

NATIONAL PARKS *Magazine*



Buck Island, a national nature monument
in the United States Virgin Islands

August 1967

The Defense of the Everglades

AGAIN, THIS PAST SPRING, EVERGLADES National Park, with its wealth of subtropical beauty in vegetation and wild-life, narrowly escaped complete catastrophe by prolonged drought, and survived after a fashion into the rainy season.

Once more the Central Florida Flood Control District and the Army Engineers, despite their imputed engineering genius, provided only a trickle of water from Lake Okeechobee and the Conservation Districts into the park.

Alarums and excursions resounded, with dire threats that water for the park would be cut off because people come before parks. After the usual immense popular effort, the powers that be were persuaded again that the people were still interested in parks, and the necessary grace was obtained.

Meanwhile, litigation brought by the National Audubon Society, with the guidance and cooperation of the National Parks Association, forestalled the hasty opening of Canal 111, southeast of the park, and the inundation of portions of the park by brackish water.

The American people in our judgment are tired of these hairbreadth escapes from destruction in the Everglades. The big park was set up by the people through the agency of Congress a quarter of a century ago; we think the people of Florida and America want it protected and perpetuated.

The complete failure of coordination of the Federal Government at top levels in these matters in recent years, and the breakdown of cooperation between Florida and the United States, are becoming a public nuisance. This basic issue of the protection of Everglades Park needs to be settled promptly and permanently.

The essential elements of a settlement are simple:

1. The aqueducts which have been authorized to carry water from Lake Okeechobee southeastward and southward directly to the park should be completed at once.

2. The storage capacity of Lake Okeechobee should be increased, if necessary, by the completion of any essential dikes and other works.

3. The profligate waste of fresh water by canal into the Gulf and the Atlantic should be stopped at once and for good.

4. One or more supplemental reservoirs should be constructed for additional water supplies, earmarked exclusively for the park. Proposals of this kind have been made by the Florida District and the Army Engineers. They should be planned with consideration for the existing wildlife, water and related resources

of the Conservation Districts, which should themselves be protected, as part of the Everglades Region, against further depredation.

5. The proposal which has been broached at times, and may now be under study by the District and the Engineers, for extensive diking of fresh water within the park by barriers southwest of the park should be abandoned; the ecological necessity of the exchanges of fresh, brackish and salt water in this area are well understood.

6. The ulterior plans for a highway around the southern and western sides of the park, utilizing the proposed barrier, should be discarded; this project will encounter the most stubborn resistance from conservationists all over America; it will arouse much bitterness.

The drainage canal southeast of the park (C-111) is another matter which has to be settled. Now that the emergency about opening this canal has abated somewhat as a result of changes in the space program (there will apparently be no immediate fueling of rockets in the area), the true function of the canal as a drainage project for real estate speculation has been exposed for all to understand.

It would be enlightening to the American public if an effective high-level investigation were to be made of interests behind the pressure which has developed for drainage in this area. We surmise that such an inquiry may soon be mounted; it might inquire into the question of a possible conspiracy to destroy or abolish the park to make way for the developers.

The protectors of the park (the American people as a whole) will be looking with interest at the recent plans of the Army Engineers for the canal. The presently remaining barrier (the "plug") will be removed but a new barrier will be built closer to the bay. The new barrier will have several large gated culverts; the gates will prevent salt water intrusion. The westerly banks of the canal will be opened to permit fresh water flows toward the park; fresh water drained from the areas to be developed will thus, so it is claimed, help to water the park.

In what seems at the moment to be the remote possibility of barges being brought in for the fueling of rockets, the new barrier, culverts and all, will simply be removed: it will be replaced after passage of the barges; this, so it seems, can be done in one day's time. For our part, we still have our fingers crossed.

The basic policy question for America in respect to the Everglades is whether

it is so important to develop the sugar industry in Florida (as against friendly Caribbean countries), and to expand the beef industry in Florida (as against the beef-producing Midwest and West), and to move the citrus industry southward year by year (as frost follows drainage), that the vital interests of the people of America and Florida in Everglades National Park should be destroyed by drainage.

Related questions are whether it is so wonderful to enlarge the great urban centers of Florida (already abominably congested) and to expand manufacturing in Florida (in competition with manufacturing elsewhere) as to endanger other economic enterprises in Florida, including the tourist industry and the shrimp industry, and to wreck a world-famous sub-tropical reservation like Everglades National Park.

These questions really come down to an exercise in national budgeting. Most of the development occurring in Florida depends on the Federal power of the purse. It depends on the Federal graduated income tax and on various kinds of grants in aid to cities, counties, districts and the State.

The American people are paying for the destruction of their own national park. We have the impression that some very able administrators in high levels of the Government see the absurdity of these contradictions and will endeavor increasingly to rectify them.

The first step will probably be (and we merely predict) that funds for more and more drainage in the Everglades will be cut off progressively until a durable, a permanent, and unshakeable method has been established to get the necessary water into the park from here on out.

A good tight grip on the jugular vein of money for drainage may prove to be the best weapon the people of Florida and America have in this battle for the defense of the Everglades. —A.W.S.

YOU CAN HELP SAVE THE EVERGLADES

If you agree that further drainage should be stopped in central and southern Florida until permanent guarantees have been given for the protection of water supplies in Everglades National Park, you can help by writing to the President, The White House, Washington, D.C., and saying so.



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Front cover photograph by M. Woodbridge Williams

During the closing days of 1961, a tiny islet in the United States Virgin Islands was brought into the national park system as the Buck Island Reef National Monument. The island, about a mile and a half off the northeast coast of St. Croix in the Virgin group, measures only about a mile by a third of a mile; but its importance is much greater than its size. Clothed with tropical vegetation, Buck Island furnishes a rookery for the man-of-war bird and contributes to the survival of the threatened green sea turtle. Its main scenic and scientific interest lies, however, in the coral barrier reef which surrounds it, vibrant with tropical fish life and habitat for many beautiful forms of marine plants. A first-hand account of a photographic expedition into Buck Island's teeming blue waters starts on page 4.

The Association and the Magazine

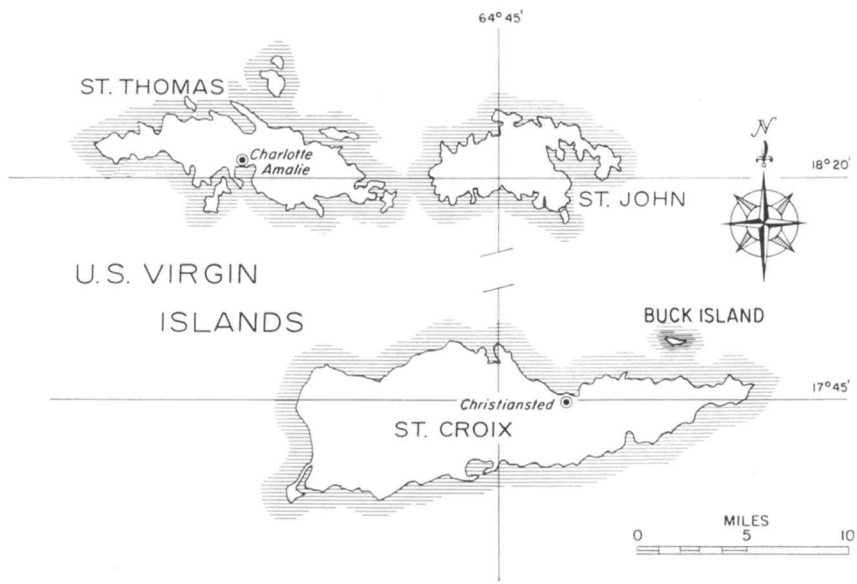
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The responsibilities of the Association relate primarily to the protection of the great national parks and monuments of America, in which it endeavors to cooperate with the Service, while functioning also as a constructive critic; and secondarily to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

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A Dive at Buck Island

By M. Woodbridge Williams

A RIM OF TOSSING SILVER SPLIT MY vision of land and sea. Above rose the tawny slopes of Buck Island, spotted by weird cactus; below spread diaphanous scenes of blue and green through which strange shapes drifted.

From the surface of the sea I looked up again to where frigate birds rode the strong easterlies, winds which brought graceful sloops and ungainly catamarans close-hauled to the anchorages around me. Then, from these charter boats, visitors jumped into the sea, just as I had, to tread with clumsy swimfins at the gateway to the Buck Island coral reef, protected, with the island, as the Buck Island Reef National Monument close to St. Croix in the United States Virgin Islands.

A guide plunged from one of the charter boats. He swam to the bottom and crouched, cheeks puffed with air. Then he opened his hands, and chunks of bread dispersed into the water. Like butterflies coming to nectar, a host of dainty fish—red, blue, green, yellow—mobbed the diver. They swarmed across the guide's face-mask and even slithered through his fingers. From the surface, visitors watched through glass-bottomed boxes and face-masks. Fi-

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Mile-long Buck Island rests in a snug coral harbor. A barrier reef of great corals protects the island from the open sea, while a calm, emerald-green lagoon lies between the reef and the island. Visitors normally anchor at the east end of the island (at left in the photograph) and dive along a marked trail through the coral. The island was designated as Buck Island Reef National Monument in 1961 to protect a fine coral reef and its life.

nally, as the diver shot to the surface, his air gone, long blue and yellow wrasse charged after him, and a strange procession of flapping fins and thrashing arms moved away from the charter boat in single file.

Some members of the file clung to cork life-rings towed by a guide. Others hung to the arms of the stronger swimmers. Some gave me a watery wave as they passed overhead, looking like giant, clumsy frogs. Yet here the normal vanity of the tourist was forgotten, for the sea had engulfed him with its marvels. With faces and noses pressed against the glass of their masks, and hair streaming, they looked upon the marked trail of the coral reef, which wound between bastions, castles, and temples of coral.

