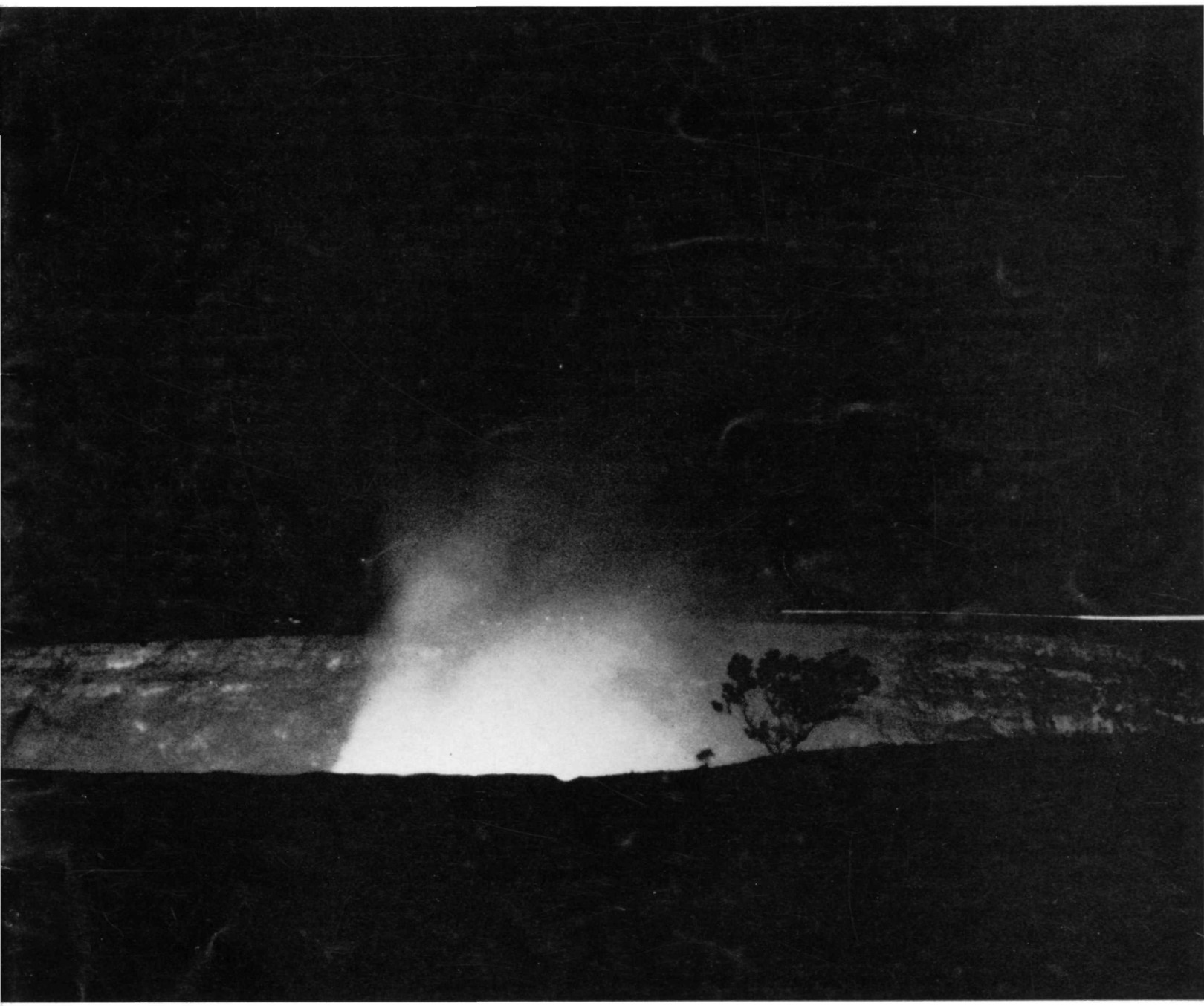
NATIONAL PARKS *Magazine*



Eruption in Halemaumau Crater,
Hawaii Volcanoes National Park: November, 1967

June 1968

The Master Key

AN EVENT OF GREAT SIGNIFICANCE to conservationists and humanitarians passed with relatively small notice last year.

The birth rate in the United States in 1967 dropped to its lowest in the entire history of the nation, 17.9 live births per 1000 population; in the depths of the depression it fell only to 18.4. A further decline in 1968 is anticipated.

The death rate in 1967 was 9.5 per 1000, the net rate of population increase (not counting net immigration) was .84% a year. The total population of the country was still increasing by a massive 2 million or so a year, but the rate of growth was beginning to level out.[1]

This downward trend reflects a resumption of tendencies before and during the Great Depression, temporarily interrupted for about a decade after World War II. Women born between 1906 and 1915 had an average of 2.3 children by the end of their reproductive years. An average of 2.2 children per woman, with present death rates, would stabilize our population.

During the postwar decade most people planned on families of 3 or 4 children; present intentions are thought to look toward 2 or 3 children; a norm of 3 will continue the general expansion and overcrowding; a norm of 2 would bring stabilization and a gradual reduction in population.

Conservationists, and persons concerned with the entire human environment, increasingly in jeopardy, have been battling one Goliath after another: air and water pollution, the abuse of herbicides and pesticides, the threatened extinction of many valuable plant and animal species, uncontrollable urban explosions, disastrous population implosions into slums and ghettos, big roads which destroy the countryside, and big dams which inundate priceless stream valleys, wildlife, farmland, forests, and invaluable recreational resources.

A general haste and commotion in our economic and social life, a feeling of transience and instability, pervades our civilization and gravely impairs the quality of life for everyone.

There are a number of deep causes for these difficulties, but central to all is the population explosion. The master key to the solution of multitudes of environmental problems would be the stabilization of population, perhaps even its reduction.

Having brought nature in its hostile aspects to a certain subserviency by technological advance, men have it within their power, now as never before, to abolish poverty, disease and ignorance and to enjoy lives of economic sufficiency, leisure, and cultural achievement. But the net rate of population increase constantly overtakes the indices of economic growth in the countries which are seeking to evolve from rural-handicraft to urban-industrial economies; even in the so-called advanced countries, crowding imposes heavy burdens which offset many of the gains from modernization.

Under these circumstances any tendency for birth rates to dip toward the greatly reduced modern death rate which prevails in more and more countries should be encouraged, in the hope that serious social and environmental problems may before too long begin to be manageable.

The reasons for the drop in the birth rate in the United States have been analyzed by the experts. Parents appear to be making deliberate decisions centering around the high cost of education and other disadvantages for large families. Moral considerations are involved, the responsibility for giving their children a fair start in life, too often difficult in large families.

There seems little reason to think that prevailing moral perspectives cannot be broadened to encompass a feeling for the entire community, for the nation. The step from a sense of responsibility towards one's own family to a feeling of obligation to society as a whole may not be too great. People may not wish to contribute consciously to the growing congestion and disorder they find around them.

The inculcation of such broad moral considerations is the responsibility of teachers, ministers, social workers, doctors and the entire opinion-forming leadership of society. Were this moral leadership to concentrate on explaining the need for a standard of no more than 2 or 3 children, the population problems of the nation might diminish very rapidly.

It will actually require a standard of 2, as contrasted with 3, to accomplish this purpose. The norm of the 2-child family allows leeway for a third child in case of a death or an unplanned birth, and also for a modest immigration. It is a teachable standard, readily comprehensible, involving no statistical fractions, and may well prove to be rather widely acceptable, considering presently emerging attitudes. If its vital significance to human welfare could be grasped by the opinion-makers and expounded with vision and vigor, enormous social pressures might be relieved in a very few years.

Consider, for example, a situation in which, instead of having to build 26 million[2] new homes in the next ten years to make up our housing deficit and provide for new families, we could content ourselves with catching up to present needs, renovating and maintaining existing housing, and conserving and enjoying the remaining open spaces.

Consider a situation in which the number of private automobiles in the land ceased to increase by millions every year, with consequent demand for more and vaster superhighways, and we could settle down to the development of well planned multi-person transportation systems and the use and enjoyment of the existing road network.

Such perspectives are alien to our deep-seated faith in the merits of an expanding economy. But the ideal of the expanding economy has its main relevance during the process of industrialization and primary technological advance, when it reflects emergence from absolute want. A moderate further per capita economic growth thereafter, in the right sectors, even in the United States, may well be desirable, but perpetual, unlimited, and indiscriminate overall economic growth is not a prerequisite of economic stability, nor of human well-being.

Rather, there is a need for a differentially expanding and contracting economy; one in which education, for example, is expanded, and the production of superfluous gadgets and harmful products is reduced. —*A.W.S.*

[1] Statistics from Population Reference Bureau. Examined in terms of the so-called fertility rate instead of the net rate of population increase, and considering certain other complicating factors, the decline is less marked, but the trend is there.

[2] President's Message on Houses and Cities, February 26, 1968.

NATIONAL PARKS *Magazine*

OFFICIAL PUBLICATION OF THE NATIONAL PARKS ASSOCIATION

VOLUME 42 JUNE 1968 NUMBER 249

Front cover photograph courtesy U. S. Geological Survey

Throughout 1967 scientists of the U. S. Geological Survey and personnel of the National Park Service kept a close watch on Kilauea Volcano, a few miles east of its huge companion, Mauna Loa, in Hawaii Volcanoes National Park on the State of Hawaii's Big Island, Hawaii. As measured by sensitive instruments Kilauea was undergoing yet another period of restlessness—growing pains in the form of an almost imperceptible swelling of the mountain mass which has proved a certain indicator of an eruption to come. In early November, 1967, the main vent of Kilauea, Halemaumau, commenced to fountain molten rock. With quiet periods during which part of the lava drains back into the volcano's interior, the activity has continued up to the time of this writing. In this issue one of our authors takes her readers through some of the history of Kilauea Volcano and along the trail that leads to its great caldera and the crater of Halemaumau.

The Association and the Magazine

The National Parks Association is a completely independent, private, non-profit, public-service organization, educational and scientific in character, with over 37,000 members throughout the United States and abroad. It was established in 1919 by Stephen T. Mather, the first Director of the National Park Service. It publishes the monthly *National Parks Magazine*, received by all members.

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

Dues are $6.50 annual, $10.50 supporting, $20 sustaining, $35 contributing, $200 life with no further dues, and $1000 patron with no further dues. Contributions and bequests are also needed. Dues in excess of $6.50 and contributions are deductible for Federal taxable income, and gifts and bequests are deductible for Federal gift and estate tax purposes. As an organization receiving such gifts, the Association is precluded by law and regulations from advocating or opposing legislation to any substantial extent; insofar as our authors may touch on legislation, they write as individuals.

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NATIONAL PARKS ASSOCIATION
1701 18th STREET, N.W. WASHINGTON, D.C. 20009

HALEMAUMAU TRAIL: STRANGEST

SCALDING WHITE BILLOWS OF STEAM rise from hidden crevices in the earth. The earth is damp and silent underfoot. Although the sun has been up for hours, its rays have only begun to penetrate the thick cover of vegetation overhead. The chill of night is still evident. Tiny red apapane birds dart in and out among the blossoming tops of the ohia trees, and their occasional calls are the only sound in the cool, dim silence of the fern forest. The path is narrow and steep.

