

NATIONAL PARKS

MAGAZINE

Special
Education
Issue



A New World Opens

40th Anniversary
National Parks Association
Founded 1919

September 1959

Fifty Cents

Park Education on School Grounds

By John Brainerd

THE ABILITY of national parks to survive increasing use will depend largely upon how intelligently people use these great natural areas. While park interpretive work has done wonders and will increase, it is now obvious that hordes of nature-ignorant people cannot suddenly be taught at the park gates what they will need to know to make enjoyable and wise use of the parks. To prepare them better, homes, churches, and schools must do a larger share. And in our culture it is the schools to which we look especially for wholesale, rapid education in an emergency such as the national parks now face.

A primary asset in teaching local park values is the school ground. This area around the school building—too often covered with asphalt and concrete—should be used much more than it is to teach children and adults the facts, concepts and sensitivities necessary for understanding proper park use. While the distinction between such local areas and the outstanding units of the national park system must be made clearly, the students' contact with nature on the schoolground will nevertheless aid their understanding of the values of these superlative areas.

The Nature Conservancy's National Committee on Natural Areas for Schools is challenging American communities to take a new look at school grounds. They point out that physical educators have given leadership to outdoor education, so that today many schools have areas for active games and healthful exercises, and occasionally for broader types of outdoor education such as nature study.

The American Nature Study Society and the American Nature Association have long recommended more variety of environments on school grounds so that they are not just level turf, paving, and shade trees. Now the National Association of Biology Teachers is raising a strong voice, through its Committee on Outdoor Laboratories, for greater diversity on school grounds, with a series of articles in *The American Biology Teacher*. A variety of other groups including the Conservation Education Association are also furthering the movement. In other words, here is a multirooted program which can grow to support both our local and national parks by creating better public understanding of our natural resources and their care.

Park supporters are needed to help this movement in every community, to give aid to the above organizations. Here are some recommendations:

(1) Write the Nature Conservancy's National Committee on Natural Areas for Schools, Springfield College, Springfield 9, Massachusetts, for literature on school grounds.

(2) Visit the school superintendent, asking if he has seen this literature, leaving him copies, and offering to help him promote outdoor education on school grounds.

(3) Discuss with likely principals possibilities of developing school picnic areas on school grounds. These should be selected, planned, and constructed *by the students*, as part of their class work in various subjects. Mapping can be correlated with math; inventory of natural resources with science classes; description with lan-

guage and graphic arts; planning with an inter-class committee; barbecue table, and waste receptacle layout with home economics class; construction of outdoor furniture by shop class; interpretive signs by art and shop classes cooperating; public relations by staff of the school paper; and so on. An effort must be made to create long-term plans, but also to set short-term objectives which can give youngsters a feeling of accomplishment.

(4) Locate individual teachers who can be encouraged to make natural-science and natural-art surveys of natural environments in the community which might be taken over as school nature areas where park enjoyment and use can be taught. Special efforts should be made to create interest in wetlands, areas having vegetation which has taken a long time to develop, and other environments which are rare in the neighborhood—including biotic communities eliminated by development.

(5) Aid efforts to make year-around use of school grounds, including summer day-camping with nature programs such as school gardening and insect study.

(6) Support educational programs at the local parks, including development of trailside museums, regularly scheduled nature walks, photographic trips, and painting groups.

In short, our national parks can survive increased use only if the populace is trained in home communities before getting to the parks. This training will require the combined efforts of schools and local parks. Let's get behind them both! ■

SPECIAL EDUCATION ISSUE

This special education issue of NATIONAL PARKS MAGAZINE is devoted to helping teachers and educational institutions of all types develop in their students—be they grammar school pupils or college graduates—a knowledge and appreciation of national parks. We hope and expect it will be of equal interest to all Association members as a reference issue and a useful tool in telling others about the parks and their problems.

Dr. Brainerd (above) suggests that natural areas on school grounds can be a useful first step in teaching national park values. Mr. Klinck describes some of the

very practical ways in which national parks can be incorporated into classroom studies. Mr. Hyde's statement together with the four-page chart summarizes facts you know about national parks and other items you may have forgotten. We hope the quiz, bibliography, map, chronology and park employment data will provide interesting reading and reference material for young and old alike. While this initial attempt must, of course, be just that—future issues will supplement this one, and eventually, we shall meet a part of the crying need for educational materials on national parks.

—B.M.K.

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PARKS MAGAZINE**

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Bruce M. Kilgore, Editor

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ON THE COVER

The boys on our cover are first discovering the world of nature as they peer into a bottle of caterpillars. Given a little help and guidance, this natural curiosity can lead them to explore facts and concepts which will be of great value to them and to society when they are older. For based on this knowledge, a teacher or parent can develop sensitivities which will enable the boys to better understand and appreciate the values inherent in our great natural outdoor preserves. Only such understanding can assure that the parks will be there always for them and their grandchildren to enjoy.—Photograph by Arline Strong.

THE NATIONAL PARKS AND YOU

Few people realize that ever since the first national parks and monuments were established, various commercial interests have been trying to invade them for personal gain. The national parks and monuments were not intended for such purposes. They are established as inviolate nature sanctuaries to preserve permanently outstanding examples of the once primeval continent, with no marring of landscapes except for reasonable access by road and trail, and facilities for visitor comfort. The Association, since its founding in 1919, has worked to create an ever-growing informed public on this matter in defense of the parks.

The Board of Trustees urges you to help protect this magnificent national heritage by joining forces with the Association now. As a member you will be kept informed, through NATIONAL PARKS MAGAZINE, on current threats and other park matters.

Dues are \$5 annual, \$8 supporting, \$15 sustaining, \$25 contributing, \$150 life with no further dues, and \$1000 patron with no further dues. Bequests, too, are needed to help carry on this park protection work. Dues and contributions are deductible from your federal taxable income, and bequests are deductible for federal estate tax purposes. As an organization receiving such gifts, the Association is precluded by relevant laws and regulations from advocating or opposing legislation to any substantial extent. Send your check today, or write for further information, to the National Parks Association, 1300 New Hampshire Avenue, N.W., Washington 6, D.C.

