it will be the only unit preserved in the national park system within this extensive forest type."

Bobcat bounty abolished The Association recently sent Bernard W. Corson, director of New Hampshire's Fish and Game Department, the following letter:

"It has recently come to our attention that New Hampshire has discontinued bounties on bobcats. On behalf of our more than 50,000 members we commend your enlightened action. We have long considered the use of bounties to be a detriment to sound wildlife management and the maintenance of the natural ecosystems. Thus, we are even more gratified by your initiative in behalf of the bobcat."

Mining in Glacier Bay The Association has learned that the Park Service is considering a mining company proposal for roadbuilding in Glacier Bay National Monument in connection with possible mining activities there. NPCA has written Park Service Director Ronald H. Walker objecting to both roadbuilding and mining in the Alaskan monument, and requesting that the director use his authority in prohibiting the activities to the maximum possible extent. "We have been informed that a task force is being formed within

the National Park Service to study the proposal," NPCA wrote Director Walker. "We respectfully request that a representative of this organization be allowed to participate in this task force."

In regard to Glacier Bay Monument, it might be noted that the preservation has been thought of as fully worthy of national park designation by many conservationists, and by the Secretary of the Interior's Advisory Board on National Parks on several occasions in the past, if the question of existing mining rights there can be resolved in favor of the monument.

UNEP and LOS meetings On July 10 a number of individuals active in the international environmental movement gathered at NPCA headquarters to review and discuss the participation of nongovernmental organizations in the recent meetings of the Seabeds Committee of the Law of the Sea Conference and the United Nations Environmental Program. In attendance were NPCA's President A. W. Smith, several members of his staff, and representatives of the Sierra Club, National Audubon Society, Nature Conservancy, National Wildlife Federation, Conservation Foundation, Save Our Seas, the Center for Law and Social Policy, Humane Society of the United States, Friends of the Earth, and the School of Advanced International Studies. Discussions concerning the Law of the Sea centered around plans and policy for the Seabeds Committee plenary sessions that recently took place in Geneva, Switzerland, and on the need to include world fisheries activities within the Law of the Sea Conference and regime that emerges.

The afternoon meeting was concerned with efforts to assess the results of the initial UNEP meeting held in June, also in Geneva. During this session the participants attempted to evaluate the best ways in which nongovernmental organizations could have a positive influence over the development of a sound international environmental program. Informal working meetings of this kind will be held periodically as the need arises, with the next one tentatively set for late summer after the Seabeds Committee completes its plenary sessions.

During July President Smith attended the Seabeds Committee session in Geneva as a member of the Secretary of State's Advisory Committee on the Law of the Sea and advisor to the U.S. delegation.

Hunting on refuges NPCA has written F. V. Schmidt, Deputy Director of the Bureau of Sport Fisheries and Wildlife, commending his statements in a memorandum to the Assistant Secretary for Fish and Wildlife and Parks relating to sport hunting in the national wildlife refuges. The memorandum was written in response to criticisms in the press and in legal actions concerning various aspects of hunting programs on wildlife refuges, in particular bow and arrow hunting, and would appear to indicate a considerable shift in Bureau policy.

In the memorandum Mr. Schmidt called for a "cleanup" of the refuge hunting program with the goal of making the hunts of better quality for the hunter and "cleaner" for the hunted. To initiate this he suggested that all available data be scrutinized to determine among other things the efficacy of various weapons, crippling losses for each

type of weapon, and the effectiveness of various hunting programs as methods of biological control. Also under consideration are qualifying tests for hunters and the weapons they use. Mr. Schmidt also said that he wants to "zero in on weaponry." In the case of bow and arrow hunting this might mean requiring a minimum strength bow and adequately sharp broadheads.

Combat range canceled A proposal by the U.S. Navy for establishing an air combat maneuvering range that would have adversely affected wildlife habitat in the Swanquarter and Lake Mattamuskeet wildlife refuges in North Carolina recently has been scuttled by public protest. Both refuges are vital to migratory waterfowl; at Mattamuskeet, the conflict between supersonic aircraft and waterfowl would have been especially critical, since it is there that a large portion of the North Carolina flock of Canada geese spends the winter. Additionally, the proposed range would have extended over a portion of Mattamuskeet's important fringe farmlands, used by the geese as feeding grounds in late winter and for bird-banding activities.

Protests by NPCA, the Interior Department's Fish and Wildlife Service, and residents of Hyde County, North Carolina, moved the Federal Aviation Agency first to formulate precautionary measures in behalf of the waterfowl and then, more recently, to wholly cancel the project. NPCA has written the FAA commending the agency on its action in the public interest.

Seabed minerals NPCA's deep interest in matters affecting the quality and integrity of the marine environment is based both on specific and on general considerations. Obviously, the degradation of ocean water quality stemming from the mining of deep seabed minerals without carefully devised regulations would have an immediate bearing on the integrity of the numerous national park and national wildlife refuge systems units on our shores; and then, in a more general sense, on all marine and coastal ecosystems.