Here, only steps away from the modern Volcano House in Hawaii Volcanoes National Park, begins the strangest walk in the world, a descent into the crater of a live volcano.

Now, to the left, there opens an enormous, gaping chasm, affording a frightening glimpse into the interior of the earth. Walking along such a trail in 1823, William Ellis, an early Hawaiian missionary, wrote in his journal, "The path was in many places dangerous, lying along narrow ridges, with fearful precipices on each side, or across deep chasms and hollows that required the utmost care to avoid falling into them, and where a fall would have been fatal, as several of the chasms seemed narrowest at the surface."

Along a trail very much like the one below a Hawaiian army of 80 men was destroyed in an eruption of Kilauea Volcano in 1790.

Photograph by the author

The trail continues downward among the groves of ohia trees. Here is an uluhe fern, one of the most primitive ferns to be found in Hawaii. The amaumau fern is one of the hardiest of its family. It can live upon deserts, bare rock cliffs, and even upon newly-cooled lava flows. The crater Halemaumau is named for this plant; Halemaumau means "House of Ferns." Pale yellow-green leaves of the precious sandalwood tree gleam in the fern forest, and one comes upon many hapuu, or tree ferns, which sometimes reach a height of forty feet!

The trail passes through a prehistoric valley of stone, and the first, panoramic vista of the Kilauea caldera appears. Dr. Henry M. Lyman, born in Hilo in 1835, describes one of his excursions to Kilauea thus: "A low cliff loomed up through the clouds on our right, the path crossed on a natural bridge over a tremendous chasm in the earth; the ground began to descend before us, and it suddenly disappeared in a gloomy abyss that was filled with whirling mist and all-pervading vapor; the guide stopped and silently pointed with his finger into this realm of chaos and old night. We had arrived at Kilauea." Even by day, 200 years later, Kilauea is much the same.

Genesis of the Caldera

The caldera (as the floor of the crater is called) was formed by flank eruptions of the volcano. These eruptions occurred when the still-molten lava beneath the surface of the hardened lava drained away and erupted from the side of the volcano. Each flank eruption left a portion of Kilauea's "top" unsupported. The unsupported sections caved in and the caldera was formed. At the farthest end of the caldera steam rises continually from the Halemaumau Crater.

The only sound is the moaning of the wind that sweeps like a gigantic, invisible broom across the uneven caldera floor. Looking down on this scene of power and desolation it is easy to understand why the ancient Hawaiians lived for so many years in constant fear of the whims of Pele, the goddess who was believed to live deep at the heart of Halemaumau's fire-pit. In 1839, Assistant Surgeon Rees of *H.M.S. Sparrowhawk* wrote of Pele: "The dreaded Vulcan of Hawaiian mythology has reigned time out of mind in Kilauea. By her were brought about all the calamities that befell the Sandwich Islander. When much offended she would shake the whole island with earthquake, or inundate entire districts with torrents of lava, on which the goddess herself would sometimes rush forth, riding on the wave of lava as the islanders on their surfboards. To propitiate the goddess, fat pigs, taro, bread-fruit and other acceptable

By Gail Tepperman Barclay

sacrifices, were thrown into the volcano. Pele also had her priests and annual celebrations."

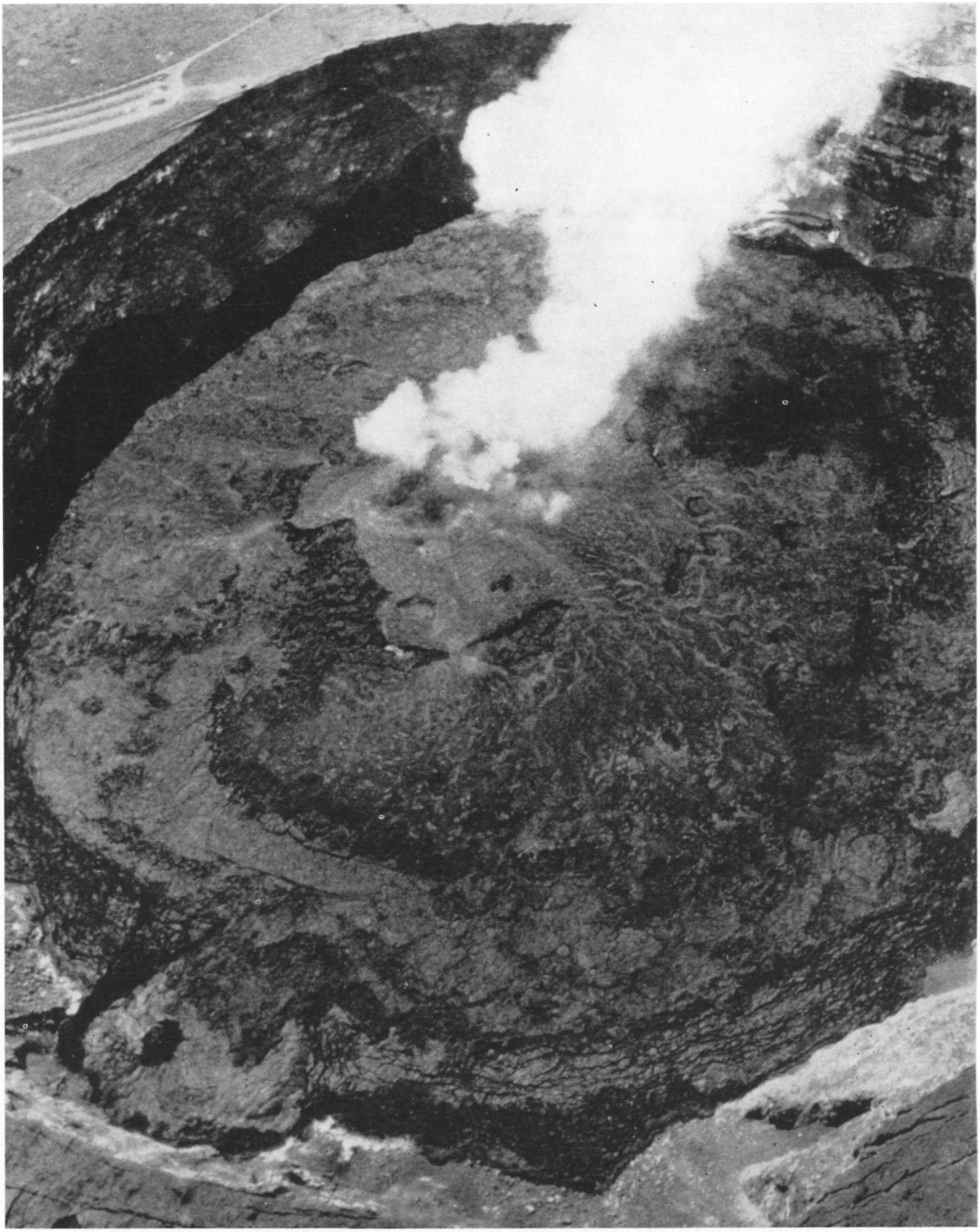
Belief in Pele's terrible powers continued among the Hawaiian people until 1824. In December of that year, High Chieftess Kapiolani and a small group of her followers completed a hundred-mile journey through desert and fern forest to the Kilauea Volcano's Halemaumau crater, "for the express purpose of overthrowing the superstitious faith in the power of the goddess Pele who was supposed to preside over the volcano of Kilauea and at will to cause earthquakes and to send forth eruptions." Daughter of a great king, Kapiolani had been educated by the missionaries, and she knew that if her people were ever to advance from their state of primitive life they must learn to overcome their superstitious fears.

Kapiolani's attendants constructed a grass shack for her on the isthmus between Kilauea and Kilauea Iki craters, on a ledge now known as Byron's Ledge. Here Kapiolani spent the night, gathering courage for her ordeal of the next day. On December 22nd, after breakfast and prayer, Kapiolani and her party descended into the crater. They sat down upon Black Ledge, a mere 500 feet above the bubbling lava lake of Halemaumau. Kapiolani stood before them. "Jehovah is my God," she said. "He kindled these fires. I fear not Pele."

To further emphasize her rejection of Pele's power, Kapiolani boldly ate a handful of ohelo berries. Considered sacred to Pele, these berries were taboo to all women. Historian Gunder Olson writes, "This unselfish and fearless act of exceptional fortitude accomplished much towards the

Halemaumau Trail winds across the uneven and crevass-ridden Kilauea caldera to the fire-pit of Halemaumau. In this part of Hawaii Volcanoes National Park the hiker leaves the trail only at the greatest risk.

Photograph by the author



Photograph courtesy U.S. Geological Survey

Halemaumau fire-pit from the air during the eruption of November, 1967. Walls of the pit are 300 feet high.

complete renouncement of idolatry by the natives."

The trail steepens, and the lush fern forest gives way to a more sparse type of vegetation. There are quantities of akia, a low and hardy shrub whose bright-red berries are said to be poisonous. The ancient Hawaiians used the tough bark of the akia for cord. Pounded until it became a pulpy mass of fiber, the roots and bark of the akia were also used by Hawaiian fishermen. They dropped the preparation into tidal pools, where its narcotic effect upon the fish stunned them into insensibility and enabled the fishermen to net them with dispatch.

Ash beds become more numerous as the trail nears the caldera floor. A greyish variety of lichen, called Hawaiian snow, grows upon some of these beds and looks indeed like snow. These lichens are pioneer plants, able to thrive under the harshest conditions. They are really two plants—a single fungus and a single algae, working in biological partnership to survive. The fungus gathers water and minerals, while the algae carries on the process of photosynthesis and converts these materials to food.

Now the trail reaches the floor of the caldera itself. The self-guiding booklet provided by the Hawaii Natural History Association and the National Park Service informs the hiker: "You are now nearly 500 feet down inside the most active volcano in the world." Gaping black fissures criss-cross the caldera. The lava crust is thin and brittle in places, making it extremely dangerous to venture even a few feet off the marked trail. Scraggly ohia trees struggle to get their roots down into the hardened lava. Walking upon the fragile caldera floor, even the bravest cannot help but wonder, Could it erupt *now*? Hot, white steam rises continually from the gaping Halemaumau crater. Could it erupt *now*?

Indeed it could! The guide pamphlet says: "Eruptions can come with very little warning. The 1954 outbreak began suddenly at 4:10 a.m. on May 31st, sending a fountain of melted rock roaring almost 600 feet above the floor of Halemaumau. About 20 minutes later, lava began pouring from a crack on the caldera floor a quarter of a mile long, rapidly becoming a wall of fire 100 feet high."

Another recent eruption of Kilauea took place on Christmas Eve of 1965. A description may be found in *Volcanoes of the National Parks in Hawaii:* ". . . for about six hours, lava fountains played along fissures extending about two miles eastward from Aloi Crater, and a cascade of lava poured down the crater wall onto the floor." Concludes the author, "Additional outbreaks appear likely in the near future."

Whatever this commentator may have meant by "the near future," the words were prophetic. For, early on the

U.S. Geological Survey photographer records a lava fountain in the molten lake of the Halemaumau fire-pit during a recent period of activity. Temperature of the incandescent lava is approximately 2000° Fahrenheit.

