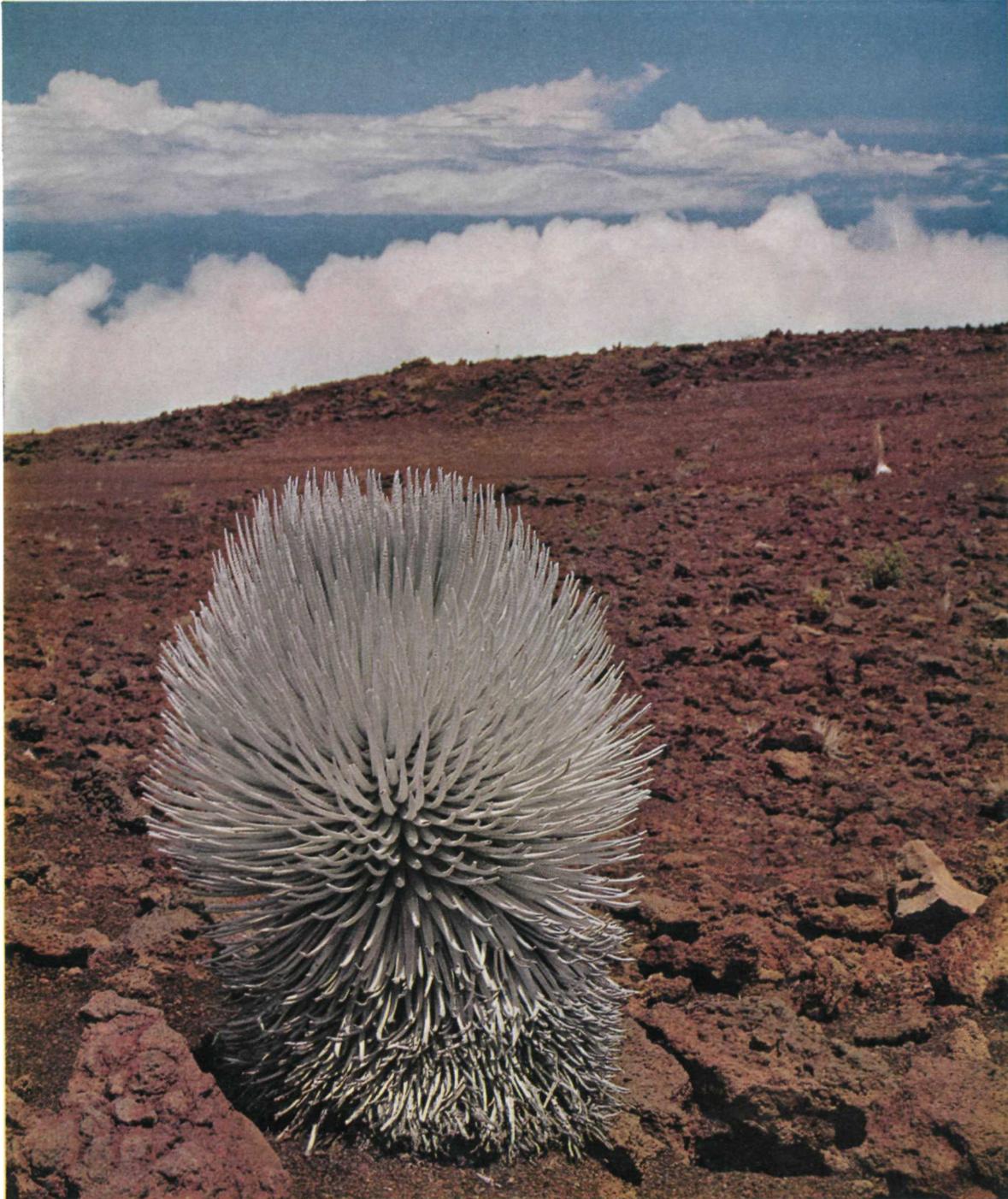


NATIONAL PARKS *Magazine*



Silversword on the rim of Haleakala Crater:
Haleakala National Park, Island of Maui, Hawaii

October 1967

Urban Gardens

THE TRAGIC VIOLENCE WHICH ERUPT-
ed in a dozen of the big cities of
America last summer has many roots;
among them unemployment, poor edu-
cation, bad housing, evil slums, high-
pressure mass-media gadget-monger-
ing, far-off agricultural dislocations,
the general population explosion, the
decay of psychological communities,
and the deep racial cleavage which
presses so insistently for humane solu-
tions.

Environmentalists will be concerned,
however, with a special aspect of the
problem, involving in varying meas-
ure all the economic and ethnic groups:
the grave deterioration of the environ-
ment and the ugly congestion which so
broadly characterize the modern super-
city, as a whole.

A catalog of the familiar urban ad-
versities can easily be compiled:
crowded run-down houses, rubbish-lit-
tered streets lined by utility poles in-
stead of trees, sidewalks overhung by
garish signs, and interiors of blocks
fenced off into useless yards choked
with garages and garbage cans; no
trees, no grass, few birds but starlings,
plenty of rodents, no quietude, no pri-
vacy, no commons, no community. And
enveloping all, polluted atmosphere,
and the steady, day-long, night-long
rumble and roar of traffic.

The suburbs provide an escape for
those who can afford it, to insulated,
artificial, one-purpose dormitory neigh-
borhoods where family life is separated
from work, and the remnant country-
side is constricted to a pocket-sized
lawn, compulsively mown, wedded to
the endless twice-daily traffic battles to
get into and out of the city.

Many new statutory tools and insti-
tutions have been created in recent
years in an effort to cope with most of
these problems. Indeed, the tool kit is
replete, and our present difficulties turn
more around the purposes and manner
of their use.

There is a growing consensus that a
main objective must be the creation of
open cities, where green space is cher-
ished, where population densities, hori-

zontal and vertical, have been reduced,
and where the pressures of the traffic
have been moderated.

A few constructive goals and policies
can be suggested.

Neighborhood rehabilitation, re-
deeming, repairing, improving usable
housing, should be substituted in con-
siderable part for demolition and high-
density, high-rent reconstruction. Part
of our problem has been that urban
renewal has evicted poor families that
have had nowhere else to go.

As tax-delinquent property is ac-
quired by the cities, or donated, as in
Philadelphia, in exchange for tax re-
mission, the buildings can be reno-
vated, or if too far gone, demolished
and the land cleared for "vest pocket"
parks. Properties condemned for struc-
tural deterioration can be treated like-
wise. Replacement housing in the same
neighborhood at moderately higher
vertical density will conserve the new
open spaces.

The concept of the super-block is
still viable. The interior streets in, say,
a four-block area of conventional grid-
iron layout can be closed off to through
traffic, narrowed to one-lane width,
walled, gated at the entrances, and re-
tained for service and emergency use
only. The space thus saved can be con-
verted into a central square, into lat-
eral park strips, playgrounds, and
pools, and into limited parking areas
restricted to neighborhood residents.
The old alleys which sub-divided the
blocks would become footways.

Interiors of the blocks which would
thus be consolidated would be merged
into parks or commons, planted to
grass and trees, made available in part
for flower gardens or vegetable gar-
dens. One of the great drawbacks of
modern city life is the loss of a nearby
supply of fresh-grown food: the loss
must be felt rather keenly by urban
immigrants recently displaced from the
countryside. Roof-top space should also
be utilized; most slum and other city
housing has flat roofs, largely wasted;
structural strengthening may be need-
ed sometimes, but the space should be

converted to roof gardens and sun
decks.

The space lost for car parking and
the flow of traffic when the interior
streets of the super-blocks are closed
can be found by removing curbside
parking from the remaining open traf-
fic arteries. Such parking will have to
go underground or into high struc-
tures. Publicly owned facilities should
be provided if private operators fail to
accept the challenge. Or the traffic con-
gestion can be reduced, together with
air pollution, by holding the suburban
traffic outside the city at peripheral
parking facilities, and providing pleas-
ant, fast, modern, mass transportation
to the center.

It is essentially a question of whether
people or traffic will be given priority;
people are the important things, and
the traffic must yield.

The new open space, green space,
parks, commons, which would thus be
provided would help to change the en-
tire quality of life in our cities and
would be a pattern for all the neighbor-
hoods, not merely the slums and ghettos.
The natural setting, from which
men have been divorced as they de-
serted the countryside in search of jobs,
would re-establish itself in the urban
world like a benediction.

The revitalized neighborhoods would
have room in them for new structures
to replace the relatively small volume
of clearance, community facilities
among them. Paid or voluntary neigh-
borhood work programs, turning
around rehabilitation and maintenance,
would be developed; training work-
shops would be established, special
classrooms, schools, libraries, meeting
rooms, chapels, all fitted into the neigh-
borhood, and hopefully saturated in-
creasingly with a sense of community.
Neighborhood organizations and self-
government would be fostered.

Can we visualize and create a new
physical environment of such spacious-
ness, quietude, and beauty, and a re-
stored moral environment of such
brotherhood and cooperation?

—A.W.S.



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Front cover photograph by David Muench

The exploration of islands remote from continental land masses has always held a fascination for scientists, and has often been scientifically rewarding. In the case of the Hawaiian Islands, rewards were particularly rich; for these immense volcanic piles, with roots some 18,000 feet below sea level, supported a wide variety of plant and animal life that had arrived, over the centuries and by one means or another, from afar to adapt to new homes and new conditions. This issue looks at one of the rare plants of the Islands—the Haleakala silversword—and at some of the archipelago's colorful bird life of both present and past.

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 35,000 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, 1300 NEW HAMPSHIRE AVENUE, N. W., WASHINGTON, D. C. 20036

Over-Use of the National Parks

"The damp night air, heavy with a pall of eyewatering smoke, is cut by the blare of transistor radios, the clatter of pots and pans, the roar of a motorcycle, and the squeals of teenagers. Except for hundreds of shiny aluminum trailers and multicolored tents squeezed into camping areas, this might be any city after dark."

SO READ PART OF A FRONT-PAGE story in the *Wall Street Journal* of June 24, 1966, titled "Ah Wilderness; Severe Overcrowding Brings Ills of the City to Scenic Yosemite." Apparently stimulated by this story, a number of national magazines and newspapers

have run articles about over-use of the national parks until now it is knowingly referred to by almost anyone you talk to. It has even been on TV.

The six million visitors to the Great Smokies are often mentioned, as are Yellowstone's two million. But Yosemite's 1.7 million visitors are attracting the most attention of all because most of them are crammed into Yosemite Valley, which comprises only eight square miles. The *Wall Street Journal* story claimed that on an average summer day the Valley contains three times the number of people per square

mile than does Los Angeles County. It is because of the uncompromising limits established by the sheer granite walls of Yosemite Valley that the problem is coming to the fore there. Such severe problems can be avoided in other parks by building more facilities. However, this is no solution. It has often resulted in the erosion of natural areas, the loss of wilderness, and an increase in the problems of an urban nature. Perhaps it is fortunate that this opportunity is not available in Yosemite, as it is forcing attention on the problem before it occurs in all of our

Standing-room only at Sequoia National Park's Giant Forest parking lot.

Photograph courtesy National Park Service



By Warren A. Johnson

most famous national wilderness parks.

It may be that, once a situation such as that in Yosemite establishes itself, the attention it attracts serves to intensify it. The gregarious individual becomes interested in the parks—the one who was not interested when they were frequented more by the nature seeker. The best example is the teenagers who flocked to the Valley when they discovered that many other teenagers were there looking for adventure, too, and without many of the restrictions of home. At the same time, those visitors who are interested in the beauty of the Valley become increasingly repelled by the antics of so many other people.

