# NATIONAL PARKS Magazine



Roseate spoonbills take graceful flight from a watercourse in Everglades National Park

July 1969

FIFTIETH ANNIVERSARY NATIONAL PARKS ASSOCIATION

# Leverage Against Chaos

UNDER CIRCUMSTANCES OF GREAT URGENCY, CONSERVAtionists rallied again this spring to rescue Everglades National Park from destruction by agencies of their own Government.

This magazine had warned editorially in January of the plans of the Dade County, Florida, Port Authority, encouraged by the U. S. Department of Transportation, to construct a giant jetport in the Everglades and cypress swamp country north of the Park, coupled with a new superhighway and other high-speed ground transportation, which would cut off water flows and heavily pollute the region.

A broad coalition of environmental and economic organizations signed a joint letter of protest to Secretary of Transportation John A. Volpe on April 17; gathered in the board room of this Association for consultation and a press conference on April 23; and met on May 14 with Assistant Secretary of Transportation James D'Orma Braman.

Thereafter the Secretaries of the Interior and Transportation announced the appointment of a joint interdepartmental committee to make a thorough study of alternatives and the probable effect of a jetport and highway on the ecology of the Everglades and the Park.

## Π

The President of this Association testified by invitation on June 11 at hearings of the Senate Interior Committee with respect to the objections of conservationists to the jetport, recommending further that a guarantee of the necessary minimum water deliveries to the Park be obtained before additional authorizations or appropriations are granted by Congress for the so-called Central Florida Flood Control project.

He also urged that inquiries be made looking toward recapture of a \$500,000 grant by the Federal Aviation Administration to the Dade County Authority for the first runway of the jetport and toward possible enforcement against the responsible officials. The Associate Solicitor of the Department of the Interior has rendered an opinion that the Department of Transportation failed to comply with the Transportation Act.

The crucial section of the law states in effect that the Secretary of Transportation shall not approve transportation facilities like the jetport and superhighway, affecting park and recreation areas like the Everglades Park and the conservation districts, unless there is no feasible alternative and unless all possible plans have been made to minimize ecological damage.

### III

This magazine also commented editorially in February on the dangers threatening our new national seashores in the overdevelopment of roads and other facilities. We published our plan for Assateague National Seashore looking toward motel and parking lot construction on the mainland, with high quality coach transportation to the Seashore. The Park Service had completed a master plan providing for the eventual location of 14,000 parking places on the Seashore, displacing people in favor of automobiles.

A coalition of most of the same organizations which joined in protesting the jetport united in opposing the Park Service plan for Assateague and met with the director of the Service to say so. They were informed that the director would not confer with them with a view to changing the plan.

In our June issue we published a proposal of our own for protecting natural conditions on Padre Island National Seashore in Texas, keeping accommodations and parking lots on the mainland, with coach transportation to the Seashore, much as in the case of Assateague. The Service has moved ahead rapidly with black-top roads and other facilities on Padre.

IV

The Everglades, Assateague, Padre Island, these are but three examples of recent crises in conservation. The events afford a measure of hope only because environmentalists were moved to join hands and resist destruction. We trust that similar flexible groupings will arise and that further practical cooperation will develop on specific issues, coupled with broad overall policy consultation.

The new Environmental Quality Council established in May by President Nixon has a tremendous potential for getting a grip in the public interest on all this disorder. Last month we reprinted a statement submitted on invitation by the President of this Association to the Senate Interior Committee on the establishment of a statutory Council of Environmental and Population Advisors.

Persons concerned with differences between the several comparable proposals will find them discussed in that statement; for the present the decision has been made, and the test of the new council will be whether it can cope in any significant degree in this country with the rising tide of environmental horror which threatens all the manifold forms of life on earth, including, and perhaps first of all, mankind.

At the moment, the council is a fulcrum for leverage against chaos. President Richard M. Nixon is chairman of the council. Americans fighting to defend their land against technological violence should write to the President at the White House in Washington and ask him to help.

No matter how small the problem may be, because the defense of the environment is unitary, they should write to the President and ask him to use the machinery he has established to stop this destruction. If this appointed inter-departmental council fails to function, stronger measures, perhaps those we have recommended, will obviously have to be taken without delay. -A.W.S.



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Leverage Against Chaos-Editor	ial	2
Can Technology Be Humanized—	-In Time? Vice Admiral H. G. Rickover	4
"Progress" Menaces the Everglades H	Photography by M. Woodbridge Williams	8
How Fire Helps the $\operatorname{Big}$ Trees	Harold Weaver and Harold Biswell	16
News and Commentary		20
The Blue Ridge Parkway—Revie	w Darwin Lambert	23

#### Front and back cover photographs by M. Woodbridge Williams Courtesy National Park Service

The roseate spoonbills on this month's front cover and the tree snail Liguus fasciatus (about  $2\frac{1}{2}$  times life size) on the back cover share several attributes: beauty; the subtropical habitat of southern Florida's expansive but vulnerable Everglades-Big Cypress region; and dependence upon human self-restraint for survival. The snail, unhappily, clings to a branch of a just-bulldozed tree in the site of the planned Florida jetport. On pages 8 through 15 are more photographs from the area now threatened by this newest Florida manifestation of "progress."