Photograph courtesy U.S. Geological Survey

morning of November 5, 1967, Halemaumau commenced an eruption which has lasted almost continuously from that time into the spring of 1968. Dr. Howard Powers, scientist in charge of the U.S. Geological Survey's Hawaiian Volcano Observatory, has recently described the renewed activity thus: "When it first began, the eruption alternated between days of eruptive activity, featuring lava fountains 50 to 200 feet high, and days of relative quiet, when part of the lava drained back into the subterranean lava chamber beneath the volcano. Since early January [of 1968], the activity has been almost continuous. This is the way Halemaumau acted for most of the hundred years prior to 1924, when an explosive eruption destroyed its continuously active lava lake."

"It is quite likely," said Dr. Powers, "that Halemaumau will continue to erupt in this fashion for quite a long time; probably for many months, perhaps several years."

Approaching the Halemaumau fire-pit, the hiker passes an old stone corral, now almost engulfed by successive flows of lava. In other days, visitors rode on horseback over much the same terrain followed by the Halemaumau Trail. Farther on the caldera floor appears to be littered with fragments of rock, deposited during the 1924 eruption. Quantities of ground-water seeped through to the hot lava in the throat of the volcano in that year, resulting in a tremendous blast of steam that ejected thousands of rocks into the air, largest of which weighed 14 tons. An eight-ton block was tossed almost a mile, and may still be seen outlined against the sky.

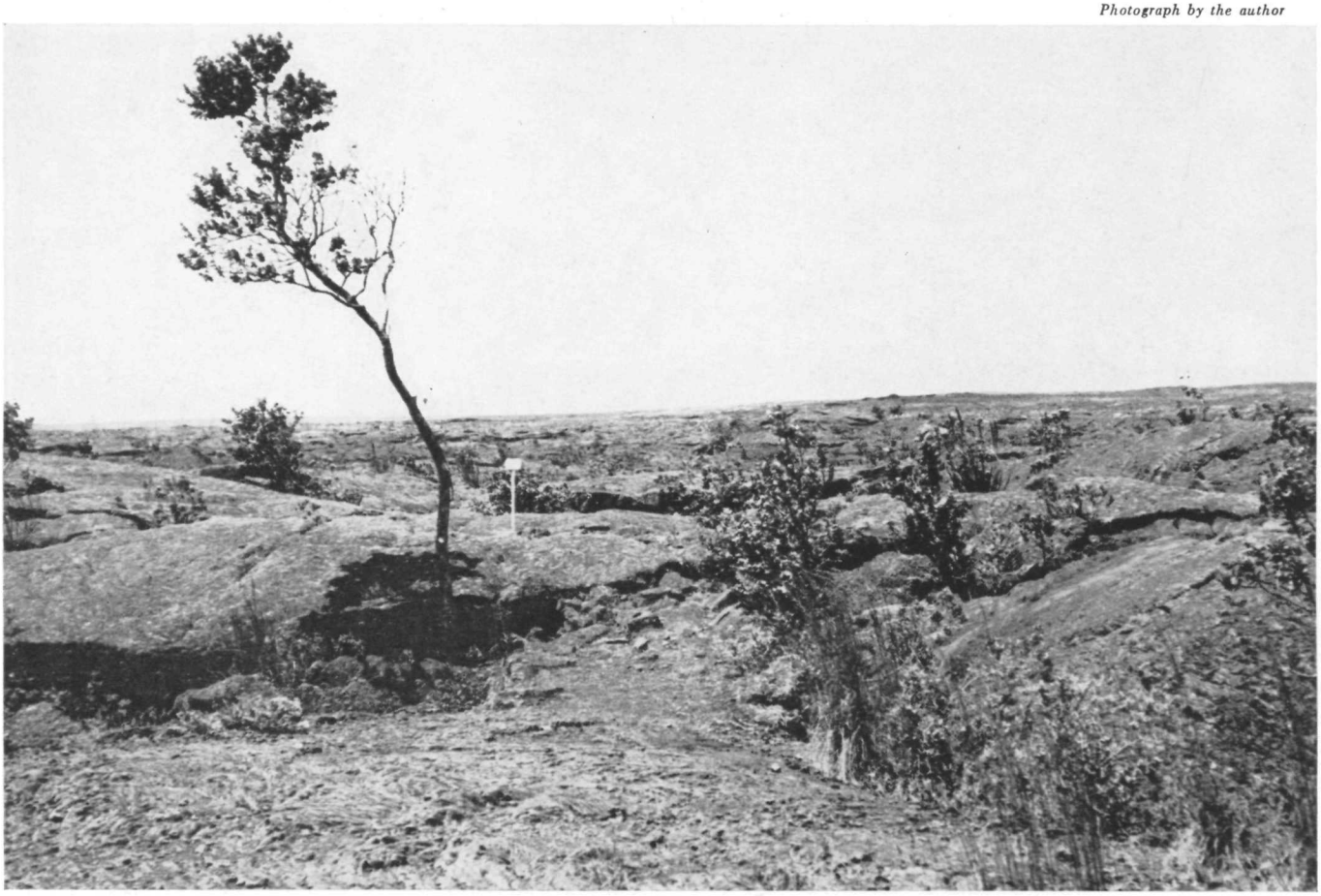
The two-hour walk is ended, and the adventurer stands before the live fire-pit. For a hundred years before the 1924 eruption, Halemaumau was a lava lake—a bubbling, seething mass of molten rock that sometimes overflowed the floor of the caldera. But, during the 1924 eruption, the lava lake flowed away. Steam blasts and flaming fountains continued for many days, and when at last the eruption had ceased the crater had been enlarged to more than three times its previous size.

Now over half a mile across and hundreds of feet deep, the Halemaumau fire-pit continues to change. Eruptions like that taking place now may raise its floor, and flank eruptions may cause the floor to collapse. The sides of the crater are continually crumbling and falling into the steaming fire-pit, and each time this happens the crater itself is enlarged.

The slow, steaming bubbles that form and break deep inside the Halemaumau fire-pit are the strange and frightening end to what is surely the strangest walk in the world.

Gnarled ohia trees, lichens and pioneer plants like the amaumau fern struggle to survive on the wind-swept expanse of hardened lava of which the floor of the Kilauea caldera is composed.

Photograph by the author



Bureau of Land Management photograph

A cattle-grazing allotment on the Lake Fork of the Gunnison River in Colorado. As a matter of general practice the Bureau of Land Management allots alpine regions to sheepmen, lower valleys fingering into the alpine ranges to cattlemen.

The New Land Office Business

By Dorothy M. Mason

THE LOUD HURRAHS that followed the passage of the Wilderness Act in 1964 largely overshadowed news of another important piece of legislation passed the same year—the Classification and Multiple Use Act. Yet the latter literally started a new land office business, involving 457 million acres of public lands in the United States; and because it is a land business of such a vast scale, every conservation-minded American should make it his business to know more about the public lands, their past history, and their prospective future.

The C&MU Act gave to the Bureau of Land Management in the Department of the Interior a directive to dispose of or retain for multiple-use management public land which the Federal Government had not been able to sell or give away during the past 150 years. The land came into the public domain as the country expanded westward, acquiring lands from France, Spain, Mexico, and Russia.

In the early 1800's these lands were put up for sale because the country needed money. The tracts, however, were large and the price of $2.00 an acre was high, for the times. But sales on the installment basis made business boom. The General Land Office handled sales and other disposals through its district land offices. People responded in droves to offers of land; thus the phrase, "a land office business." The Government later gave millions of acres of land away as bonuses to war veterans, as homesteads, as incentives to transcontinental railroads and land grant colleges. Also from these lands the Western national parks and forests were carved. Still there is land left over in the 11 Western States and the State of Alaska—a total of nearly 60 percent of all Federally owned land. Surveying a half-billion acres of land in five years to determine which should be kept and which should be disposed of is not easy, but BLM was 18 years old when the law was passed and ready to take on the man-sized job. It could draw on the experience of its forebears, the Grazing Service and the General Land Office, which dated back to 1934 and 1812 respectively.

Even before final passage of the Classification and Multiple Use Act, BLM was working out and testing proce-

dures to carry out the classification. Local officials and organizations made it clear they wanted to be "cut in" on decision-making. Therefore, when lands are about to be surveyed for disposal or retention, BLM officials discuss the law and the land involved with local and state advisory boards; local, county and state officials; representatives of industry, labor, social service clubs, and conservation organizations. Public meetings are then held in key communities for open discussion. The classification which evolves from public opinion is published in the *Federal Register* and in a local newspaper. Public hearings are then held. Actual classification is published, again in the *Federal Register* and a local paper.

The people have every opportunity to make their voices heard, and they have. The results have been amazing. In Montana, for instance, everyone was sure that individuals would favor disposal of certain isolated tracts of land. They found that the local people looked upon these lands as *their* picnic areas, *their* rockhounding heaven, *their* hunting grounds. They wanted *their* lands in public ownership.

In North Dakota, BLM had long considered what to do with tag-end lands along streams or other water. All kinds of suggestions were made, including a transfer of land to the State through special legislation. In the end all agreed that BLM should manage the land, at least for the time being. Thus the Bureau is changing from custodian to land manager even in areas of small landholdings.

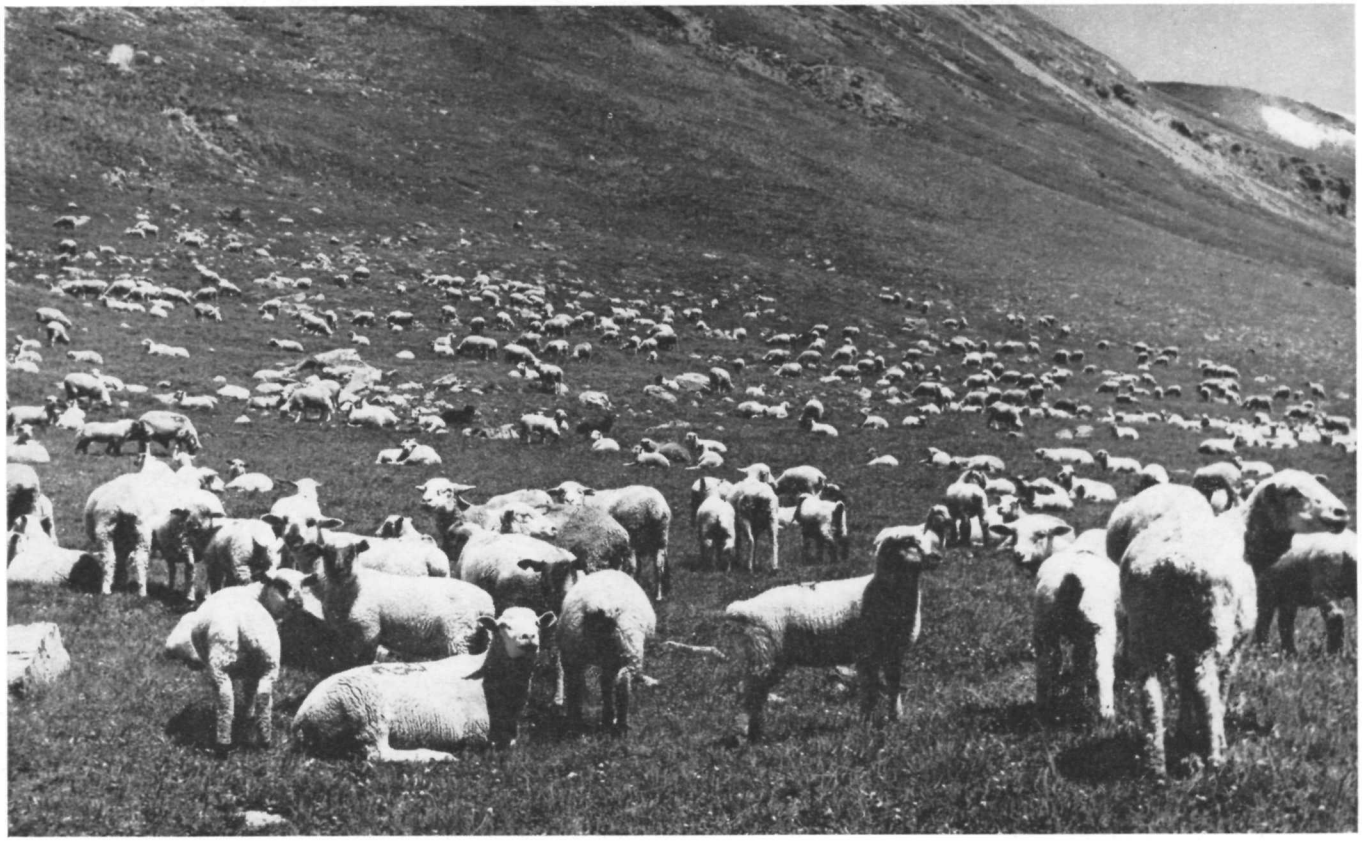
"We were surprised at the public reaction," Boyd Rasmussen, Director of BLM, said after these decisions. "It's quite a switch from expressed public opinion a few years back. But these lands which didn't look like much 50 years ago have taken on new importance. Recreation lands in the national forests and national parks are getting crowded. Recreationists want space; we have it; and they want us to make sure it is kept open to public use."