The Association has testified on invitation on a potential Deep Seabed Hard Minerals Resources Act (S 1134), on which the Senate Interior and Insular Affairs Committee's Subcommittee on Minerals, Materials, and Fuels took public testimony in July; it expressed the view that the bill was not adequate to the need; that it would not effectively control mining of surface and subsurface minerals of the deep seabed beyond national juris-

isdiction in a way that would promote their conservation and orderly development pending adoption of an international regime for the purpose. "It appears to us a thinly veiled . . . attempt by the mining interests to seize the opportunity presented by good faith efforts to negotiate a rational solution to very difficult problems and fill the partial vacuum which presently exists with a self-serving solution . . .," said NPCA.

In view of the current meetings of preparatory committees for the Law of the Sea conference, the bill also may be premature in broader environmental context, NPCA pointed out. The committees contemplate establishment of a comprehensive regime for oceanic environmental protection, including deep seabed mining. "The efforts of the United States delegation to the Law of the Sea Conference to join in an attempt to develop a rational regime by multilateral agreement have been endorsed by Congress [in resolutions] which recognize the great importance of successfully concluding the Conference on the Law of the Sea," it was noted. "Our review of the provisions of S 1134 suggests that its passage would severely prejudice and complicate multilateral efforts to develop a rational regime and would be contrary to our national interest, quite apart from our interest in environmental quality."

Deepwater oil ports In the May issue we summarized the position taken by NPCA and a number of other national environmental organizations on the prospective construction of deepwater ports for reception of foreign oil in supertankers and its transshipment to the mainland. That position was expressed, on invitation, to the Senate's Committee on Commerce, which was considering a measure providing the National Oceanic and Atmospheric Administration with authority to certify various offshore structures, including ports for supertankers.

The same organizations recently have restated their general position before the House's Merchant Marine and Fisheries Committee on invitation, but with stronger emphasis on the need for promotion of energy conservation and the costs and benefits of alternative energy strategies. The groups have also made the additional point that supertanker shipment of oil, although perhaps permitting greater industry profits, would not necessarily mean lower gasoline prices for consumers. As in the first instance, the views of the groups were presented by

Attorney Eldon V. C. Greenberg of the Center for Law and Social Policy. NPCA again expresses its appreciation to Attorney Greenberg, who has agreed to represent the Association in this matter on a pro bono publico basis.

It may be noted that the Administration already has proposed legislation for regulation of deepwater port construction and operation; the Department of the Interior has released an environmental impact statement on the subject, and NPCA will be reviewing and commenting on the statement.

. . . and oil tanker design An issue closely related to the potential of deepwater oil ports for polluting our coastal waters is that of the Coast Guard's proposed oil tanker construction standards. The standards, on which NPCA and a number of other environmental organizations commented favorably earlier in the year, as reported in the June Magazine, would require incorporation on oil-carrying vessels operating in navigable waters of the U.S. of segregated ballast and double-bottom design features that would go far toward eliminating oil pollution from both normal tanker procedures and from accidents. The proposed standards also have been supported by a number of states, local governments, and planning boards and commissions.

During July Attorney Greenberg made a similar presentation to the House's Subcommittee on Coast Guard and Navigation on behalf of the same organizations. The Coast Guard has indicated an intention to defer rule-making pending outcome of a proposed October international Convention for Prevention of Pollution from Ships; but the organizations told the subcommittee that in their opinion the U.S. should commit itself to unilateral action in the matter to put other nations on notice as to the strength of its commitment, and be a leader in strong standards by example. But, the groups said, regardless of the outcome of the conference "we believe the U.S. must take such action as is necessary to protect its own waters and coastlines. There is clearly a risk that any international agreement worked out in October will be a compromise and may not be stringent enough to meet the United States own environmental goals."

Water projects brochure We would like to remind members that "Disasters in Water Development," a brochure canvassing thirteen "of the most economically wasteful and environmentally destructive projects of the Corps of Engineers, the Bureau of Reclamation,

and the Tennessee Valley Authority," is still available at no charge on a single-copy basis. From time to time we have printed excerpts from the publication, and understand that one of the problems connected with its compilation was to determine which, out of many, projects qualified as the "most economically wasteful and destructive," there being so many candidates for that description currently.

OCAW strike A large percentage of the pollutants that contaminate U.S. air and waters emanates from industrial sources, although it is not recognized that the quality of our environment usually is at its worst inside the factory where the pollutants are concentrated.

One of the most hazardous of workplace environments is the oil refinery. There workers may come into contact with some 1,600 chemicals, the long-term effects of most of which are unknown.

For four months recently about 5,000 members of the Oil, Chemical, and Atomic Workers (OCAW) were on strike against nine Shell Oil Company plants for environmental health and safety reasons. NPCA is one of eleven environmental organizations that signed a statement of support for OCAW during the first weeks of the strike.

OCAW said it was striking because Shell refused to insert a health and safety clause in a new two-year contract. Shell was contending that it alone bears the responsibility for worker health and safety. More than fifteen oil companies already have accepted OCAW's health and safety clause.