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Hileman

A New Answer to An Old Need

By Richard E. Klinck

I HAVE a question for you: Have you ever thought of each of our national parks as a splendid classroom—as an outdoor laboratory completely equipped for education?

Of course you know that each of them offers a few startling statistics about the deepest canyon or the most glaciers or the highest mountain. But have you considered that these outstanding scenic reserves, visited by millions during leisure moments, offer today's youngsters their finest opportunity for seeing the forces of nature in action? I do not mean during the casual approach of a summer vacation, but as a worthy framework for doing formal classroom teaching in every school subject.

As a teacher, I have found that these choicest bits of America can be used

to produce the finest kind of teaching—the kind that becomes vivid, meaningful and real for both pupil and teacher. Several years ago I began to experiment with a national park classroom, and I found my results to be far beyond what I had expected. Last May I returned with still another class of boys and girls. It was then, as I saw my thirty-one youngsters gathered around a campfire at End O' Valley Campground in Rocky Mountain National Park, learning the essence of our national parks, that I realized fully the teaching impact possible by using these priceless places. For that day they were actively learning about the wonderful world at their fingertips, the world of nature, and they were doing it in one of the most remarkable places in our land.

In the hours just before and just after that campfire, which to me symbolized the whole day, they observed interesting features within every one of the natural sciences—from a lethargic marmot who spoke of the special animal adaptations required for high-altitude living, to the tree-covered moraines which testified mutely to the reign of long-departed glaciers.

While they were gaining this rich and varied knowledge through eyes and minds more widely opened than ever before, these thirty-one youngsters also subtly began to discover the real meaning of a national park. It was a discovery that is sure to permanently affect their future attitudes.

So I suggest teaching with the national parks as a new answer to an old need—the need to induce learning that is meaningful and clear. These twenty-nine pearls offer variety of approach, and an occasion for blending subjects ranging from music appreciation to English into the kind of integrated teaching which produces best results.

My students were sixth graders, 11- and 12-year-olds, at what I considered the very peak of vulnerability for such teaching. Teaching with the national parks can be as successfully applied to children, both older and younger; and such a unit of study can be tailored to fit any period of time, from a few weeks to the whole school year. The longer the amount of time made available, the better; for you will find that the parks offer a thousand and one possibilities for teaching.

There can be many approaches to your study. But first of all, find out which National Park Service areas are in your state and neighboring states. The western states have a rich and varied selection of areas close at hand, each capable of becoming a valid and worthwhile teaching tool. In the Mid-

Mr. Klinck, who has just returned from one of his summer "refresher courses"—a 43-day trip to 19 of the western national parks and monuments—wrote this article especially for this education issue. With his Wheatridge, Colorado, sixth-graders, he proves that the parks offer unmatched educational opportunities, and hopes that other teachers will take advantage of these outdoor classrooms.

west and East historical sites predominate, which offer individual and unique possibilities, while state and city parks can in many cases give assistance, too.

From the very beginning, if it is at all practical, plan to include a visit to one of these outdoor areas as the climax to your national parks study. This field trip should be an all-day affair, and I guarantee the day will seem too short. If you are unable to do this, make the parks come to you, perhaps Hawaii or Virgin Islands or Mount McKinley, and make the class experience equally rich and worthwhile by the wealth of audio and visual

aids that you can make available.

Have a camera in hand every summer for taking pictures you can use later. From my personal slide collection I was able to produce sets of slides to illustrate the lessons we were studying and make them colorful and real. Good filmstrips are available showing many of our parks and monuments. Viewmaster offers a variety of reels for use in hand viewers. Suitable movies can be found, too.

Every national park and monument was established first of all because of a main feature or group of features that set it far above the ordinary. Chosen carefully, these can run the

gamut of the natural sciences. Rainier tells of glaciation, Lassen of vulcanism, Bryce of erosion, Olympic of the wondrous effects of rainfall, the Everglades of the jungle, Sequoia of the biggest of trees, Kings Canyon of mountain building, and so on down the line. Sketch your plans for teaching the natural sciences, then teach them vividly within the context of America's national parks.

Any one of the parks also offers a splendid array of amazing features other than their climax portion. So you may, if you prefer, choose but one of the parks and get to know it well. Explore its features carefully and you will find that it alone can offer an endless variety of teaching suggestions. Whether you choose Shenandoah or Isle Royale or Big Bend, you can use its examples of plant and animal life, climate zones and effects, geology, and all the rest.

I used all of the parks as my teaching aids, plus a visit to one as a final review, and I used the second of our two semesters to do the job. I could have taken the whole school year or I could have used only a few weeks—the amount of time is up to you.

What Do National Parks Conserve?

In the fall with summer just behind, or in the spring with summer just ahead, a study of conservation in its many facets offers a fine approach to teaching with the national parks. After discussions of the wise use of water, the forests, our soil, and wildlife, ask of the national parks: "What do they conserve? Why do we conserve these places?" Through class discussion develop an answer, keeping within the definition of conservation—saving in order to use wisely. Lead them to see that in this case the wise use consists of saving forever, in their present condition, these fantastic places we call the nation's parks. Thus you can sketch the narrowed meaning of preservation as opposed to the broader concept of conservation.

Maps, either teacher-prepared or student-drawn to teach or re-teach the fundamentals of map-making, can be used to locate each of the parks in the United States, while an area map can locate the Park Service areas within your region. Questions regarding the locations of the various parks are

A yearly 150-200 inches of rainfall nourish this lush rainforest along the Hoh River in Olympic National Park, Washington. Grinnell Lake (opposite page) is fed by waters from Grinnell Glacier in Glacier National Park, Montana.