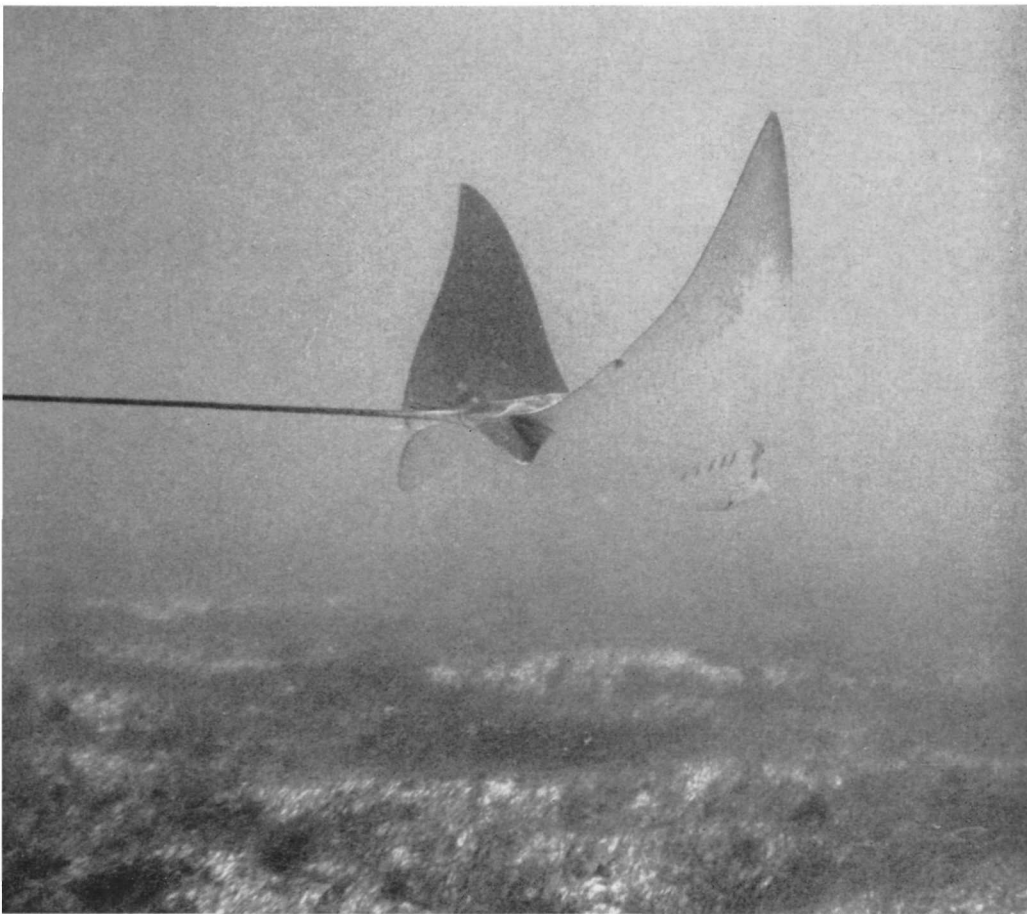
Now I turned from my sea-level view of sky, island, and sea, and called for an underwater camera and a light meter. From the deck of the patrol launch, *Park Ranger*, George Schesvener, my diving buddy, handed down the gear. I carefully strung the cords around my neck so as not to tangle the air hose from the tank on my back, then, letting go the boat ladder, swam slowly down the pastel depths. At twenty feet I came to rest on white coral sand.

Being somewhat of an underwater wilderness man, I veered off and away from this strange guided tour. I was not alone, for George churned along overhead with spare camera and snorkel, but no tanks. With his young lungs he could "ride herd" on a photographer just about as well without tanks, especially on these shallow-water dives. His



job was to watch out for sharks, keep the preoccupied photographer from trying to work too long under water without air, and to switch cameras when film ran out.

Together we swam seaward through the sheltered waters of the lagoon, where staghorn coral raised brittle, golden-brown fingers. Above these colonies schools of yellow grunt hovered like a protective coat, while butterfly-fish meandered among the branches of the animal gardens. Between coral patches, schools of light green tang, almost the color of the water, foraged without noticing us. (These neat, oval fish are also called surgeon-fish because of the razor-sharp bone in the base of the tail). Farther along a goat-



Photograph by George F. Schesvener

A large ray flaps across the grassy sand bottom in the lagoon behind the Buck Island reef.

fish, searching for worms and “bugs” in the bottom, nuzzled up clouds of coral sand with its snout and drooping barbels.

As we swam among the outlying heads of the barrier reef, dapper French angelfish blocked the entrances to their grottos with dark discoidal bodies on which each scale was rimmed with gold. Nearby, under a ledge, a moray eel swayed its mottled green body back and forth, and yawning, flashed needle-sharp teeth in our faces.

Now the main barrier reef loomed in the water-mist, as if it were coming into the focus of a new dream sequence. This mass of elkhorn arose wild and jumbled from a coral base, centuries old. On top it formed a living bulwark around Buck Island against the thrust of the open Atlantic. Soon we were swaying back and forth with the swell, and could discern reef details. Here and there among the reef-building colonies rose massive domes of brain coral. Protruding from the slimy brown

animal surface sprouted the gay heads of segmented worms. As our shadows passed across them, the worms withdrew quickly from sight.

Suddenly we were swimming hard against a strong current, as if bucking a desert wind rushing down a canyon; we were crossing the reef by a narrow channel. Here the seas poured cata-racts of silver bubbles down among the coral arms. I submerged slightly in the passage and used my lung to keep from banging against the sharp elkhorn or voluted spreads of stinging coral that encrusted the reef in areas of strong surge. Finally, George and I broke through the turmoil on top of the reef, and hung in the open sea above the outer face. Here we looked down across its rampart into the misty beyond where the bottom dropped out of sight.

Descending about thirty feet, I came to rest among swaying sea whips, and looked into a jungle of great jagged coral arms stretching toward the open sea. In this world of all-prevailing blue,

I found our friends the tangs drifting in schools among the coral arms. However, their dress was now the most saturated of blue, except for the built-in stiletto on the tails, which was yellow. Oddly enough, these fish when young are solid bright yellow.

“Shooting” the Outer Reef

On the outer reef we encountered fish not seen inside. One of the commonest species, the blue chromis, hovered curiously in loose schools above my head. The small, tuna-shaped bodies and split tails of these fish were a luminescent blue.

All of this fish life was set against a background of natural underwater smog composed of plankton and coral mud stirred up by the wind-driven sea. Yet we decided to shoot, for we had found, during an earlier trip to the reefs of Fort Jefferson National Monument that the water-haze often enhances the pictorial quality of the scene and also makes it more convincing. Sometimes shots made in the exceptionally clear water of the tropics look as if they had been made in air, for there is no texture to suggest water.

On the Buck Island reef, I first made panoramic shots to show the jagged sweep of the reef, then narrowed my focus down to details of soft and hard corals and to individuals that might be sneaking, swimming, or crawling about them.

I learned that George was not content with “riding shotgun” for photographers—he would shoot a few pictures himself, and without a tank of air. Although he only had time to take perhaps two or three shots per dive, he came back with some gems. For example, he secured our only photograph of the stately queen trigger-fish, aristocrat of flowing fins and violent splashes of rainbow colors.

However, now it was quiet, and George’s silhouette floated on the surface among endless flashing mirrors, reflections from the underside of the choppy waves. The marine butterflies were moving closer. To my delight, an enlarged version of a minnow slid out from under a ledge of bright sponges. Called the royal gramma, its front half had been dipped in lavender, while its back half had been dipped in dark orange. Then some of the sea’s oddities came into sight—a trumpfish left its

vertical, head-down position among the sea whips and drifted toward me with no visible signs of propulsion. Only upon close inspection did I catch the glint of tiny, vibrating fins on the back and underside of the long body. I drifted up and down with this fish until it again melted into the surrounding marine jungle. Soon another strange sight came cruising sedately along. It was encased in a hard box of fused scales, so that it needed neither speed nor camouflage for survival. Called a trunkfish, it was covered with black polka-dots on a white background, had a small snout pursed in contempt, and two tiny top and bottom fins for sculling along. (Aquarists say it secretes a poison which is fatal to fish confined with it.) Finally a skittish blue parrot-

Mr. Williams is Chief Photographer, National Park Service, at the Service's headquarters office in the nation's capital.

fish came crunching its way along the reef, biting off pieces of coral with its hard beak and extracting bits of the inhabitants for its afternoon meal. I cautiously swam closer for a shot; but my air started coming in laborious gulps.

I realized that my contact with this twilight zone of wonder would always be an elusive thing—that I could only bite off a small chunk of its reality at a time, like one bite of coral taken by the parrotfish. Like a fish blowing

limy debris from its mouth, I emptied my lungs of stale, high-pressure air, and swam toward the surface on the few gulps left in the tank.

Back in the brilliant sun and the blue and emerald seas, I turned on my back and swam toward the opening in the reef. George dove and cavorted alongside, like a dolphin escorting a hulk under tow. In this fashion he led me through the reef and back into the lagoon.

Soon we were aboard the *Park Ranger*, and the skipper, Dave Lane, helped us wash down the cameras and other gear in fresh water. Then we put out through the reef on the backside of Buck Island alone, for the guided tour had sailed home to St. Croix an hour ago. ■

In the marine gardens of Buck Island's reef a trunkfish swims through antler coral.

Photograph by the author





The male dusky grouse, Dendragapus obscurus, on the ground in his spruce-fir habitat. Photograph taken in Grand Teton National Park: June, 1966.

"FOOL HEN" OF THE ROCKIES

BY BILL GABRIEL

Photographs by the author



After attracting the female to a small opening in the forest, the male dusky grouse struts about with his tail feathers spread and cocked up over his back. Photograph was taken in Grand Teton Park, May, 1966.

THE SPRUCE AND FIR FORESTS OF the high mountains surrounding Jackson's Hole, and other Rocky Mountain valleys, are the home of the dusky grouse. Dusky grouse are solitary birds and lack the communal display activities and gregarious roosting habits of the sage grouse described in the October 1966 issue of *National Parks Magazine*.

This dull gray-colored bird is so difficult to see in the dark shadows of the fir forest that many hikers on trails in Grand Teton National Park walk past the large animal without noticing it. To the ornithologist, the dusky grouse is *Dendragapus obscurus*, meaning an inconspicuous lover of trees. In fact, because it is so inconspicuous, the uninitiated hearer might mistake a courting dusky grouse for an owl. The male emits a low-pitched *hoot, hoot, hoo-hoo* sound, and he is ventriloqual.