To strengthen its efforts the union called for a nationwide consumer boycott of Shell products. By supporting the OCAW strike against Shell, NPCA and other environmental organizations have said that the workplace environment must receive the attention of all concerned with environmental quality.

The strike recently has been settled by a compromise contract. The health and safety clause of the new contract is not as strong as that in contracts signed with oil companies prior to the strike. It does, however, recognize the importance of maintaining environmental quality within the workplace.

Perhaps the greatest gain has been increased understanding and cooperation between labor and environmental groups. Good relations among these groups are essential in the fight to preserve the overall quality of the human environment.

news notes

Tracks of the past From a point very close to the common boundaries of Vermont, New Hampshire, and Massachusetts in the Connecticut River Valley of central New England, there runs a colorful red sandstone, inter-sandwiched with dark basaltic rock, all the way to southern Virginia in a narrow and disconnected fashion. These rocks are the relics of earthbuilding and volcanic activity that took place during the closing millenia of a remote geologic period—the Triassic—in a long basin that was rapidly filling with sediment: mud, fine sand, coarse sand, and small gravel. Across the mudflats and sands of the basin strode dinosaurs of various species and other great reptiles; and small creatures whose nature can only be surmised for the most part.

The Triassic was the beginning of the end for the "terrible lizards" and some of their equally fearsome companions, but before they left the earth some—a relatively minute handful, it must have been—had left their tracks and trails in the muds and sands of the basin to be preserved for two hundred million years. A hundred and fifty years ago geologists and paleontologists would have said that they were awaiting the arrival of man the curious.

Whether or no, man did arrive, and the tracks in the Triassic red sandstone of the East were discovered fairly early in the Connecticut River Basin, and some controversial conclusions drawn; but a locality that was discovered only in 1968 as a result of quarrying operations at Clifton, New Jersey, recently has been added to the National Registry of Natural Landmarks, which is administered by the National Park Service as a very fine cooperative venture with public and private landowners that hold outstanding natural history sites and conduct them in a manner that serves the public interest.

This particular locality covers sixteen acres, and is known as the Riker Hill Fossil Site. It will be donated to an Essex County park, just adjacent, by its owner, the Walter Kidde Company. According to the Park Service, more than a thousand Late Triassic animal tracks and insect trails have been recorded here to date; most of the footprints were left by several species of dinosaurs, a crocodile-like reptile, and some other creatures unidentified. "The variety of species represented at Riker Hill appears to be greater than at Dinosaur Trackway, a registered natural landmark in Connecticut," says

the Park Service. "It is one of the two largest known fossil sites along the northeastern coast."

Members might be further interested to know that the site first was proposed for landmark status by three teenagers from Livingston, New Jersey—Paul Olsen, Anthony Lessa, and Bruce Lordi. Olsen's interest in the site, the Service adds, led him to pursue professional training at Yale, where he currently is majoring in paleontology.

Land and Water Fund Secretary of the Interior Rogers C. B. Morton has announced the approval of three Land and Water Conservation Fund grants.

A grant of \$1,925,000 has been awarded the state of Tennessee to assist in acquiring 750 undeveloped acres for the Radnor Lake Natural Area located ten miles from the center of Nashville. The federal grant will be matched by state and private funds. The acquisition, which includes a 70-acre lake, will serve some 500,000 residents of Nashville and surrounding areas.

A grant of \$510,000 to the state of
(continued on page 31)



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FERN CANYON: BENCHMARK FOR THE FUTURE

IN THE UNITED STATES TODAY there are many hundreds of closely protected reserves, widely scattered in terrain ranging from desert to swampland, that attest to the growing American interest in the protection of type localities for research, study, or simply for the sake of their plants, animals, or geologic stories. This burgeoning system of natural areas lying beyond the boundaries of the national park system is owned and operated by various governmental and private organizations—notably colleges and universities—and by some individual Americans.

At the federal level the U.S. Forest Service was early interesting itself in the concept of the natural area—the research natural area, in Service terminology—as long ago as the early 1930s with establishment of the Harvey Monroe Hall tract in the High Sierra of California. (“The Harvey Monroe Hall Research Natural Area,” NPCM, July 1972.) To this first natural area the Service since has added more than a hundred other units to create a still-growing system whose purpose was clearly described by a former Chief of the Forest Service in 1971. Writing in the magazine *AMERICAN FORESTS*, Dr. Edward P. Cliff said:

“Because of their representative or unusual nature, such areas are of great value to ecologists, silviculturists, agronomists, and other biologists who study plant succession and other range and forest life processes. Typical or

Surrounded by a dense stand of chaparral Browns Park, in the U.S. Forest Service’s new Fern Canyon Research Natural Area, supports a scattering stand of ponderosa pine. The “park” actually marks the depression, long since filled with soil by the leveling processes of nature, that occurred at the upper edge of an ancient landslide. The course of the slide was toward the viewer in this photograph taken by H. C. Storey of the Forest Service.



unusual plants or animals, geologic or soil formations, aquatic features or processes are all bases for RNA status. By studying these conditions in natural, undisturbed areas, scientists have benchmarks or baselines against which to compare disturbed or managed areas. . . . An additional benefit from Research Natural Areas is that they provide a gene pool—a reservoir of genetic diversity—that is of increasing importance to plant and animal geneticists studying fundamental and applied problems of inheritance and variation.”