Philip Hyde



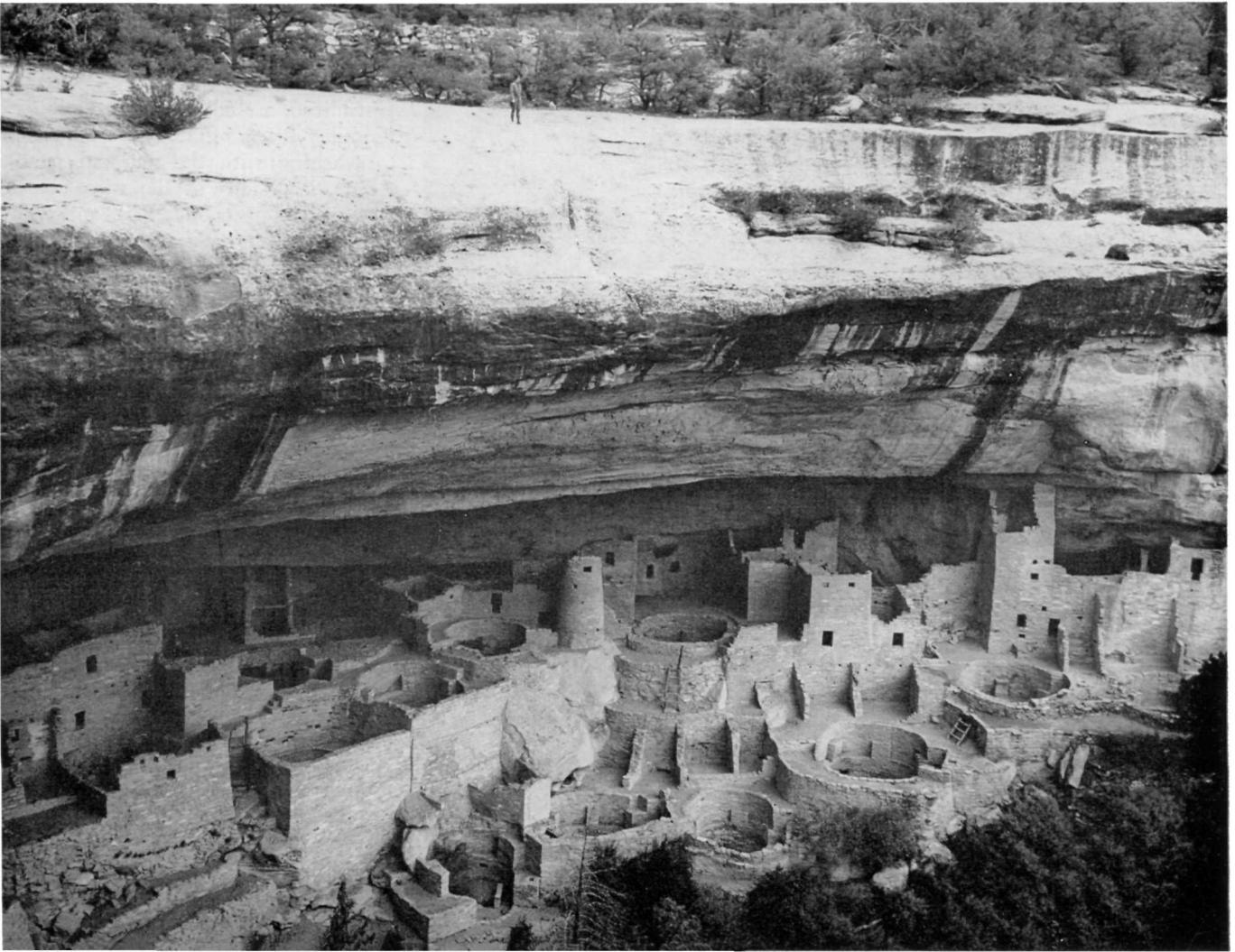


National Park Service photo by Allen Rinehart

The Great Smoky Mountains (North Carolina-Tennessee) are one of the oldest uplands on earth. With over 1300 varieties of trees, shrubs and herbs, it is regarded by some botanists as the cradle of eastern America's present vegetation.

Two cowboys looking for stray cattle discovered this largest of all cliff dwellings—Cliff Palace—in 1888. This and many similar strange, silent cities of prehistoric Pueblo Indians are now preserved in Mesa Verde National Park, Colorado.

National Park Service



good general geography reviewers.

Have each student choose one of the parks as "his own" and prepare a business letter requesting a park brochure and any other free materials available. The business letter can be the concluding project in an English unit on letter writing—you might say a final test, but a more practical one because it involves the actual need of using the various rules learned instead of merely recalling those points to answer the questions in a standard type test. Furthermore, penmanship lessons can be led to revolve around the writing of these letters to the parks and good legible penmanship becomes more a device for communication than something for the teacher to dwell upon endlessly.

Ask each student to prepare a report on his park, gathering materials from encyclopedias and other reference books in the manner taught during another concurrent English unit, here again using a parks lesson as a proving ground for techniques being taught in a seemingly far-distant subject.

Let more able students choose additional areas, other parks, or several

national monuments, places that encourage their special interests. Some of these, if desired, could be used as springboards for introducing apparently unrelated subjects into your curriculum. Several of my students wrote to Kitty Hawk for information about the Wright brothers, an excellent starting place for an aviation unit. Others wrote to the Statue of Liberty, to Edison's Laboratory, and to Muir Woods, for we had talked at length of John Muir. Several selected Death Valley and Petrified Forest because these especially interested them.

History, Faulting, Dinosaurs . . .

The national parks system offers a perfect basis for a study of the United States. Given sufficient time, we could have used historic sites to learn more about famous Americans, and we could have paid visits to the scenes of many important events in our history. On another grade level the study of Indians could be richly explored via the national parks, plus such areas as the archaeological monuments in the Southwest.