To date BLM has classified about 2,000,000 acres for disposal since the Classification Act, and has classified for retention 80,000,000 acres. Disposal is considered only if land is needed for community development or if it is more valuable for residential, commercial, agricultural, industrial, or local public uses than for combined general public use. Officials must be sure the transfer contemplated is in the best public interest, because this is the public's land.

Having passed its majority, BLM now realizes it cannot survey every bit of its half-billion acres even with the Classification Act's extension to 1970. Schedules have been set up to get as much done as possible. Large well-blocked units, where 50 percent or more of the land is in public domain, are usually studied first, since in these units it is generally easier to separate the retention from the disposal lands. Then medium blocks, where 30 to 50 percent of the land is in public domain are taken up, together with scattered tracts with less than 30 percent of the land publicly owned. The medium blocks are

A band of sheep graze on BLM land in the alpine country near Cinnamon Pass, Colorado.

Photographs below and opposite courtesy Bureau of Land Management



Mrs. Mason, Press Officer for the U.S. Forest Service before her recent retirement, is now a free-lance writer.

the most difficult to handle, for within them competition for lands is generally greatest.

"This is a plan, not a regulation," Mr. Rasmussen has pointed out. "It will be advisable in appropriate places to consider small tracts along with large ones near large population centers. Our one hard-and-fast rule regarding our surveys is that decisions will be made and announced promptly. Nothing can dull the public interest more than studies with no evident results, and public participation is vital to the future of the public lands."

What will happen to the land retained? BLM is charged by law, at least until Congress acts on Public Land Law Review Commission recommendations, to manage it for many uses: grazing, fish and wildlife development, watershed protection, timber production, industrial development, occupancy, mineral production, outdoor recreation, and wilderness preservation. The final decisions regarding use will depend in large measure on the interests expressed by the public to the Commission, which was created by Congress in 1964 to study the public land question and to report its findings by 1970.

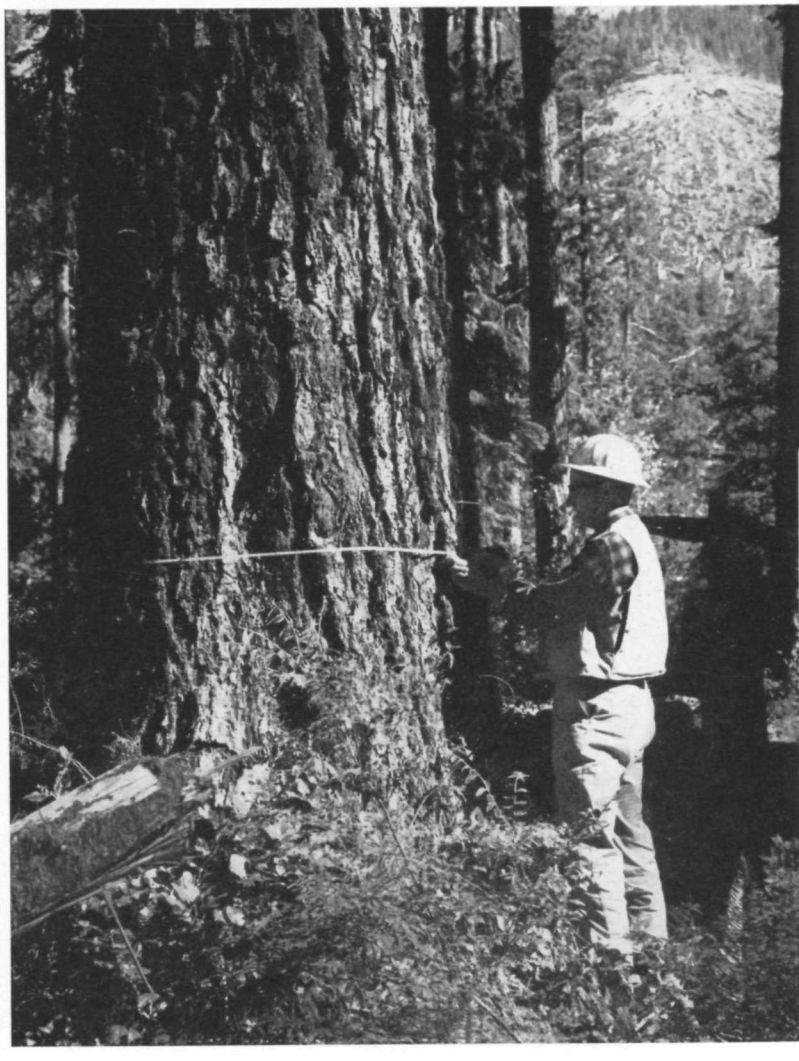
Within these public domain lands are deserts which offer beauty, solitude, wildlife, and space. There are scenic mesas and canyons with pictographs and rock writings. There are points of historic interest and ghost towns such as Virginia City in Montana, where relics of mining operations still exist.

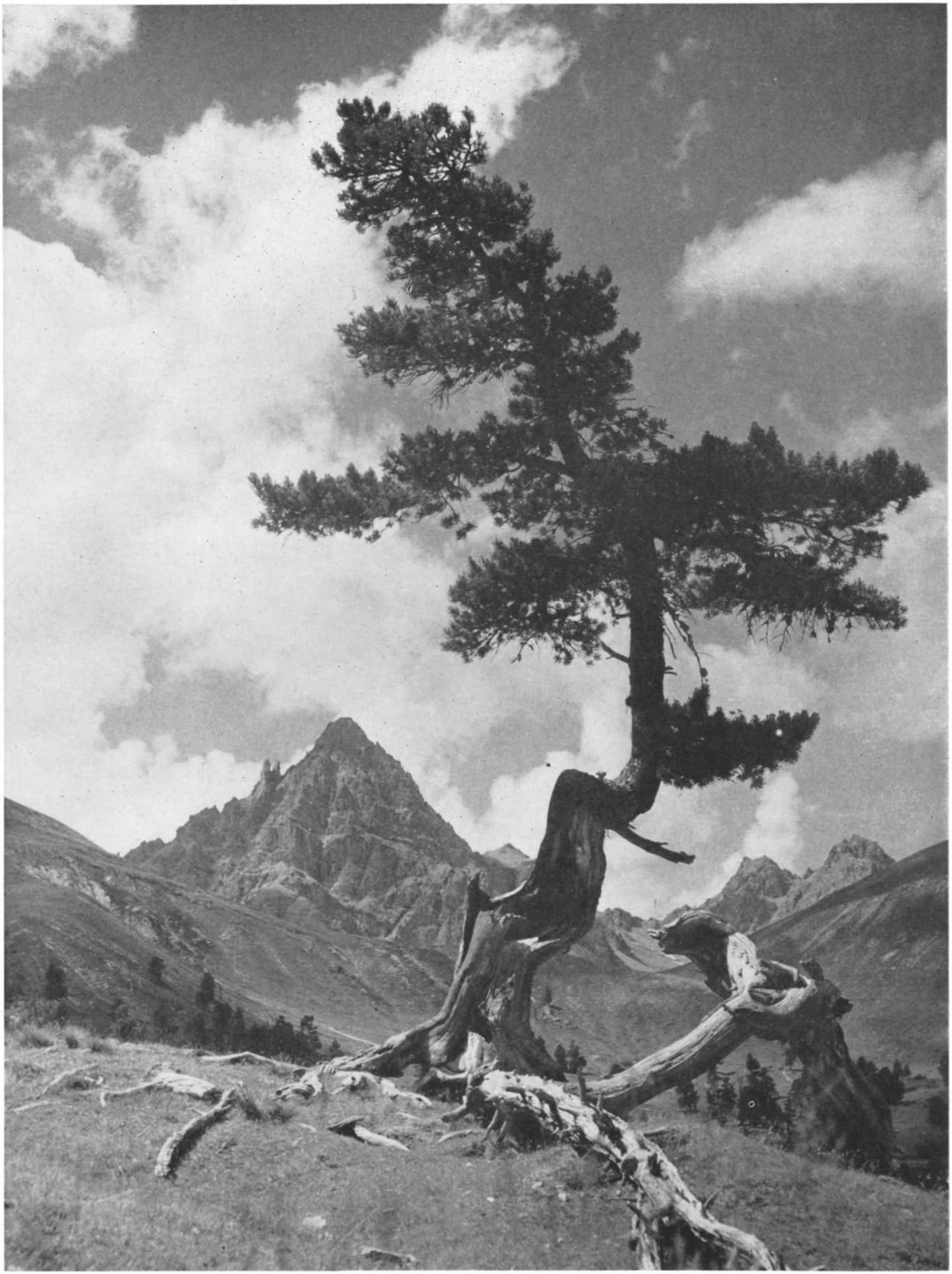
Thus these lands are scenic areas, historic sites, natural history museums. There is space for picnic and campgrounds, trails for hikers, horseback riders, jeepsters, and motor bike enthusiasts; and there is room for wilderness. Though BLM lands were not included in the Wilderness Act, the Congress included wilderness as a recognized use of the land. "One thing going for wilderness," Director Rasmussen pointed out, "is the fact there have been relatively few private development plans for the lands—public lands have historically been beyond the frontier of development."

One area where use of classified land has been designated is the 66,000-acre Red Rock Canyon Recreation Lands outside Las Vegas, Nevada, which was cooperatively planned by BLM and the State of Nevada. In this area are campgrounds, picnic tables, and interpretive signs.