One of the Forest Service’s recently established RNAs is Fern Canyon, a 1,370-acre tract in the Angeles National Forest of southern California. Boundaries of the new unit encompass an entire watershed that has a vertical range of 2,600 to 5,500 feet. Slopes of the natural area are covered with

vegetation and trees typical of the San Gabriel Mountains; but there is a rather extreme vegetational contrast between north- and south-facing slopes (as the photograph well shows). The dry, hot soil of south-facing exposures supports a typical regional chaparral growth; but cooler, moister soils opposite are clothed with another suite of plants, including in places the rare bigcone Douglas fir.

The bigcone Douglas fir is not an endangered species, and under Forest Service management probably always will exist in the region. It is classed as rare simply because it never has been “common,” being restricted in range only to congenial locations in the ranges that curve in a rough arc around Los Angeles. Nearly all habitat of the tree lies on Forest Service lands in the Angeles, Los Padres, San Bernardino, and Cleveland national forests that patch this mountain arc.

An interesting geological feature of the unit is a 115-acre grassy meadow, with extremely deep soil, known as Browns Flat. The Flat, lying at about 4,300 feet, actually is the now-filled depression that was left at the upper margin of a large ancient landslide. Today it supports a small natural stand of ponderosa pine in an open, charming setting.

The Fern Canyon NRA is of particular value for scientific research, for records on climate, geology, hydrology, and vegetation there date back some forty years. Thus the area possesses documented guides to its past as well as information on the present. Little wonder that this closely protected preserve currently is attracting Forest Service scientists, researchers, and students from California colleges and universities, and people from the state’s Division of Forestry, all of whom will one day check their present findings against the natural changes inevitably brought by the future.

Below, a contrast in vegetation at Fern Canyon RNA. The south-facing slope at right supports a growth of chaparral plants that can stand high heat and low soil moisture. The north-facing slope in the foreground at left, with cooler soil and more moisture, has among other plants a stand of bigcone Douglas fir, a species of tree classed as rare because of its limited range in the mountains to the north, east, and south of Los Angeles. Photograph is by E. L. Hamilton of the U.S. Forest Service.



(continued from page 29)
California for acquisition of 115 acres at the Point Pinole Regional Shoreline Park has also been approved. Point Pinole, just north of Richmond, California, is an important wildlife habitat for two endangered species—the California clapper rail, and the saltmarsh or red-bellied harvest mouse.

Another grant of \$199,975 has been approved for a "reclamation-for-recreation" project to convert a 51-acre gravel pit in Bernalillo County, New Mexico, into a regional park to serve metropolitan Albuquerque's 500,000 residents. Bernalillo County will contribute an equal amount of funds to acquire, reclaim, and develop the land. The area will provide opportunities for off-road vehicle use that is expected to minimize the use of off-road vehicles in existing public parks, school yards, and residential neighborhoods.

Everglades book The National Park Service has published a new 106-page handbook entitled "Everglades Wildlife." The book is based on a text and concept by Jean Craighead George, prize-winning writer on nature subjects. The book discusses the park's plant communities and the ecological roles of the mammals, birds, amphibians, fishes, crustaceans, and insects found in our only mainland subtropical national park. More than eighty color drawings by Betty Fraser depict the ecology and origin of the Everglades. Six color maps, a glossary, bibliography, and checklists of mammals, birds, reptiles, trees, and rare and endangered animal species also are included. The book is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, for \$1.50. An Everglades color poster by Betty Fraser also is available for 50¢.

Backcountry permit plan National Park Service Director Ronald Walker has announced that the free permit system to protect fragile national park backcountry, initiated in three parks last year, has been extended to a number of other major parks across the nation for 1973. The program will provide that hikers and campers must obtain free permits to use specified trails in remote backcountry areas. Permits

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will be issued on a first-come, first-served basis, and will be issued only to the number of people that trails and campsites can accommodate without environmental damage. The program does not affect normal visitor use of developed park areas or campsites reached by automobile.

Areas that will have trail and campsite use limits in effect in 1973 are Big Bend, Guadalupe Mountains, Carlsbad Caverns, Grand Canyon, Mount Rainier, North Cascades, Yellowstone, Grand Teton, Glacier, Rocky Mountain, Yosemite, Kings Canyon, Lassen Volcanic, Great Smoky Mountains, Shenandoah, and Isle Royale national parks, and Navajo National Monument. Backcountry users should write to the superintendent of the park where they wish to hike for details on the program in that park.