#### The Association and the Magazine

The National Parks Association is a completely independent, private, non-profit, publicservice organization, educational and scientific in character, with over 39,000 members throughout the United States and abroad. It was established in 1919 by Stephen 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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# Can Technology Be Humanized—In Time?

If not, warns Admiral Rickover, mankind may face the catastrophe of a planet turned uninhabitable

# BY H. G. RICKOVER VICE ADMIRAL, U. S. NAVY

K EEPING OUR SMALL PLANET HABITABLE IS A MATTER OF utmost importance and great urgency. If I may use a legal expression, the "last clear chance" to avert catastrophe may soon be upon us. We have been brought to this critical situation by the scientific-technological revolution, and can extricate ourselves only by a change of direction in thought and action so drastic it would rate the term counterrevolutionary.

To the historian, this is a familiar sequence of events. During revolutions—social, political, technical—long established patterns of living are swiftly and radically altered by concentration on the attainment of a single objective without regard to cost. Eventually the cost is revealed and if it is too high there is a counterrevolution. But this takes time, perhaps more than is available to us. Few laymen as yet have any conception of the true price we pay for the marvels of technology, although the mass media are now full of stories of poisoned water, air and soil, of depleted resources and of overcrowding—all clearly among its adverse effects, all crying out for remedial action.

What chiefly delays public recognition of the costs of the scientific-technological revolution is, I submit, the univer-

sal popularity of its objective: material abundance and an easing of man's earthly lot through mastery of nature, the "empire of man over nature" of which Francis Bacon dreamed three and a half centuries ago. Modern technology, solidly based on accurate scientific knowledge, comes remarkably close to this goal. Even the poorest in technically advanced countries are better fed, housed and clothed, work in safer, more comfortable surroundings, enjoy greater leisure and more varied entertainment and live longer, healthier lives than they could ever hope for in the vast backward regions of the earth. This accounts for what W. H. Ferry calls the "stupid love affair" of the general public with technology. "Breaking up the love affair," he said, "does not mean abandoning technology, but replacing infatuation with an understanding of its toxic qualities, and finding ways to direct it to humane ends."

Fortunately we have a means to such an understanding in ecology—a science conterminous with modern technology. Derived from the Greek *oikos*, meaning household or living place, ecology deals with the interrelationships of plants and animals (including man) and their environment. Ecology, until recently a modest academic discipline chiefly serving agriculture and medicine, is destined to become the key science for correctly assessing the negative aspects of technology. In my opinion ecology should be included in the curriculum of more schools. In this connection, I should like to make two suggestions. *First*, limit the study to plant

This article was adapted from a speech at a convocation on ecology and the human environment held May 7 at St. Albans School, Washington, D. C. St. Albans has instituted ecology instruction for all students. Text copyright 1969 by H. G. Rickover. Not to be reproduced without the author's permission.

and animal ecology which is a fully developed branch of the exact sciences, omitting for the time being what goes under the name of social ecology. We tend in this country to try to do two or more things simultaneously; in consequence we do neither of them as well as we might. Second, consider the possibility of beginning the study at an earlier age. During a visit to Switzerland for the purpose of familiarizing myself with their educational system, I was much impressed by the way ecology was taught in a one-room village schoolhouse. It was part of the curriculum throughout the primary grades, being presented at first very simply —but always graphically; later, on a more complex level; and always alongside the three R's and history and government, so that the children absorb it as part of their general education.

HAT NEEDS TO BE DEVELOPED AT THE EARLIEST OPPORtunity is a habit of thinking ecologically, of being thoroughly familiar with the balance of nature which Barry Commoner, the biologist, recently defined in simple words comprehensible to the nonscientist, old or young. All living things, he said, "are dependent on the great interwoven cyclical processes followed by the four elements that make up the major portion of living things and the environment: carbon, oxygen, hydrogen and nitrogen. All of these cycles are driven by the action of living things." Green plants convert carbon dioxide into food, fiber and fuel, and produce the oxygen in the atmosphere. Animals, living basically on plant-produced food, regenerate the inorganic materials: carbon dioxide, nitrates, and phosphates-all of which support plant life. This vast web of biological interactions "makes up a huge, enormously complex living machine the ecosphere—and on the integrity and proper functioning of that machine depends every human activity, including technology. . . . If we destroy it, our most advanced technology will come to naught and any economic and political system which depends on it will founder."

I wonder, too, whether ecology, properly presented at the higher secondary school levels, might not help dissipate the tendency in contemporary thinking of regarding technology as an irresistible force with a momentum of its own that puts it beyond human direction and restraint. Mere awareness of all the adverse effects of technology may not suffice to mobilize public support for countervailing measures. What is additionally needed is a change of attitude on the part of the public and of its leaders, that is, of the prevailing concepts of what technology is and what purpose it should serve. Only when viewed humanistically-in other words, as a means to human ends-can technology be made to produce maximum benefit and do minimum harm to human beings and to the values that make for civilized living. It may even enable man to become more truly human than it has ever been possible for him to be. Of technology it can rightly be said that it is not "either good or bad, but thinking makes it so."