The net result is that the average visitor moves farther toward the gregarious end of the visitor spectrum. The people interested in the intrinsic values that the park was established to protect become fewer and fewer. The policy of the National Park Service is to preserve these unique areas for the enjoyment of the people. But many people who come to the parks are not interested in Park Service policy; many are obtaining a recreational experience that could be obtained in other recreation areas. It is evident that many parks are not being used appropriately. The present use of Yosemite Valley is in brutal contrast to the sublime natural beauty of the "Incomparable Valley."

Conflict of Interests

It is not a fruitful endeavor to try to limit the use of the parks to those who appreciate them in the manner visualized by the framers of the 1916 organic act of the National Park Service. The conflict between the "mass recreationist" and the "purist" could hardly be considered by a government agency because of its implications of mass tastes versus cultural elitism. And besides, in a democratic society no one should be discriminated against, although the "purist" is being effectively discriminated against in many cases of overcrowding. But even if ac-

cepted in principle, this discrimination probably could not be carried out in practice.

Consider a hypothetical national park with developments that are generally considered to be appropriate, such as an access road, a campground, a visitor center and trails. Two different visitors may make completely different use of the same park. One may go to the visitor center, avidly learn everything possible, and then hike the trails to see first-hand what he has learned. The second visitor may sit in his camper and play cards all day. At present, there seems to be no way to separate these visitors.

The best that the National Park Service can do is to provide the opportunity for all visitors desiring to visit the parks to do so, but commensurate with similar desires of others, and under conditions which have the widest public acceptance. In the past, the parks have had the firm support of "purists" and "recreationists" alike to preserve the quality of the national park experience, even though this is a very different experience to different people. Unfortunately, the national park experience may be incompatible with the demand which is developing for it.

It is easy to become pessimistic. Almost every list of problems facing the national parks includes over-use; but so far, efforts to overcome it have been disappointing. It was hoped that provision of alternative recreation sites would syphon off much of the demand for recreation in the national parks. But the quality of the resources in the parks is so superior that the alternatives just cannot compete very successfully. There is only one Mount Rainier, Sequoia and Everglades, and they have to be pretty crowded before many people will go elsewhere.

In Yosemite, it was felt that if non-conforming uses, such as dancing and movies, were eliminated, then use patterns would improve. But this has not been the case. It appears that the scenery, the opportunity to camp and

swim in the river, the pleasant summer temperatures and the millions of people living within a few hours' drive are enough to result in over-use of Yosemite. The problem seems particularly intractable because demand is rapidly increasing for resources which are fixed in quantity.

Two Encouraging Trends

The major problem seems to be that the parks are being used in an inappropriate manner. Are these superlative areas to be swallowed up in the recreation boom, to be used as any other recreation area without regard for their great cultural and spiritual potential? Let us hope not. There are two trends under way which do offer hope, if effectively encouraged. One is the increase in day use and the other is the rapidly expanding technology of transportation. The two are closely related.

In 1953, visitors to Yosemite who did not stay overnight accounted for 36.1% of all visitors. Last summer this figure was 54.9%. It is only because of this increase in day use that the park has been able to accommodate a continually increasing number of visitors, since the overnight facilities have been filled to capacity for years. What increase there has been in overnight use has been at the expense of terrific overcrowding. It is the overnight users who are primarily responsible for over-use, since they stay so much longer; last year they accounted for 73.2% of the 3.6 million visitor days recorded in the park. They are primarily responsible for the juvenile delinquency, the smog, and the ecological damage to areas used as campgrounds, overflow campgrounds and wood-gathering areas. And although an overnight stay has traditionally been a part of the national park experience, and on its own merits is desirable, the whole experience is being lost primarily because of the demand for overnight use.

It is doubtful if overnight use ever could, or should, be eliminated. If Yosemite Valley were empty at night, part

of its potential for inspiring visitors would not be utilized. But the number of overnight visitors it can support is small. What must be done is to ration the available overnight use among the

many desiring it, probably by drastically limiting the length of stay. The allowable visit should be short enough so that everyone desiring to stay overnight would be able to find facilities to

do so while leaving plenty of space for day users. Since the allowable visit would have to be quite short—probably around three days—those visitors who are looking for a camping experi-

Most of Yosemite Park's 1.7 million yearly visitors are crammed into Yosemite Valley.

Photograph courtesy the "Fresno Bee"



ence primarily would decide on other recreation areas where they could spend their full vacation without restriction; a desirable effect.

In a place like Yosemite Valley day use is particularly appropriate; for once, the Valley's small size is an advantage. During the course of a full day it is possible to experience the tremendous natural environment that is Yosemite, to see the most notable features and still have time for several walks, a meal and a stop at the visitor center. Most campers do not do much more, since much time is often spent puttering around the campsite or relaxing on the beach. But day use is not without problems, at present.

To have a full day in the Valley requires a strenuous day—an early start and a late drive in the evening—by the time the trip is made both ways. Also, once in the Valley, roads and parking areas are jammed. If a public transportation system could be developed to take these visitors to the Valley rapidly, and to permit their free movement within the Valley, these objections to day use could be overcome. The ultimate objective would be a rapid transit system efficient enough to permit the exclusion of private cars.

Benefits of Car Exclusion

If this could be accomplished, there is no question that the park environment would be greatly enhanced, as visitors to Colonial Williamsburg, certain Alpine areas and Venice can testify. Far less space is taken up by transportation facilities, which leaves more room for people. The sounds of nature can once again be heard and the air is free of exhaust fumes. There is less disturbance to the ecosystem and more opportunity for intimate contact with it; far more than through the window of a car. People will be encouraged to walk, and to sit, and experience the essential elements of the environment, rather than the limited offerings of a crowded campground or a cabin.

But the creation of such a transportation system will not be easy. Practically all developments in the Valley evolved around the private car. Roads and parking areas would be useless without them. And it would be difficult to use the existing clearings and roadbeds for the public conveyance, since most of them would have to remain in

The basis for this article was a thesis written by the author for a master's degree in natural resource administration at the University of Michigan. While Mr. Johnson was formerly an employee of the National Park Service, the article was not intended to reflect Service policy in any way, nor was the subject connected with the author's duties.

use during construction of the new system. Even with the rapid advances in transportation technology, it may be some time before a workable system can be developed for a national park. Not only would it have to be functional but it could not be permitted to create unacceptable scars on the landscape.

Buses have been suggested to replace cars, but it is doubtful if they could gain wide public support because they are slower than cars and much less convenient. However, they may serve a useful purpose in facilitating the transition to public transportation, to help make the difficult jump into an environment without cars.

Transportation may well be the key to the question of how the national parks are to accommodate increasing millions of visitors without destroying the things that the people are coming to see. Without cars, far more people can be in a park, and under superior environmental conditions. Because of this, it would be worth while for the National Park Service to arrange for the services of consultants to study alternative forms of transportation in several parks with over-use problems.

But this is necessarily a long-range opportunity. For the present, something must be done about such conditions as already exist in Yosemite, and which are developing in other areas. For this purpose, rationing of use offers positive control. It can do three things: reduce the intensity of use, permit all who wish to visit the park to do so under acceptable conditions, and reduce the ecological damage which results from over-use. It will not keep people away, and should not, but will only reduce their length of stay so that others can come. And, could it be that visitors would enjoy the area more intensely when they realize that they have only a short time to stay?

Because, in Yosemite three days would have to be the limit in the summer to accomplish the objectives of

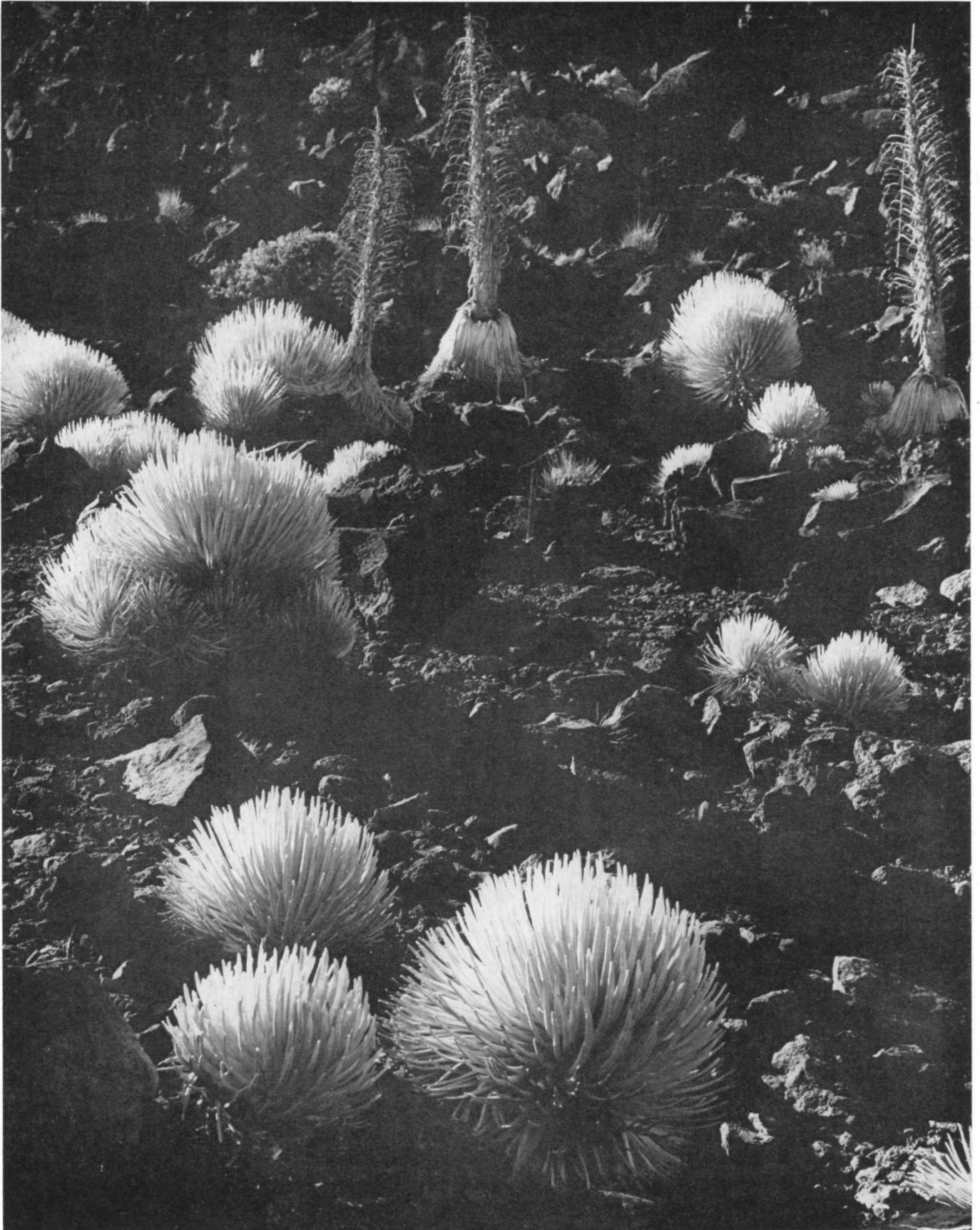
rationing. A longer period would not reduce the intensity of use adequately. At present, only 18.8% of the visitors to Yosemite stay more than three days, but these visitors account for 51.4% of the visitor-days of use. To accomplish such rationing, it would not only be necessary to limit the initial stay to three days, but also to prohibit subsequent visits. A visitor could not be permitted to turn around and re-enter for another three-day visit. Perhaps the entrance permit which is issued to a visitor when he enters the park could be used to do this.