USFS reorganization NPCA has been notified that the U.S. Forest Service is suspending its plans to readjust its regional boundaries. The highly controversial proposal called for the phasing out of Forest Service regional offices in Missoula, Montana; Albuquerque, New Mexico; and Ogden, Utah. Forest Experiment Stations in Ogden and Asheville, North Carolina, also would have been abolished. Secretary of Agriculture Earl Butz claimed that the internal reorganization would have made the present Forest Service regional structure conform to the standard administrative boundaries adhered to by the Bureau of the Census.

NPCA and other conservation groups were quick to point out, however, that an administrative structure based on natural forest systems was more relevant to Forest Service operations than one based on population distribution. Many felt, for example, that it made little sense to place the administration of national forests of New Mexico's semidesert range with the southern pine forests and Florida's subtropical forests under a single regional office in Atlanta, Georgia.

The jobs of more than 1,000 Service personnel would have been affected by the aborted reorganization plan. This leaves an important question unanswered. The federal budget for the fiscal year beginning July 1, 1973 calls for a reduction of 1,590 full-time positions in the Forest Service. Where and how will those personnel reductions now be made?

NPCA field trips When participants in a recent NPCA East African field trip were asked what was the high

point of the tour, they answered promptly, "the Ngorongoro Crater." Others who think of joining one of these trips may welcome a brief preview of this incomparable ecological setting, legacy of the largest extinct volcano in the world.

The crater, in northern Tanzania, apparently was formed when the volcano collapsed inward as molten lava subsided within the cone. Its flattish floor, ten to twelve miles across and more than a hundred square miles in area, lies 2,000 feet below the rim. Within the steep, unbroken walls are many swamps and waterholes and a forest-fringed lake, which sustain the grassy plain the year around. Hence abundant wildlife is to be found in the crater at all seasons, wet or dry. Masai nomads also roam there with their cattle, coexisting peacefully with the wild animals.

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reader comment

The desert tortoise In an article published in the June 1973 issue entitled "The Desert Tortoise," by R. Bruce Bury and Ronald W. Marlow, the following conditions were described: "On only two miles of dirt road north of California City in the Mojave Desert we found eight adult tortoises that had been shot."

Our city has approximately 2,500 persons residing within its boundaries. There are 182 square miles of incorporated area that is policed by the city's police department.

I'm sure you agree that such unnecessary willful destruction of animals is not in anyone's best interests. We would appreciate any notification of the unlawful killing of the desert tortoises or for that matter the wholesale slaughter of any animals, rather than learning of it months later in any publication.

George E. Howes, Chief of Police
California City, California

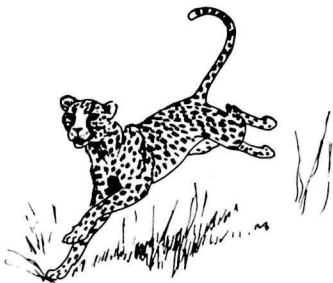
Vandalism at Arches Carved out of red Entrada sandstone in a remote corner of Arches National Park in eastern Utah is one of the most beautiful and incredible wonders of nature—Delicate Arch. Fully 65 feet high and 40 feet wide, it is in places less than 10 feet thick. Standing relatively alone, it looks as if it could have been fashioned only by a skilled human artist; yet it is entirely natural.

Late afternoon is the best time to visit and photograph the arch. My children—Tim, 10, and Melissa, 5—and I chose a June 1973 afternoon when the sky was clear, the visibility unlimited, and the La Sal Mountains to the southeast were still possessed of much of their winter snow. We drove a mile and a half off the pavement on a dusty but

easily passable road, then parked the car and continued on foot. We crossed the Salt River on a picturesque swinging footbridge, then climbed 500 feet in a mile and a half on a trail paved much of the way. By setting a slow, easy pace we were under the arch in less than an hour. Even Melissa was fresh and eager as we sat down under the arch; Tim called the paved part of the trail the "Delicate Arch Freeway." The arch over our heads and the steep dropoffs on both sides gave us an eerie feeling. By standing under the arch and looking straight up, one really has a feeling of being suspended in space. But the floor of the arch is broad, and in reality there is no danger for anyone. Only with great regret could we leave the arch and walk back down the trail. But no subsequent visitor could tell we had ever been there.

Not all visitors have been as kind to Delicate Arch. I was there once before, in 1965, and saw a very few names written on the soft sandstone at the base of the arch. Nearby was a wooden sign: "If you must write your name, write here; it may cost you less." Eight years later dozens of names and recent dates were scrawled all over the arch. The metal supports of the sign were still evident, but the sign itself had

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been stolen. It ought to be replaced. Soft sandstone is, of course, a name-writer's haven; but the extent of the vandalism reveals neglect of responsibility on the part of the National Park Service. The day after my visit to the arch I drove to Moab to the Service headquarters to file a written complaint of the vandalism. The day was Saturday, and Superintendent Robert Kerr was unavailable. We talked instead with Assistant Chief of Interpretation and Resource Management David May. He received us with courtesy, and we conversed openly about vandalism and other problems before I wrote out my complaint. Shortly after I returned home I received a reply from Superintendent Kerr. He thanked me for interrupting my vacation to discuss the problem with his staff.