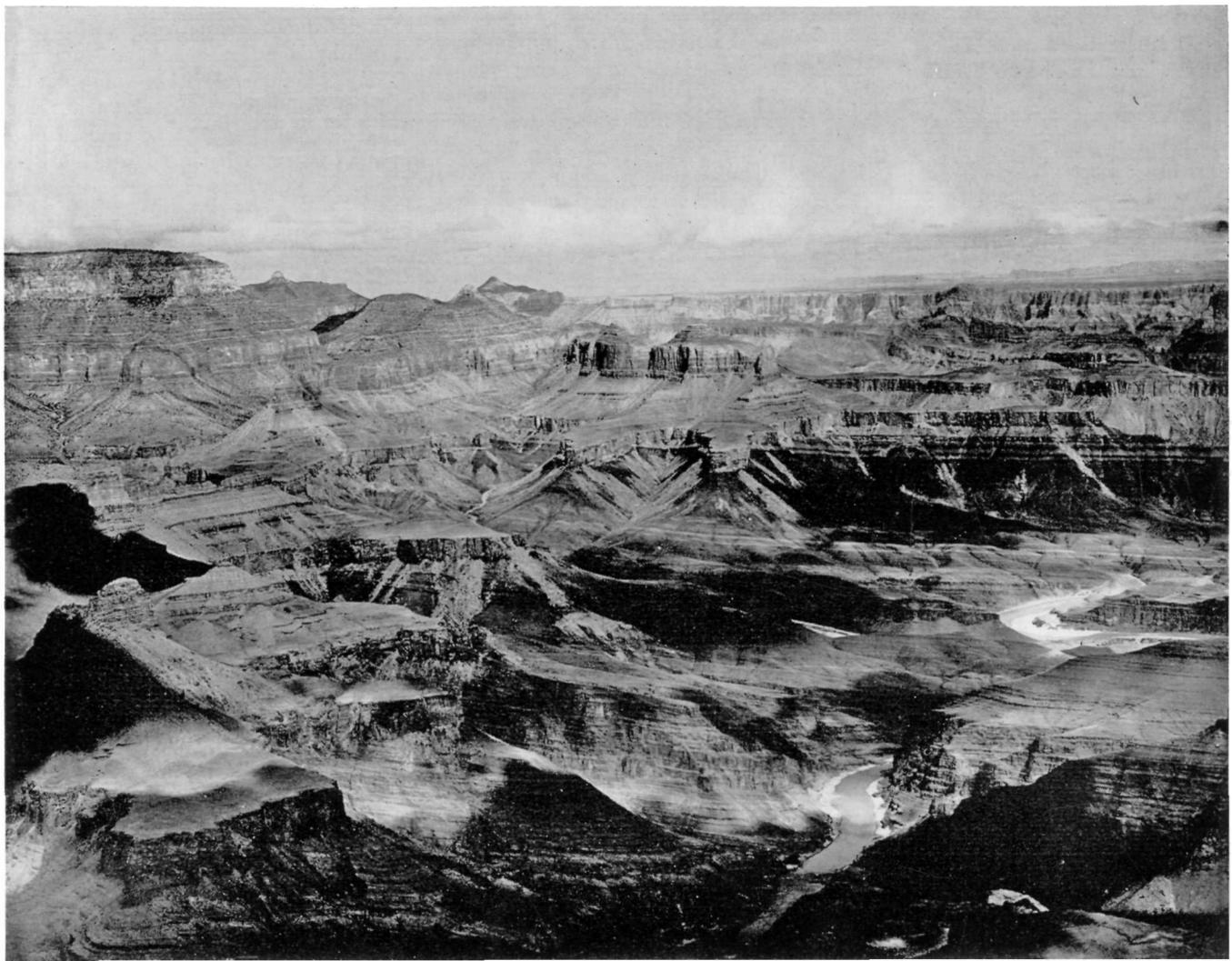
Having chosen a park as a starting



National Park Service

Steadily-smoking Martin Volcano in Katmai National Monument, Alaska. In 1912 a series of gigantic explosions from nearby Mount Katmai shot 2 cubic miles of gas and volcanic ash into the stratosphere and around the globe, lowering the temperature in North America, Europe, Asia and northern Africa.

More than a billion years of earth history have been exposed in Grand Canyon by water erosion. The resistant layers of rock stand out as cliffs—the weak layers as slopes.



point, let it lead you and your class into exploring some of these: glaciers, the Ice Age, dinosaurs, petrified wood, volcanoes, erosion, how rock is made, lichens, the changing seasons, communities, flowers, trees, wild animals and their many interesting ways, hibernation, estivation and other special animal and plant adaptations, the balance of nature, the water table, seeps, springs, how mountains are built, climate zones, migration, the water cycle, watersheds, canyon carving, faulting, decay, insects—choose whichever suit your need. Any field of the natural sciences is yours to explore in that place where it may be best observed—a national park!

You may let your adventures be caused by something you discuss in your exploration of a certain park, or you may select the science lessons first and illustrate them by park examples. I found of immense value the list of parks available from the Superintendent of Documents in Washington, D.C., for 20¢. It lists all 180 areas by classification, tells their location and size, the date of establishment, and a sentence or two about the main features. This was used extensively by youngsters searching for additional places to write for information. What amazes me most is the constant correlation made so easy by the fantastic variety within our national park system. It is as if you had a library at your fingertips with the most excellent of every conceivable reference.

Park Math, Art, and Writing

Once the park brochures start to arrive, each youngster should begin in earnest to complete his park report. Those with a knack for writing should be encouraged to make their report in the form of a personal visit to a park. Some fine stories can be thus developed.

Create sets of math problems about the national parks using dates, areas, and various other figures in the story problems, thus including that subject too. Assign each boy and girl the creation of a diorama showing the main feature of each park. Pictures of the various parks can be drawn in art class and photo albums can be filled with personally created "snapshots."

Let reading lessons involve related stories in your readers. You'll find

every reader has a number that can be successfully tied in. Read stories orally from such references as Richard Halliburton's "Complete Book of Marvels" in which he takes his young readers on a personally escorted tour of Yosemite and Grand Canyon and brings them the true flavor and magic of these incredible places. Give listening tests over this reading to better develop those ears. Sketch and duplicate pictures of the places you are reading about, have the youngsters take notes and practice writing summaries, so all important in grasping and understanding main ideas. Let those who wish complete the sketches with appropriate colors and file them in a national parks notebook they are building. Ask them to collect related clippings and pictures from newspapers and magazines. Use "The Real Book About the National Parks" as a Book-of-the-Week and pass it quickly from hand to hand by allowing each person only a week's borrowing time.