The Public Land Law Review Commission will soon make recommendations concerning public land laws which will affect all public land agencies. Bureau of Land Management actions on classification and use will be useful background for the Commission and for the Congress which will ultimately decide on the final disposition and management of the public lands. Meanwhile, BLM pushes on with the greatest land office business ever—one that far surpasses the rush of the covered wagons when this same land was opened up for homesteading. And every American should be taking an intelligent and informed interest, for these lands belong to all of us. ■

Above, a desert scene on the public lands near Las Vegas, Nevada. Below, A. L. Larson, a BLM district forester, measures a Douglas fir on Quartzville Creek near Sweet Home, Oregon.





TWO EUROPEAN PARKS AND AN AMERICAN COMPARISON

By Lawrence C. Merriam, Jr.

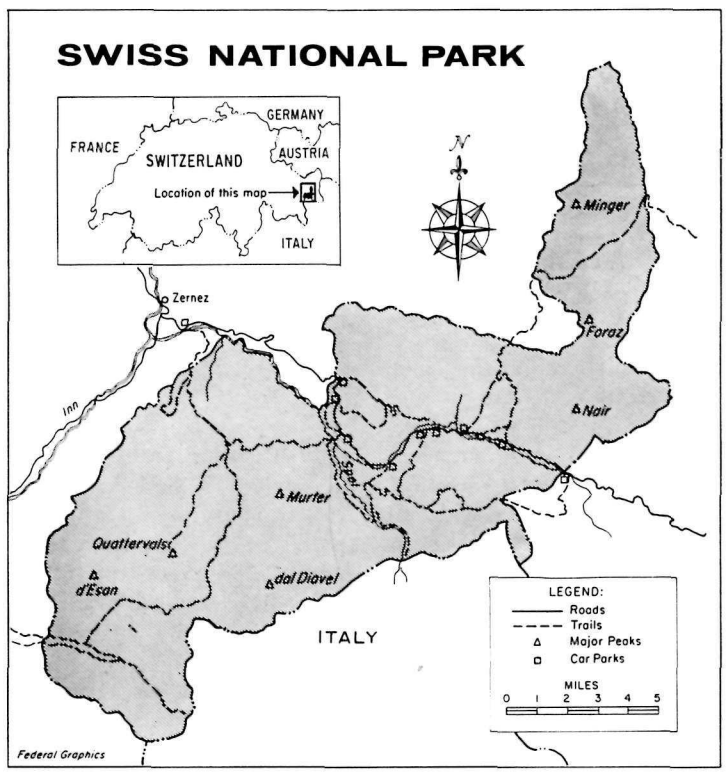
BECAUSE OF SOME SIMILARITIES in physiographic features and natural and scenic attractions between the Alps and the mountains of the western United States, some people have suggested that the management for recreation and other resource uses as carried out in the European Alps should be applied to certain of our western mountain parks and wilderness lands. Yet the many dissimilarities between the Alps and our western mountain regions, rooted in cultural differences and historic land ownership and use patterns, suggest that comparison of the two regions for park and recreation management is most complex. At the same time, the undeveloped near-natural state of many western mountain wilderness areas and parks is an asset that is respected internationally, and there are many Europeans who would like more near-natural areas preserved from extensive development, as in our national parks.

A general discussion of Alpine-Western American societal differences with descriptions of the Swiss National Park near Zernez in Switzerland and the Parc National de la Vanoise near Chambéry in France serves to illustrate the problems of regional comparisons. The Alpine country under discussion includes Switzerland and a portion of France in Savoie.

In Switzerland the Alpine mountain regions are not generally reserved in restricted use categories under Federal or cantonal ownership; rather, the situation is one of many ownerships by public communities and private citizens where many uses are allowed and where the rights of each user group have been developed over hundreds of years. One small watershed might be owned principally by a community within that drainage, and its uses would include sheep and cattle grazing in the mountains, scientific timber production, skiing developments and attendant funicular or cable railway access. Where trails are a major form of access, as in the Pontresina region of the Engadin, local workers are hired for trail maintenance and repair. The next valley over the mountain may have different access—cable railway, for example—and different resource uses. It may also be owned by different groups or communities with different management objectives.

The public generally, in Grisons and other cantons, has rights to wood for its own use as fuel or for other purposes. This is obtained free or at very low cost. The public also has the right of access to forests for berries and mushrooms. The forest of the Alps is managed carefully to provide products needed by locals and the country, which is a net importer of wood. Alpine forests are primarily protection forests, providing protection to communities from avalanche and floods, and are important for water supply purposes. These forests are to be maintained in productive sustained yield condition. Cuttings are on a selection basis with almost no clear-cutting, and this only in blocks less than one hectare in size, depending on cantonal law.

In this heavily populated European area people have moved, fought and existed for centuries. Patterns of land use control with national barriers have developed over hundreds of years, and little if any of this part of Europe is really wild land in the sense of non-occupancy or non-cultivation. For centuries people have hiked the Alps, and within the last century has occurred the rise of tourism, starting with Cook's European Tours in 1863 to Switzerland. Now people can travel easily by excellent rail and connecting ship lines all over the region in a few hours. Rail lines extend into remote alpine valleys, and



Photograph by courtesy Dr. Robert Schlöeth

On the page opposite, a view from the Val Mingèr in the northeastern section of the Swiss National Park. The park, detailed in the map, covers 41,670 acres in the Unterengadine Alps near Zernez.

Photograph by Pierre Bringe

A scene in French National Park de la Vanoise, looking toward the Col de la Vanoise (Vanoise Pass). In the background is the Grande Casse Range; the sharp peak in the center foreground is the Aiguille de la Vanoise (Vanoise Needle).

roads and airline improvements of recent years make travel even faster.

In Europe there are several types of national parks, some of which involve local area zoning with continued private land ownership, as in England. Others have more restrictive use with preservation; but the opportunities for the reservation of large public areas, as in the western United States, are largely past. Let us view two of the parks visited by the writer in 1967 and observe their management and some problems.

THE SWISS NATIONAL PARK, of 41,670 acres, is a nature reserve located in the Canton of Graubünden high in the Alps of the Unterengadine near Zernez. This tract was created a national park in 1914 with provisions for complete protection of all plant and animal life, with no timber or other resource production in the park, and for scientific research. It extends for about 10 miles along the Swiss-Italian frontier. The park terrain is mountainous, with elevations ranging from about 5500 to 10,200 feet above sea level. It contains numerous deep and narrow valleys and is about one-third forested. The alpine zone occupies a little over half of the park area.

There are very few areas in Switzerland that have not been subjected to man's influence. The park region is no exception, and was the scene of iron mining and manufacturing activities in past centuries. In the fourteenth and fifteenth centuries the forests were exploited

for wood for brine-pits, and for charcoal. Blast furnaces probably operated in the region up to the 17th century.

Administration of the park is by a Federal Commission, with responsibility locally under the Conservator or Chief Warden, Dr. Robert Schlöeth, and six wardens. The park land is owned by the community of Zernez with some private inholdings. The Federal Government pays the Zernez community rent for park use as a subsidy. While Dr. Schlöeth is a zoologist, scientific work in the park, one of the main establishment objectives, is directed by the Swiss Society of Natural Science.

For the visitor there are no developments except trails, signs and some informational bulletin-boards. The emphasis is on visitor education, not recreation. Visitor regulations for the park are the responsibility of the Canton Graubünden. A new headquarters with visitor center is being built in Zernez. There are some 100,000 visitors a year in the June-to-October season. Some of these visitors stay at the hotel at Il Fuorn, while many others camp just outside the park, or stay in nearby towns like Zernez, as there is no camping allowed in the park. Visitors are narrowly restricted to the roads and trails. On a hike from Il Fuorn to Alp Grimmels, Herr Wilhelm Stöckli of the Swiss Forest Research Institute and I found marker posts restricting visitor movement even at overlook points. There was little evidence of off-trail travel.

We also inspected a dam project on the Italian border of the park which will control the water flow of the Spöl River in the park. Though the dam is in Italy, there will be hydro-generating works affecting the park. Dr. Schlöeth indicated that the Swiss Society of Natural Science opposed the dam, but was unsuccessful.

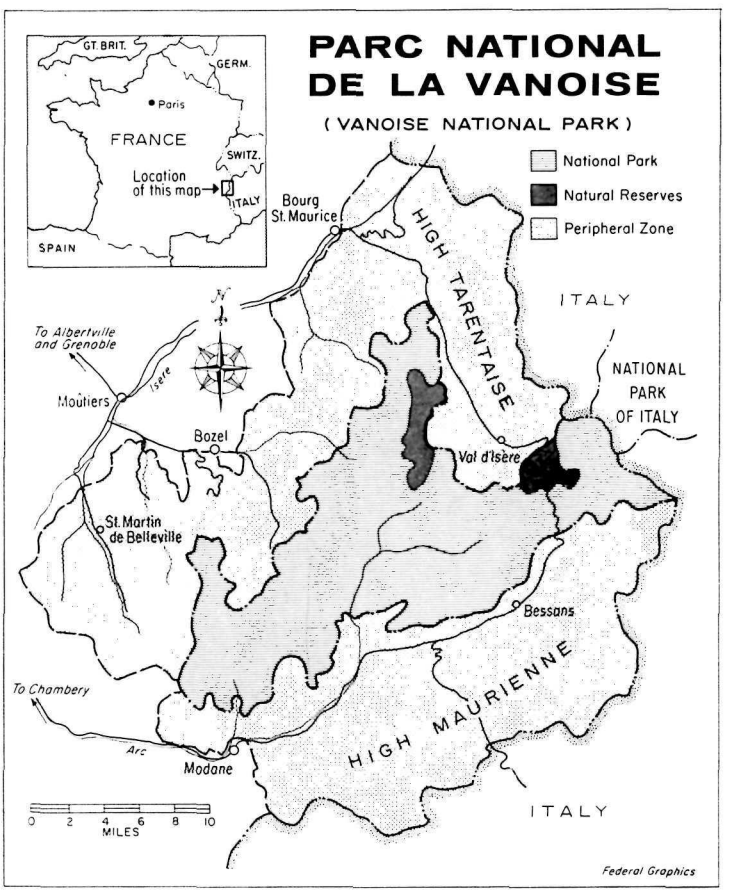
The Swiss respect the scientific purposes of this national park. In Switzerland hiking is a major national pastime, as is simple camping without elaborate facilities. Visitors both local and foreign seemingly enjoy the park in complete preservation status.

FARTHER SOUTH, in the French Alps, the Parc National de la Vanoise, created in 1963, provides nature preservation in the park zone, some extensive recreation use, and government subsidization of the mountain economy in a peripheral zone. The mountain sectors are somewhat similar to the Swiss park in elevation, ranging from approximately 4000 to 12,600 feet; but there is much more of the higher alpine sector in the Vanoise, and a relatively small part of the park zone is forested. Spectacular high mountain valleys and peaks are numerous. The high, open, grassy and rocky slopes have been grazed for centuries by sheep and cattle of the mountain people (montagnards), whose huts are still to be found throughout the park. This park zone is to be preserved for scientific study and limited human use, but grazing continues.