Courtship begins in April or May when the first green buds appear in the valley far below. The birds glide down to the lower mountain slopes from their winter homes high up in the fir forests. They sail across streams and canyons, but rarely fly over ridges. Tiring quickly, they drop to the ground and leave long trails in the snow as they walk to their next launching point.

Attracting the Female

The solitary male inflates concealed air sacs in the side of his neck and makes the hooting sound to attract a hen. He may do this while sitting on the ground under a conifer or while perched on a large limb a few feet above the ground. The air sacs are normally hidden by gray feathers, but when they are inflated the feathers open to reveal two scarlet patches of bare skin bordered by white feathers. The hooting is done without any visible effort, and sometimes you can look right at the bird without realizing that he is in fact making the sound.

Both male and female dusky grouse have dull orange or yellow "eyebrows" of bare skin which become bright red when the bird is excited.



Female dusky grouse at the base of a Douglas fir. Grand Teton Park, June, 1966.

When the male has attracted the attention of a female, he struts about in a small opening with his tail feathers spread and cocked up over his back. Courtship is brief and he soon disappears, leaving the nesting and rearing chores to the hen.

The unusual vertical migration of the dusky grouse starts in mid-summer when they begin to follow the ripening berry patches up the steep slopes. In the fir and spruce stands below timberline they make their winter home where large conifers provide shelter and a never-failing food supply of buds and needles.

These grouse are very reluctant flyers and will walk away from intruders,

or climb from limb to limb in a tree instead of taking wing. This trait has earned them the name "fool hen" because they will often sit on a limb within reach of a rock or a club and allow themselves to be killed without attempting to fly away. Stories are told of a whole tree-full of young birds being killed in this way.

The dusky grouse has many natural enemies among the coyotes, marten, hawks, and owls, but they seem to feel safe when sitting on a tree limb. The Richardson ground squirrel and the chipmunks account for much of the predation on unhatched eggs, and less than half of the eggs laid will develop into mature birds. ■

Studying the Black Bear

By Olin E. Bray

*Photographs by courtesy
Colorado Cooperative Wildlife Research Unit*

MORE THAN FOUR MILLION PEOPLE visited Yellowstone National Park during the 1965 and 1966 visitor season to enjoy and study the scenic and hydrothermal wonders and the abundance of wildlife. Many came to see Old Faithful Geyser erupt for a few minutes, or to view the magnificent Grand Canyon of the Yellowstone. However, the first question many visitors asked as they reached an entrance station was, "Where can we see the bears?"

Ever since the automobile mobilized the public, many a black bear has accepted handouts from visitors for a large portion of its summer diet. Those who come to Yellowstone to see bruin (and not to feed him) seldom return home disappointed. By spending a few hours, or a day at the most, one usually is assured of seeing this animal in the park. If one stops to view a bear, it probably will approach the car and assume the characteristic look its trade has taught it: that of looking like a hungry orphan without a friend in the park. Because of the danger involved in feeding bears, the National Park Service is continually trying to inform the visitors of the risks involved in feeding or molesting the mammals. In 1965 and 1966, 101 Yellowstone Park

visitors were injured by black bears.

During the 1965 and 1966 season many visitors were surprised to see some of the black bears wearing colorful ear-ribbons. Some visitors had the opportunity to watch the capture of these bears, the streamers being attached, and then the bears being released unharmed. The ear streamers are used by two graduate students from Colorado State University, Victor G. Barnes, Jr., and the author, to mark the bears for identification as part of two research projects being conducted for the National Park Service.

A Two-Year Study

The research projects are supervised through the Colorado Cooperative Wildlife Research Unit and supported by the National Park Service. The Service will incorporate the data from this two-year study on black bears into a future management plan to help alleviate conflict between the black bear and the rapidly increasing number of visitors. Barnes' project entails studying the activities, movements and habitats utilized by the black bear, while the author's objectives are to determine a suitable census method and obtain population data about black bears in relation to the habitat types they utilize.

Since Yellowstone Park is such a large area (3472 square miles), the study has been confined to the western one-third of the park. This area encompasses territory west of the road from Old Faithful to Indian Creek campground. Public roads, campgrounds, picnic areas, garbage dumps and the habitat immediately adjacent to these are referred to as the "roadside area."

In recent years the National Park Service has developed a garbage-can cover which is virtually 100 percent bearproof. Within the study area the proportion of bearproof garbage cans has been altered to determine their effects on population densities, activities, and movements of the black bear.

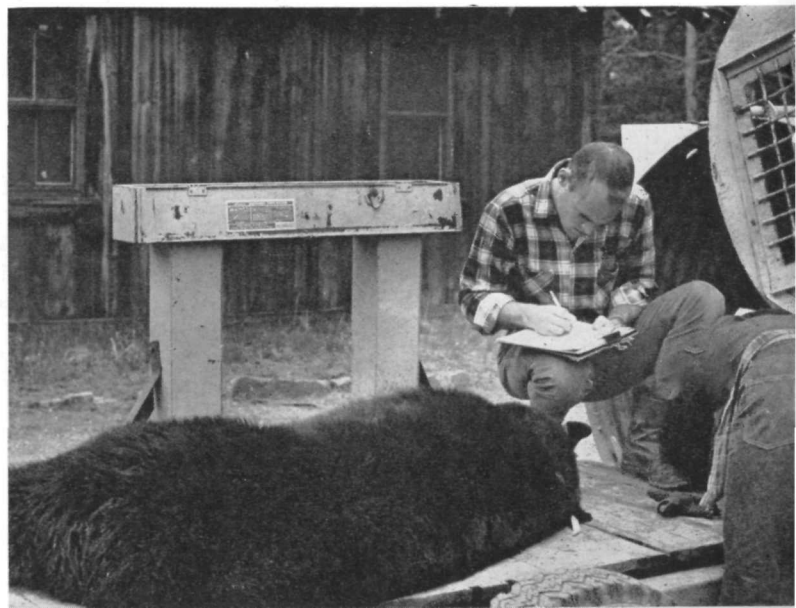
In roadside areas bears are captured by use of culvert traps or a carbon-dioxide powered Cap-chur gun that shoots a drug-filled syringe which, when injected, immobilizes the animal. Bears captured in culvert traps also are immobilized to allow the researchers to tag them.

Sucostrin was the drug most often used to immobilize the bears. This drug does not put the animals to sleep. Instead, they lose control of muscles and are unable to fight the researchers during tagging procedures. The amount

The author recording data.



Researchers prepare immobilization and tagging equipment.



in Yellowstone National Park

Ear-streamers are useful in helping population, activities, and habitats researchers obtain data on park's bear

of drug given is proportional to the bear's weight. Immobilization time varies from a few seconds to more than two minutes, but usually requires about one and one-half minutes. Complete recovery from the drug varies from 10 minutes to an hour, but normally takes about 20 to 30 minutes. Another drug, Sernylan, has been used on a few occasions to immobilize bears. Since this drug is safer and keeps the bear immobilized longer, it is used on cubs or when the researchers need to keep the bear immobilized longer than the Sucostrin permits.

Once immobilized, the bears are weighed and neck and girth measurements are taken. The cubs weigh about seven pounds (after weighing only from eight to 13 ounces when born in late January or February) when they emerge from dormancy (the black bear's denning period is referred to as "dormancy," for they are not true hibernators) in May or June with their mother. By the end of the summer the cubs weigh 50 to 60 pounds. Adult females captured in this study weighed from 100 to 200 pounds when they emerged from dormancy, while adult males weighed from 130 to 275 pounds. During summer the bears doubled their weight before they went

into dormancy in the fall of the year.

After the weight and measurements are taken, the bears are tagged with aluminum cattle ear-tags in each ear. The color of the tag in the right ear signifies the age of the bear when tagged (cub, yearling or adult), while the color of the left ear-tag indicates the general area in which the bear was marked (the main study area has been divided into three smaller study areas). To one of the ear-tags is attached two bright-colored, plasticized, nylon fabric streamers. Five colors of streamers are used in combinations of two. The colored streamers are attached to the right ear-tag of bears inhabiting roadside areas, but are attached to the left ear-tag of bears tagged in the back-country. By this tagging method each individual can be recognized after it is released.

Back-Country Methods

In the back-country areas, bears are captured by use of the Cap-chur gun or Aldrich snare. The Aldrich snare is a relatively new device that causes absolutely no harm to the bear. It is made of airplane cable and catches the bear on the leg. The snare is placed in a "set" constructed from dead trees. The snare set is shaped like a "V" with the top enclosed. The bait is placed in the

apex of the set, and the bears can enter only from the open end. The snare is placed between the entrance and the bait, with sticks and rocks spaced so as to make steps for the bear. The snare encircles one of the steps, and when the bear uses this step the snare will be released.

The black bears are counted along the roads twice a week. These counts are started at a specific time and are standardized to eliminate error. During months of heaviest visitor use (June, July and August) one can usually see four to five bears while driving through the 42-mile-long study area. During May and September (months of low visitor use) one probably will see only one or two bears.

Scats are counted in campgrounds and different habitat types in order to estimate bear numbers. Campgrounds with bearproof garbage cans do not have as much use by bears as those without bearproof cans. Forests broken by grassy meadows and open hillsides have a higher density of black bears than those which are continuous over a large area. The extensive lodgepole pine forests in Yellowstone are very dense, and allow little undergrowth. These forest types without adequate under-story do not provide enough food

Bear is removed from culvert trap for tagging and weighing.



Ear-tag and streamers are attached to immobilized mammal.



to sustain as high a density of black bears as the interspersed forest types.

Whenever a tagged bear is seen it is recorded to aid in mapping the movements of each bear. Some males have moved as far as 15 miles in one day, and one male is known to have traveled eight miles in four hours. Single females travel about half as far as males, while females with cubs move very little. Problem bears (bears which have caused injuries or damage in the campgrounds) show a strong homing ability. Some of these bears have returned after being released as far as 30 miles from the campground where captured, and they usually make the trip in two or three days. One yearling male traveled 21 miles from the location where he was tagged, only to find his new home occupied by numerous hostile grizzly bears.

Information about the activities of bears is obtained by watching them. Only after many hours of observation can one appreciate the individuality that these creatures express and the clowns of nature that they are.