Use Your Library

Explore the wealth of park-related materials available from the public library and borrow generously of them. Obtain lists of materials that may be purchased inexpensively from the parks themselves. Watch for the small government books now being put out on many of the parks and monuments, chock full of information and selling for 25 to 30¢ each. Carefully check the Reader's Guide and it will reveal many articles concerning the parks, a large number of which will meet your needs. Keep in contact with such magazines as *Arizona Highways* and *National Geographic* for they offer excellent articles and fine pictures that may be clipped for bulletin board use. Have copies of the books by Freeman Tilden and Devereux Butcher close at hand for constant reference.



George Grant

Trilobite fossils from 500-million-year-old shale in Grand Canyon National Park.

Discuss the duties and activities of park rangers and ranger-naturalists for perhaps you have a future national park ranger in your class. Play "Songs of the National Parks" found on Disneyland Records. Listen to the "Grand Canyon Suite" and then read Marguerite Henry's delightful book, "Brightly of Grand Canyon." Encourage an interested group to write an original play about the national parks and let them and others produce it with home-made puppets. During the 1959-1960 school year make use of the Chevron school radio broadcasts, which this season will use the national parks as the theme of each of their 30 minute weekly programs. Booklets describing these programs are available from the Chevron (Standard) Oil Company.

Visit a Park

As a climax to your studies, whether they have consumed several weeks or several months, take that trip to a national park or monument.

A visit beforehand will permit you to plan your activities, know what to watch for, and make each second count. Our trip utilized roadside stops, the park museum, a ranger naturalist, an after-lunch nature hike; each was a teaching aid. At our noon campfire I talked to my students of the inception of the national park idea at that river junction in Yellowstone which permitted them to be in such a glorious place as this. The campfire became a symbol, and as we heard some of the carefully prepared reports on what were now truly *their* parks, each of the boys and girls grew even more firmly aware of the ideals involved.

As it turned out, I had used the national parks to teach of many things and had ended up teaching of the national parks. I had taught them what a national park means, its special sights and sounds, why it exists, how it should be used, and what will become of it if we do not understand its special purpose.

Understand—that was the key. These children will be visiting the national parks long after I will. If we are to assure the continued sanctity of the parks, they should become an inherent part of our teaching so that every young American fully appreciates the greatest of our treasures. ■



Mount McKinley National Park, Alaska

Army Air Force photo

America's Crown Jewels

By Philip Hyde

WITH NEW generations of Americans discovering natural America, it is perhaps a good time, today, to take stock of our scenic and inspirational resources. What do we in America own in scenic resources? Why are they important to us? What do they mean to us?

The national parks have been described as America's Crown Jewels, and to anyone who has spent time in the parks, this seems an apt description, for within our nation-wide system of national parks is represented nearly every type of landscape and natural phenomenon known on earth. Consider how volcanism's ever-fascinating workings are displayed in Yellowstone National Park, in Lassen Volcanic National Park, and in Lava Beds National Monument; how the inexorable, unseen power of moving ice is so wonderfully displayed in the magnificent cliffs of Yosemite and Kings Canyon National Parks. Many of our parks contain forests, but perhaps the climax of all is in the still, dense rain forests of Olympic National Park. The power of moving water is vividly displayed in many parks, but never so tellingly as in the vast chasm of the Grand Canyon; and the strong, but delicate fingers of erosion show their workmanship in the endless rows of crenelated buttes and spires of Bryce Canyon, and the high, colorful cliffs of Zion.

Everywhere, the landscape speaks

eloquently the story of the earth, its processes and workings, and reveals to him who sees with more than eyes, the inner secrets. By this revelation, a man may come and know something larger than himself, may study the order and beauty of the world, and come to know himself better—to see himself as a part of this grand creation. Whether this coming and knowing be of few days or many years, he who has known it returns to the world of men refreshed and gladdened by a new concept of the Universe and himself.

This kind of re-creation offered so abundantly in the spiritually vast storehouses of the national parks becomes increasingly important and precious as the cadence of mechanization accelerates, and marches into the farthest reaches of once-wild America. Places of unmanicured nature are rapidly growing fewer and farther between to a generation whose forebears lived with wild nature at their doorsteps. The hunger for natural environment is in our blood, and where will we satisfy this if all of nature's wilderness is at last subdued and subjected to the control of men's planning? Where can grass grow on the pavements of cities?

To some, suffering from a myopic concern with immediate gains, the national parks represent new soil to be cultivated for exploitation. Perhaps blinded to man's need for the inspiration of things natural, they wish to

reduce the national parks to so many foot-pounds of energy, or so much iron, gold, or uranium, so many acre-feet of water, or so many board-feet of lumber. But, an incontrovertible fact stands out like a mountain peak on this desert of materialism: man has devised substitutes for nearly every commodity, but has yet to invent a substitute for the spiritual, inspirational values obtainable through close association with the natural scene. Which, then, is the most precious?

In the earliest history of the national parks, a few men with vision saw their importance to all of mankind, and worked for their preservation, for all. In 1870, in a meadow by the junction of the Gibbon and Firehole Rivers, in western Yellowstone, a group of men were discussing the wonders their eyes had recently beheld, when one man voiced the momentous idea that was to grow into the national park concept: this was national domain, full of scenic wonders, whose inspirational values could accrue to everyone; why not preserve it for ALL the people to enjoy freely? This generous spirit has grown and prospered in the years intervening between that scene and today, and has matured into what you and I know as the national park system. ■

The chart that follows summarizes a few of the amazing natural features displayed in 25 of our 29 national parks.