Technology has been defined as that which covers "the field of *how* things are commonly done or made" and "what things are done or made." It is tools, techniques, procedures: the artifacts and processes fashioned by modern industrial man to increase his powers of mind and body. Marvelous they are, but let us not be overawed by these man-made things. Certainly they themselves do not dictate how we should use them nor, by their mere existence, do they authorize actions that were not anteriorly lawful. We alone bear responsibility for our technology. In this, as in all our actions, we are bound by the principles governing human behavior in our society. Ethics, I need hardly say, are not only personal; they are social as well.

This surely must be obvious to any reasonable man. Yet it cannot be overemphasized, for a considerable body of opinion propagates what comes close to being the opposite view. The notion is widespread that, having wrought vast changes in the material conditions of life, technology perforce renders obsolete traditional concepts of ethics and morals, as well as accustomed ways of arranging political and social relationships. Earnest debates are currently taking place as to whether it is *possible* to act morally in the new technological society, and proposals have been made quite seriously—that science must now *replace* traditional ethics! We have here a confusion of means with ends that should be cleared up.

HE LAWS DISCLOSED BY SCIENCE MUST OF COURSE BE heeded by those who wish to exploit scientific discoveries; in his technological activities man is bound by the laws of science. But it does not follow that he is bound by the laws of science in his purely human relations as well: "Science," wrote Vannevar Bush, "has come a long way, in delineating the probable nature of the universe that surrounds us, of the physical world in which we live, of our own structure, our physical and chemical nature. It even enters into the mechanism by which the brain itself operates. Then it comes to the question of consciousness and free will—and there it stops. No longer can science prove, or even bear evidence. Those who base their personal philosophies or their religion upon science are left, beyond that point, without support."

Through technology man has been relieved of much brutal, exhausting, physical labor as well as boring routine work; he has been provided with numerous mechanical slaves who do certain kinds of work faster, cheaper and more efficiently than people. Why should the ease and affluence made possible by technology affect precepts that have guided Western man for centuries? This may brand me as old-fashioned but I have not yet found occasion to discard a single principle that was accepted in the America of my youth. Why should anyone feel in need of a new ethical code because he is healthier or has more possessions or more leisure? Does it make sense to abandon rules one has lived by because he has acquired better tools for doing his work?

Tools are for utilizing the *external* resources at our disposal; principles are for marshaling our *inner*, our human resources. With tools we alter our physical environment; with principles we order our personal life and our relations with others. The two have nothing to do with each other.

It disturbs me to be told that technology "demands" an action the speaker favors, that "you can't stop progress."



#### NY State Air Pollution Control District

A rip in the web of life: roughshod technology pollutes not only air and water but also the human spirit.

It troubles me that we are so easily pressured by purveyors of technology into permitting so-called "progress" to alter our lives, without attempting to control it—as if technology were an irrepressible force of nature to which we must meekly submit. If we reflected, we might discover that not everything hailed as progress contributes to happiness; that the new is not always better nor the old always outdated.

Perhaps we are receptive to these arguments because we tend to confuse technology with science. Not only in popular thinking but even among the well-informed the two are not always clearly distinguished. In consequence, characteristics pertaining to science are attributed to technology. The technology of the word may contribute to this confusion. Its suffix lends to technology a false aura—as if it signified a body of accumulated, systematized knowledge, when in fact the term refers to the apparatus through which knowledge is put to practical use. The difference is important.

Science has to do with discovering the true facts and relationships of observable phenomena in nature, and with establishing theories that serve to organize masses of verified data concerning these facts and relationships. Because of the care scientists take to verify the facts supporting their theories, because of their readiness to alter theories when new facts prove an established theory to be imperfect, science has great authority. What the scientific community accepts as proven is not questioned by the public. No one disputes that the earth attracts the moon, or that atomic fission produces energy.

BUT TECHNOLOGY CANNOT CLAIM THE AUTHORITY OF SCIence. It has proved anything but *infallibly* beneficial. Much harm has been done to man and nature because technologies have been used with no thought for the possible consequences of their interaction with nature. A certain ruthlessness has been encouraged by the mistaken belief that to disregard human considerations is as necessary in technology as it is in science. The analogy is false.

The methods of science require rigorous exclusion of the human factor. They were developed to serve the needs of scientists, whose sole interest is to comprehend the universe; to know the truth; to know it accurately and with certainty. The searcher for truth cannot pay attention to his own or other people's likes and dislikes, or to popular ideas of the fitness of things. This is why science is the antithesis of "humanism," despite the fact that historically modern science developed out of and parallel to the humanism of the Renaissance.

What scientists discover may shock or anger people—as did Darwin's theory of evolution. But even an unpleasant truth is worth having; besides one can choose not to believe it! It is otherwise with technology. Science, being pure thought, harms no one; therefore it need not be humanistic. But technology is *action*, and often potentially dangerous action. Unless it is made to adapt itself to human interests, needs, values and principles, more harm will be done than good. Never before, in all his long life on earth, has man possessed such enormous power to injure himself, his human fellows and his society as has been put into his hands by modern technology.