Sixty black bears were captured during 1965 and 1966, but a total of 81 bears were known to inhabit the roadsides of the study area. All of these bears obtained a portion of their diet from the unnatural food made available to them by man. Several bears were recaptured three or four times, and some as many as six times. This shows the persistence the bears have in using the campgrounds as a source of food. Most of the bears using the campgrounds were content with raiding the garbage cans. But who can blame those that did not resist a meal on a picnic table that was left unguarded by some

Mr. Bray is a Graduate Research Assistant working with the Colorado Cooperative Wildlife Research Unit at Fort Collins.

visitor at his camping site? It was just a few hours earlier that these same people were willingly feeding (although against Park Service regulations) the bears on the roadsides. However, the bears show individual habits, for some are strictly roadside beggars, campground raiders or dump visitors, while others are a combination of the three.

Only four black bears were captured in the back-country. This was not due to the lack of bears, but to our inability to capture them. As mentioned before, it was originally planned to capture bears in the back-country with the Aldrich snare. However, due to the number of grizzlies and their dominance over the black bear, we snared only grizzlies. The grizzlies were released unharmed and without incident. On one back-country trip 25 different grizzlies were observed while only three black bears were sighted. The use of the Aldrich snare was curtailed due to the small chance of snaring a black bear. As a substitute we used the Cap-chur gun to capture three black bears, and the fourth was caught with a culvert trap.

As the number of visitors declined in September, the begging activity of the bears declined rapidly. Many of the bears spent their time foraging on berries and other natural food. White-bark pine stands in the back-country were used heavily by bears. They would climb the pine trees and break the cones and limbs in an effort to obtain the seeds, which appeared to be an es-

sential part of the mammals' fall diet.

In 1965 the black bears went into dormancy during the last part of October or first half of November. In 1966 the bears went into dormancy around November sixth, when a large snow-storm covered Yellowstone with a deep blanket of snow. In 1965 we found five dens with a total of nine bears in them. One sow and her two cubs had denned under a building, while another sow and her two cubs had chosen a culvert under a road. A lone male was found in a cave. Another lone bear of undetermined sex was found in a hole dug in the ground, while another utilized a culvert. These bears appeared to be very sleepy in November, and after being in their den for a month they did little more than look up when we encroached upon their privacy.

Black bears are expected to emerge from dormancy in Yellowstone during April, May or June. Lone males will probably appear on the roads the last of April or in May, while the females with yearlings (as the young are called their second summer) will probably not appear until the first part of June. During the summer the yearlings will be driven off by the female to fend for themselves. After their departure the female will breed in July and give birth to cubs, usually twins, the following winter. Female black bears produce young every other year.

It is hoped that, through the research being conducted and the understanding of the visitors in abiding by the regulations imposed by the National Park Service, the magnificent black bear will always be present in Yellowstone in its free-roaming state to greet visitors to this great national park. ■

A "problem" bear is released from trap in the back country.



Tagged bear seeks food in dense lodgepole pine forest.



A Bald Cypress Swamp in Indiana

By Charles S. Watson, Jr.

THE PICTURE ON THIS PAGE seems more typical of old Dixie than southwestern Indiana; and yet it was taken just 18 miles southwest of Vincennes in a former riverbed at latitude 38°26' N.

The storied Wabash, whose name is derived from the French "Ouabache," has many winding tributaries called bayous, testimonials to the poorly-drained, sandy bottomland of the vicinity. Such soil, combined with annual flooding, is known to be ideal for natural growth of the bald cypress. Farther south in Indiana, similar bottomlands have apparently been stripped of this tree; at Coffee Bayou, for example, which is fairly close, one may find, rarely, an old stump or two. Only near the mouth of the Wabash, where it flows into the Ohio, can modest growths of bald cypress be seen. (Neighboring Illinois has two excellent but little-known cypress swamps at Horseshoe and Mermec Lakes, both much farther to the south, near Cairo.)

The bald cypress found in the isolated Knox County, Indiana, location is the main natural history attraction of an old ox-bow riverbed north of the White River, not far from the confluence of the White and the Wabash. Closest community is the village of Orrville, two miles northeast. The surrounding terrain is flat and subject to intense cultivation; yet the old riverbed remains a pristine island of wilderness with bald cypress, although scattered, enhanced by a climax bottomland forest. In summer the dense forest canopy almost blots out the sun. To be seen here are the strange bald cypress "knees," vertical outgrowths of a shallow, lateral root-system; functions of the cypress knees are little understood.

Best bald cypress are seen on the northeast end of this hook-shaped bottomland of some 300 acres. So far as known, the swamp has no formal name. The huge specimens seen here have thick, bulbous trunks, and are unquestionably of virgin growth.

At the extreme northerly edge of the range of the bald cypress, this isolated swamp has gone almost completely unnoticed. The Indianan Winona H. Welch mentioned it in 1931, and a map, showing the possible northerly occurrences of the tree, appeared in the Department of Agriculture's Handbook 271 (1965) titled *Silvics of Forest Trees of the United States*. The only other location for bald cypress which rivals the Indiana site for northerly latitude is Delaware's Trussem Pond, where cypress occurs naturally in the only stand north of the Mason-Dixon line. In the Midwest, the natural range of the bald cypress extends up the Mississippi and branches sharply up the



Photograph by the author

Near the confluence of the White and Wabash Rivers in Indiana there is a fine occurrence of bald cypress in an ox-bow river bed.

Ohio. In Indiana, its range ends just west of Evansville along the Ohio.

Many Americans are beginning to feel that permanent preservation of such small, unique areas as the Indiana cypress occurrence is a vital part of national conservation planning for the future; this particular cypress swamp remains an almost unknown natural wonder. Without doubt it would handsomely complement the recent acquisition by Illinois, for its state park system, of the 650-acre Forest of the Wabash (Beall Woods), a virgin Wabash woodland. The Indiana cypress swamp is one of the last vestiges of the original wilderness which greeted French explorer François Marie de Vincennes in the year 1732. ■

OLD ROCK DAMS ON THE POTOMAC RIVER

By Horace P. Hobbs, Jr.

THE POTOMAC is one of the longest rivers in the eastern United States, and one of the most beautiful, although it will need some purification before it becomes the "model river" that the President has said it should be. It is also one of the most interesting, with history, legends and landmarks at every bend. It is a great river for naturalists, geologists, historians and archeologists, for it has many secrets to stir their curiosity and challenge their ingenuity.

For instance, at many places in the river, between the Great Falls and the Allegheny Mountains, one can see, in times of low water, a long line of rocks extending diagonally from each bank to form a large V, pointing downstream. At first glance, these long rows of rocks appear to be natural formations in the riverbed; but on closer inspection they are recognizable as man-made dams. Who made them? And for what purpose? Not even the local fishermen, who for generations have anchored their boats near the dams to fish for bass, bluegills and channel-cats—not even they can tell you the story of those old rock dams. But the river has kept that secret long enough. It is time for the story to be told—even though it may end in another mystery.

ONE SUMMER DAY in 1785, General George Washington and some friends boarded a small boat near Harper's Ferry, West Virginia, and travelled about twenty-five miles down the Potomac to a point above the Great Falls. The month was August, the middle of the dry season, and the water was low. The oarsmen had to keep a sharp lookout for rocks and shoals. Washington noticed that some of the worst rapids, or "ripples," were caused by man-made rock dams, which he called "fish dams" or "Fish Pots." In his diary he wrote: "The Fish Pots, of which there are many in the River, serve to clog the Navigation, and to render the passage more difficult . . ."

Washington knew that those dams had been in the river for a long time, for he had come down the same part of the river thirty-one years before in a birchbark canoe. He must have wondered whether the dams had been made by Indians or by early white settlers. But it made no difference to him now. He regarded them only as obstacles that would have to be removed by the Potowmack Company,

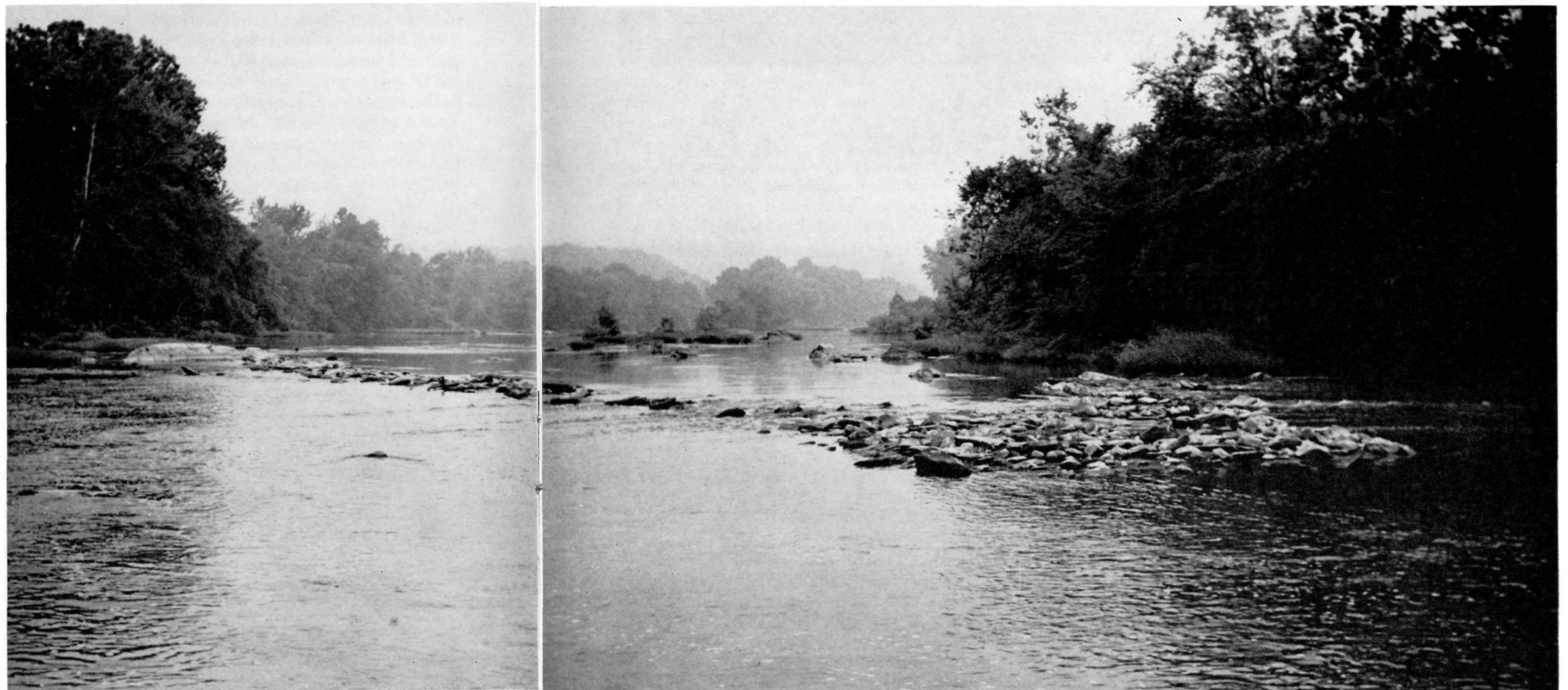
which he had organized a few months earlier for the purpose of improving the river for navigation.