A Glance at Some of Our National Parks

National Park and Address	Date Established	History	Wildlife and Plants	Size in Acres	Geology	Special Educational Opportunities
ACADIA (Bar Harbor, Maine)	1916* (1919)	Discovered in 1604 by Samuel de Champlain. Site of first French Missionary colony in America.	Sea beach and tidal pool animals, pitcherplant, pink lady's slipper and black spruce bog.	41,634	Mountains affected by ice age glaciers. Great sea cliffs produced by ocean undercutting.	Abbe Museum of Archeology contains relics of Stone Age period of Indian culture. Sea beach and tidal pools provide rich biologic field for study.
BIG BEND (Texas)	1944	History divided into 5 periods: Apache Indian, Spanish, Mexican, Texas Republic and U. S.	Peccary, mountain lion, colima warbler, aplomado falcon; cactus, pinyon pine, fir, and cottonwood.	708,221	Fossils indicate that present folded and tilted rock layers were once deposited by ancient seas. Erosion carved cliffs, columns, and buttresses.	Curious mixture of plants and wildlife of Mexico and U. S. offer unusual study opportunities for biologists.
BRYCE CANYON (Utah)	1923* (1928)	Basketmakers and later Pueblo Indians and Paiutes lived here. Named after Mormon cattleman, Ebenezer Bryce.	Prairie dogs, swallows, swifts, nutcrackers and ravens; juniper, ponderosa pine, arrowroot, and cinquefoil.	36,010	Limestone and sandstone laid down beneath early lakes and swamps (and varying greatly in kind and hardness) has been eroded into numerous fantastic pink and white formations.	Colorful and unique erosional forms—pinnacles, walls, spires—in horseshoe-shaped amphitheaters illustrate the earth's most recent geologic era (last 60 million years).
CARLSBAD CAVERNS (New Mexico)	1923* (1930)	Used by early Indians and known as "bat cave" by 1880 cattlemen. Jim White explored cave in 1901.	Eleven species of bats, including the Mexican free-tailed bat plus springblooming desert plantlife above ground.	49,447	This largest of the world's limestone caverns was formed by water dissolving the limestone and later depositing it in curious stalactites and stalagmites.	Comprises an underground laboratory for study of cave building with great variety of formations on display. The incredible summer night bat flights interest biologists.
CRATER LAKE (Oregon)	1902	Discovered in 1853 by prospector, J. W. Hillman. William Gladstone Steel fostered national park idea.	60 mammals and 120 birds found in life zones ranging from Transition through Alpine-Arctic.	160,290	Collapse of mountain top followed catastrophic ejection of pumice and lava from ancient Mount Mazama. Resulting pit now holds 2,000-foot-deep rain and snow water lake.	Tells an amazing geological story of lake's origin with natural exhibits of dikes, glaciation, and growth of new volcanic cones within the collapsed caldera.
EVERGLADES (Homestead, Florida)	1947	Birds were slaughtered and almost exterminated by plume hunters before refuges and park were established.	Spoonbill, ibis, herons, egrets, manatee, alligator; sawgrass, royal and cabbage palm, mangrove and air plants.	1,406,218	Once the bottom of a shallow sea, the park is now scarcely above sea level.	Largest subtropical wilderness in United States; outstanding rookeries of birds seen on Audubon Wildlife Tours.
GLACIER (Montana)	1910	Hudson Bay Company men entered park in early 1800's. Established as part of International Peace Park in 1932.	Mountain goat, moose, elk, grizzly bear, bighorn, fisher, wolverine; beargrass, glacier lilies, 30 tree species.	1,013,129	After deposition on the ocean floor, land was uplifted causing buckling, folding, fracturing. Stream erosion and glaciation then carved V- and U-shaped valleys of today.	Fascinating display of glacial remains: cirques, U-shaped valleys, glacier-formed lakes and hanging valleys. Multi-colored bands in mountains. Museum of Plains Indian on nearby reservation.
GRAND CANYON (Arizona)	1908* (1919)	Basketmakers and Cohonino Indians lived on the rims about 1 A.D. Coronado's expedition discovered the Canyon in 1540.	Abert and Kaibab squirrel, mountain sheep, lazuli bunting, crossbill; cottonwood, pinyon and yellow pines.	673,575	Colorado River and thunderstorm water in this arid country combined with slow uplift of earth's crust has eroded the 217-mile long, 4- to 18-mile wide, mile-deep gorge.	The oldest rocks known to geologists occur in the narrow inner gorge. Yavapai Point Overlook combined with trails offers excellent site for study of earth history.
GRAND TETON (Wyoming)	1929	John Colter passed through in 1807. The three Teton peaks were once landmarks for Indians and "Mountain Men" of Jackson Hole.	Large elk herd, moose, trumpeter-swan; lodgepole and whitebark pine, alpine fir, spruce, sagebrush and Indian paintbrush.	310,350	Mountain building by slow, titanic upthrust. Volcanic and sedimentary rocks eroded to expose ancient, crystalline rocks of Teton Peaks.	The range illustrates fault-block type of mountains with volcanic, Paleozoic sedimentary, and Precambrian crystalline rocks exposed to view.
GREAT SMOKY MOUNTAINS (North Carolina-Tennessee) (Hdqs: Gatlinburg, Tennessee)	1930	Home of Cherokee Indians. White settlers were rugged mountaineer descendants of English and Scottish colonists.	Bear, deer, bobcat, turkey; 1300 species of tree, shrub and herbs plus 1800 fungi, 330 mosses and 230 lichens.	510,393	One of the oldest uplands on earth, and the most massive in the East.	Museum near Cherokee displays early tools and household objects of pioneers. Botanist's paradise with more than 3000 species of plants.
HAWAII (Hawaii)	1916	Frequent volcanic activity (eruptions of liquid lava and steam) between 1790 and 1955, within the Kilauea and Mauna Loa sections.	Birds: apapane, amakihi, elepaio, iwi, koae; plants: the rare silversword and tropical rainforest—including tree ferns near Kilauea.	246,747	Park (and islands) formed by volcanoes. Kilauea's summit has collapsed to form caldera paved with recent lava flows. Molten lava sometimes gushes forth from cracks in Mauna Loa (31,680' above ocean bottom).	Ideal for study of recent volcanism and how plant life regenerates soil. Rare species found on Kipukas (islands of soil surrounded by recent lava flows).
ISLE ROYALE (Houghton, Michigan)	1940	Chippewa Indian territory until 1843. French fur traders here early. Illusive copper mining explorations abandoned in 1899.	Wolves, moose, beaver, eagle, osprey, 46 species of fish; evergreen and hardwood forests meet here. Devil's club and orchids.	539,338	The ancient lava rocks of this wilderness island were ground smooth by ice age glaciers. When these melted, the island was submerged until lake level fell.	Wilderness island 50 miles from Michigan shore where wilderness animals may be studied under primeval conditions. Pre-Columbian copper mines.
LASSEN VOLCANIC (Mineral, California)	1907* (1916)	Latest volcanic eruption of Lassen Peak in 1914-1917. Named for Peter Lassen, early pioneer.	Black-tailed and mule deer, bald eagle, rainbow trout; ponderosa, jeffrey and white pine, manzanita, chinquapin, snowplant.	105,921	Near Lassen Peak once stood a great peak "Tehama" which later was destroyed by collapse. Four park peaks are remnants, and Sulphur Works and Bumpass Hell show thermal qualities.	Only recently active volcano in continental U. S. Hot springs, steam and sulphurous vents in Sulphur Works and Bumpass Hell areas. Chaos Crags and Jumbles remarkable examples of volcanic violence.
MAMMOTH CAVE (Kentucky)	1941	Cave was first discovered in 1799 by white man. Used early by Indians. Saltpeter obtained here in War of 1812.	Bats, eyeless fish, cave crawfish and cave cricket; above ground—broadleaved trees, Solomons-seal, wakerobins, mayapple.	51,354	Cave limestone laid down some 260 million years ago by inland seas. Rainwater later dissolved limestone corridors at 5 levels, followed by deposit of dripstone.	Illustrates the two stages of limestone cave building at five successive levels. Unique cave wildlife of great biological interest.
MESA VERDE (Colorado)	1906	Pueblos supplanted pit houses 750 A.D. Classic pueblo period 1100-1300. Drought causing abandonment began 1276.	Mule deer, fox, mountain lion, 100 birds; pinyon pine and juniper, penstemon, lupine, sweetpea, paintbrush.	51,333	Erosion of massive layers of sandstone by wind and water hollowed out the caves that form the setting for the ruins seen today.	Hundreds of ruins of prehistoric pithouses and pueblo dwellings scattered throughout 20 canyons and side canyons tell story of prehistoric civilization.
MOUNT MCKINLEY (Alaska)	1917	First white man set foot on the mountain in 1902. First ascent in 1910, by Taylor and Anderson.	Caribou, white (Dall) Sheep, moose, grizzly bear, wolves; surfbird, willow ptarmigan, wandering tattler; white spruce.	1,939,493	During ice ages, valleys and lowlands were filled with glacial ice. Glaciers now retreating.	Only national park with caribou and wolves. Extensive glaciers cover this highest peak (20,269) in North American continent.