To most of us who are ardently interested in the national parks, these proposals seem quite unattractive—having to leave our personal car out of the park and not being able to stay in some of the most famous spots as long as we wished. But the alternative is here already—tent cities, juvenile delinquency, noise, and most important of all, the erosion of irreparable natural beauty under the pressure of too many people. Without some change in use, the future of some of our best-known parks is obscure. Perhaps other alternatives will develop as more thought is given to the problem. But, can we count on a sure solution somehow evolving out of the future? It is doubtful.

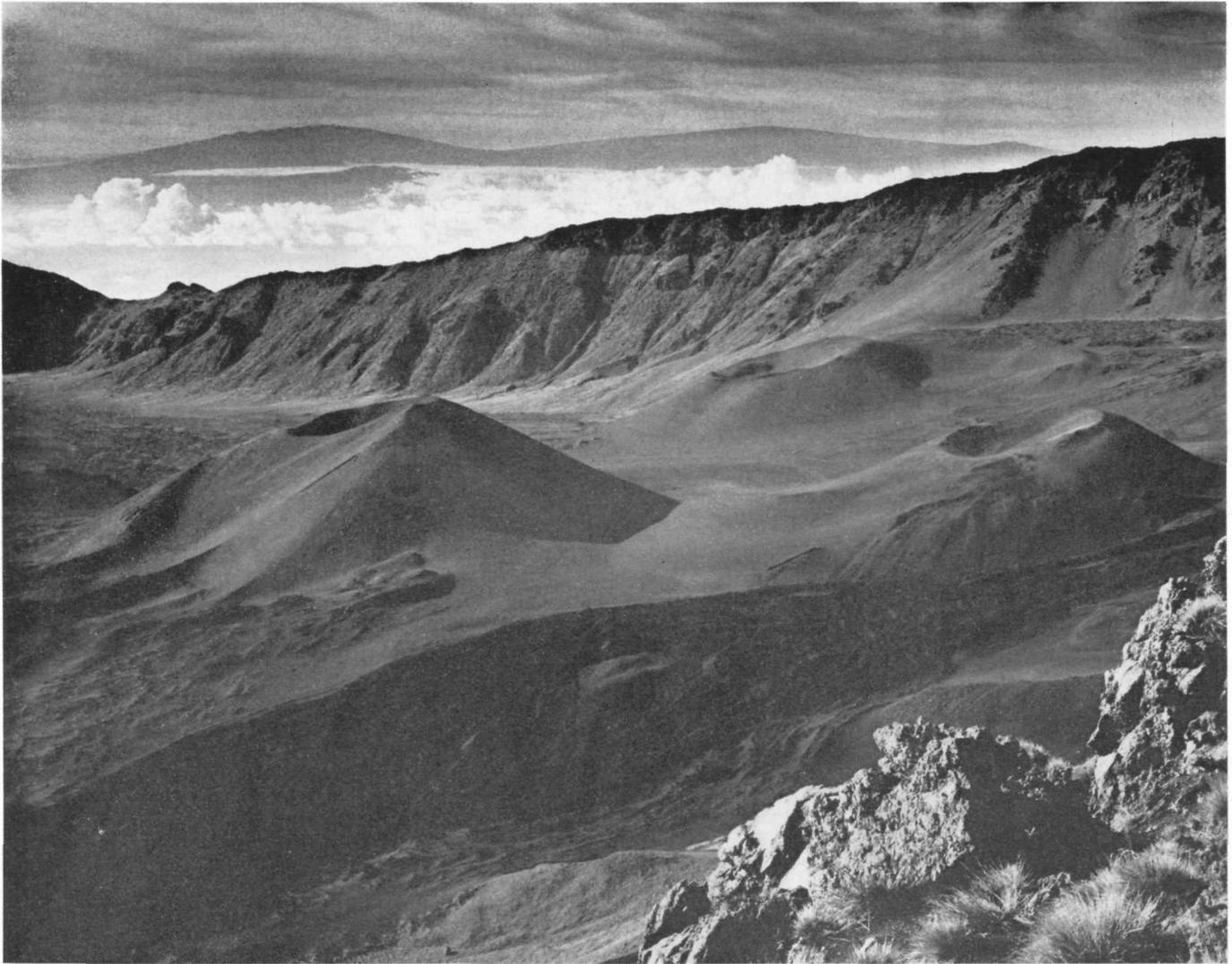
The Fundamental Problem

Why is it doubtful? Because in the long run, numbers are against us. The major conservation issue, facing not only the parks but the quality of our environment as a whole, is the growing population. The word "rationing" itself is illustrative. To most people it brings back memories of World War II. Since then it has rarely been used because this country is able to produce plenty of the necessary goods and services. But, for all our productive capability, we are not able to produce another Grand Canyon, Yellowstone or Yosemite. With each gain in the population, the availability of these places to each person decreases except as efficiency is improved.

The alternatives suggested here have been for the latter, improving the efficiency of use so that more of our burgeoning population can enjoy the parks. And yet, even these efforts will be inadequate without a leveling off in the population growth. ■



The Haleakala silversword, one of five related species native to the Hawaiian Islands, reflects a silvery-gray light from its dense clothing of fine hairs. Three plants in the picture above have sent up tall flower stalks and, having bloomed once, are dying.



On a clear day the rim of Haleakala Crater on the Island of Maui affords a view of the great Mauna Loa and Mauna Kea volcanoes on the Island of Hawaii.

The Silversword of Haleakala National Park

With two photographs by David Muench

MANY VISITORS TO HAWAII'S HALEAKALA National Park, picking their way through the upper reaches of Haleakala's barren cinder-fields, intrude into the domain of the Haleakala silversword. It is a somewhat shrunken domain, for this silversword, one of five species found in the Hawaiian Islands, once flourished on the slopes of several of the other great shield volcanoes there. Tourists of an earlier day, we are told, took odd pleasure in uprooting large specimens of this member of the Composite family to watch the ball-like plants roll down-

slope; this practice, along with the voracious appetites of some of the Islands' less fortunate animal imports, and some insect enemies, has reduced the numbers of *Argyroxiphium macrocephalum* to the present estimated 20,000, all confined to the upper slopes of Haleakala, the immense "House of the Sun."

On a pleasant day the park visitor finds silversword environment enjoyable, or at least endurable. But the visitor may leave at will, while the silversword must remain; its adaptation to the stinging radiation of the sun at this altitude is

evident in the fine hairs which clothe the incurving leaves, to both shield the plant and prevent excessive loss of moisture by evaporation.

After the silversword reaches a diameter of perhaps two feet it sends up a tall, straight flower-stalk with numerous lavender-petalled blooms, to produce brown seeds whose future will be anxiously watched by park botanists as well as by conservationists the world over. Having produced a single seeding the plant's mission has been accomplished, and it withers and dies. ■

HAWAII'S BIRD PARADISE

By Winifred Bell Fletcher

Line Illustrations by Betty Alexander

ABOUT TWO MILES NORTHWEST of Kilauea Volcano on Mauna Loa's lava-scarred flank lies Kipuka Puau, within Hawaii Volcanoes National Park, one of the world's most unusual bird parks—last refuge of the Big Island's vanishing bird population. Roughly oval in shape, it is an "oasis" of open forest encircled by more recent flows. Cut off by lava from the surrounding vegetation, Bird Park is habitat for some forty varieties of native trees; here flourish survivors of rare and beautiful avian families found nowhere else.

While exploring a grassy trail in this hundred-acre meadow dotted with *ohia*, soapberry, *kolea* and *mamane* trees, I was startled by a clear wolf-whistle: "whee-oo!" A little brown bird with black, white and gray markings and perky tail hopped out of the lush undergrowth. With forward-thrust, quivering wings it regarded me inquisitively, and then flew into an *ohia* and searched up and down the trunk for insects with its straight, sharp bill,

uttering nasal "yeekiks" as it fed. It was an *elapio*, or Old World flycatcher, one of the friendliest inhabitants of that island sanctuary.

Overhead a flash of crimson among the *lehua* blossoms betrayed the presence of an *apapane*. In the Kipuka also live the white-eye, house finch, red-billed leothrix, *iiwi*, *amakihi*, cardinal and others. Near the volcano are seen the Hawaiian thrush and English skylark, and on Mauna Loa's upper slopes the rare Hawaiian goose, recently saved from extinction.

Ornithologists surmise that in the dim past a few storm-driven feathered travelers arrived. From these have evolved some 70 forms that successfully adapted themselves to their new surroundings. Gradually they underwent changes in color, shape of beak and nesting habits, to accommodate to climate and available food supply.

The Drepanididae, with its two main branches—the Chlorodrepanines (yellow and green plumaged) and the

Photograph courtesy National Park Service: Douglass Hubbard



Melanodrepanines (black plumaged)—is by far the most remarkable family, having evolved from a single ancestor into an amazing and diverse fauna. To this group belong the honeycreepers and finches. Though opinions vary as to whether they came from South America, Australia or Asia, Kipuka denizens have excited the interest of scientists everywhere.

Let us examine the feeding habits of these birds and see how the available plant and insect food and other factors have affected their appearance and survival. Let us observe the fascinating interdependence of bird and tree. And finally, let us consider why certain extinct species that form striking examples of such relationships have disappeared.

The physical characteristics of these birds seem to depend on the type of flower or tree upon which they feed. An excellent illustration of this ecological dependence is seen in the long, curved beak of the Kauai *akiola*—perfectly adapted to fit the narrow, tube-shaped *lobelia* flower. The outer third of the upper half of the bill being flexible, the bird was also able to suck honey from flowers having a different curve.

A stroll through the Bird Park will acquaint us with its strange and colorful residents. Some that keep to the treetops are hard to see. We can barely distinguish a flock of crimson-bodied, black-winged apapanes, *Himatione sanguin*, busily extracting honey from the lehua blossoms of the tall ohia trees. We can identify them by their white abdomens. The lehua's thistlelike red stamens bear cups filled with nectar. Apapanes nest in these trees, making a

National Park Service photograph



«

The large ohia tree at the left is a landmark in the Island of Hawaii's Bird Park, and it attracts many birds, among which are the iiwi, apapane, cardinal, red-billed leothrix and elapio. The lehua, its flower, is much sought for its nectar, and its pollen attracts insects that are relished by some of the Bird Park's avian inhabitants. The ohia may be the most common species of tree on the Big Island; the lehua, with thistlelike red stamens, is shown in the picture above.

soft bowl two inches across out of twigs and grass, lined with the down of the tree fern. Their eggs, white with reddish-brown spots banding the large end, are carefully concealed from above to escape detection by their enemy, the owl.

A whirl of wings announces the arrival of an iiwi, *Vestiaria coccinea*, among the other honeyseekers. It prefers the upper middle branches rather than the treetops. We know it by its long orange bill and scarlet body. This noisy flier's call of "ker-eek" sounds like the creaking of a rusty gate. It is alighting to feed upon the nectar of the mamane blossoms, sucking it up through a tubular tongue in its sickle-shaped beak. Now it flits to a small alani tree, whose flowers are low enough to give us an excellent view.

Example of Adaptation

Another mamane lover is the *amakihi*, *Loxops virens*, which we saw fluttering in the foliage along the road leading to the park. It ranges up to the tree-line, its buzzing "djee" alternating with a trilling "tink-tink-tink." Like the akiola, this honey eater loves the lobelia; but its sharp bill, too short to reach the bottom of the flower, pierces the blossom near its base—another instance of adaptation. It also eats insects attracted by the pollen of the *ieie* vine. Its pollen-smearred head helps pollinize other plants.