For many years before the Potowmack Company was formed, Washington had dreamed of a water-route between the Atlantic seaboard and the land beyond the Alleghenies. Out of this dream grew his plan to open the Potomac River, by a system of locks, canals and channels, from the port of Alexandria, Virginia to Fort Cumberland, Maryland, and to build a wagon road from Cumberland to the headwaters of the Ohio. Washington was intrigued with this idea for two reasons: first, the direct trade with the West would give Alexandria a commercial advantage over Baltimore and Philadelphia; and second, the easier

travel would encourage the westward migration of settlers, and this would help to prevent the Northwest Territory from falling under the control of the British to the north or the Spaniards to the south. But Washington did not live long enough to see this dream come true. When he died in 1799 the upper Potomac was still clogged with natural obstructions and man-made "Fish Pots."

The Potowmack Company struggled for thirty-six years, including twenty-two years after Washington's death, in its attempt to make the upper Potomac navigable. Every summer and fall, when the water was low enough, gangs of hired Negroes and slaves were sent out to blast and

haul rocks from the riverbed. Locks were built around the Great Falls, a canal was dug around the Seneca Rapids, and a barge equipped with a crane lifted heavy boulders out of the swift and dangerous rapids below the mouth of the Shenandoah. Many smaller rapids were made passable by drowning them behind sluice-dams, walls about eighteen inches or two feet high, made of rounded stones picked up from the riverbottom and piled in long rows from shore to shore in the form of a V pointing downstream, with an opening twenty feet wide at the apex. By 1798 flat-boats loaded with barrels of flour were coming down the river "almost daily" from Harper's Ferry to Great Falls.



A rock dam in the upper Potomac River near the Catoctin Mountains. Pile of rocks at the right was probably a circular well for spearing fish; the well has been filled in by action of the river. Such dams are visible only during the summer and fall when the flow of the river is low; they are but one of many attractions of the Potomac.



The arrow in the photograph above shows where the stone projectile point of Archaic type, pictured at left, was found at a dam between Harrison Island—about 30 miles up the Potomac from the District of Columbia line—and the Virginia shore. The dam pictured here may have been built by aborigines several thousand years ago.

The quartzite projectile point mentioned above measures $2\frac{1}{8}$ inches long, with broken barbs. The point may be a clue to the age of such fish dams; it resembles a North Carolina projectile point type known as "Morrow Mountain I," estimated to be 6000 to 7000 years old.

But the river was passable for not more than forty-five days in a year. In winter and spring the current was too swift, and in the summertime many boats were stranded in midstream when the water-level dropped suddenly. Above Harper's Ferry the river was so shallow and full of obstructions that the required depth of the channels was reduced from four feet to one foot. Even so, the time limit for completion of the project had to be extended several times. By 1821 the Potowmack Company was heavily in debt, labor was scarce, and so little progress had been made that the board of directors decided to suspend operations.

The governments of Maryland and Virginia then appointed a board of commissioners to examine the work of the Potowmack Company and make a recommendation as to whether to continue the project or give it up as a total

loss. The commissioners surveyed the river in 1822, and reported the following year that in their judgment the project was hopeless. They found that most of the sluice dams the Potowmack Company had constructed were already in such a state of ruin "that they were difficult to distinguish from the numerous fish dams found along the whole course of the river." The only apparent difference between the two types was that the sluice of a navigational dam was wider than that of a fish dam. But now all of the sluices were full of rocks, and the walls of the dams had been broken by the relentless current of the spring floods.

So the Potowmack Company went out of business. In 1828 it was succeeded by the Chesapeake and Ohio Canal Company, which eventually did provide a water route from Alexandria to Cumberland. The C. and O. Canal got its

water from the Potomac. Seven dams were built to divert part of the river into the canal. Unlike the navigational dams of the Potowmack Company, and the old fish dams, the dams constructed for the canal were not made entirely of stone. Triangular wooden cribs were placed in a line across the river, filled with rocks, and connected to each other by walls of timber sheathed with planks. Most of the canal dams have long since crumbled and decayed, leaving still more piles of rocks in the river to be confused with the remains of the older rock dams.

One rock-and-timber dam, "Number Three," was built and owned jointly by the C. and O. Canal Company and the U. S. Arsenal at Harper's Ferry. The Arsenal used water power to run its milling machines for the manufacture of rifle barrels. This dam was later rebuilt with concrete and is still in use, one end of it running water into a restored section of the canal, the other end supplying power for the Virginia Electric Power Company.

The older, all-rock dams have long been a puzzle to residents of the Potomac region, and various theories have been invented to account for them. It has been assumed that all dams made of loose rocks were fish dams; that those with straight sides are of colonial origin, and that those with curved or irregular sides were made by Indians or pre-Indian people. Another theory was that all of those dams are of fairly recent origin, and that none was made by Indians. This was based on the testimony of some old farmers who, a few years ago, said that when they were young they had helped to build rock dams in the Potomac. A fisherman once explained to me that a certain V-shaped rock formation was the foundation of an old bridge. Photographs of rock dams have been published without recognition of the fact that some were fish dams and some were navigational dams.

It is not generally known that the Potowmack Company built any dams at all. That fact has lain buried and forgotten in the Company's records in the National Archives, and in the report of the commissioners who surveyed the Company's works in 1822. Those records describe the navigational dams in some detail, but tell us very little about the old fish dams.

Many fish dams were in the Potomac in Washington's time, as we have already seen. How long had they been there before then? Were they made by white men or by Indians? Early records give us only part of the answer.

Company vs. "Delinquents"

In May, 1802, while the Potowmack Company was preparing for its seventeenth season of work on the river, the president and directors of the Company were informed that a few thoughtless landlubbers had recently obstructed the channel by erecting fish dams. So the Company instructed its treasurer to ". . . ascertain as soon as may be the number of Fish Pots that have been recently erected . . ." and to get "the names of the Delinquents and witnesses and their places of residence . . . that suits may be commenced at the next Montgomery [County, Maryland] Court."

Evidently very few fish dams had been "recently erected" in the right-of-way, for in November of that year the president of the Company wrote to the Governor of Virginia that "Below that chain of Falls at Harper's Ferry, and between

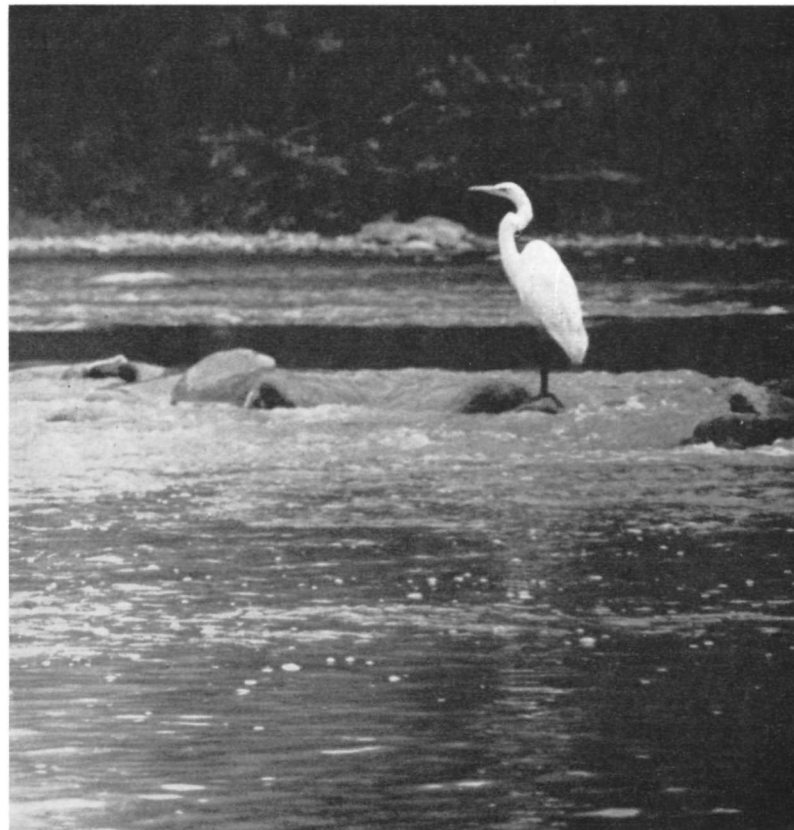
there and Seneca Falls, there are *three or four* fish dams (author's italics) and one gravel shoal which require moving . . . When this done, and the walls [navigational dams] [are] made in that chain [of rapids] below Harper's Ferry, the navigation will be completed from thence to tidewater." This means that any other fish dams in the main channel had already been cleared away, or were such old ruins that they were no hazard to navigation.

It would be interesting to know whether any "Delinquents" were arrested and hauled into court for obstructing the channel, and if so, whether they argued in their defense that they had only repaired some old Indian dams that were already there—but no such record has turned up.

However, there is plenty of evidence that it was illegal for a white man to build a fish dam, or even a mill dam, in the Potomac even before the Potowmack Company began to clear the river. In both Maryland and Virginia there were laws (dating back to 1680 in Virginia) against obstructing the navigable rivers and creeks—and "navigable" meant passable by canoe. These laws were intended not only to keep the waterways open for navigation, but also to allow fish to swim upstream to spawn. It was illegal to erect wooden weirs or stone dams even in the smaller channels, where they would not interfere with boats in the main channel but would hinder the passage of fish.