This is why it is important to maintain a humanistic attitude toward technology; to recognize clearly that, since it is a product of human effort, technology can have no *legitimate* purpose but to serve man—man in general, not merely some men; future generations, not merely those who currently wish to gain advantage for themselves; man in the totality of his humanity, encompassing all his manifold interests and needs, not merely some one particular concern of his. When viewed humanistically, technology is seen not as an end in itself but as a means to an end, the end being determined by man himself in accordance with the laws prevailing in his society.

A WORD MAY BE IN ORDER CONCERNING THE DISPARATE meaning of the word *law*, depending on whether it is used in the ordinary sense—which is also the original sense of the word—or by scientists. Law, as commonly understood, refers to the rules of human conduct prescribed and enforced by society. The scientists have appropriated the term. They use it to describe regularities exhibited by physical phenomena—the rules by which the cosmos governs itself. In the transition, the word has taken on a new meaning.

Law that governs human society is not the result of scientific method, but of wisdom and experience, of consensus as to what is just and fair. In autocracies, law is what the ruler decrees it to be and what he is able to enforce by naked power. The purpose of human law is to resolve conflicts by the application of definitive rules. These rules are always debatable and can be changed when there is public demand for a change or when the rule-maker desires them to be changed.

From the layman's point of view, what the scientist calls law is fact, rather than law—immutable fact. Or, if you prefer, it is law operating in a sphere where man exercises no influence. He cannot alter the laws of the cosmos; he can only discover them.

It has taken a long time to attain this rational attitude toward science, and we are conscious of the consequences of intolerance in the past. Perhaps this is why we have been excessively tolerant toward those who claim the right to use technology as they see fit, and who are wont to treat every attempt by society to regulate such use in the public interest as if it were a modern repetition of the persecution of Galileo!

Assuredly, we have the right to use the instrumentality of law and of government to protect ourselves against technological injury. Yet this simple truth is obscured by the effective way in which opponents of protective measures play upon the layman's respect for science—in a conscious or unconscious attempt to brainwash the public so it will accept their argument without debate. When attacking legislation that would restrain the user of technology, it is common practice to argue as if at issue were acceptance of a law of science. Yet what is being discussed is not science but the advisability or legality of the technological exploitation of science. The public would not be deceived by such arguments if it clearly understood the fundamental difference between science—which is *pure knowledge*—and technology—which is *action* based on knowledge.

WHETHER OR NOT A PARTICULAR TECHNOLOGY HAS HARMful potentialities should be decided by competent and disinterested professionals; it is not a proper subject for adversary proceedings and, above all, ought never be left to those who wish to use it. Destructive technologies are often highly profitable for those promoting them. They have a vested interest in the technology; it may give them money, reputation, power. They are an interested party to the conflict between private and public interest that every potentially harmful technology poses. Moreover, they are nearly always practical men more knowledgeable about *efficiency* in using a technology than about the *legal and social implications* of such use.

I think one can fairly say that the *practical* approach to a new scientific discovery and its utilization through technology is usually *short-range* and *private*, concerned only with ways to put the discovery to use in the most economical and efficient manner, little thought being given to its ultimate consequences. The *scholarly* approach—if I may use this term—is *long-range* and *public*; it looks to the effects which a new technology may have on people in general, on the nation, on the world, on present and future generations. And this, of course, brings us back to ecology and the vital part it could play in assigning to technology its proper place in human affairs.

How we use technology profoundly affects the shape of our society. In the brief span of time—a century or so that we have had a science-based technology, what use have we made of it? We have multiplied inordinately, wasted irreplaceable fuels and minerals, and perpetrated incalculable and irreversible ecological harm. I have thought much about this, and I can find no evidence that man contributes anything to the balance of nature—anything at all. On the strength of his knowledge of nature, he sets himself above nature; he presumes to change the natural environment for *all* the living creatures on this earth. Do we, who are transients and not overly wise, really believe we have the right to upset the order of nature, an order established by a power higher than man?

These are complicated matters for ordinary citizens to evaluate and decide. How to make wiser use of technology in future is perhaps the paramount public issue facing electorates in all industrial democracies. A free society centers on man. It gives paramount consideration to human rights, interests and needs. But once ordinary citizens come to feel that public issues are beyond their comprehension, a pattern of life may develop where technology, not man, would become central to the purpose of society. If we permit this to happen, the human liberties for which mankind has fought, at so great a cost of effort and sacrifice, will be extinguished.



EN MONTHS AGO GROUND WAS BROKEN FOR WHAT SOME hope and others fear will be a classic landmark in the relentless human subjugation of the natural environment. Within a few weeks, in what has been wild Florida swampland, the first runway of a new pilot-training airport will become operational. By 1980 or sooner, if all goes according to plan, this beginning will have been transformed into the world's largest commercial jetport, occupying 39 square miles in the heart of the ecologically fragile Everglades-Big Cypress Swamp region and signaling far-reaching change.