* Date established as national monument. National park establishment date in parenthesis.

National Park and Address	Date Established	History	Wildlife and Plants
MOUNT RAINIER (Longmire, Washington)	1899	Mountain sighted in 1792 by Vancouver. Climbed in 1870 by Stevens and Van Trump.	Mountain goat, marten, white-tailed ptarmigan, sooty grouse; Douglas fir, hemlock, yew, cedar, avalanche lily.
OLYMPIC (Port Angeles, Washington)	1909* (1938)	Spanish sea captain Perez discovered Olympic mountains in 1774. First major exploration was Seattle Press Party of 1889.	Olympic elk; extraordinary rainforest of Sitka spruce, western hemlock, Douglas fir, and western redcedar; ferns.
ROCKY MOUNTAIN (Estes Park, Colorado)	1915	Utes and Arapaho Indians here early. 1859 gold rush brought settlement of meadows beneath Front Range. Enos Mills was "father" of park.	Bighorn sheep, elk, beaver, 215 species of birds; Colorado blue spruce, ponderosa pine, Douglas fir, quaking aspen.
SEQUOIA AND KINGS CANYON (Three Rivers, California)	1890 1940	Established separately, these two parks are administered as one. Hale Tharp was first white man to see Giant Forest sequoias.	Sierra bighorn, pine marten, wolverine, fisher; giant sequoias up to 36' diameter, 272' high, 4000 years old; fir, incense cedar, sugar and ponderosa pines.
SHENANDOAH (Luray, Virginia)	1935	First exploration by Lederer in 1669. Mountain gaps important during Stonewall Jackson's Civil War campaigns.	Woodchucks, deer, bear, ruffed grouse, turkey, tanager; oak, gentians, beadlilies, fringe-orchid, wood lilies.
YELLOWSTONE (Wyoming-Montana-Idaho) (Hdqs: Wyoming)	1872	Discovered by John Colter 1807. Famous Washburn-Langford-Doane expedition of 1870 resulted in first official national park in 1872.	Grizzly bear, moose, bison, pronghorn antelope, bighorn sheep, elk, white pelicans, trumpeter swan; lodgepole pine, fringed gentian, yellow fritillary.
YOSEMITE (California)	1890	Yosemite Valley and Mariposa Grove sequoias set aside in 1864 as state park. Later added to national park. John Muir's writings aided park preservation.	Great variety in five life zones—chipmunk, squirrel, water ouzel, rosy finch, grouse; giant sequoia, pines, fir, oak, incense cedar.
ZION (Springdale, Utah)	1909* (1919)	Padre Escalante first white man to visit in 1776. Mormons settled near here in 1850's naming it "Zion."	Mule deer, cougars, coyote, weasels, road-runner, nuthatch, golden eagle; cactus, yucca, cottonwood, pinyon-juniper, Zion moonflower.