The Maryland Assembly decreed in 1768: ". . . That

Old rock dams of the Potomac are favorite fishing places for water birds. American egrets and other herons wade among the rocks and in the shallows while kingfishers and ospreys fish in the deeper water between the converging rock walls of the dams.





A brush-net sinker (obverse at left, reverse at right) recovered near a fish-dam on the Potomac River, "too big and heavy to have been used with hook-and-line and not heavy enough to have served as an anchor for a canoe."



all fish Dams or other devices for catching of Fish already made, or hereafter to be made . . . in the River Potowmack between the Great Falls and Will's Creek (Cumberland) or in the River Monococy (sic) . . . shall be and are hereby deemed and declared Nusances, and may by any Person or Persons be pulled down, prostrated and abated as such, And that no Person or Persons whatsoever shall hereafter put, place or erect any such Fish Dam, or place or make any Heap of Stones or other Erection whatsoever within the said parts of either of the said Rivers under penalty of fifteen Pounds Current Money for every such Offense."

There was no loophole in *that* law! Similar laws in Virginia carried a penalty of a thousand pounds of tobacco.

And there are records to show that those laws were taken seriously. For example, there is the case of Christian Strowder, who ". . . at great Expense and Trouble erected a Dam for a Grist and Saw Mill across Monocacy River" in 1771, then discovered that he had violated the Maryland law of 1768, and had to petition the Assembly "to save himself and his Family from immediate ruin." In another case, Carter Henry Harrison was not allowed to build a mill dam across Will's Creek until the Virginia Assembly, in 1762, passed a special act permitting him to do it, provided that ". . . he shall at the time of raising the said dam, build and place a lock therein sufficient for the passage of boats and canoes, and shall also make an opening or slope in the said dam for the passage of fish." Under Virginia law, a fish passage in a mill dam had to be at least ten feet wide and a foot deep.*

Considering the laws and the penalties, it seems unlikely that more than a few of the early settlers would have taken the risk and the trouble to build fish dams in the Potomac. Even if there had been no laws "For the Clearing of Rivers and Creeks," any person guilty of interfering with the

*If it seems strange that these Virginia laws were applied to a creek in Maryland, there is a plausible explanation: at that time, during the French and Indian War, Fort Cumberland was probably occupied mainly by Virginians.

passage of boats and spawning fish would have found himself in trouble with the fur traders coming downriver in birchbark canoes, and the farmers delivering flour and tobacco by the boatload, and the fishermen along the banks of the river. So it is pretty certain that not many fish dams were built by the early settlers. Most of those dams must have been made before the settlers arrived.

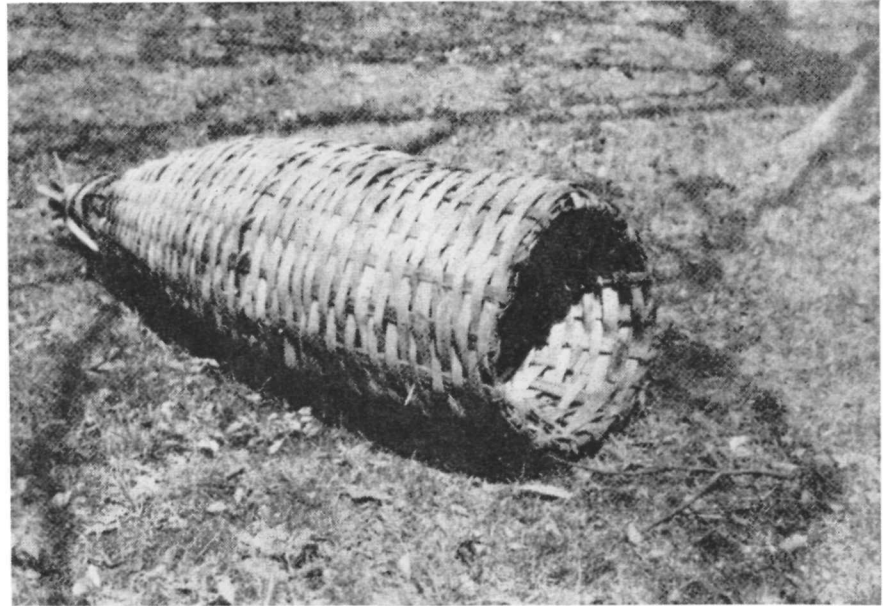
Practically every place in the river suitable for a fish dam—that is, shallow and relatively narrow, or partly blocked by a natural rock ledge—has the remains of a fish dam in it. When the water is very low, enough of the rocks appear above the surface to show the outline of a V, with an opening at the point, where a spillway was formed by two parallel rows of rocks about five feet apart and ten to twenty feet long. The shifting of the riverbottom has filled the spillways with rocks and gravel, or buried them under small islands. Some fish dams are so nearly washed out that their outlines can only be detected by the ripples on the water. Many others are so far gone that their presence was unknown until they were discovered a few years ago by Carl Strandberg, of Alexandria, Virginia, in the course of a survey of the river by aerial photography.

Fish dams are found not only in the Potomac but in rivers, creeks and tidal estuaries all over North America—wherever there are fish, rocks, and shallow water. From California to Alaska, across northern Canada, and down both sides of the Alleghenies the remains of old stone fish weirs are found. Some are known to have been used by Indians.

Although there seems to be no record of Potomac River Indians fishing in stone dams, there are eyewitness accounts of Indians fishing in dams to the north and south of the Potomac.

James Adair, a trader who lived among the southeastern Indians for many years before he published a book about them in 1765, saw Indians fishing in this manner in some southern river, which he did not identify: "The Indians have the art of catching fish in long crails [basket-traps]

Basket-traps of this type, three to five feet long with sharp splinters facing inward from the mouth, were probably used by Potomac River Indians. The trap illustrated was made by Catawba Indians of South Carolina, and is reproduced here from a Library of Congress photograph.



made with canes and hickory splinters, tapering to a point. They lay these at a fall of water, where stones are placed in two long sloping lines from each bank, till they meet together in the middle of a rapid stream, where the entangled fish are soon drowned. Above such a place, I have known them to fasten a wreath of long grape vines together, to reach across the river, with stones fastened at proper distances to rake the bottom; they will swim a mile with it, whooping and plunging all the way, driving the fish before them into their large cane pots.”

Another Eye-Witness Account

A variation of this method was described in 1886 by A. F. Berlin of Allentown, Pennsylvania, who had the story from an old resident whose grandfather had seen Delaware Indians fishing for shad in the Lehigh River: “The first step was to throw up two lines of stone walls, extending from each shore in an oblique manner toward the middle of the stream where they almost met. Here was walled up a round receiver resembling a well . . . This finished, there was taken into the stream, extending from shore to shore [above the dam] . . . a braided mass of brushwood called a net, attended by hands enough to easily drag it along through the water . . . to scare and sweep the fish into the circular well . . . after which it was closed. Each person then prepared himself with his spear, and the one who handled his implement with the greatest dexterity was rewarded with the largest number of fish.”

A. F. Berlin added that he had found on the banks of the Lehigh River “numerous flat, water-worn stones of different sizes and various forms tending, however, almost always to the oval shape, having notches worked into the sides opposite each other, which are correctly called [brush] net sinkers.”

In the Potomac River, about thirty-five miles northwest of Washington, D.C., between a large island and the Maryland shore, there is a fish dam that seems to have had a circular enclosure of stones instead of the usual sluice at

the point of the V. On an eroded bank of the island, among fire-cracked stones and sherds of cord-marked pottery, I found a water-worn piece of sandstone which exactly fits A. F. Berlin’s description of a brush-net sinker. The sinker I found is too big and heavy to have been used with hook and line, and not heavy enough to have served as an anchor for a dugout canoe. This should pretty well settle the question of whether Potomac River Indians fished with brush-nets and stone dams.

But one question remains: How old are the oldest rock dams in the Potomac? There is no sure answer, but we may have a clue.

An Archeological Find

One day in August, 1963, I was trolling for bass and drifting lazily down the river when I came to an old fish dam between an island and the Virginia shore. I got out of the canoe and waded in the shallow water to inspect the dam. Standing beside the sluice, I looked down into a little sandy basin among the rocks at my feet. There, under a few inches of water, was an arrowhead or harpoon point made of brownish-yellow quartzite.

Judging from a photograph of this projectile point, the Virginia State Archeologist, Colonel Howard A. McCord, Sr., informed me that it looked very much like an Archaic type of point excavated by Dr. Joffre Coe in North Carolina, known as “Morrow Mountain I,” and believed to be six or seven thousand years old. If the point I found were lost by a man spearing fish at the dam, then the dam must also be several thousand years old.

There is a theory that some of the earliest migrants into North America from Asia were not what we would recognize as Indians—that is, not “Mongoloids”—but “Caucasoids,” a primitive white race perhaps related to the Ainus of Hokkaido. Some of these people may have been the first inhabitants of the Potomac Valley. So it may be true, after all, that the oldest rock dams in the Potomac were not made by Indians but by white men! ■

News and Commentary

Rampart Dam

Congratulations to the Administration seem in order on its position against construction of the proposed Rampart Dam on the Yukon River in Alaska. The position became apparent recently when Secretary of the Interior Stewart L. Udall rejected the huge Corps of Engineers dam and impoundment during the course of a press conference.

This Association has published articles on the monstrosity in question in the past. The scenic and wildlife resources which would be destroyed by the gigantic reservoir surpass the imagination. The irreplaceable ancestral homes of the Indians who have occupied the area from time immemorial would be destroyed. Irreplaceable salmon runs would be injured and waterfowl breeding grounds of great importance for the entire North American continent would be ruined. The vast quantities of hydroelectric power which would be produced would find no market for a long time if ever. Rainfall, weather and climate might be affected unpredictably throughout vast regions. There are better ways to get the hydropower for which Alaska may have reasonable needs in the foreseeable future: smaller hydropower projects, natural gas, and possibly nuclear energy, although we continue to have reservations as to the atom.