With planes, of course, come noise and pollution. Airports also must be linked with the places they serve. And they quickly spawn motels and other supplementary facilities. In this case, an interstate highway and a high-speed ground transportation line—perhaps exotic in terms of

today's technology, and probably noisy—are projected as links with Miami and Tampa. And all this is sure to be followed by another surge in the Florida land-development boom. Some predict a brand-new metropolis of a million or more in the jetport area.

Only a half-dozen miles from the jetport site is Everglades National Park, created two decades ago to provide a wilderness sanctuary for the profusion of birds, plants and other fascinating life-forms sustained by south Florida's subtropical waters and wetlands. Some of these living things are on the thin edge of survival. Already imperiled by human competition for, and manipulation of, vital water flowing from Lake Okeechobee in the north, the park and its living wild communities face a serious new threat in the prospect of the giant jetport and its aftermath. Pesticides and other contaminants from outside could imperil

# Photographs by M. Woodbridge Williams



Devastation marks the bulldozer's course at the Everglades jetport. Above, part of Bloodhound Hammock, until recently an undisturbed home for many distinctive living things, such as the colorful tree snail on this issue's back cover. Below, mountainous ridges of dolomite, or limerock, stretch where it is being gouged from the cypress swamp for fill.





the wildlife. Land drainage would divert more of the precious water. Noise would cancel much of the inspirational value for human visitors. All drastic changes in the swamps to the north would undercut a total ecosystem of which the park is but part.

So evident is the danger to this exceptional national resource that Secretary of the Interior Walter J. Hickel and Secretary of Transportation John A. Volpe recently announced creation of a joint committee to investigate the environmental implications of the jetport plan before any further federal commitment to support it financially. The Senate Committee on the Interior also conducted two recent hearing sessions on the plan and on flood-control projects of the Army Corps of Engineers which affect the park.

Will the jetport go forward, or might it perhaps be moved elsewhere? The Dade County Port Authority, owner of the giant site and local sponsor of the project, and the Federal Aviation Administration, which administers federal aid for airport construction, say they consider no alternative site desirable, but national conservation organizations have urged an effort to find one.

National Park Service Photographer M. Woodbridge Williams recently traveled to south Florida to record what is happening at the jetport site. An eloquent sampling of what he found, and some glimpses of Everglades National Park, are contained on these pages.





A segment of Everglades National Park sweeps to the horizon from a plane a few miles southwest of the jetport site. A brightly flowered bromeliad, an air plant related to the pineapple, at left adorns a lichen-laced dwarf cypress in the vicinity of the jetport. Below is the Everglades' special trademark, a lurking alligator.



Slashing across remnants of bulldozed cypress swamp, seven miles north of the boundary of Everglades National Park, are the nearly completed initial runway and taxiway of the projected Dade County Port Authority jetport, planned to be the world's largest. From the downed trees, strewn like match-

sticks amid displaced muck and marl of the swamp bottom in the foreground, to the landing strip's far end is a distance of two miles. The thin white streaks near the horizon are borrow pits supplying the foundation fill. Sponsors expect eventually to double the strip's length





A striking pattern is formed by sawgrass prairie and mangrove-bordered watercourses in Everglades National Park. A dragonfly balances adroitly on a rush tip in the park's watery world. Lush subtropical plant growth crowds the edge of a hardwood hammock.





# How Fire Helps the Big Trees

# BY HAROLD WEAVER AND HAROLD BISWELL

# PHOTOGRAPHS BY HAROLD WEAVER

GIANT SEQUOIA, ALSO CALLED BIG TREE, IS LIMITED IN natural distribution to about 70 scattered groves on the western slope of the Sierra Nevada mountains in California. Almost without exception, those observing the groves have noted the characteristic absence of sequoia seedlings on undisturbed sites, and their presence wherever the soil has been exposed by fire or other disturbance.

On a trip through the southern groves in the summer of 1875 John Muir observed that "seedlings, saplings, young and middle-aged trees are grouped promisingly around old patriarchs, betraying no sign of approach to extinction. On the contrary, all seem to be saying everything is to our mind and we mean to live forever." Muir noted that most reproduction occurred in disturbed areas where there was fresh mineral soil. He saw 86 young giant sequoias on half an acre of ground in an area of burned chaparral. In a ravine of rough, bouldery soil that had been scoured by flood waters he counted 536 young giant sequoias. Along an extensive landslip of about 50 feet he observed that ". . . many companies of hopeful seedlings and saplings were growing confidently on the fresh soil along the broken front of the avalanche." Muir also mentioned that the fall of old trees and the burrowing of animals stirred the soil and furnished seedbeds for the constant renewal of the giant sequoia forests.

In Trees of California (1923), Dr. Willis Linn Jepson noted that in the southern groves, giant sequoia seedlings appear in large numbers, particularly on "burns" or fire spots still protected by the mother forest. Walter Fry and John R. White in their book *Big Trees* (1930) confirmed that the seeds of giant sequoia had no chance of direct contact with mineral soil unless the "crust," consisting of humus, debris and vegetable mold, could be removed. These authors listed forest fires, the uprooting of trees, landslides and erosion as agents providing the necessary exposure.