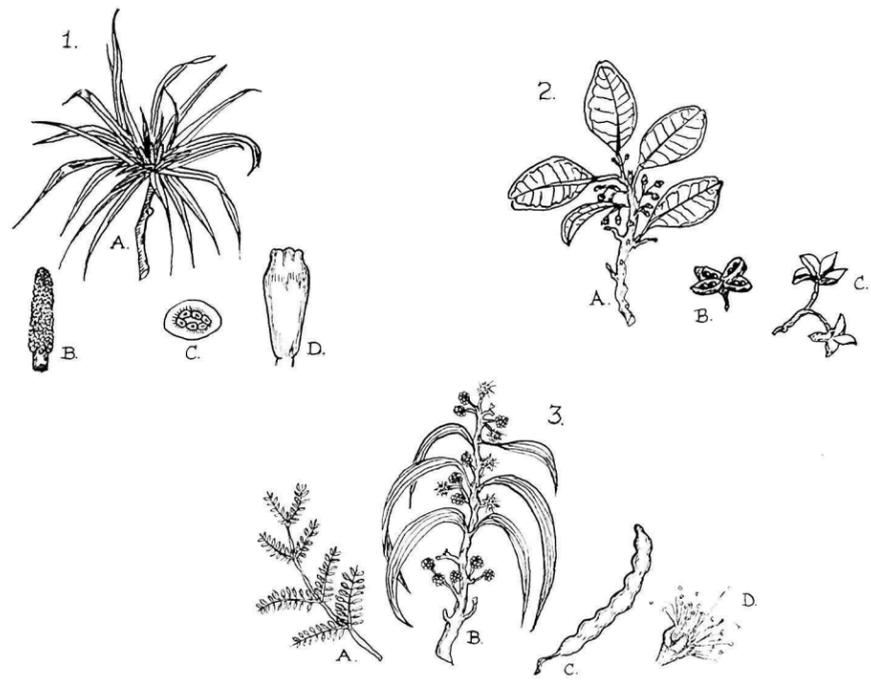
A bird that exemplifies an unusual type of adaptation is the Hawaii *nukupuu*, now seldom if ever seen. This olive-hued bird, gamboge-yellow underneath, had a thick, sturdy lower mandible that extended farther back than in most birds. This perhaps resulted from its being used to hammer off bits of bark as a woodpecker does, then acting as a lever to throw the bits away. With the curved upper half of its beak the bird extracted insects from the cracks thus exposed, or hooked them out of partly-opened koa pods. The joyous song of a brighter olive-green bird—the Hawaii akiola—is, alas, no longer heard on this island.

(The round petioles of the koa flowers upon which the nukupuu fed present an interesting example of plant adaptation to changing conditions. Its originally compound leaves, when exposed to an arid climate, drew into globular form to conserve moisture. In a succeeding wet era, the globe flattened out, the leaves evolving into the long, sickle shape of today. Koa seedlings, however, exhibit the original compound leaf.)

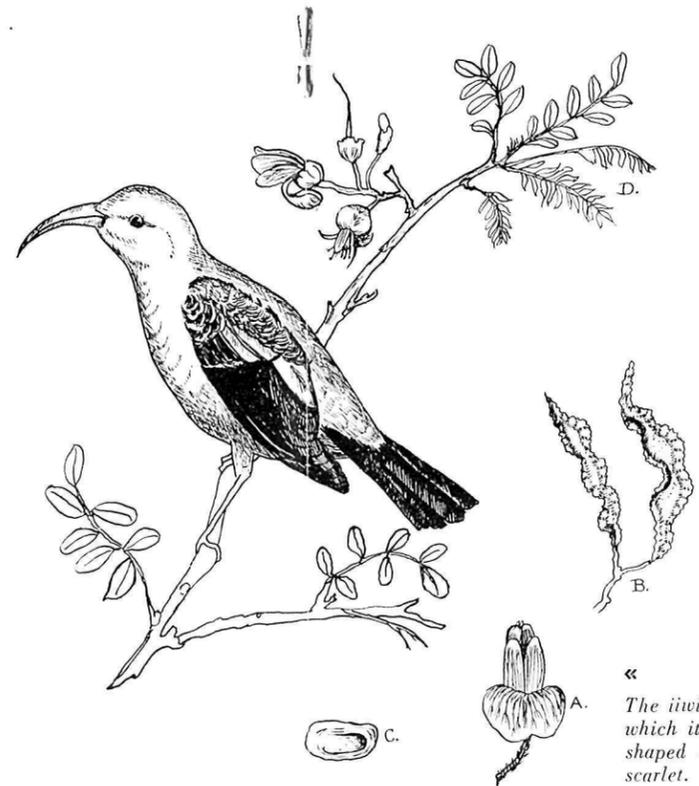
Two of the most beautiful honey-lovers, the black *mamo* and the *oo*, are extinct today. The mamo, *Drepanis pacifica*, was prized for its velvety golden wing and tail feathers, used for making the famous Hawaiian feather cloaks. The spectacular brown and yellow *oo* sported long, white, spirally-twisted tail feathers. Introduced diseases wiped out these beauties.

A warbling song arrests us. It is coming from the house finch, *Carpodacus mexicanus*, that grayish-brown bird with rosy-red breast. He is a sociable little fellow, hopping around in a grassy plot with his companions. This linnet is a seedeater, with a thick, short bill admirably adapted to the dry forage of the nearby Kau Desert.* His cousin on Maui is yellowish-orange, possibly because of a different diet.

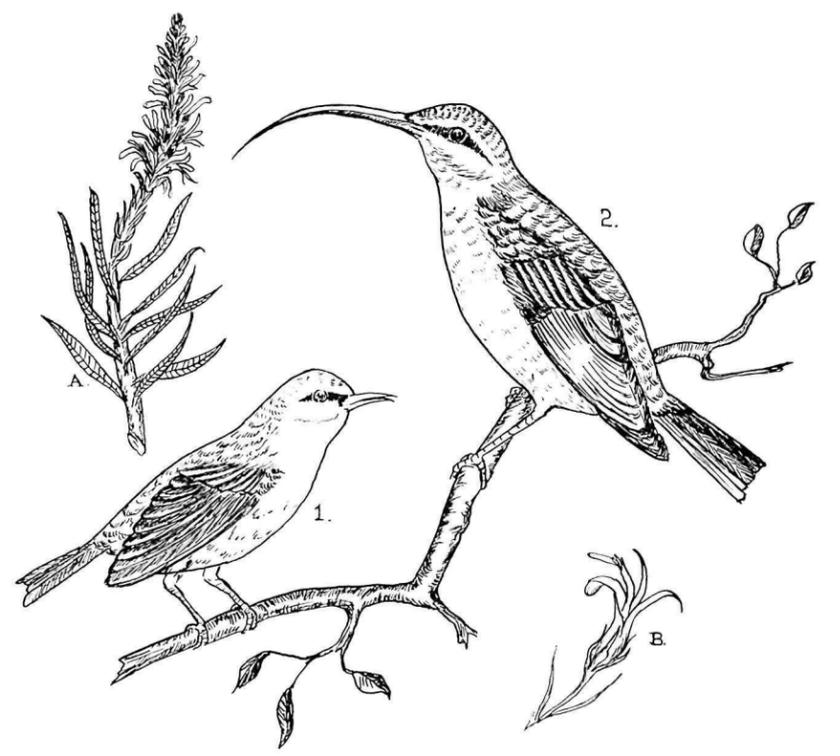
* See the author's "Footprints in the Lava," June 1967 *Desert Magazine*, Palm Desert, California.



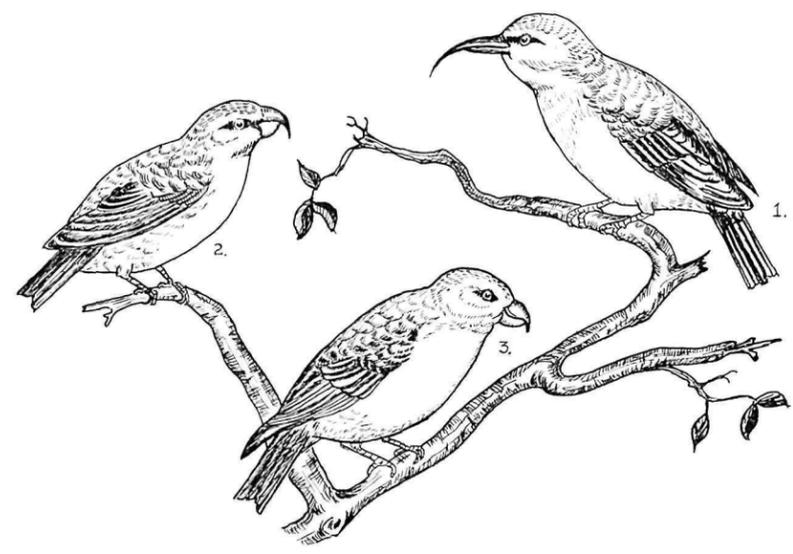
At left: 1, the ieie, or climbing screwvine. (a) staminate flowering branch; (b) young simple pistillate flower cluster or cone; (c) cross-section of fruiting cluster; (d) mature fruiting flower cluster. The oo and the ou fed upon flower bracts, and the amakihi sought insects attracted by its pollen. 2, Alani (pelea). (a) twig with flower capsules; (b) dried flower capsule opening into four parts, each with two shiny black seeds; (c) flower, which the iwi seeks for honey. 3, the koa. (a) single ancestral-type leaf; (b) twig showing modern sickle-shaped leaves; (c) seed pod; (d) single blossom. Nukupuu feeds on round petioles of koa's flower and on insects in koa pods, while akepa scaled insects from its leaves. Koa leaf's evolution from original compound form through round petiole stage during dry eras to flattened, sickle-shaped modern form of moist climates is an interesting example of plant adaptation to surroundings.



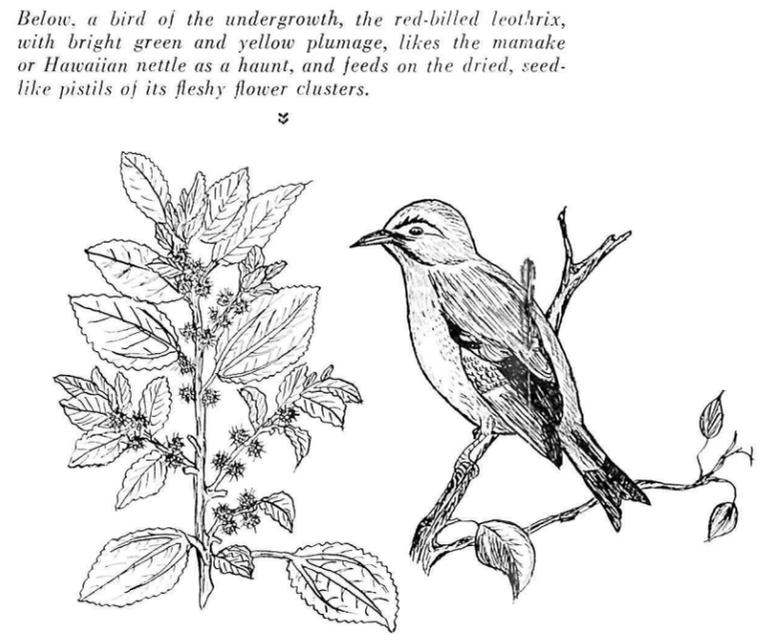
« The iwi is fond of the honey of the mamane blossom (a), which it sucks up through its tubular tongue in a sickle-shaped beak, orange in color. The iwi's body is brilliant scarlet. (b), pod of the mamane; (c), seed; (d), branch.