The Vanoise Park zone, of some 140,000 acres, is accessible by trail, with only one road crossing it near its eastern extremity. The park zone is surrounded by a larger peripheral zone of some 345,000 acres, including the high river valleys of the Arc and the Isère in the southeastern portion of France. The peripheral zone abuts the Italian border on the east, and the interior park zone joins the Italian National Park Grand Paradise for about four miles. Between the peripheral and park zones there are also two natural reserve sectors in the upper Isère Valley, in which some skiing and tourist facilities are allowed. Within the peripheral zone there are 27 communities with major trans-alpine highways and some railways passing through. The towns maintain their socio-economic activities as they have for centuries, and one of the objectives in creating the Vanoise Park was to preserve the historic patterns of the mountain communities.

Professor Merriam is with the School of Forestry, University of Minnesota. He is vice-chairman of the Board of Trustees and Executive Committee of the National Parks Association.

Historically, the mountain people have had an increasingly difficult time supporting themselves with a meager and resource-depleting agriculture. As in Switzerland people moved out of the mountains to the towns, where living conditions were better. Between 1861 and 1954 many high mountain rural communities lost up to 44 percent of their populations. Improvement of pastures, forest plantings, and control of erosion, overgrazing and avalanches were at first resisted by the mountain people, but in recent years the situation has moderated. It was thought that tourism would improve the lot of the mountain people—particularly ski developments, which were begun in the 1920's and 1930's and have greatly expanded since World War II. Two major ski centers of international importance have been developed at Val d'Isère and Courcheval in the Vanoise peripheral zone. However, the skiing



The Vanoise National Park is a priceless refuge for the rare Alpine ibex, thought to have once inhabited the lower regions of France but driven by relentless hunting to a last stand among Alpine summits. The ibex shown at the right is a young male four to five years old.

Vanoise National Park photograph

developments and summer tourism, being seasonal and competitive with mountain agriculture, have not improved the mountain economy in accordance with expectations.

The creation of the Vanoise National Park and its peripheral zone in 1963 was directed in part to improving as well as maintaining the cultural and economic conditions in the region of the French Alps. The Federal Government (Department of Agriculture-Department of Water and Forests), working with an advisory council of local and department (state level) representatives, administers the park and has considerable control over the peripheral zone, especially in matters of land and other resource use, industry, architecture (maintaining the style of the region) and retention of amenity values. In a very real sense the government subsidizes the local economy in order to maintain local communities. For example, in order to replace a church roof in the town of Termignon with desired but costly stone rather than cheaper metal, the government paid the replacement costs.

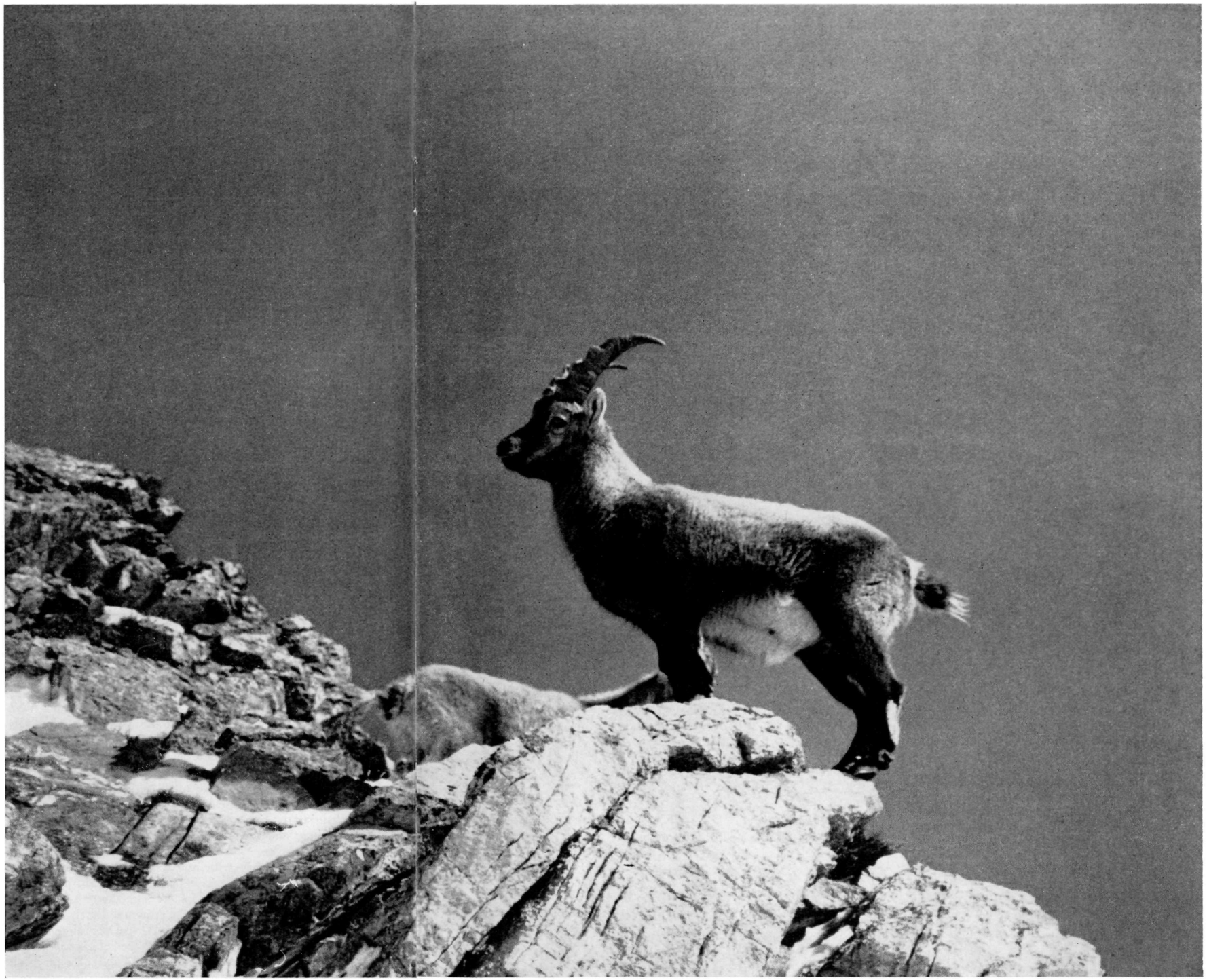
The chief administrator of the park is the Director, Maurice Bardel, a forester with years of experience in Savoie, and instrumental in the park's establishment. He has two inspectors in charge of the northern and southern park regions (Tarentaise and Maurienne). In addition there are six sector chiefs under the inspectors and 30 guards (rangers) who patrol in pairs.

Over 90 percent of the land in the park zone is owned by local communities. There is no hunting allowed in the park zone. Fishing is allowed. Developments are limited to existing montagnard houses, which are retained in the park for allowed grazer use. Some shelters are planned for climbers and visitors. Trails are quite good and well signed, as in Switzerland. On a hiking trip into the park with Inspector François Gros of the Haute Maurienne region, we observed various groups of hikers and montagnards. Cars were left at the boundary.

Some primitive camping is allowed in the park; but primarily people camp outside in the peripheral zone or stay at village pensions or hotels.

Director Bardel, who escorted me to the upper Maurienne region, pointed out interpretive informational signs for visitors near the park boundary and showed me a visitor center under construction, as well as some of the winter sports developments. The Director has a difficult task managing a high mountain trail park and coordinating activities of the surrounding peripheral zone. This appears to be a heroic effort in land zoning and administration, too recently instituted to evaluate results. The major ski developments at Val d'Isère and Courcheval, with their large winter crowds, may prove quite a challenge even though in the peripheral zone. Yet the French Government in an authoritarian society has considerable power to control land and visitor use, particularly when this is coupled with the granting or withholding of funds.

In both the park examples discussed here the reader can see the problem of establishing unique scenic and natural



preserves for limited public use and scientific study in the crowded conditions of Europe. There are no public lands to set aside; only lands used for centuries and then mostly abandoned. Yet while the Government, in the French case, is motivated partly by the need to stimulate the local mountain economy of the Vanoise, there is also a desire to create national parks; and France had three in 1967.

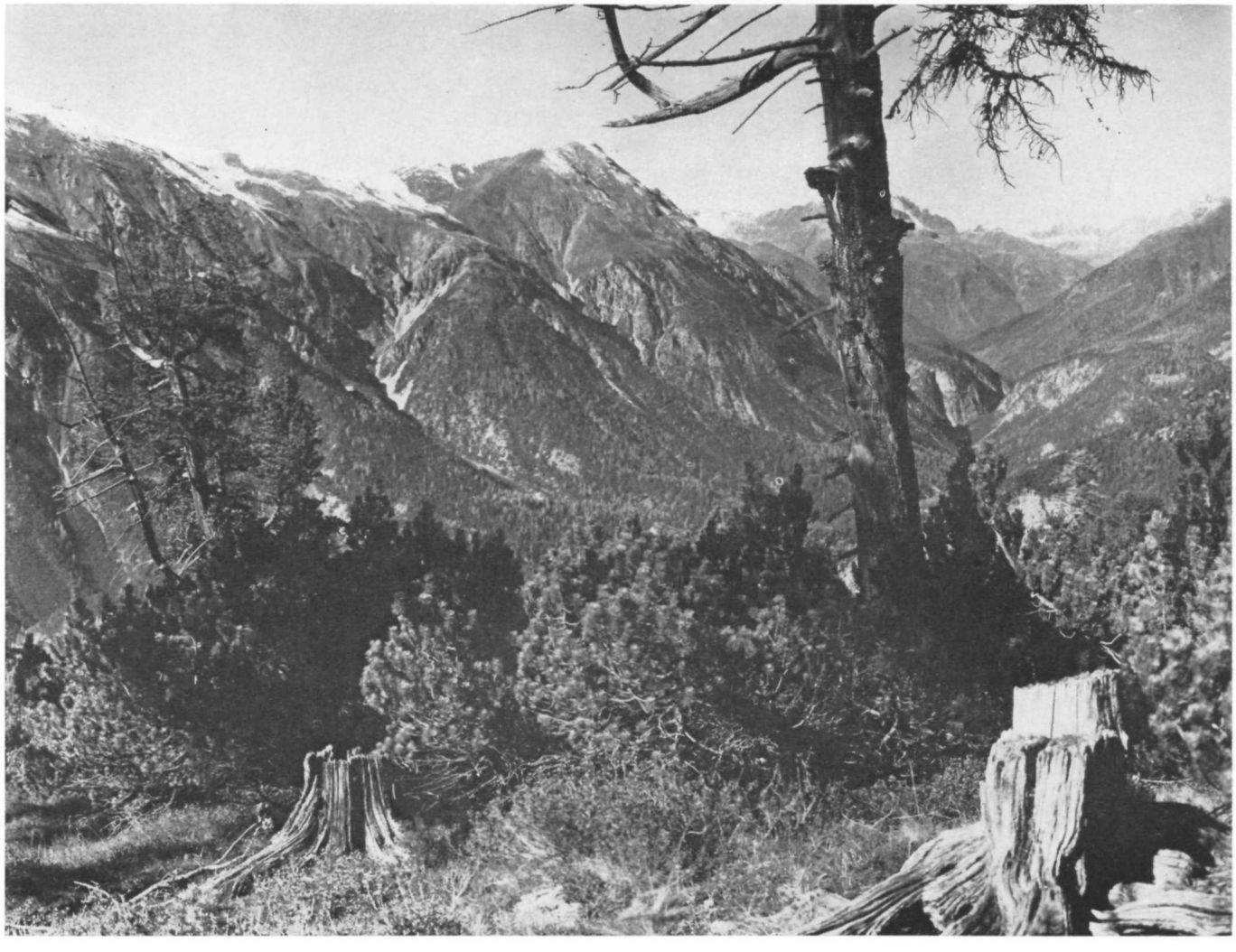
At the same time there are the larger, popular, highly developed and often crowded resort areas such as St. Moritz, Davos and Chamonix. In the United States we have, with a less authoritarian Government and much non-designated public land, been able to support additionally sufficient resort areas of the Aspen, Sun Valley or Lake Tahoe type. While comparisons are difficult here because of cultural-governmental differences and other difficulties, the peripheral zone approach in the French National Park of the Vanoise may well have application in our concern for regional planning related to our own national parks.