In an article on fire ecology of the giant sequoias (1964), Richard J. Hartesveldt wrote: "The sequoia story is one of repeated disturbances that have set back the succession of other plants and have favored the reproduction of giant sequoia, a tree of intermediate position in plant succession. Fire is the most important disturbance factor in this story. Wildfire has been a natural environmental factor throughout the evolution of the species. In fact, the sequoia could not have evolved or survived as it has without frequent fires." Recent studies by James Agee, graduate student in forestry, University of California, Berkeley, and Harold Biswell revealed that more sequoia seedlings start and survive on burned spots than on spots that are not burned. In

> To the left of the majestic giant sequoia specimens in the photograph can be seen a grove of young sequoia sprung up where other conifers were logged and slash was burned in the mid-1940's in California's Mountain Home State Forest. Note the dwarfed human figure to the right of the central tree.



another article, in 1967, Hartesveldt pointed out that fires have a qualitative as well as a quantitative relationship to sequoia regeneration. The hotter fires seem to produce better conditions for seedling survival than do light fires or other conditioning of the substrate.

During the past two summers we observed giant sequoia regeneration in several of the southern groves. Reproduction was especially abundant on heavily burned areas that have since been protected against fire. In the primitive forests, fire was no doubt the most important natural agent creating suitable seedbeds for giant sequoia reproduction. But the same surface fires that prepared seedbeds also killed most of the reproduction that had followed earlier fires. Under primitive conditions the seedlings that had the best chance of surviving surface fires were those in moist places and in open spots least subject to the spread of such fires.

Under our present fire protection policy the objective is to suppress all fires as quickly as possible. Even so, small spots in the deep duff are occasionally burned by lightning fires, thus creating ideal conditions for the reception of seeds and for seedling growth. In burned areas of this sort, seedlings often appear in great abundance and produce stands that are too dense. Because surface fires are now suppressed, they no longer serve as a thinning agent.

Thus the general abundance of giant sequoia seedlings in the groves as a result of earlier fires has now been decreased through excellent fire protection. On the other hand, certain of man's activities have resulted in an increase in sequoia regeneration in some places. For example, road building through Big Tree groves has created bare roadbanks in which regeneration may take place. But the most important agent, by far, has been logging operations followed by burning of slash. Before 1910, about 7,550 acres (21 percent) of the giant sequoia lands in California were logged. Another 13 percent had been logged by 1945. Fortunately, few if any of the old-growth trees are being felled at present. Most of the giant sequoia lands are now in public ownership-including 98 percent of the area that had been cut over by 1945-and are protected against logging operations.

WHITAKER'S FOREST, ON THE WESTERN SLOPE OF REDwood Mountain, dramatically illustrates the influence of site disturbance in establishing giant sequoia reproduction. This 320-acre forest next to Kings Canyon National Park was logged from 1873 to 1879. Sugar pine and ponderosa pine were the principal trees cut, but 223 mature sequoia —nearly half of the original stand—also fell to the woodman's ax and saw. On his trip through this area in 1875 John Muir noted the heavy logging operations that led to site disturbance ahead of the seeding of this area. "In this glorious forest," he wrote, "the mill was busy, forming a sore, sad center of destruction, though small as yet, so immensely heavy was the growth. Only the smaller and



Second-growth giant sequoia in Whitaker's Forest where heavy logging and firing about 90 years ago created conditions ideal for regeneration. The forest adjoins King's Canyon National Park.

most accessible of the trees were being cut. The logs, from three to 10 or 12 feet in diameter, were dragged or rolled with long strings of oxen into a chute and sent flying down the steep mountainside to the mill flat, where the largest of them were blasted into manageable dimensions for the saws. And as the timber is very brash, by this blasting and careless felling on uneven ground, half or three fourths of the timber was wasted."

Today there is little evidence of early logging in Whitaker's Forest except for the massive stumps of giant sequoia that are still standing, showing but little decay. The reproduction that followed is now up to 180 feet tall and in many places forms dense stands. Such excellent reproduction is no exception and is usually seen on all areas heavily cut in earlier logging operations. Of course enough old trees had to survive the ax and saw to provide seed for the cutover areas.

Another excellent example of giant sequoia reproduction following logging disturbances and burning of piled slash is found on the Mountain Home State Forest a few airmiles south of Whitaker's Forest. This forest is managed by the California Division of Forestry to demonstrate good

Harold Weaver for many years was with the Bureau of Indian Affairs. Harold Biswell is professor of forestry at the University of California, Berkeley. Both have made extensive studies of fire ecology.



A lightning strike on incense-cedar two decades ago resulted in this sample of sequoia regeneration in Mountain Home State Forest. Fire can create a perfect sequoia seedbed.



Avalanches also can help regenerate the giant sequoia. A youthful visitor to Mountain Home Forest, Janet Stuhl, inspects a thriving stand of young trees amid mountain boulders.

forestry practices for recreation, aesthetics, wildlife and timber. Pines, white fir and incense-cedar are harvested for economical management of the area, but the giant sequoias remain virtually untouched. In each of the logged areas, giant sequoia reproduction occurs both on the areas of burned slash and on those disturbed only by bulldozer and skidding. It is certain that if there were several heavy logging cycles this forest would become essentially one of pure giant sequoia.