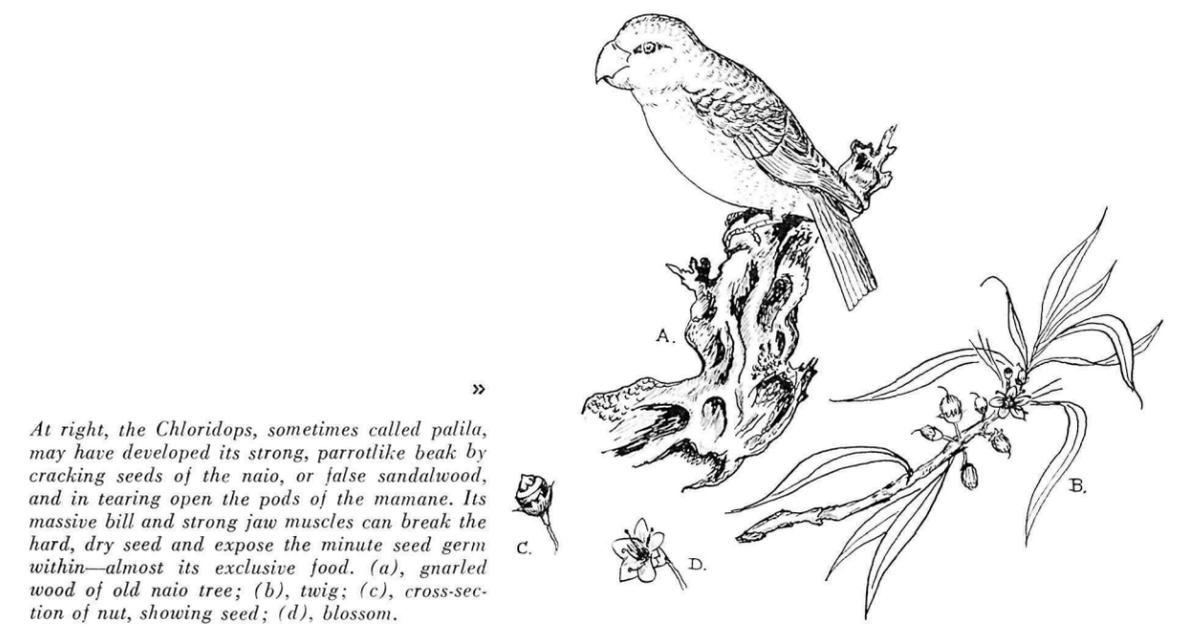
» The Hawaii amakihi, 1, and the Kauai akiola, 2, are both honeyeaters and both feed upon the nectar of the lobelia blossom. The akiola's long, curved bill reaches to the bottom of the tubular flower, but the amakihi's bill, being too short, is sharp and well designed to pierce the blossom near its base. (a), Hawaiian lobelia plant. (b), flower of the Hawaiian lobelia.



» Above: 1, the nukupuu, or akiapolaau, with lower mandible extending farther back than in most birds to hammer off bits of bark; it then extracts insects with curved upper mandible. 2, the Pseudonestor, or Maui parrot, of similar habits, hooks insects out of partly opened koa pod, illustrated above. 3, the ou. This bird displays a still more marked parrot bill, scooping up fleshy flower bracts of the ieie vine with its hooked beak. One investigator thinks the Pseudonestor may be a link between the extremely slender-billed nukupuu and the thick-billed ou.



» Below: a bird of the undergrowth, the red-billed leothrix, with bright green and yellow plumage, likes the mamake or Hawaiian nettle as a haunt, and feeds on the dried, seed-like pistils of its fleshy flower clusters.



» At right, the Chloridops, sometimes called palila, may have developed its strong, parrotlike beak by cracking seeds of the naio, or false sandalwood, and in tearing open the pods of the mamane. Its massive bill and strong jaw muscles can break the hard, dry seed and expose the minute seed germ within—almost its exclusive food. (a), gnarled wood of old naio tree; (b), twig; (c), cross-section of nut, showing seed; (d), blossom.

Another seedeater, the Chloridops or *palila*, *Loxiodes bailleui*, last seen in 1892, may possibly survive at higher elevations. This yellow-throated, ashy-gray bird has a strong, parrotlike beak well suited to cracking seeds of the false sandalwood, or *naio*, and to opening mamane pods.

The *ou*, also a parrot-billed Chlorodrepanidid, flew high and migrated wherever it could find food, making its nest in staghorn ferns. Its head was yellow, its body a beautifully shaded green. The melodious songster fed upon the fleshy flower-bracts of the *ieie*, scooping them up with its hooked beak, and also feasted on native mulberries. Its habit of seeking the lower levels for guavas exposed it to mosquito-borne diseases, to its destruction as a species.

The koa finch, or Pseudonester, had still more pronounced parrot characteristics. Its huge, hooked bill and non-tubular tongue suggest that it may have been a link between the slender-billed nukupuu and the thick-billed *ou*. It lived on larvae, pupae and beetles scooped from koa and *pelea* trees. Its cup-shaped nest was made of lichens.

Man brought death to many birds by importing fauna and flora carrying diseases previously unknown in Hawaii. For example, exotic game birds released in the forests introduced coccidiosis, gapeworm and Asiatic parasites fatal to native species. Again, blood parasites and the deadly bird pox virus afflicting domestic fowl were borne to the wilds by mosquitoes.

A loud, flutelike whistle comes from an olive-brown bird flying down from the treetops to feast on low-growing *ohelo* berries. It is the *omao*—the Hawaiian thrush, *Phaeornis obscura obscura*, sweetest of all Island singers. It warbles all day, even when flying. Like the *elapio*, it belongs to the Muscicapinae. It lives on fruits and does the trees a service by ridding them of caterpillars and distributing seed, which

Below, a big koa in Kipuka Puauulu. Its flowers furnish honey and its leaves and bark harbor insects on which winged visitors feed.



it swallows whole. It is especially fond of *ohelo* berries.

A little fellow is peeping out of the undergrowth. It is a red-billed leothrix, *Leothrix lutea*, or Peking nightingale. You can easily spot him by his bright red beak and brilliant green and yellow plumage. This robin-like bird was introduced from Asia in the 1920's. His leafy retreat is the *mamake*—Hawaii's stinging nettle. It is a favorite haunt, for the leothrix is fond of the dried, seedlike pistils of the *mamake*'s fleshy flower-clusters. The indigestible seed passes through the bird and is thus carried to new localities. Fruit, seeds and insects are his diet. In winter he commutes to the top of 10,025-foot Haleakala on Maui. Although one of Hawaii's most loved birds, he is a carrier of a bird malaria that brings death to the honey-creepers.

That familiar all-red, crested bird hobnobbing with the leothrix is our old friend, the cardinal, imported since 1929. He dines on insects, fruits and seeds, but the handsome fellow unchivalrously drives his mate away from her dinner. On occasion he redeems himself by bringing her a seed, however.

Everywhere we see the diminutive yellow-green white-eye, *Zosterops palpirobrosus*. It is the commonest bird on this island, easily spotted by a white ring around the eye. It was brought from Japan in 1929 and has staged a "population explosion" in recent years. See how quickly that flock gleans insects from one shrub, then flits to another, uttering high pitched "chee-chee-chee's." Though white-eyes have driven away some native honeycreepers, they do destroy many harmful insects.

That large bird over there in the open meadow, splendid in iridescent green and purple, with long tail quills, is a Japanese blue pheasant, *Phasianus versicolor*, an import. He ranges to 7000 feet, but may sometimes be seen along the Mauna Loa Strip Road and the Crater Rim.

If we were to extend our wanderings by a horseback expedition up to tree-line, we might be fortunate enough to see a rare *nene*, or Hawaiian goose, *Branta sandvicensis*, Hawaii's state bird. This ducklike bird with its black and cream stripings was near extinction by rats, pigs, dogs, mongoose and human hunters until 1949, when the Department of Agriculture and Conservation and the U.S. Fish and Wildlife Service took steps to restore the species by tracking down breeding places and raising the geese in captivity. As a result of this remarkable project a special mountain sanctuary has been established for them and *nenes* have been released on Mauna Loa. On these barren slopes, far from the open water of their original habitat, the *nenes* raise their broods during the winter months in nests of twigs and brush on the ground. In time, they may mix with the wild remnant and become a common sight.

As our ramble draws to an end, we feel that we have met some of the most exquisite and unusual birds in the world, and have learned how bird and tree complement one another. Contemplating the past glory and abundance of these feathered beauties, we cannot help deplore the demise of so many. Man's ruthless indifference to the needs of Hawaii's winged creatures has for the most part been the cause of these tragedies; let us hope that other rescue programs may be started to save other endangered species of Hawaii. Neither that State nor the world can afford to lose a single one. ■

On Destruction

By Dara Sorgman

I

THE SEASHORE IS A PLAYGROUND for children and hermit crabs, a stretch of melting castles. It is a fishing ground for men standing in thigh-boots and for seagulls crying. It is a race course for one splashing through the wet sand, and a picnic ground for friends around a fire. It is a bed for lovers in the sand and starfish under the waves.

On summer days it is filled with bathers laughing and splashing and running way up the hill to the club house for ice cream, soda, popcorn. The crowds are free from the bind of hot clothes and the walls of the city. They are free from all barriers. The shoreline stretches endlessly in both directions, while the ocean is endless in the imagination.

One part of it was hers, or perhaps she belonged to it more. Many people loved it in the summer sun; she came in the storms, too, and battled the waves. "Her" beach came just at the break of the cliffs, then looking north the shoreline was level to the horizon. It was a small beach, rather rocky, but the view was not small and its beauty made up for the rocks.

She had spent her earliest summers on the beach. For her it was the border between civilization and the mystery of the ocean, between the finite and the infinite.

In time, she moved away from the

shore—too far away to come back often. She missed the expanse of the beach, but years passed before she returned.

When she did it was an icy blue winter's day. She smelled the sea in the air before she could see it. Then suddenly on her left, she noticed a tall wire fence. It enclosed "her" beach on three sides; the ocean lapped at the fourth.

On all the broad shoreline, someone had fenced in one private part, perhaps trying to possess a part of its beauty. He had tried to capture it with wire and a locked gate on which a sign read PRIVATE. Now, in winter, the fence stood, the only sign of man in a world of nature.

II

High in the north mountains a beginning river spills over a series of cliffs and foams into deep pools. Through the clear water you can see that the bottoms of the pools have been carved in intricate patterns of holes, tunnels, and circular depressions by ages of water. Up the sides of the cliffs the rocks are covered with moss moist from the spray.

An old man remembers how good the fishing was here when he was young, and how he had watched raccoons wash their dinner on the pools' banks. Sometimes deer would come to drink. He remembers the sight of the falls in winter, when the water had frozen into

icicles and the white snow was untouched by man's footsteps. He remembers the clean smell of the forest, and the silence of nightfall.

The old man had moved away to the city with his children, and the site of the waterfall has become one of many similar state parks.

Young children play with butterflies and toy pistols on the field below the falls while their older brothers and sisters climb the mossy rock to the top of the mountain. There they drop bubble-gum wrappers onto the water to see if they can watch them as they are carried over the brink and down into the next pool. Their parents picnic and drink beer below. They throw the empty tin cans and bags of rubbish in the underbrush. Fishermen crowd the lower stream, thigh-high in the cold water. They step on rusted beer cans while gum wrappers float past them. But there aren't enough fish to go around.

The old man returned to the waterfall, remembering the peace of his past. He came on an autumn evening, after the last tourist had gone, and was greeted by blowing bits of paper and the faintest stale smell of beer. No deer came to drink in the moonlight; they had all been frightened away. As the old man made his way carefully up the mountain, he inadvertently kicked a beer can. The hollow-tin noise split the silence as it bounced down the rocks. The peace was gone. ■

BIRD WATCHER

You did not come with spring this year,
But another's settled here

In your own tree.