The western United States—Pacific Coast and Mountain States—in contrast with the European region discussed, has a smaller population concentrated in several large cities like Los Angeles, San Francisco, Seattle, Portland, Denver and Phoenix. Nearly 54 percent of the land in the 11 western States is Federal. Settlement by the white man has received its main impetus since the 1860's. Travel is not so convenient as in Europe, except by air. Distances relative to population concentrations are large. While auto travel is very good on main interstate routes in this country, not all areas are accessible. Rail travel has actually declined in numbers of opportunities (this paragraph was written on the last surviving Northern Pacific passenger train passing through Montana on a bleak winter day). In this region are most of our large national parks containing outstanding examples of naturalness and scenic quality, and in addition many true wilderness tracts on national forest and public domain lands.

While we do have the prospect of greater crowds in the future, we may be fortunate that we still have large areas of wild land which, with careful planning and management, can be preserved nearly intact for the enjoyment of people in this country and abroad. This may well be a major contribution of the American West. ■

There are few areas in Switzerland that have not been subjected to man's influence. Below, a view over the Valley of Spöl in the Swiss National Park shows evidence of forest exploitation in past years.

Photographs by courtesy Dr. Robert Schlöeth



News and Commentary

Vice President Heads Natural Beauty Council

A news item of especial interest to conservationists is the appointment of Vice President Hubert H. Humphrey to head the President's Council on Natural Beauty and Recreation. Chairmanship of the Council, composed of the secretaries of the principal executive departments with responsibilities in these fields, has until now rotated on a two-year basis among its members. This has resulted in several breaks in continuity of leadership, most notably when there were three Secretaries during the Department of Commerce's two-year term in the chair. The National Parks Association has long urged that the President's Council take the key role in achieving the coordination of government planning for outdoor recreation on a regional basis as the best insurance that our great national parks and monuments can be protected. Mr. Humphrey is known to have a large interest in the protection of the national parks, and it is hoped that under his leadership the Council will assume this responsibility, for which it is well suited.

The Conservation Message

The President's commendable message on conservation, "To Renew a Nation," has received much favorable comment in the press, and we need not recount the details here. Members of this Association may, however, want to take especial note of several items.

One of these is Mr. Johnson's reiteration of the urgent need for a National Water Commission which would take a long-term view of our water needs and, hopefully, would develop its recommendations for the nation's water programs from the basis of protection of natural ecologies and human communities. The creation of such a commission has been urged by this Association for several years; the President had first requested its establishment in 1967.

An encouraging trend in the message appeared in several sections in which Mr. Johnson proposed stiffer regulation of the industrial and community civic activities which contribute various types of environmental pollution. In each case there was a shift toward placing greater responsibility for abatement on the source. For example, one criterion for federal assistance to localities in an increased program of water pollution abatement through the construction of more waste treatment plants would be the imposition of a system of user charges on those who use the plants. In addition to providing an equitable way of sharing costs, Mr. Johnson said, a system of use charges would provide an incentive for industries to curb pollution through improved manufacturing techniques and would also relieve pressure on the tax bases of local governments.

Similarly, the President's proposals would impose upon the pollutor responsibility for cleaning beaches and waters when spillage of oil or other pollutants occurs. If the owner or operator responsible failed to act, the Government would be empowered to clean up the spills and require the pollutor to reimburse the full costs.

Mr. Johnson also recommended a nationwide system of cooperation between the States and the Federal Government to ensure that lands which had been surface mined would be reclaimed. He has already directed that all federal contracts for the purchase of coal and other surface-mined minerals contain effective reclamation clauses.

Study Teams Appointed for Three Parks

The appointment of two study teams to develop master plans for Mammoth Cave Park and for Sequoia and Kings Canyon parks has been announced by Park Service Director George B. Hartzog, Jr. Sequoia and Kings Canyon are adjoining parks in California which are administered as a single unit. Members of the team for those parks are: Leslie P. Arnberger, deputy assistant director for operations, NPS, chairman; Albert G. Henson, of the NPS Service Center in San Francisco; John S. McLaughlin, superintendent, Sequoia-Kings Canyon parks; John L. Sansing, NPS Western Regional Office; J. Thomas Crowe, Visalia, California; Dr. Richard J. Hartesveldt, San Jose State College, California; and Edward H. Hilliard, Jr. conservationist, Denver.

The Mammoth Cave team will study these areas in planning for "optimum visitor use": traffic patterns, including one-way roads, and by-passing of developed areas, plus possible alternates to transportation by private cars; water and air pollution control programs; removal or relocation of administrative and concessioner facilities intruding on park resources; future role of winter sports in the parks; improvement of the parks' interpretive programs; visitor accommodations both within and outside the parks, and the impact of visitor use on their ecology and natural resources.

Members of the team are: Charles S. Marshall, assistant regional director, NPS Southeast Region, chairman; W. Drew Chick, office of resource planning, NPS Washington Service Center; John A. Aubuchon, superintendent, Mammoth Cave; Professor Bassett Maguire, Jr., University of Texas; Professor Thomas C. Barr, Jr., University of Kentucky; and Dr. William B. Holton, chairman, Maryland Game and Inland Fish Commission. Dr. Don Lockwood, chief of planning for the Canadian National Park Service, will participate in the study as part of an exchange program between the U. S. and Canadian park services.

Dates of public hearings to be held by both teams will be announced later.

NPA Protests on Amchitka

The Association has received information that the Atomic Energy Commission is proceeding with its plans to conduct underground nuclear tests at Amchitka Island in the Aleutian Chain in Alaska. Amchitka is vitally important for the preservation of the sea otter and certain seals which have been in serious danger.

President Smith of this Association has made strong representations to Dr. Glenn T. Seaborg, AEC Chairman, urging him to make public whatever reasons there may be why the Commission re-

(continued on page 20)

gards Amchitka as uniquely suitable for the nuclear testing program. Without this information, Mr. Smith said, "the public cannot pass an informed judgment on vital public policy. Indeed," he added, "without them we conclude that no genuine defense interests are involved in this situation." President Smith stated that the Association yields "to no one in our determination that the defense requirements of the nation must be met, but we are far from satisfied that defense needs of any kind require the impairment of habitat on Amchitka which would necessarily result from nuclear tests there."

The Red Buffalo Test

Just before this issue went to press, Secretary of Agriculture Orville L. Freeman decided not to allow Interstate 70 to be routed through the Gore Range-Eagles Nest Primitive Area in Colorado. The decision will have an effect far beyond Colorado, for the disputed "Red Buffalo" route provides the first major test of what use the Administration intends to make of section 4(f) of the Transportation Act of 1966, which directed the Secretary of Transportation not to approve any [road] project requiring use of public park or recreation areas "unless there is no feasible and prudent alternative" and unless planning for such a road minimizes harm to the area.

The pressures exerted by the Colorado Highway Department, backed by the Bureau of Public Roads, on behalf of Red Buffalo seemed incongruous in November in view of the fact that the road through the wilderness, with its mile-long, twin-bore tunnels beneath Gore Divide, would cost about $41 million more than the alternative routing along existing U. S. 6 over Vail Pass. Now, estimates for both routings have been upped, and the disparity is reckoned at $50 million.

President Smith of this Association was among the signers of telegrams sent early in May urging the President and the Vice President to encourage the Secretary to reject the destructive proposal which would take 7000 acres of undeveloped land subject to wilderness review. They emphasized also their concern about the adverse effects on the Rocky Mountain bighorn sheep, deer and elk, whose major migration routes between their wintering and summering grounds would be disrupted.

We congratulate Secretary Freeman for his decision in this case. The Secretary noted that it was made against a background of strong conservationist support; we add that thoughtful and well-documented letters to public officials in matters like this are always in order.

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Reviewed by Charlton Ogburn, Jr.

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THE LIFE OF THE FOREST. By Jack McCormick.
THE LIFE OF THE MARSH. By William A. Niering. (Reviewed in the February, 1968, issue.)
THE LIFE OF THE MOUNTAINS. By Maurice Brooks.
THE LIFE OF THE OCEAN. By N. J. Berrill.
THE LIFE OF THE POND. By William H. Amos.
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McGraw-Hill Book Company, 330 West 42nd Street, New York, New York 10036, in cooperation with The World Book Encyclopedia. 1966-67. Each 199 pages + 32 pages of appendix. With photographs, paintings, and line drawings. Each $4.95.

Nothing could give an adequate idea of the richness of this series of ten books, published under the collective title of *The Living World of Nature*, but the series itself. "Gold mines of information" will not do; "fruit cakes of information" tells more about their color, comprehensiveness and flavor. Anywhere you put in a thumb you will pull out a plum: Antarctic seals are assisted in keeping warm by a metabolism that burns food twice as fast as that of land mammals . . . To help them conserve body water, kangaroo rats have kidneys five times as effective as human beings' . . . Birds in New Jersey have been estimated to consume 160,000 bushels of insects a day . . . From a seed weighing less than 3/1000ths of an ounce, a 6000-ton redwood grows . . . Trees in a desert canyon have been found to give off one and a half million gallons of water per acre in the warm six months of the year . . . The cycle of boom-and-crash among varying hares in the West Virginia mountains is synchronous with that of northerly populations from which they are widely separated . . . Timberline in the Rocky Mountains descends 360 feet with every degree of northward latitude . . . The eyes of squids and octopuses and of vertebrates are anatomically almost identical although evolved entirely independently . . . Irrigation of farmland in the United States consumes nearly 100 billion gallons of water a day . . . About

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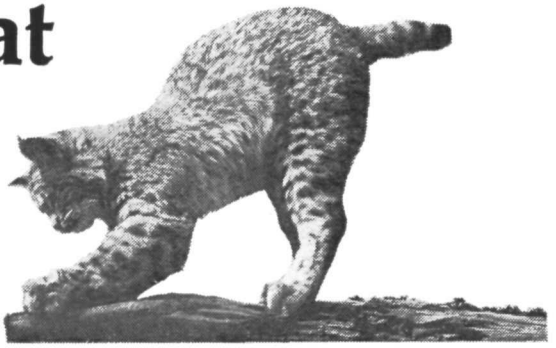

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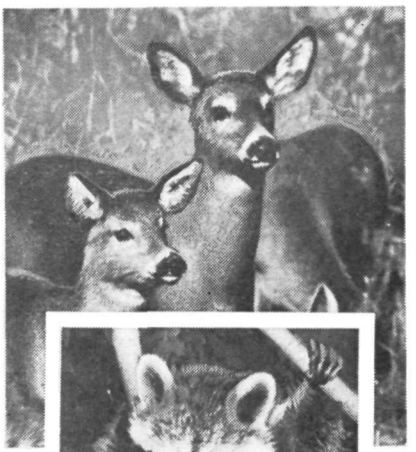

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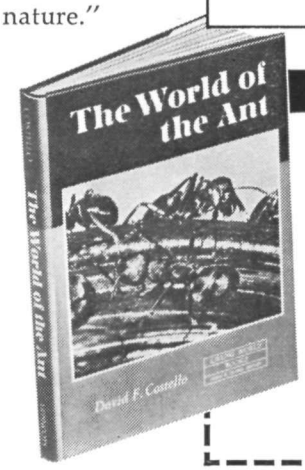

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half the adult bird population of the forest dies each year.