Fruit of the giant sequoia is a flat, oval-shaped seed roughly  $\frac{1}{4}$  inch long and  $\frac{3}{16}$  inch wide. There may be as many as 91,000 in a pound. The kernel, a thin, dark stripe down the center of the seed, is surrounded by a flat, stiff, golden-brown wing. Seeds are cast around the first of October and may be blown a distance of 580 feet in favorable winds. If the seeds fall on duff, they are wasted. Those falling on ash or in loose soil, however, may be covered by a light rain and thus come in contact with the mineral soil. Not only are the seeds minute, but the young seedlings are also small and fragile. Fry and White pointed out that young seedlings are attacked by many destructive agencies such as birds, cutworms and large black wood ants. Fungi probably play an important role in preventing germination and survival, and certainly soil moisture deficiency is one of the more important limiting factors.

Among techniques for creating mineral-soil seedbeds, prescribed burning would be the most natural and perhaps the cheapest. If seeds are available, regeneration is certain to follow on the burned areas. If prescribed burning is followed by fire exclusion there is an excellent chance of survival of some seedlings. The most effective fire, although somewhat dangerous, would be one in late September immediately before seed fall. It should be intense enough to kill most of the small trees in the understory of giant sequoia and remove the duff to mineral soil. However, springtime fires that destroy logs and other heavy debris in spots are quite satisfactory. The bulldozer is another means of creating mineral-soil seedbeds but is probably more expensive than burning. A third method is to plant young growing stock in open spots. Any or all of these measures will insure sequoia regeneration for the future. Very little reproduction, however, is necessary to perpetuate stands of giant sequoia that may live for 3,000 or 4,000 years.

# News and Commentary

## Secretary Hickel Issues Park Policy Guidelines

Secretary of the Interior Walter J. Hickel on June 18 approved a memorandum establishing fresh policy guidelines for the national park system. Part of the memorandum's emphasis was on providing more parks and park activities in and near large urban centers. The secretary asked the National Park Service to develop, with the Bureau of Outdoor Recreation, a plan for an expanded program of federal and federally aided acquisition of park and recreation land to serve such centers. He also asked for new approaches to using urban-area parks, including environmental education, and for development of nearby hostel facilities and group camps.

Another emphasis was on protecting natural values by developing mass transportation to reduce automobile intrusion, and by increased regional planning to spread the recreation load beyond the parks.

"It has become increasingly obvious in many parks, especially in Yosemite National Park during the height of the summer season, that the private automobile is impairing the quality of the park experience," the memorandum said. "As our population continues to increase in the decades ahead, accompanied by the growth in private automobile ownership, this condition will worsen unless we begin to deal with it now. Mass transportation facilities, such as shuttle buses, tramways, etc., will not only transport more people—they will better protect the resources of the park. Moreover, mass transportation facilities in many instances will enhance the quality of the park experience."

In this connection, Mr. Hickel said, "before major park road construction is initiated in the future in any natural area, I wish a thorough study to be made of alternative methods of access and transportation."

On regional recreation development the secretary cited a recent grant by the Department of Housing and Urban Development for planning in the Gettysburg National Military Park area as a sample of what he would like to see elsewhere.

On other scores the memorandum:

• Called for accelerating studies of prospective wilderness areas.

• Committed the Park Service to government operation of park system campgrounds, instead of concessioner operation, and proposed a citizen-government task force to consider long-range camping objectives.

• Suggested increased cooperation with foreign national park agencies, including formulation of a North America park and recreation plan in time for the 1972 Yellowstone centennial observance and second World Conference on National Parks.

# Toward a Better Environment

President Nixon's creation late in May of a White House-level Environmental Quality Council and a supporting Citizens' Advisory Committee on Environmental Quality hopefully marks the advent of a more aggressive attitude in Washington toward the deteriorating human habitat. The President himself heads the council, which includes Vice-President Agnew and the Secretaries of Agriculture; Commerce; Health, Education and Welfare; Housing and Urban Development; Interior; and Transportation, and will operate through the office of the President's science advisor, Dr. Lee A. Dubridge. Laurance S. Rockefeller heads the 15-member advisory committee, formerly the Citizens' Advisory Committee on Recreation and Natural Beauty.

Under the executive order establishing the two bodies the council is charged with recommending steps to insure that federal policies and programs take adequate account of environmental effects, reviewing existing systems for monitoring and predicting environmental changes, fostering cooperation in environmental programs, advancing scientific knowledge and technological development to prevent or minimize adverse environmental impacts, stimulating antipollution pro-

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grams, encouraging public disclosure of plans affecting environmental quality, assuring assessment of changing technologies, coordinating pertinent federal activities and reviewing federal plans and actions affecting outdoor recreation and natural beauty. The Rockefeller committee will advise the President and council on the same wide spectrum of subjects.