The Park Service certainly is aware of the problem of vandalism. But with dozens, perhaps hundreds, of archeological and natural sites susceptible, actively guarding them all is not feasible. Nevertheless, there is much that can and should be done, which would greatly reduce excesses of vandalism presently occurring. One big problem is peculiar to Utah. A 1970 statute provides for federal magistrates in each state to prosecute "minor" offenses on federal lands. But Salt Lake City Federal Judge Willis Ritter has refused to appoint any magistrates for Utah; so federal prosecution of offenders becomes very difficult. This refusal is technically legal; the doctrine of separation of powers gives great independence to the bench. Judge Ritter's inaction will be recognized as a serious breach of duty by many thoughtful readers.

Most modern vandals, unlike those of the late 1800s, are shallow, weak-willed people, often grownups who still behave like children. Increased emphasis in organized interpretive activity on "antivandalism" messages is being encouraged by Superintendent Kerr, and trail patrols of some of the more heavily vandalized regions may be possible if sufficient personnel become available.

Certainly the National Park Service has a responsibility to protect the parks from callous acts of careless people, a responsibility not sufficiently implemented in recent years. But prevention of name-writing goes beyond the Service and becomes the responsibility of every citizen. An interesting opportunity for such service is the Volunteers in Parks (VIP) program. Through this program citizens without any spe-

cial training can become summer park rangers without pay. They must assume their own expenses, but all have the privileges and responsibilities of national park rangers. Readers who have summer vacations are encouraged to apply for positions in the VIP program. Spending a summer as a park ranger, at Arches or elsewhere, will be one of the most stimulating and memorable experiences of one's life. These volunteers help alleviate the manpower shortage that prevents the Park Service from adequately protecting the parks from vandalism.

Citizens who cannot take special summer positions can and should take their part in stopping the writing of names on rocks or walls. This responsibility rests on everyone. Children and immature adults write their names because they think they see some glory in it, especially among their peers. If responsible Americans, especially responsible young Americans, can disgrace rather than glorify their own friends who write their names on walls in their home towns, then name-writing will largely end. The permissiveness of present attitudes is reproachable. It should be brought to a speedy end, replaced by an attitude among all to use responsibility without abusing. Concerned citizens everywhere should act vigorously, not just complain, to disgrace the callous and the careless.

Frederick Pilcher
Jacksonville, Illinois

conservation docket

PUBLIC HEARING NOTICE

The Subcommittee on Fisheries and Wildlife Conservation and the Environment of the House Merchant Marine and Fisheries Committee has scheduled public hearings on a group of proposals to establish the Tule Elk National Wildlife Refuge in California. Time and place: September 24 and 25 at 10:00 a.m., Room 1324, Longworth House Office Building in Washington.

Various measures of interest to environmentalists, recently acted on by House or Senate, have included:

Bicentennial: HR 7446, to establish the American Revolution Bicentennial Administration. Passed House June 7.

Safe Water: S 433, to assure that the public is supplied with an adequate supply of safe drinking water. Passed Senate June 22.

IMPORTANT NPCA PUBLICATIONS

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OMB Director: S 37, requiring Senate confirmation of the Office of Management and Budget Director and Deputy Director. Passed Senate June 25.

Interior Appropriations: HR 8917, providing continuing appropriations for the Interior Department. Passed House June 27.

Water Pollution: S 1776, to amend the Federal Water Pollution Control Act. Passed Senate June 28.

Oceans Policy: Senate Resolution 82, endorsing the objectives of the President's ocean policy and supporting the U.S. delegation to the Law of the Sea Conference.

Measures recently introduced into the Congress on various facets of the environment have been:

National Park System

Cascade Head: S 1943 and HR 8352, to establish the Cascade Head Scenic-Research Area in Oregon. To Interior and Insular Affairs committees.

Zachary Taylor Site: HR 8536, to establish the Fort Zachary Taylor National Historic Site. To House Interior and Insular Affairs Committee.

Big Thicket: S 1981, HR 8655, HR 9051, to establish the Big Thicket National Biological Reserve in Texas. To respective Interior and Insular Affairs committees.

Sequoia Park: HR 8737 and HR 8783, to enlarge the Sequoia National Park in California. To House Interior and Insular Affairs Committee.

Erie Canal: HR 8775 and HR 8776, to authorize the establishment of the Ohio & Erie Canal National Historical Park in Ohio. To House Interior and Insular Affairs Committee.

Bills introduced into Congress are referred to standing committees of House or Senate, which may then refer them for initial consideration to appropriate subcommittees. Public hearings on bills may be called both by subcommittees or standing committees. NPCA members, as citizens, may write committee and subcommittee chairmen asking that they be placed on lists for notification in the event of hearings. Members may also submit statements for the hearing records if unable to appear in person. Copies of bills may be obtained from the House Documents Room, Washington, D.C. 20515, or the Senate Documents Room, Washington, D.C. 20510. In the Conservation Docket, HR indicates a House bill, S a Senate bill.