Sharing Monument Facilities

The National Park Service and the U. S. Forest Service will share offices, visitor center, maintenance facilities and residential developments at Lehman Caves National Monument, Nevada, under an agreement which took effect July 1 this year, after eighteen months of negotiation. The monument and nearby Wheeler Peak Scenic Area in Humboldt National Forest together constitute a substantial fraction of the proposed Great Basin National Park. Lehman Caves are the public focal point of the entire Wheeler Peak region, and the Forest Service can best reach visitors there. The combination will also save money and show a "togetherness" of the two agencies.

First concrete step, already under way, is remodeling and expanding the monument's "Mission 66" visitor center. The restaurant-souvenir shop is expected to occupy the new section beginning next spring, and the Forest Service will use the concession's present location. Interpretive exhibits of the two services will be linked through an archway. The 1968-

69 construction program includes a six-unit apartment building for seasonal personnel (Park Service four units, Forest Service two), a new parking area and access tunnel, and a three-bedroom home for the Scenic Area's visitor information specialist.

The Forest Service is initiating its Wheeler Peak interpretive program this summer, including scenic overlooks on the new road into the high country, informational signs and nature trails, and is also stepping up its surveillance program to preserve outstanding flora (e.g., bristlecone pines, earth's oldest living trees), Great Basin fauna, and nationally significant geological features.

The Watershed Congress

We expressed the hope in our editorial for June that the Fourteenth National Watershed Congress, meeting that month in Boston, would advocate using the watershed management approach to supersede in great part the big-reservoir methods of the large dam-building agencies; the Congress disappointed our hopes, contenting itself with polite accommodations. Relief was accorded by a penetrating paper by Dr. Arthur Maass of Harvard, criticizing the complacent and indiscriminating use of the concepts of multipurpose development and comprehensive planning, and suggesting the need for a better formulation of social objectives; also by an excellent statement by Mr. Sydney Howe, Senior Associate of the Conservation Foundation, advancing criticism of a somewhat similar nature. The National Parks Association was represented by its President, A. W. Smith, who reviewed the original history of the Watershed Congress, turning around the promotion of headwater techniques, and urged a return to such origins.

Yellowstone Elk Herd

John S. McLaughlin, Superintendent of Yellowstone National Park, is to be congratulated on the current programs for the management of the Northern Yellowstone elk herd. Accomplishments of the 1966-67 management program were related at a meeting in the park on June 16 to which representatives of interested organizations were invited.

The National Parks Association was represented by Tom Messelt, Sr., of Great Falls, Montana, an official correspondent of the Association, who made a brief statement to the effect that the Association would be opposed to the use of

public hunting in the park as a management tool. This has been the Association's position for many years, and was also that of the Committee on Wildlife Management in the parks in 1963, chairman of which was Dr. A. Starker Leopold. This also continues to be the policy of the National Park Service with respect to the great primeval parks and monuments. The 1966-67 program, as reported at the meeting, eliminated 2648 elk from the herd; 1108 by hunter kill outside the park, 1105 by trapping, 239 by direct reduction by park personnel. In addition, 153 animals were taken for physiological studies in research projects, 41 were listed as trap losses, and two were taken for museum specimens. Present census and estimates indicate the need for reduction by about 1300 in 1967-68. Accounts also show 188 antelope in the park, 231 bighorn sheep, 397 bison, and 949 elk in the Madison-Firehole herd. Harmony seems to prevail among game commissioners, sportmen's clubs, ranch operators and conservationists generally, with respect to present elk management operations.

The Golden Passport

A list of more than 2500 Federal recreation areas showing where the \$7 annual Golden Eagle Passport is valid for entry, and where other recreation user and service fees are charged, has been published by Federal agencies and is available for general distribution through the Bureau of Outdoor Recreation. The publication lists Federal recreation areas alphabetically by States. Each agency's designated list shows which permits are valid for entry to individual areas, and whether there are special user and service charges. Visitors may use the \$7 Golden Passport to enter most Federal recreation areas by the carload an unlimited number of times through March 31, 1968. Also available is a one-day individual 50¢ daily permit, and the \$1 daily carload permit for single Federal recreation areas. Copies of the *Directory of Federal Recreation Areas Requiring Entrance Admission and User Charges* may be obtained free from the Federal agencies that sell the \$7 permit; or from Operation Golden Eagle, P.O. Box 7763, Washington, D.C. 20044.

Redwoods Parks Additions

Cooperation between Federal and State agencies has added 120 acres to the Rockefeller Forest in the Bull Creek watershed, Humboldt Redwoods State Park. At the suggestion of the Save-the-Redwoods League, the State of California made application in 1963 for transfer of these lands from the Bureau of Land

Management to the State of California as an addition to Humboldt Redwoods State Park. This was a part of the continuing program to round out the State Redwoods Parks within logical watershed boundaries.

Three parcels adjacent to Gold Bluffs Beach, formerly administered by the Bureau of Land Management, have also been transferred to the State for addition to Prairie Creek Redwoods State Park, as a part of the same program. Gold Bluffs Beach was added to Prairie Creek Redwoods State Park in 1965, at a cost of \$2.4 million. The Save-the-Redwoods League and the State used matching funds to purchase Gold Bluffs Beach.

The Federal Land and Water Conservation Fund and the State of California in cooperation with the Save-the-Redwoods League are contributing matching funds to purchase the six miles of superlative forest, including the incomparable Pepperwood Flat, on the Avenue of the Giants Extension for addition to Humboldt Redwoods State Park. This purchase will add 1600 acres of first-growth forest to the park.

Some Pertinent Comments on Water Problems

Dr. Raymond L. Nace, an internationally-recognized research hydrologist with the U. S. Geological Survey, said recently that "there are really no final solutions for water problems."

Speaking before the 35th Annual Meeting of the California Municipal Utilities Association at Sacramento, California, on March 2, Nace emphasized that water problems are necessarily "people problems," and "political problems," and that "hydrologists and engineers cannot be expected to solve water problems; they can solve only hydrological and engineering problems. They can tell the water planner what he has to deal with physically—and that is all."

The USGS spokesman, who is also the Chairman of the U. S. National Committee for the International Hydrological Decade, said that "three besetting sins tempt water planners and their advisors: faith in science and technology; worship of bigness; and arrogance toward the landscape.

"The belief that technology can solve any water problem is not only wrong, it obstructs consideration of alternative nontechnological solutions that might be preferable," Nace said. He emphasized that "in a broad sense, no important new physical concept of proved value in water management has arisen in many hundreds of years.

"The diversion dam, and the canal for irrigation, navigation and city water sup-

ply were invented nearly 6000 years ago by the Sumerians of Mesopotamia," Nace pointed out, adding the "ancient Egyptians invented the off-stream storage reservoir and created Lake Moeris in the desert 50 miles southwest of Cairo. . .

"The technology of dam construction has improved, but the product is still just a dam," Nace said. "Purposes are unchanged: to alter nature's plumbing system in order to put water where someone wants it today, with only superficial thought about where our descendants may want it tomorrow. This is the sort of action that Henry Thoreau classed as *improved means to an unimproved end*," the Survey hydrologist said.

Dr. Nace warned of the creation of big water works for the sake of bigness alone. "The Pyramids are admirable proofs of the engineering and geometric skill of their builders; they are also monstrous momentos of misguided worship of bigness; they were eternal resting places for God-Kings, but when the Kings ceased to be gods, the pyramids lost their purpose," said Nace.

"The motivation for ever larger structures and systems for water management needs critical evaluation," Nace warned. "In some cases," he said, "the motivation may be simply the urge of engineers to build something big. In others, the motive is simply to put water where people want to be, or where promoters and 'developers' persuade them to go."

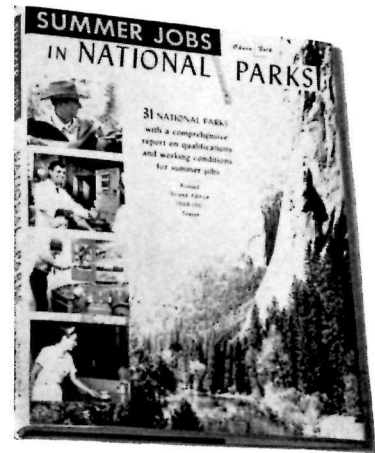
Commenting on man's "arrogance toward the landscape," Nace said that "considering the world as a whole, human occupation, at least during the past 2000 years, has operated chiefly to harm the landscape, not to preserve it.

"A vital question is whether man is better able now to cope with the landscape than were, say, the men of Mohenjo-Daro, an archeologically famous city civilization that flourished on the Indus Plain in what is now West Pakistan from 2500 to 1500 B.C.," said Nace. "The answer is not necessarily affirmative, because men are so numerous, and their destructive actions so ingenious, that new changes occur faster than older ones can be evaluated and dealt with," he said.

"It seems essential," Dr. Nace asserted, "that a new frame of mind, some new perspective be applied in water planning."

Dr. A. Starker Leopold Named NPS Chief Scientist

A distinguished scientist well known to the conservation world was recently appointed by Secretary of the Interior Stewart L. Udall as Chief Scientist of the National Park Service. Dr. Leopold,

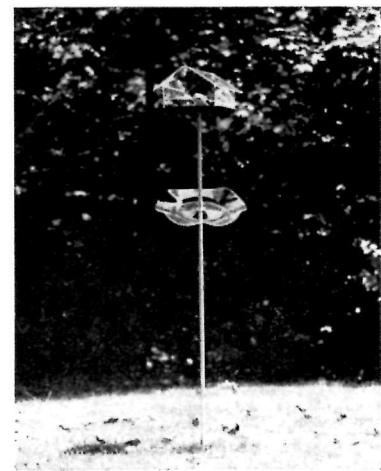


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professor of zoology at the University of California and a prolific writer in the field of conservation and wildlife, was chairman of the Secretary's Advisory Board on wildlife management in the national parks; the report of that board to the Secretary, presented in 1963, has since guided Park Service wildlife management policy. The five-man Advisory Board has since undertaken other important conservation studies for the Secretary, and is still chaired by Dr. Leopold. Secretary Udall's office has also announced that Dr. Robert M. Linn, most recently a research botanist in the Park Service's Washington headquarters office and acting Chief Scientist for a number of months past, has been appointed Deputy Chief Scientist of the National Park Service; as such, Dr. Linn will carry on the day-to-day administrative operation of the Service's natural science research program.

Water Scare Postponed?