But imposing and consistently interesting, even fascinating as is the array of information marshalled for *The Living World of Nature* each fact has a place as a window onto a broader conception, a larger truth, and generally a truth bearing on the response of living forms to their physical background and to one another. Eight of the volumes—a ponderous word for books less than half an inch between covers, though ten inches high—deal with major habitats of the United States and Canada and with the communities of plants and animals that make it their home. We come to know the realms of otters, caddisfly larvae and dragonfly nymphs, mussels, bass and sturgeon, red-eared turtles and cattails, of cactus, mesquite, gila woodpeckers, roadrunners, tarantulas and jack rabbits, of bluestem, switchgrass and gamma, bison, pronghorns, coyotes and ground squirrels, sage grouse and golden eagles, of the major forest types from the taiga to the mangrove, rain forest to Southern pinery, ruffed grouse, goshawks, water ouzels, thrushes and warblers, martens, black bears, wolves and moose, of cave salmanders, flatworms and isopods that are blind and colorless, white crayfish and long-eared and free-tailed bats, of sand-dollars, sea-cucumbers, plumed worms, sea-stars, barnacles, periwinkles, purple marsh crabs, ghost crabs, grunion, silversides, loggerhead turtles and oystercatchers.

Of the remaining two volumes, one takes for its province the whole ocean (a habitat hardly to be treated in terms of North America alone) and the other the mountains, which actually do not constitute a separate habitat but merely a semi-vertical arrangement of what elsewhere is laid out horizontally. "The Life of the Mountains" necessarily overlaps widely with others in the series, but it also brings us an illuminating treatment of life zones and of the genetic divergence of animal populations stranded on highland "islands" (as for example the Plethodon salamanders of the southern Appalachians) and Maurice Brooks's admirable characterizations of the major North American ranges. Others in the series also overlap with one another. After reading them one is pretty familiar with photosynthesis, the food pyramid with the loss of energy from level to level, and the role of the decomposers. But this is unavoidable.

For those coming of age today *The Living World of Nature* offers an introduction to the natural history of the continent such as we who are now in our middle years had almost nothing to approximate when our eyes were being opened to the world. What we had were guides, handbooks and other texts that treated living forms species by species or in terms of orders or phyla, as in those days museum specimens were lined up on stacks of shelves and the more exciting and enlightening habitat groups were just beginning to be known. Among the shortcomings of the older approach, in which individual species were seen more or less in isolation or in their purely taxonomical relationships, was that it permitted a belief that if we exterminated a species the result would be simply a gap such as a marksman leaves when he knocks over one of a row of ducks in a shooting gallery—a depressing gap and an ineradicable blot on man's escutcheon, but nothing more. When the living world is seen for what it is, a skein of interlocking communities in which man himself is inescapably a member, we can better understand that by blasting a way through these communities we may duplicate Samson's feat when he pulled down the pillars of the temple. (This is not to say that species-by-species treatments are not still essential, which they are).

The Living World of Nature brings us habitat groups, but groups that are anything but static. All is in motion. Populations are being germinated or hatched and are growing, often through wildly diverse forms, to maturity, energetically pursuing the business of feeding, defending themselves and reproducing. At the same time, the habitats themselves are in process of change. The ice-locked pond is a different world from that incubated by the summer sun, as is the desert after the July rains from that which preceded it. Rivers that arise at a glacier's snout or in a spring bordered by marsh marigolds end in sand-fringed estuaries where fresh-water forms are gradually replaced by those of the sea. Ponds are slowly, inexorably filled in by the products of the vegetation they nourish, forests wiped out by lightning-born fires, and the change from open water to dry land, from charred tree-stubble to renewed climax forest, is marked by a long succession of changing species of plants and animals. There are also, alas, the transformations wrought by man. Robert L. Usinger has drawn a telling portrait of rivers poisoned by multiplying kinds of pollutants, and what we have done to the grasslands is brought out only too poignantly by Durward L. Allen's panorama of midland America before the white man and of a vanished abundance exemplified not only in those unimaginable herds of bison but in a prairie-dog town in Texas that covered 25,000 square miles and housed 400 million inhabitants.

The initial impact made by *The Living World of Nature* is visual. Every page is illustrated by drawings or photographs, most of the latter in color and many full- or double-page in extent, representing the work of scores of cameramen—their best, one would suppose. One has the impression that animal portraiture can go no farther. There are action shots, too, that one looks at almost unbelievingly, such as Ed Cesar's photograph of a lynx pouncing on a varying hare, Glenn D. Chambers's of a ruffed grouse drumming, and Edmund Hobson's of a school of mantas. Some are pictorially breathtaking, like Nick Drahos's Adirondack stream in sun-pierced mist, Chambers's river in early

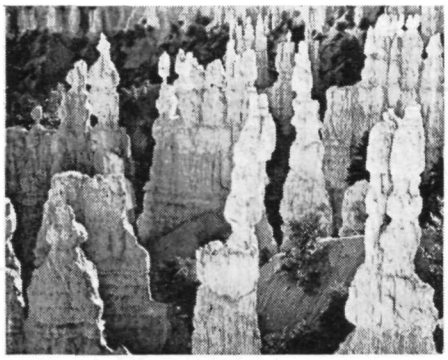
morning and Joseph Muench's "Cathedral in the Desert"—a subject now inundated behind Glen Canyon dam. Graphs and diagrams, covering every subject from the difference in elevation of major mountains and the times of migration of the principal transients at Hawk Mountain, Pennsylvania, to the feeding habits of the herring and the upwelling of Antarctic currents add greatly to the value of the books. So, especially, do the maps —maps of the extent of various types of forest, of major rivers and drainage areas, of the principal deserts and desert communities, of types of grassland, of ocean currents of the varying composition of deposits covering the ocean floor.

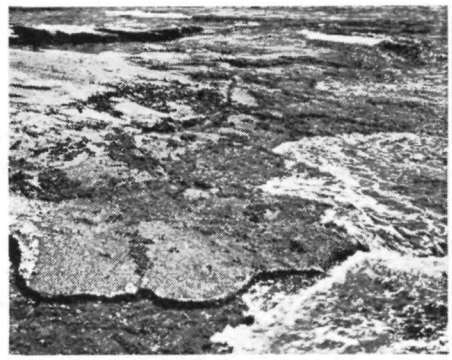
But with respect to the photography, the question arises as to whether there is not too much of it, whether the text is not overwhelmed. Diagrams, drawings and maps seem to consort well with verbal exposition, perhaps because both are fully human products, but verbal exposition and the products of the camera, especially big color photographs, do not really blend, and one or the other must be subordinate. Or so this reviewer believes. The volumes comprising *The Living World of Nature* are neither picture-books with captions nor literary works with illustrations. They try to be both picture-books and literary works and the result is conflict; the reader is pulled in different directions. Those responsible for the series seem to have recognized this duality and to have tried, most unsuccessfully, to make a virtue of it. They have provided that in each volume the story will be told twice, once in the literary version and again in the visual material with copious written amplification, and that the two stories will be interlarded. Thus the reader repeatedly turns the page to find the text interrupted by a double spread of pictures with perhaps several hundred words of explanatory matter. If he is expected to hold an incomplete sentence in mind while he assimilates this intervening text, too much is being asked of him. If he is supposed to skip over it and return to it, then the intervening parts should be placed together at the end of the chapter—if, that is, the ground has to be covered twice.

This exasperating format is the fault of a book produced by a committee. Perhaps we today are especially conscious of the communal character of nature because our own undertakings are increasingly communal. *The Living World of Nature* is the product of a publishing biome—albeit a very good one with an editor (Richard B. Fischer of Cornell), ten consultants drawn from the National Park Service, Field Enterprises Educational Corporation and five universities, and up to five special consultants for each particular volume. Withal, the writing is lucid, competent and enjoyable, I must admit—"must," because the masthead also lists a "Readability Consultant," which gives me gooseflesh.

The series is clearly designed for both young and mature readers. Occasionally in some volumes the address is recognizably to the former, on their own supposed level. ("Perhaps you have seen waves created by wind in wheatfields." . . . "Pleasant though the amphibian chorus may sound on a spring evening, it is not to entertain casual listeners."), but on the whole the series seems to this reviewer to strike a note to appeal to an audience of the broadest age-span. Incidentally, considering the diversity of the contributing talents the style is remarkably uniform (even to the continual use of "transform" as an intransitive verb—the only stylistic annoyance.) In the physical properties of the series, uniformity is complete. In each case there are 199 pages of text and pictures followed by 32 of appendix on buff stock. The appendices form a significant feature of the books, each comprising an index, list of illustration credits, glossary, bibliography, catalogue of areas in the national park system (or wildlife refuges) in which the habitats discussed in the book are exemplified, sketches (graphic and verbal) of prominent dwellers in the habitats, and a section on devices useful in firsthand study of the habitats: aquaria, herbaria, plankton nets, waterscopes, etc.

One who reads the entire series ends feeling dazed and overpowered by the lengths to which living creatures have gone to find a role for themselves in their crowded and competitive environments (imagine a shrimp that hatches in pools formed by desert rainstorms and grows to maturity to mate and spawn eggs in its turn before the pool dries up and kills it, and imagine a little fish that buys immunity from larger fish by cleaning their surfaces of parasites, then on top of that imagine another little fish that obtains an opportunity to take a bite from the fin of the larger fish by mimicry of the first little fish) and scarcely less dazed and overpowered by the understanding that man has achieved of the natural world, of which, Jekyll and Hyde, he is the scourge. —*Charlton Ogburn, Jr.*





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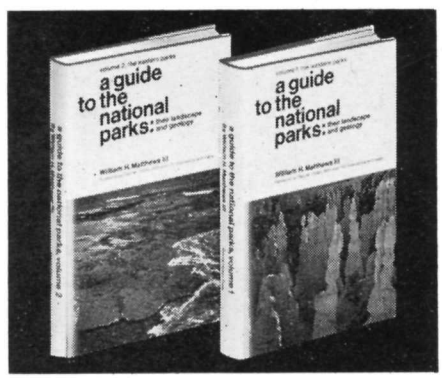

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