Legislation still is under consideration in Congress which would create a more independent White House environmental arm, an approach indorsed by National Parks Association President Anthony Wayne Smith in a statement printed in last month's magazine.

# **Congress Studies Additions**

Two potential additions to the national park system, both supported by the Nixon administration, recently began moving through the lawmaking process in Washington. One is the proposed Buffalo National River in Arkansas which would stretch for 132 miles, nearly the full length of a still almost unspoiled waterway noted for its fishing and scenic beauty. The Department of the Interior last month recommended legislation authorizing a 95,730-acre reservation. Senate hearings were held in March, and a House hearing is awaited.

On June 20 the Senate approved legislation authorizing acquisition of 6,000 acres of private land for the proposed Florissant Fossil Beds National Monument in Colorado, an area of rich insect, leaf and tree remains dating back 40 million years. As this was written the measure was scheduled for a hearing in the House Interior Committee.

### **Rebuff** on Assateague

Representatives of a dozen organizations met on June 18th with National Park Service Director George B. Hartzog, Jr., on the issue of the Service's development plan for Assateague National Seashore in Maryland. An unexpected development at the session was the assertion by Mr. Hartzog that the Service does not contemplate any public hearing on the plan. Service officials indicated earlier that one could be expected in the wake of the recent announcement of Secretary Hickel's instructions to the Service to conduct public meetings on all future park master plans.

In the case of Assateague, Mr. Hartzog said, the Service considers that the plan actually was settled more than a year ago, when Service intentions were outlined to the House Committee on Interior and Insular Affairs. While a master planning team is still at work, it is engaged only in certain supplemental studies re-



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lated to the region, he said. He declined to meet with the conservationists on possible revisions.

Despite the rebuff, National Parks Association President Smith on behalf of the group requested additional documentation and urged that the Service give serious consideration to the NPA plan for the seashore. The latter plan would restrict development on the seashore itself and look to tourist facilities chiefly on the mainland with public transportation to the beach.

After the conference with Mr. Hartzog the conservationists met with Director John S. Gottschalk of the Bureau of Sport Fisheries and Wildlife. This discussion concerned the future of Chincoteague National Wildlife Refuge, part of the seashore, which would be vulnerable to overdevelopment on the rest of Assateague Island.

On a related question, NPA President Smith in a recent letter to Secretary Hickel urged that three nearby Virginia islands, Smith, Ship Shoal and Myrtle, be acquired by the federal government to protect them against threatened private development. Mr. Smith offered to have NPA undertake a technical study of the three islands. In another letter he commended the chairman of the Virginia Outdoor Recreation Commission, Fitz-Gerald Bemiss, for a suggestion that the islands be added to Assateague National Seashore.

## **Two NPA Overseas Tours**

Association members who have not yet done so will want to take note of the two exciting conservation-oriented overseas trips which are being planned as a part of NPA's new World Travel Program. One, to East Africa, will take tour members to Kenya, Tanzania and Uganda and visits to some of the world's richest wildlife habitat as well as most striking scenery. This 21-day tour will start on November 5. The second tour will go around the world with a stopover for the meeting of the International Union for Conservation of Nature in New Delhi, and will begin November 8. More detail will be found in the ad on page 23.

#### **Refuge Enlargements Approved**

Approval of additions to Okefenokee National Wildlife Refuge in Georgia and the J. N. "Ding" Darling National Wildlife Refuge on Sanibel Island in Florida was announced last month by the Migratory Bird Conservation Commission in Washington. The Bureau of Sport Fisheries and Wildlife will acquire 3,110 acres for Okefenokee and 234 acres for the Darling refuge.



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# REVIEW

## THE BLUE RIDGE PARKWAY

### By Harley E. Jolley

University of Tennessee Press, 1969. 172 pages with 62 black and white photographs and five maps. \$6.95 (paper \$2.95)

Reviewed by Darwin Lambert

Dr. Jolley declares in his preface that few of the "more than nine million visitors" who travel Blue Ridge Parkway each year "have any inkling of the dreams, labors, controversies, lobbying and politicking that were brought into play to make the magic of this mountain scenery available to them." He then pre-sents these factors in a way that (despite thorough documentation by footnote and bibliography) might tease and hold, even, those readers not normally intrigued by history. There are controversies over who is the father of the Parkway, quarrels (notably between North Carolina and Tennessee) over the routing, and troublesome disagreements with mountain folk and Cherokees over rights of way and scenic easements.

A professor of history (now at Mars Hill College, N.C.), the author has spent eleven summers as a seasonal historian with the National Park Service, mostly concerned with the Parkway and its region. He reveals modern meaning and possibly hope for the future in the blossoming—from cauldrons of controversy and efforts to relieve the hardships of the Depression—of a great "road for pleasure" which preserves the "work of nature."

The book will increase public understanding of how national park areas are secured, developed and protected, and for many it will add a new level of enjoyment to Parkway travel. While predominantly political-historical, it does contain brief guide material and advice on "things to see and do," and it does, especially through its photographs, evoke the mountain scenery and the fascinations of the frontier-mountaineer culture.

Mr. Lambert, a free-lance, is researching a book on the Shenandoah region.

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