Say was there somewhere in the flight
Rush of owl on gusty night

Too quick to flee,

Or hawk burst down the blinding blue;
Was it hawk or owl changed you—

Or was it me?

—William E. Mahoney

On Some Names in Natural Bridges National Monument*

By Neil M. Judd

IN ITS 1967 DESCRIPTIVE BROCHURE (1) the National Park Service tells how the three great sandstone bridges in Natural Bridges National Mounment, southeastern Utah, were created and how they happen to bear Hopi Indian names. The description is interesting and informative, but the names are irrelevant, impromptu selections.

Although the pamphlet does not so state, those same natural bridges were named and renamed long before the Nation Park Service came into being. The first white men known to have seen them were Cass Hite and three companions, "Indian Joe," Edward Randolph, and "Scotty" Ross, who were out in the White Canyon country in September, 1883, presumably searching for mineral prospects. With an ear tuned to national politics, Hite promptly named the three bridges, in order of decreasing stature, the President, the Senator, and the Congressman. With cowboys Tom Hall and Jim Jones, the same bridges were seen in the fall of 1895 by James A. ("Al") Scorup, a cattleman from Bluff City, who presumed they had been discovered earlier that same year by one Emery Knowles.

Cass Hite, a former prospector who admittedly had "tested every likely sandbar on both sides of the river," eventually abandoned placer mining and built himself a post-and-mud cabin on the west side of the Colorado opposite the mouth of White Canyon. Here, at a ford commonly known as Dandy Crossing, he became a sort of unofficial postmaster for those who still hopefully sought precious metals in the Glen Canyon sandstones. He was still there, a lone resident of the settlement that bears his name, when Professor Byron Cummings interrupted his 1907 survey, mentioned

in more detail below, and crossed the river to meet him (Plate 1). Nearby was the grave of a soldier, presumably one of those killed in an Army skirmish with the Utes in 1885, and since submerged by the rising waters of Lake Powell.

In early March, 1903, Horace J. Long, a mining engineer on a prospecting holiday, stopped at Hite's cabin to pick up his mail and there met "Al" Scorup, the Bluff City cattleman who had seen the White Canyon natural bridges eight years before. Long expressed a desire to have a look himself and Scorup volunteered to guide him, provided one of the three be named Caroline (or Carolyn) in honor of his mother (2).

The two men left Dandy Crossing on horseback March 13, 1903 and two days later camped at their first natural bridge, the Caroline. Next day their second bridge, largest and most graceful of all, was named the Augusta, in tribute to Long's wife. The third and smallest bridge, the one Cass Hite had called "the Congressman," became the Little Bridge and remained so until 1905 when it was renamed "the Edwin" in recognition of aid given by Colonel Edwin F. Holmes, a prominent Salt Lake citizen, to a pictorial expedition sent out under leadership of the artist, H. L. A. Culmer, whose magnificent paintings remain a distinguishing feature of the Salt Lake City Commercial Club.

These three names, the Augusta, the

*Photostat copies or original letters and other data on which this study was based were given to the National Park Service March 9, 1964, and were subsequently forwarded to the Regional Director, Southwest Region, Santa Fe, New Mexico (ref. H14-RHAA).

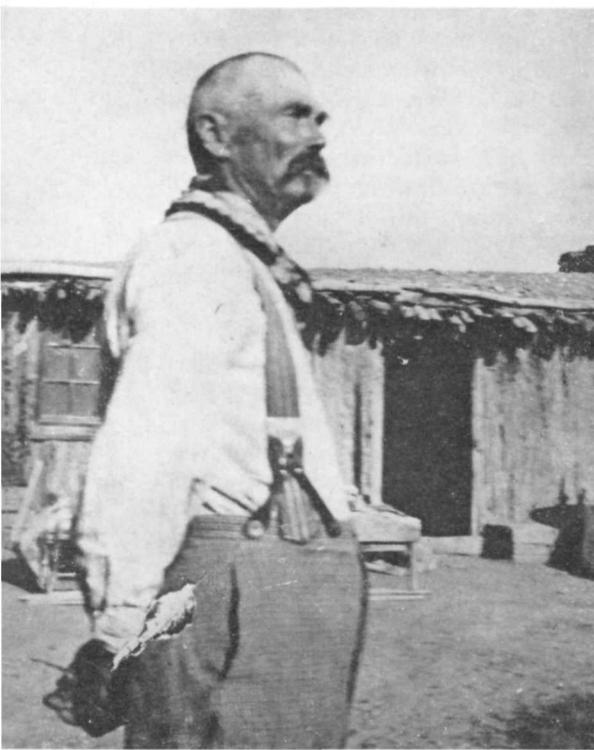


Plate I

Cass Hite, at Hite, Utah, from a snapshot photograph by Byron Cummings, 1907. This plate is from a copy negative in the Office of Anthropology Archives, U.S. National Museum, made from an original print donated by the author.

Caroline, and the Edwin, were generally recognized by Utah residents and were widely known throughout the East when Professor Cummings of the University of Utah in 1907 organized an expedition "to explore as much as possible of that part of San Juan County lying north of the San Juan river." His party numbered seven including two student surveyors and two archeologists, of whom I was one (Plate 2). During the weeks we were in the field, we mapped the central portion of White Canyon, measured and photographed its three natural bridges, and briefly examined the more accessible cliff dwellings.

Upon conclusion of this fieldwork Prof. Cummings submitted a written report to the General Land Office in Washington, through Dr. Edgar L. Hewett, representing the Archaeological Institute of America, sponsor of the Cummings expedition, and through Senator Reed Smoot of Utah (3). The report was accompanied by Fred Scranton's topographical map of White Canyon and its principal tributary, Armstrong, locating the three natural bridges and showing their relationship to each other. Unfortunately, neither report nor map could be found in 1957 when this study was under way, but it is reasonable to believe they supplied the data on which President Theodore Roosevelt based his proclamation of April 16, 1908, establishing Natural Bridges National Monument.

New Survey Made

Not content with the information already in hand, the General Land Office on May 15, 1908, directed one of its own staff, William Boone Douglass, Examiner of Surveys, to make a new map of White Canyon and to record the Indian names, if any, of its natural bridges. Mr. Douglass wrote the General Land Office from Bluff City September 11, 1908, that he had begun preliminary investigations June 3; that actual surveying had continued from September 12 to October 3. On the basis of this new survey, a new proclamation was issued by President William Howard Taft September 25, 1909, enlarging the area of the monument and assigning Hopi names to its natural bridges.

Instructions to record Indian names of these natural bridges put the surveyor in a quandary, for there were no



Plate 2

The 1907 Cummings party at Caroline Bridge, White Canyon, Utah. From the left, front to rear, Rev. F. F. Eddy, Prof. Cummings, Fred Scranton, J. C. Brown, Burl Armstrong, Dr. Edgar L. Hewett, Neil M. Judd and J. B. Driggs. From Office of Anthropology Archives, U.S. National Museum.

Plate 3

The Augusta (Sipapu) natural bridge. A 1907 photograph by the author from Office of Anthropology Archives, U.S. National Museum.

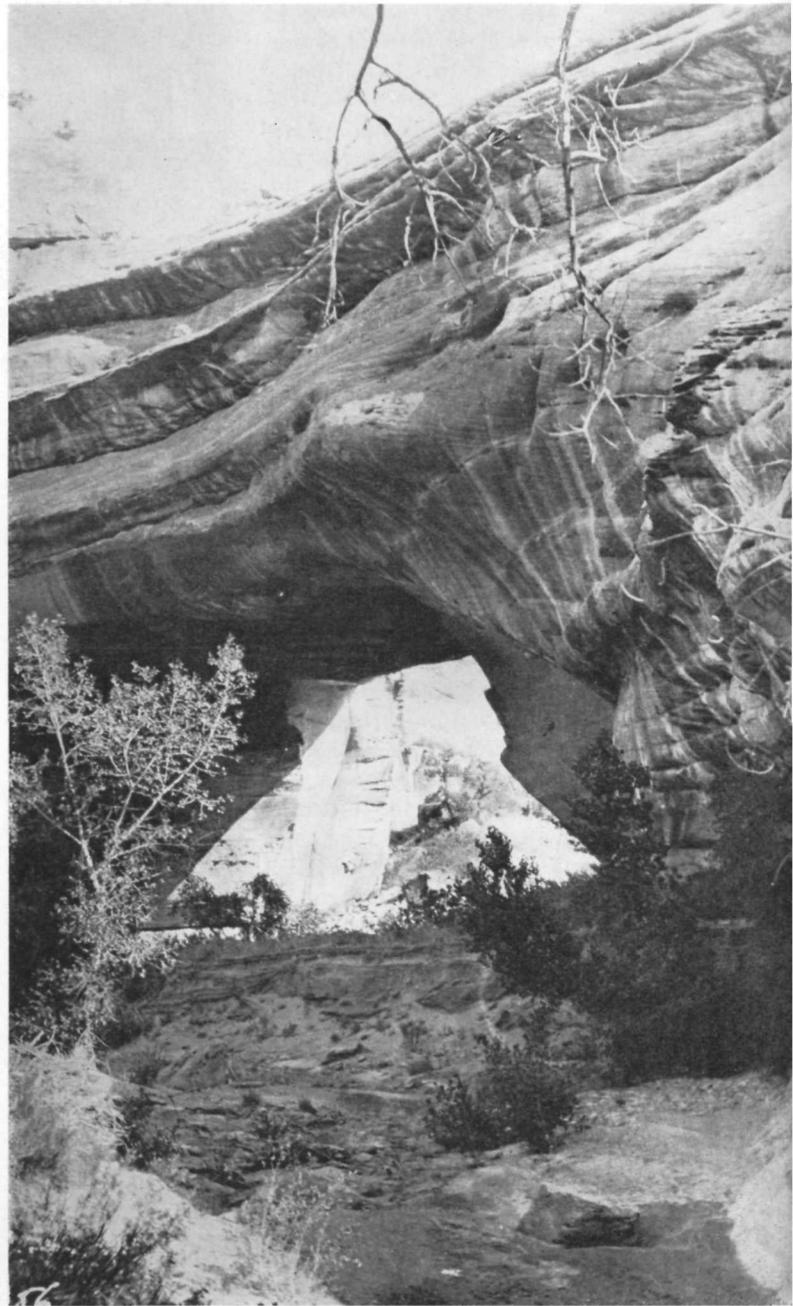
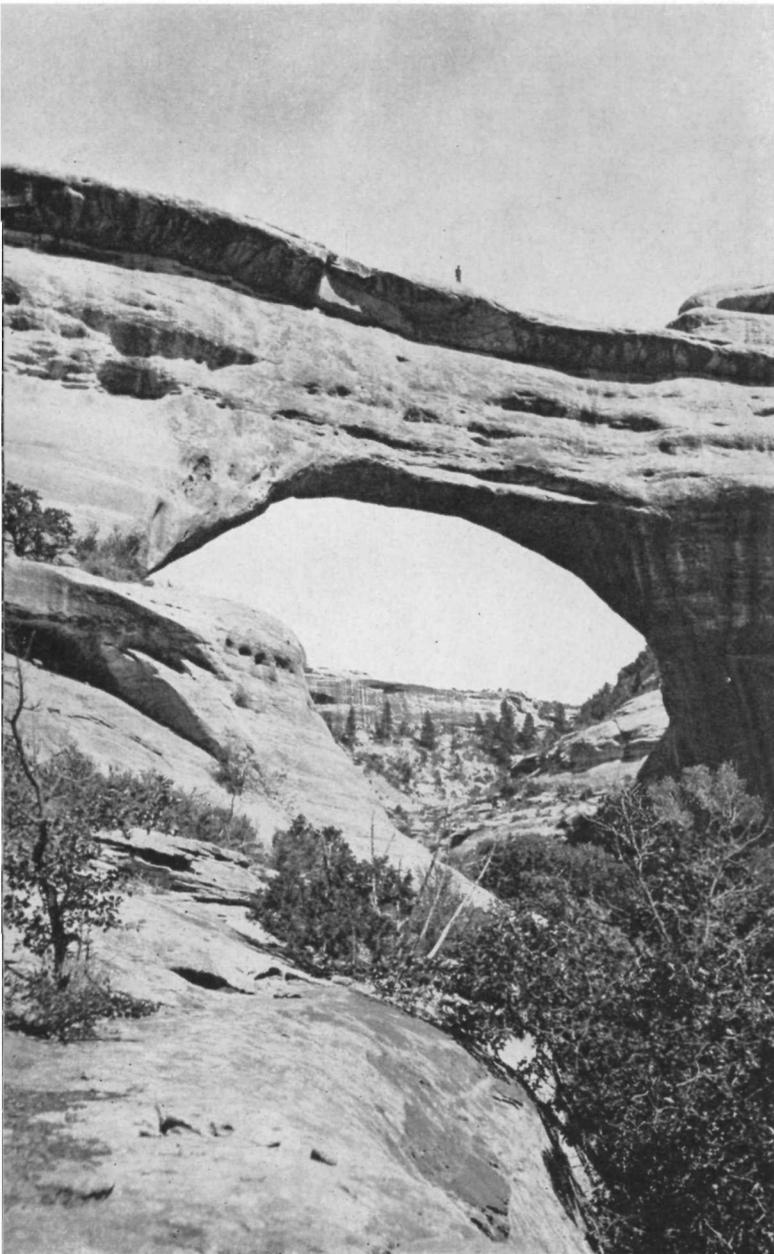