As of this writing, the annual ritual of the Great Water Scare in the nation's capital is still unscheduled, perhaps because of conflict with other metropolitan activities like the Shriner's parade. True, there was a small gesture in the appropriate direction during June, which fetched only one newspaper headline

which said in rather unexcited type that "Officials See Possibility of Water Crisis in Area." We checked the Potomac Estuary on the way to NPA headquarters, to make sure it was still there, and can report that it is; further, that its immense gallonage of fresh water—sufficient after normal treatment to guarantee the Washington Metropolitan Area abundant supplies of high quality emergency water through the foreseeable future—was being criss-crossed by pleasure craft from the area's several marinas. A brave sight, indeed!

Attacking Pollution Problems

Many conservationists are following with great interest the pollution-reduction programs of the Department of Health, Education and Welfare's Public Health Service, which appear to be moving along fairly swiftly in the research stage. For example, the Service's Solid Wastes Program has recently announced, through the office of Chief Leo Weaver, grants totalling a little more than three-quarters of a million for 17 research projects to be conducted by scientists at various universities and colleges throughout the nation; the projects look toward solutions of some acute air and surface pollution problems, including those which are capable of being reduced through utilization of waste products. Typical of these latter projects are an assignment to Auburn University, to evaluate composted municipal refuse and sewage sludge in agricultural applications, and one to the University of California which would determine the feasibility of shredding woody wastes from agriculture and incorporating them into the soil.

Commentary on the Recent International Conference on Water for Peace

By Dr. John H. Cover
Observer for the
National Parks Association

An International Conference on Water for Peace was held in Washington, D.C., from May 23 through May 31. The official program aimed to facilitate "a sharing of man's experiences and ideas in identifying, defining, solving and planning to solve his water problems." Reassurance was offered in the sentence, "It is not a negotiating conference."

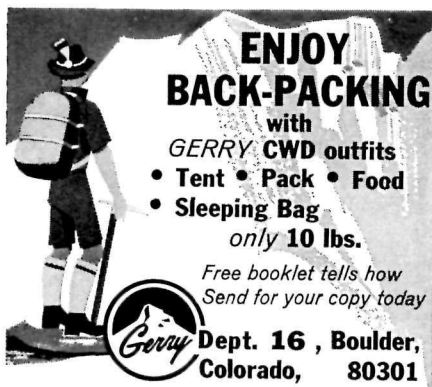
Secretary of the Interior Stewart L. Udall was President of the Conference, and J. Karl Lee of the Department of the Interior was Chairman of the Program Committee. President Johnson addressed the opening assemblage in a panoply of martial music provided by

the Marine Corps Band. Dean Rusk, Secretary of State, gave the closing address.

With recognition accorded persons, functions, climate, and areas, in the plenary sessions, the conference was divided into two groups: (1) "The ministerial sessions will be limited to ministers or their alternates and invited official delegates, and representatives of intergovernmental organizations." (2) "... expert sessions will be open to all participants." The ministers appear to have been provided with a general survey of problems and current methodology, and short sessions. The non-ministerial group was given as many as five concurrent sessions from which to choose. There were sessions in which ministers and experts might have found mutual gain by joint attendance in seminar-type discussion.

There were no innovations in subject material, perhaps intentionally. The usual discussions of multi-purpose dams were given by representatives of the Corps of Army Engineers and the Bureau of Reclamation. Specific discussions of interest were given on desalination, solar and nuclear energy, experience in water control on the Ruhr and Danube and the Netherlands coast, regional development and the legal system, cost and benefit estimates, renovation of sewage effluent, waste-water reclamation, critique of foreign assistance, essentials of meaningful data, and preliminary system analysis. Missing were some of the most recent research on river basin analysis and planning, as well as an integrated approach to nature preservation and human welfare in the predatory attack of machines, and developers. More than 160 separate papers were scheduled, plus comments of chairmen and of rapporteurs.

It is hoped that somewhere among the short sessions and prolonged social events, ministers were apprised of the critical relations of human life to many



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technological applications and their destruction of the natural environment. While searching for specific preventatives for radioactivity, detergent and insecticide mass killers which already are destroying the balance of nature, it is also vital to include alleviation of man's "civilized" predations in cities, highways, and transport and industrial noises. The total concept is an environment of psychological well-being.

Reviews

GRAND CANYON: THE STORY BEHIND THE SCENERY. By Merrill D. Beal. KC Publications, Flagstaff, Arizona. 1967. 38 pages, 9" x 12", illustrated. \$1.00.

The first cause for wonderment about this sumptuous paperback is that K. C. Den Dooven, Editor and Publisher of *Western Gateways* Magazine, can turn out such a superb job at such a low price. Even the look and feel of the book makes one want to handle it and peruse its contents. And inside, on fine-stock paper, is the Grand Canyon captured by some 45 beautifully reproduced photographs, sections and maps in full color, some of them page-size and double-spreads.

The text is by Merrill D. Beal, Chief Park Naturalist of Grand Canyon National Park, who has been active in protecting and interpreting our magnificent scenic heritage for the past 20 years. He describes in an easily understood, readable style, the principal features of the Grand Canyon, its formation, and how through millions of years of diastrophism and erosion it became one of the greatest gorges on earth. The dynamic geology is illustrated by chronological graphic maps by Robert Jacobson, and includes a large center-folding map of the Grand Canyon as it is today. Mr. Jacobson is also the designer of the book.

Mr. Beal's geology follows the latest thinking on the carving of the Canyon through the Kaibab Plateau, and breaks completely with the classical theory. Instead of a consequent river maintaining its original meandering course by down-cutting as rapidly as the Plateau was uplifted, the newer conception is that the Canyon was extended eastward through the Plateau, with headward erosion by an ancestral "Hualapai River" which captured the prehistoric Colorado drainage. This would explain the sudden jog in Grand Canyon National Park where the present river turns abruptly from a north-south to an east-west direction. But the traditionalist will find many unanswered questions in the river-capture theory, and some people may be slow to adopt it. However, such things make the book

more interesting.

The volume is the second in a series of large-size, paperbound books on the Canyon Country bearing the Den Dooven imprint. First was *An Introduction to Southwestern Indian Arts & Crafts*, published in 1964 and written by Tom Bahti, authority on the subject. With the same format, it is a fascinating illustrated story of American Indian work in silver, semi-precious stones, painting, sculpture, basketry and ceramics. In the planning stage is a third volume on *The Golden Circle*, which will deal with the fabulous rock wilderness of northern Arizona and southern Utah.

Long may Mr. Den Dooven bring to us glimpses of one of our grandest natural regions at one dollar a look!

—Weldon F. Heald

THE WORLD OF THE WOODCHUCK. By W. J. Schoonmaker. J. B. Lippincott Company, Philadelphia and New York. 1966. 146 pages in hard cover. \$4.95.

"The woodchuck is a mammal because it is covered with hair, has mammary glands, and gives birth to living young that suckle the breasts of the mother."

With these simple facts Mr. Schoonmaker introduces layman naturalists to *The World of the Woodchuck*. That world is a rather dangerous place, as is the world of all wild mammals; and after reading the tales of woodchuck predation by dogs, foxes, bears, wildcats, humans, and even some birds, the reader may well wonder how the mammals manage to survive at all. The author tells how, nonetheless, though the text he produces in the course of the telling is not by any means inspired. The book is one of a series of "Living World" volumes produced by Lippincott and edited by John K. Terres; like the others in the series, *The World of the Woodchuck* is possessed of a wealth of fine photographs.

Prominent in the book are the biologic facts about the woodchuck. We learn that it is the third largest North American rodent (mature adults weigh from 9 to 11 pounds); that it has white incisors (some other rodents have orange incisors); that eyes, ears and nose are located close to the top of the head, enabling it to see, hear and smell with only a tiny portion of the crown protruding from the burrow (important to survival); and that after a winter of hibernation, males emerge to seek mates and live thereafter in the female's den until the young are born, usually in April.

All the author's observations and facts merge themselves into a highly educational book, one that seems well worth adding to the library of the amateur naturalist.

—Maxine A. Rock

THE CONSERVATION DOCKET

Three recent appointments—two in the Department of the Interior and one in the Department of Health, Education and Welfare—have recently been announced as follows:

Archie D. Craft, chief of the Bureau of Land Management's forestry staff since 1965, to succeed James F. Doyle as State Director for Oregon, who is retiring after 29 years of Interior Department service;

Dr. William J. Murtagh, formerly of the National Trust for Historic Preservation, as Keeper of the National Park Service's Office of Archeology and Historic Preservation, with responsibility for expanding the National Register of historic properties to include state and local districts, sites, buildings and other objects significant in American history, architecture, archeology and culture;

Dr. Andrew W. Breidenbach, member of the staff of the Robert A. Taft Sanitary Engineering Center in Cincinnati for the last 11 years, to be Chief of Research of the Solid Wastes Program in the Public Health Service's National Center for Urban and Industrial Health.

The Department of the Interior has withdrawn more than a million acres of public lands in five western States as of "current potential value for geothermal resources." The States in which the land withdrawals have been made are: California, 838,000 acres; New Mexico, 140,000 acres; Nevada, 38,000 acres; Montana, 18,000 acres, and Idaho, 16,000 acres. Designation of potential was made by the Interior Department's U. S. Geological Survey, and includes areas where underground steam sources are substantial enough to be of potential value for power production.

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Photograph by M. Woodbridge Williams: National Park Service

The coral reef and its inhabitants: Buck Island Reef National Monument

Many people who live in the world of sunshine and rain are becoming more and more interested in the welfare and protection of another and largely unfamiliar world—that of the plants and animals that inhabit the seas and the “land” that floors them. In our own country that interest has developed over the past few years into actual protective effort, so that today we possess at least two preservations devoted primarily to the protection of underwater life and its environment. One of these is Buck Island Reef National Monument, brought into the park system in 1961.

As the nation’s leading private conservation organization concerned mainly with the welfare of the national parks and monuments, the National Parks Association closely follows proposals for Federal or other protection of the marine environment and its inhabitants. You can help in this work in any of several ways: by contributing to the Association’s general funds over and above regular dues; by remembering the Association in your will; or by helping secure new members. All dues over and above basic annual dues, and all contributions, are deductible for Federal income taxation; gifts and bequests are deductible for Federal gift and estate tax purposes.

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