Grand Canyon Park: S 2017, to enlarge the Grand Canyon National Park. To Senate Interior and Insular Affairs Committee.

Fish and Wildlife

Tijuana Refuge: S 1964 and HR 9018, to establish the Tijuana National Wildlife Refuge in California. To Interior and Insular Affairs committees.

Ocean Claim: S 1988 and HR 9136, to extend on an interim basis the jurisdiction of the U.S. over certain ocean areas and fish in order to protect the domestic fishing industry. To Senate Commerce and House Merchant Marine and Fisheries committees.

In the National Forests

Free Timber: HR 8459, to amend the Act of June 4, 1897, to expand the Agriculture Secretary's authority for permitting the free use of timber and stone found on the national forests. To House Agriculture Committee.

Forest Products: HR 8509, to amend the Act of June 4, 1897, to increase the value limitations on the amount of forest products that the Agriculture Secretary may sell without advertisement. To House Agriculture Committee.

Forest Improvement: S 1996, to authorize programs to restore the quality and productivity of the nation's forest lands; to provide forestry incentives to encourage better forest resource management by nonfederal forest landowners; to expand and strengthen forest-related research, education, and technical assistance; to establish a special receipts account as the source of additional investment capital needed to improve forest resource management on federal lands; to establish an advisory board to provide advice and counsel on forestry; and to enhance the quality of environmental resources. To Senate Agriculture and Forestry Committee.

Various Other Measures

World Environment: Senate Joint Resolution 120, to designate June 5 of each year as World Environment Day. To Senate Judiciary Committee.

Santa Barbara Oil: S 1951, to terminate and to direct the Secretary of Interior to take action with respect to certain leases issued pursuant to the Outer Continental Shelf Lands Act in the Santa Barbara Channel offshore of the state of California. To Senate Interior and Insular Affairs Committee.

Energy Department: S 2135 and HR 9090, to promote more effective man-

agement of certain related functions of the executive branch by reorganizing and consolidating those functions in a new Department of Energy and Natural Resources, by reorganizing and consolidating others in a new Energy Research and Development Administration. To respective committees on Government Operations.

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survival value for man, except as part of the essential ecosystem of the planet, but do have an indispensable scientific and esthetic significance. The NPCA recommended such a program to the old Commission, and we urge that the new agency consider it sympathetically.

IN ENVIRONMENTAL and historic preservation, the old Commission, in one of its creative moments, approved the plan known as the Heritage Meeting House program. Under this plan each of the states would select a significant historic structure from the National Register of Historic Places for purposes of restoration and permanent utilization as a center for education and action in the preservation of the entire environment. The term derives from the community centers which were the setting of the early American participatory democracy. Youth groups, among others, would be encouraged to use the meeting houses for vigorous environmental and historical programs of their own. It is an imaginative proposal, turning around a concern for the complete life-environment, natural and cultural, around the ideas of continuity and permanence, not a flash-in-the-pan celebration, and it should be endorsed and pursued by the new Commission.

RETURNING TO THE PARKS, decisive action is needed to protect the Redwood National Park and adjacent Redwood Forest. The government of the United States has the statutory authority to take that action by acquiring interests in the surrounding forest land which would be adequate to require the management of the nearby commercial forest on an ecological basis. An Executive Order could bring about a profound transformation of this situation overnight; the effort would cost the government nothing because the value of the land would be improved. The survival of a vital part of the original outdoor heritage of the American people is at stake; the Bicentennial celebrations can be significant only if they embrace such opportunities and responsibilities.