Plate 4

The Caroline (Kachina) natural bridge. Photograph by the author, 1907. From Office of Anthropology Archives, National Museum.

Indian names. Although the bridges stood within former Ute territory the Utes had no name for them, either individually or collectively. Thus, since a U.S. Geographic Board regulation of the period forbade naming a geographic feature after a living person "unless of very great importance and unimpeachable position" (4), the personal names by which the three had long been known were to be discarded and three substitutes improvised.

So handicapped, Mr. Douglass turned to Dr. Walter Hough of the U. S. National Museum, a life-long student of Arizona's Hopi Indians, and asked for suggestions. Hough naturally would have proposed Hopi names, even uninfluenced by the presence of ancient cave ruins in White Canyon, but the letter Douglass wrote him from Cortez, Colorado, September 13, 1909, implies that names had already been chosen. Thus, to quote the 1967 Park Service brochure, Sipapu Bridge (the Augusta, plate 3), "suggested to its namers the sipapu—a hole through which the Hopi

Mr. Judd's professional career has spanned many years with the Smithsonian Institution as Aide in Ethnology, as Curator, American Archeology, and finally as Curator of the Division of Archeology. Most recently he held the honorary position of Associate in Anthropology; now retired, he makes his home in Silver Spring, Maryland.

believed their ancestors emerged from a lower world . . .". Kachina bridge (the Caroline, plate 4), was so named because nearby pictographs "resemble Hopi masked dancers, or kachinas." Owachomo Bridge (the Edwin, plate 5) is distinguished by a "large rounded rock mass near one end," to be seen from above but not in profile.

The present writer, a student member of Dr. Cummings' 1907 exploring party, considers these Hopi names purely adventitious but realizes they are probably here to stay. Nevertheless, their dogmatic selection should be a matter of record. To excuse their use by citing the proximity of prehistoric cave

ruins is reasonable, but those ruins could as readily have been built and occupied by the ancestors of any other Pueblo group native to the Southwest. In either case there is no evidence a Hopi Indian, prehistoric or contemporary, ever saw White Canyon or one of its three natural bridges. ■

References

- (1) *Natural Bridges National Monument, Utah*, U. S. Government Printing Office, 1967, 0-245-268.
- (2) Dyar, W. W., "The Colossal Bridges of Utah," *Century Magazine*, vol. 58, pp. 501-511, August, 1904; same article, briefed in *National Geographic Magazine*, vol. 15, pp. 367-369, 1904. See also Cummings, Byron, "The Great Natural Bridges of Utah," *National Geographic Magazine*, vol. 21, pp. 157-167, February, 1910; same title, *University of Utah Bulletin*, vol. 3, No. 3, Pt. 1, November, 1910.
- (3) Letter of May 23, 1908, from Gifford Pinchot, U.S. Forest Service, to James R. Garfield, Secretary of the Interior, *University of Utah Bulletin*, vol. 3, No. 3, Pt. 1, p. 12, November, 1910.
- (4) General Land Office letter of September 2, 1908 to W. H. Holmes, Chief, Bureau of American Ethnology.

Plate 5

The Edwin (Owachomo) natural bridge. A 1907 photograph by the author, from the Office of Anthropology Archives, U.S. National Museum.



News and Commentary

Advisory Board Appointments

Secretary of the Interior Stewart L. Udall has appointed two new members to his Advisory Board on National Parks, Historic Sites, Buildings and Monuments. They are James W. Whittaker of Redmond, Washington, and Laurance G. Henderson of Washington, D.C. Whittaker, who enjoys world fame as a successful mountain climber, is chairman of the Parks and Recreation Commission of his home State.

Henderson, an airline management executive and authority on housing, directed the Special Committee on Historic Preservation for the National Conference of Mayors. In addition to his airline and aircraft industry activities, he has served as staff director of the Senate Small Business Committee and director of the National Housing Conference.

An Adirondack Park?

A proposal has recently been put forth for establishment of a new national park in the Adirondack region of New York State. The new national park would contain some 1,720,000 acres, of which 1,100,000 are presently within the great Adirondack State Forest Preserve. The other 620,000 acres would be acquired through Federal purchase of lands now privately owned.

The Association has followed the proposal with interest for some time, and as members know, is keenly concerned for the protection of areas of great natural beauty or importance. It is likely, however, that many conservationists will feel that, inasmuch as the New York Constitutional Convention has recommended that these state lands be kept "forever wild," the state constitution may offer the best protection for this magnificent area.

Dan Beard Retires

Daniel B. Beard, whose name has been synonymous with national park work and park protection for more than 33 years, retired from the National Park Service in mid-September. Known affectionately by conservationists throughout America as "Dan," Mr. Beard's work with the Service looks back over many important positions, including the superintendencies of several of the great parks and monuments, and several years as an assistant Director of the Service in its Washington office. He was most recently Director of the Southwest Region of the Service. The

conservation world wishes Dan and Mrs. Beard a pleasant life in their retirement home in Santa Fe, New Mexico.

New Ontario Park

The Ontario Department of Lands and Forests is planning to develop a 9000-acre park 25 miles north of the city of Kingston, NPA is advised. There are six lakes within the proposed area, and facilities for swimming, picnicking, camping, and boating will be provided, in addition to a system of nature trails and overlooks. Development of the park is going forward under a two-year program, according to Mr. Harold Cantelon, District Parks Supervisor.

Ivory-Billed Woodpecker

Results of a field study in the Big Thicket region of East Texas indicate that there might be from five to ten pairs of ivory-billed woodpeckers in that heavily-timbered area. The ivory-billed woodpecker is listed as "perhaps extinct," or "extremely rare," according to one's authority; in any case, the study, made for the Interior Department by John V. Dennis, an expert on woodpeckers, has caused conservationists to hope that the large and beautiful native bird may be rescued from extinction, as have several other species of birds in the past few decades. Interior's Fish and Wildlife Service has already requested timberland owners in the Big Thicket region to cooperate in a program aimed at the rescue. The Big Thicket country of Texas has also been in the news during recent months as the possible site of a national park.

Second Battle of Antietam

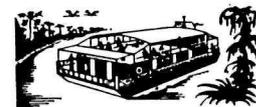
The outcome of the second battle of Antietam, now underway, may hinge on the power of aroused public opinion. That is the only weapon available to opponents of the Potomac Edison Company's scheme to route a portion of a new 500,000-volt power transmission line across the Antietam battlefield, in Maryland near Harpers Ferry, scene of the bloodiest single day of the Civil War. The controversy over the location of the transmission line is typical of many that have arisen in various parts of the country where power companies have been exempted from external restraint and where needs for electric power are growing. Although the line in question, which would run from Hatfield's Ferry, Pennsylvania to Doubs, Maryland, is clearly an interstate transmission, the

Federal Power Commission has no jurisdiction over routing. Local authorities—Maryland's Washington County Planning and Zoning Commission—have gone on record against the route but have no authority to order re-routing. Similarly, the Maryland Public Service Commission lacks authority to require the utility to obtain a certificate of necessity for the route. Potomac Edison has blanket powers of condemnation, and the above-ground path through a scenic area rich in American history is the cheapest route.

With no legal obligation to consider any interest but those of its stockholders, the company was able to make its plans without notice to the public. Its intentions came to light only in April when a property owner protested, in vain, the presence of company surveyors on his land. The company's president has been quoted as saying, "We didn't exactly plan it [the route] in secrecy. . . . But we didn't advertise it either."

The controversy centers on twelve miles of proposed route through the area where the battles of South Mountain, Harpers Ferry and Antietam took

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place, within a mile of General Robert E. Lee's headquarters during the battle of Antietam, and near John Brown's farm. The transmission line, requiring towers up to 110 feet tall over a 200-foot-wide right of way, would cut across the Chesapeake and Ohio Canal. It would be clearly visible from all these historic sites and would mar a view of Harpers Ferry that Thomas Jefferson said was worth a trip across the Atlantic to see.

Inasmuch as the proposals to establish a C&O Canal Historical Park or a Potomac National Park are still only that, the Department of Interior has no jurisdiction, either. Secretary Udall, however, is commendably pressing for an alternative route which would use existing gas-line rights of way along the Mason-Dixon line and an existing power-line route east of the disputed area.

This second battle of Antietam may not be in vain. Because the area holds so much meaning for all Americans, the controversy has attracted some national attention. As a particularly flagrant example of abuse of the power of eminent domain, it may hasten the day when that power is returned to government, which has the duty to take into account all the effects of proposed decisions of this sort.

Review

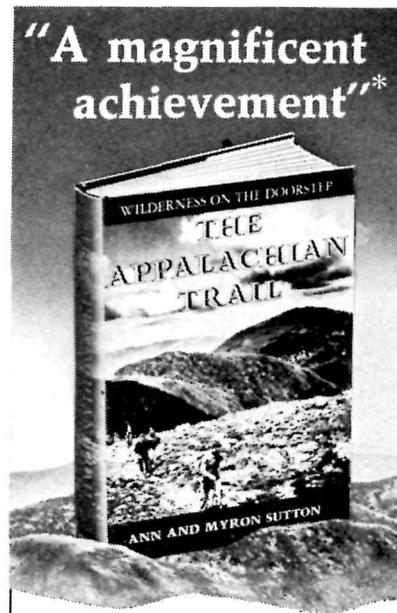
A REVOLUTION IS IMPENDING IN THE planning and management of water and its environment. The natural and physical sciences, technologies, and the social sciences are participating.

Many new practical developments already are available to substitute for the traditional structures and equipment and outmoded methods. The pervading question now is how soon these contemporary innovations will be substituted for the concepts and procedures which have lingered for generations in the practices of governmental agencies. Frequently, the

capital and operating costs of the new installations will be less and their life-spans longer than with traditional projects. The essential consideration is the acquisition of skill in the new processes both for directional and educational purposes.

An extensive, intricate and definitive study of methodology by the group of the Harvard Water Program has appeared under the title: *Design of Water Resource Systems; New Techniques for Relating Economic Objectives, Engineering Analysis, and Governmental Planning*. The authors of this 620-page book, including illustrative figures and graphs, tables and mathematical formulae, are Arthur Maass, Maynard M. Hufschmidt, Robert Dorfman, Harold A. Thomas, Jr., Stephen A. Marglin, and Gordon Maskew Fair. (Harvard University Press, 1966. \$12.50).

Conventional methods used by governmental agencies, particularly the Army Engineers, Bureau of Reclamation, and Soil Conservation Service were minutely studied, tested and discarded. Among major contributions of the Harvard study are two techniques applied to water system design: the simulation of a simplified river basin system with analysis of its functioning, using high-speed digital computers; and the creation of mathematical models for river systems. But, in addition, much insight is provided and (continued on page 22)



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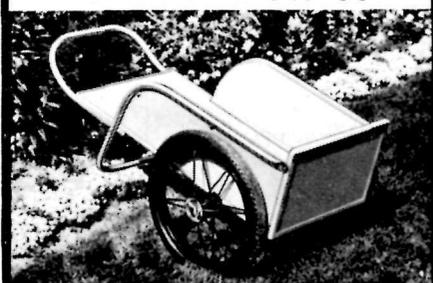
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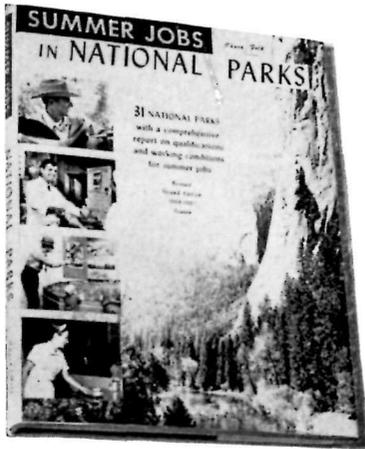
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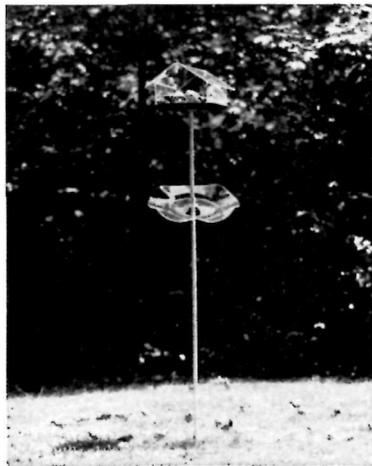


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many incisive proposals offered for checking objectivity and validity, and for assuring the adequate functioning of our governmental institutions under democratic requirements.

For the layman hesitant in using mathematics it should be noted that the report can be read, understood, and appreciated from a perusal of the non-mathematical portions. Not only is the study a distinct portal to innovation in river basin research and planning; in addition, the scientific, economic and technological methods are available for application in extensive fields of human interests.

The study is deeply concerned with validity. The significance of a method in a specific analysis is necessarily dependent upon many factors: concepts, assumptions, objectives, and inferences of the persons involved, the data used, and the procedures selected. The mathematical formulae and the computer mechanics are automatic, and therefore objective. The objectivity of the human manipulator controlling the experiment requires testing also; this has been a major objective of the Harvard study.

Based upon a three-dimensional concept of National Welfare—size or quantity, the division or dissemination of income, and the method of apportioning—a single index, such as National Income, is discarded in favor of the development of "alternative objectives for the most important ways in which water-resource development can contribute to national welfare." These include efficiency, with the objective of maximizing social welfare, and income distribution related to community values. These aspects are presented and illustrated in terms of design criteria.

Under assumptions which are specifically recorded, an economist's competitive model is employed using system outputs and inputs.

In treating the relation of efficiency and economic growth, an optimal, not maximal, growth rate is specified; maximization of the rate of growth would dictate maintenance of consumption at subsistence levels, in order to provide the greatest possible quantity of resources for investment.

The relations of economic and engineering contributions are presented in Chapter 3. "Questions of what can be done and how much it will cost are largely in the province of the engineer; questions of what is worth doing and how worthwhile it is are mostly within the competence of the economist" (p. 88).

Under a section on Decision Theory, various principles and procedures are discussed, including limitations. This sec-

tion should be widely read not only by analysts and planners, but by the speculation-prone as well.

The model river basin systems created were required to meet the following tests: (1) be simple enough for experiment, but sufficiently complex to represent multi-unit and multi-purpose river developments; (2) provide sufficient knowledge of costs and benefits to permit full examination of relevant combinations of facilities and outputs; (3) include the most important kinds of water-resource outputs, or purposes, as withdrawal-consumptive uses, nonwithdrawal nonconsumptive uses, and retardation, or withholding uses; (4) the hydrology should be typical of a major region; (5) the models should be capable of submission to detailed analysis by high-speed digital computers at moderate cost.

A simulated river basin system was created as one device; it contained four reservoirs to provide irrigation, flood control, and electric power. "If successful methods could be devised for analysis of a river basin system that included those three purposes, therefore, it seemed safe to assume that such methods would be applicable also to both larger and smaller . . . and including other combinations of purposes and facilities, both in greater or lesser numbers" (p. 267). As stream-flow data, records of the Clearwater River and its tributaries in Idaho were used. Limitations of simulation are identified.

Simulation operations involved the equivalent of many thousands of equations; the number was reduced drastically to use mathematical models which optimize. Two models are illustrated; both use linear programming. The basic difference relates to their handling of the stochastic component of stream flow. One is called the multistucture model, and the other the stochastic sequential model.

In developing operating procedures for

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simulation, a master procedure was envisaged, the difference of which could be varied within wide limits. A model was designed to synthesize a record of 510 years of flow data.

An evaluation of conventional methods and techniques used by U.S. Government agencies in system design, designated "project formulation" or "plan formulation" in agency terminology, is offered together with a description of an adaptation to the simplified system, in Chapter 8. Two fundamental types of limitation, with examples, are indicated:

1. Objectives for development, such as economic efficiency and income distribution, often are "not specified properly and translated into adequate design criteria for river-basin planners" (p. 304). Five categories of current weaknesses are described.

2. Techniques for project formulation may be ineffective in finding the best design. Here, also, five categories of examples are specified.

As a test of a completed plan, it is suggested that each purpose, in turn, be considered as a final increment in the plan.

In chapters 9 through 14 detailed exposition of analysis by simulation, mathematical programming, model technology, and economic analysis is given.

The final chapter, 15, relates system design to the political process. "Our purpose is to identify those institutional factors which rightly are pervasive requirements and to show just how they limit what is otherwise an area of free choice among alternative governmental arrangements" (p. 565). These requirements are of two types: those deriving from characteristics of the technologic and economic functions for water resource development; and those deriving from the requirements of a constitutional democratic system of government. This is a significant discussion, pertinent to all decisions applying to public works, usually omitted from technical texts, and its substance frequently ignored in governmental procedures.

A vital point is made in the following: "the community's political function is to foster a process of discussion which results in agreement on objectives and in a propensity to re-examine them. This is quite different from considering the functions of a community, as do some commentators, in terms of resolving conflicting demands on the basis of power" (pp. 566-67).

There follow, in Chapter 15, topics on leadership and accountability: division of governmental power; institutionalization of electoral, legislative and administrative process; implications for water planning of the government's responsibility

for organizing the legislative and administrative process, for informing the community, and the implications of the division of governmental power.

In present legislative and administrative functions in relation to water planning, three governmental responsibilities are suggested as associated with the three major states of system design:

1. Objectives would be set by legislative action, through open discussion in terms of efficiency, income redistribution, regional economic growth, control of speculation in benefits provided, etc. The chief executive should propose a program of consistent objectives, and the legislature approve, revise, or reject it."

2. Values for benefits and costs, interest rates, and budgetary constraints should be set to reflect the objectives, and incorporated into design criteria.

3. Projects should be constructed in accordance with the designs. The major activity is executive, with the legislature overseeing for efficiency, honesty, and conformity to standards.

"A survey of certain aspects of water planning in the United States . . . should serve to demonstrate why it is desirable to be abundantly clear on these matters" (p. 586). Startling illustrations are given:

The process for authorizing plans for navigation, flood control, and multipurpose projects frequently omits the "most meaningful stages of the process of democratic discussion. The legislative process is by-passed."

Project designs developed in the field are reviewed at higher echelons in Washington, including the Executive Office of the President (Bureau of the Budget), and transmitted to Congress. "The Congress is asked to give its approval to, and thereby authorize, plans proposed for Twitch Cove, Maryland, to protect crabbers; of Cheesecake Creek, New Jersey, for pleasure craft; of the Columbia River, to provide hydroelectricity, irrigation, and flood protection over a wide area. Bienally Congress considers an omnibus Rivers and Harbors and Flood Control Bill which consists mainly of approval, in whole or in part, of the project reports completed and submitted to the legislature in the interval since the last omnibus bill. The hearings and debate do not turn on objectives or even on design criteria, but on whether the specific proposals for Twitch Cove and Cheesecake Creek should be approved" (p. 587); usually the Congress defers to the member of Congress interested.

Another example relates to the recommendation of the President's Water Resources Policy Commission in 1950 for legislation to establish objectives for water development. (Vol. 1, *A Water*

Policy for the American People). Those proposals favored by the Bureau of the Budget were incorporated in a Bureau circular of 1952, which was binding on all executive agencies. "In this instance one may say that the executive has contributed to poor water-resources planning and that complaints of the congressional committees are prima facie justified" (p. 589).

"Finally we note that relations in the United States between the executive water-resource bureaus and the committees of Congress are so direct and intimate that clearly they violate that part of the model which relates the whole of each institution to its parts" (p. 589).

Treatment of the government's responsibility to inform the public is made under several topics, the first of which is "Problems in Maintaining Objectivity."

A river-planner generally is a physically-oriented professional and is likely to use the principles and goals of his profession as the objective he should implement. Planning engineers are inclined to conceal the alternatives under so-called technical principles. Frequently special interest groups, perhaps large property owners, influence the purpose and design of an agency's project.

This Harvard study and its recommendations set river basin system designing on a new scientific level, a course toward efficiency and professional ethics. It is a gift to American progress, and we cannot afford to neglect it. —John H. Cover

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Why Texans fought to give away their Treasure Island.

Padre Island is still giving up buried treasure from Spanish Galleons. But its real treasure is its worth as a natural recreation area, to draw visitors and vacationers from all over the country. Texans were always pretty well agreed on that. What they disagreed on was how to go about it. The Great State chose up two sides.

One side wanted free enterprise with no fences. They promised that the island, all 117 miles of it, would be developed in a sort of commercial way, and wind up like some of the large resort cities. The opposing side said no, that idea would only build an overgrown seaside amusement park. This group believed that part of the island, at least, should remain natural and undeveloped;

that its big stretches of white sand, its exotic vegetation and its flourishing marine life should be preserved in its natural state for everybody, including future generations. The only way to carry out this plan was

to have Padre Island made a National Seashore.

Both sides went along fairly nip and tuck until Texas' Senator Yarborough succeeded in getting Washington to agree to its part in the National Seashore. This put more fight into the opponents back in Texas, who proposed that Padre should become a State, not a National Park, leaving about half of the Island out of the plan.

But Governor Connally had promised Texas a National Seashore, and he stuck by his guns. Support rallied. A newspaper, the Corpus Christi Caller-Times, carried the cause right into South Texas, the hotbed of opposition. Largely through the work of newspaperman Ed Harte, and a committee of private citizens in Corpus Christi, the tide finally turned. Now

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