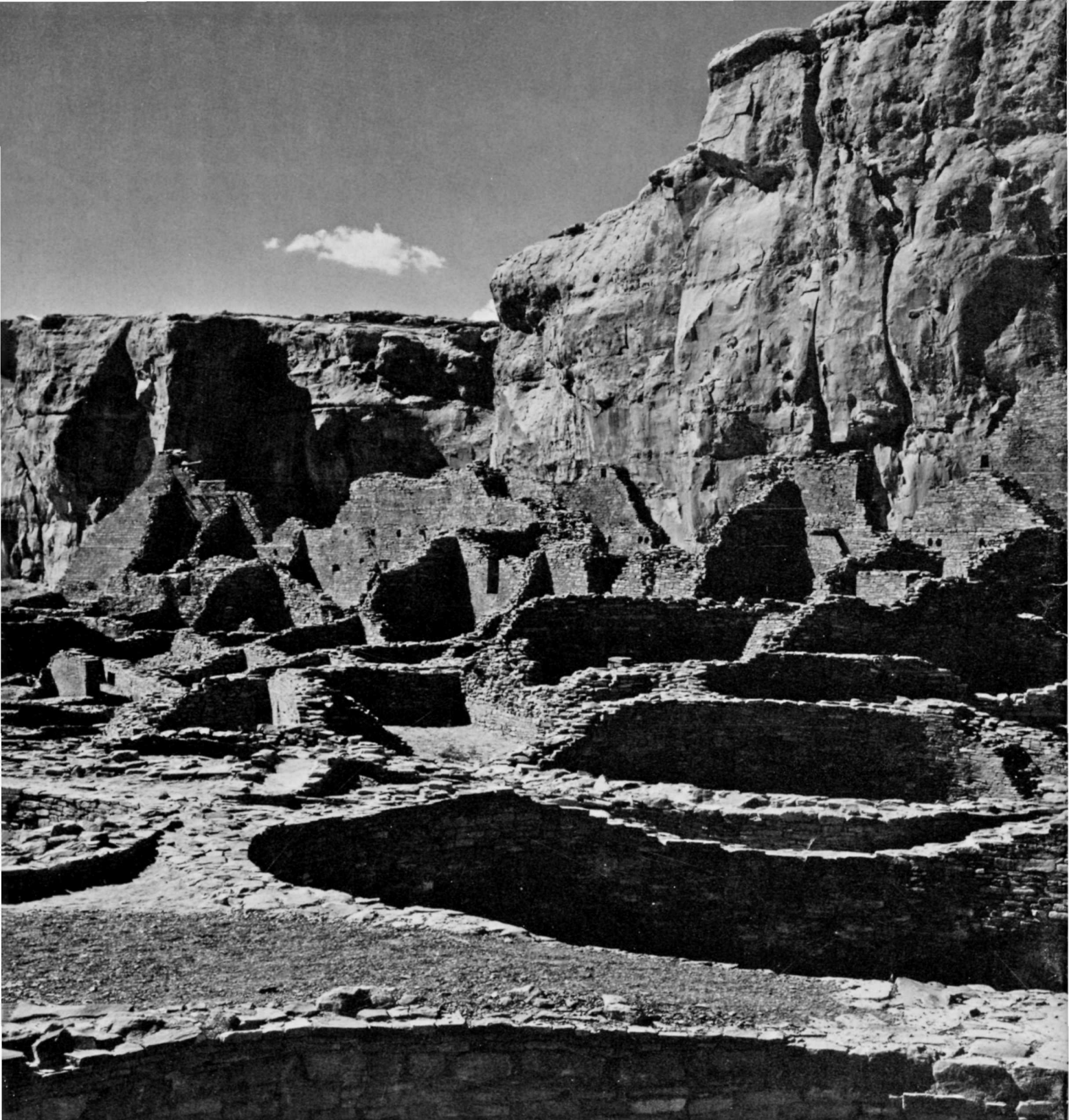
IT WOULD BE EASY to enumerate a host of similar possible projects, all directed toward the restoration and preservation of the great national heritage which ought to be symbolized by the Bicentennial celebrations. We would point to a wide range of problems with which the American

people are quite certainly deeply concerned at the moment: the breathless pollution of the air in our cities; the befouling of our lakes, rivers, and estuaries; the desecration of the countryside by predacious real estate development; the need for an immediate and vigorous development of mass transit systems in the cities; the desirability of the vigorous promotion of the use of existing techniques for capturing solar energy for residential and even industrial purposes; the need for a renewal of our soil conservation efforts and the development of a truly ecological agriculture; a concern with the great oceanic fisheries which impinge on our shores, which are gravely endangered, and on which a considerable part of the food supply of the world is already dependent; and not least the survival of our many endangered species of wildlife.

A concern with the minorities within our society should inform the work of the new Commission. Most of us are descended from people who fled the old countries as a result of religious or political oppression, or who were brought here as chattel slaves or indentured servants. The American Indian should be given a prominent place in the Bicentennial celebrations as the aboriginal American, and encouraged to develop his own forms of participation and spontaneous expressions of his plans and aspirations for the future. And surely the same is true of the other distinctive ethnic, national, and religious minorities, and the great emerging black minority with its surviving African traditions and its wealth of many centuries of changing experience in the Americas.

THIS IS NO TIME in American history for sentimentality and platitudes with which to wreath and encumber the Bicentennial idea. The third century of independence should be taken seriously; else our civilization will not outlast it. The grave purposes of the restoration and protection of the natural and social setting should guide the work of the new Commission. Awards—not trivial Oscars, but Pulitzer prizes, Nobel prizes—and in another vein Executive Orders and cogent recommendations for the establishment of effective public and private institutions should be the means of implementation. Such an approach could arouse the genuine interest and even the enthusiasm of the American people, which has been sadly lacking thus far in preparation of the Bicentennial celebrations.

—Anthony Wayne Smith



Among the missions of our national park system is the protection and interpretation of human prehistory in the American Southwest. No other national conservation group has remained so deeply involved in and so wholeheartedly committed to this purpose; and in the larger context to the protection and enlargement of the system.

Please help us to enlist new support for this and other vital environmental work. From among the people you know, will you enroll just one new member? Life membership is \$500 with no additional dues. Annual membership categories are: Sustaining, \$100; Supporting, \$50; Contributing, \$15; Associate, \$10; and Student, \$8.

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