Size in Acres	Geology	Special Educational Opportunities
241,782	Sedimentary and lava Cascade Range was uplifted and dissected by river erosion. Then local eruptions built Rainier cone, followed by extensive glaciation.	Excellent chance to study 26 glaciers at work in the greatest single-peak glacial system in America. Illustrates melt water, moraines, polished and fluted rocks, cirques and crevasses.
896,599	Sedimentary rocks (from shallow seas) and lava were uplifted to form Olympic Mountains. Ice and water then eroded present rugged shapes.	Wettest climate in U. S. (140 inches); produces finest remnant of Pacific N.W. rainforest. Ocean strip offers 50 miles of primitive coastline for study.
259,876	Hazy story includes several periods of deposition beneath a sea and uplift together with volcanic eruptions, and glacial carving.	Offers legible record of Ice Age glaciation. Glacial deposits at Moraine Park make it ideal study site.
386,560 454,600	Huge sedimentary block of earth's crust uplifted and tilted westward, causing faulting along eastern face of Sierra. Molten rock intruded from beneath, cooling slowly into granites. Glacial ice then quarried valleys.	Largest groves of the world's biggest and perhaps oldest trees— <i>Sequoia gigantea</i> ; Crystal Cave; much high mountain wilderness including 14,494 foot Mount Whitney.
211,325	Volcanic materials—lava and granite—covered by sediment from shallow sea. Mountain building followed with erosion again lowering area to present height of Blue Ridge.	Greenstone (among the oldest rocks in park) displayed at Hawksbill Head and Stony Man Mountain, illustrates early earth history. Great varieties of wildflowers.
2,221,772	Violent volcanic eruptions—primarily of rhyolite lava—covered former inland sea sediments between older Absaroka and Gallatin Ranges. Stream erosion and glaciation followed.	10,000 thermal features including geysers, hot springs, mud volcanoes, paint pots, pools, terraces; outstanding wildlife sanctuary; Grand Canyon (of Yellowstone) erosion. Upright petrified trees.
760,951	Westward tilting of Sierra Nevada "block" (with eastern edge rising to 14,000 feet along cracks in the earth's crust) caused Merced River to cut deeply followed by glacial carving of U-shaped valley.	Remnants of glaciers including polished granite domes, "erratics," moraines, U-shaped valleys. Waterfalls, giant sequoias, John Muir Trail.
143,254	Sheer wall canyon cut by Virgin River through soft sandstone. Exposed rocks midway between Bryce and Grand Canyon in age. Some faulting here.	Carved by the Virgin River, deep, narrow, multi-colored, vertically-walled Zion Canyon displays "medieval" geology. "Checkerboard Mesa" illustrates cross-bedded sandstone.

SUPER-UNIVERSITIES OF NATURE

One of the world's greatest geological stories is told by the three parks represented in the accompanying chart. This story concerns the nature of the earth, the manner of its building, the forces which have come into play and the meaning of the almost limitless history of earthmaking seen by the visitor to these canyons.

More than a billion years of earth history can be traced from the most recent sedimentary rock layers in Bryce Canyon's pink and white cliffs through the middle-aged (Mesozoic) rocks of Zion to the world's oldest known rocks in the ancient Precambrian layers at the bottom of Grand Canyon.

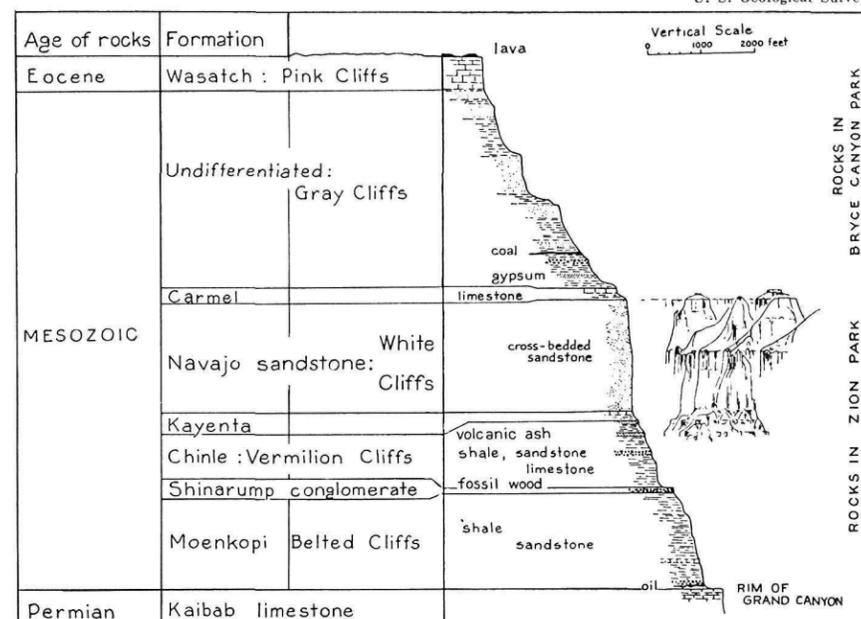
Disturbance of the earth's crust is illustrated by faults and in other ways. Deposition of sedimentary layers at the bottom of ancient seas is documented by fossil plants and animals. And the tremendous forces of erosion which have cut the 2,000-, 4,000-, and 6,000-foot canyons continue today to carve new formations.

As Dr. John C. Merriam put it, "Parks are not merely places to rest, exercise and learn. They are regions where one looks through the veil to meet the realities of nature and of the

unfathomable power behind it." They are "super-universities" of nature. ■

Cross section of rocks exposed in Bryce, Zion and Grand Canyons in southern Utah and northern Arizona.

U. S. Geological Survey



YOUR NATIONAL PARK SYSTEM

Management of most federal lands—such as national forests—is directed primarily toward economic use of their resources. By contrast, the areas of the national park system have been set aside to minister to the physical, mental and spiritual health of all Americans—for their recreation.

With the establishment of Yosemite as the first state park in 1864 and Yellowstone as the first officially "national" park in the world in 1872, the United States was pioneering a new type of land use. Other parks were added slowly, and in 1916 Congress established a single government agency to manage the variety of areas in the new system.

The Act of Congress which established the National Park Service requires it to "provide for the enjoyment" of the priceless properties entrusted to it "in such manner and by such means as to leave them unimpaired for the enjoyment of future generations."

A 1933 reorganization of federal activities placed all national monuments and numerous military parks (formerly administered by other agencies) under the National Park Service. Thus many east-

ern areas established for their historical significance were made a part of the system. This trend was aided by passage of the Historic Sites Act of 1935.

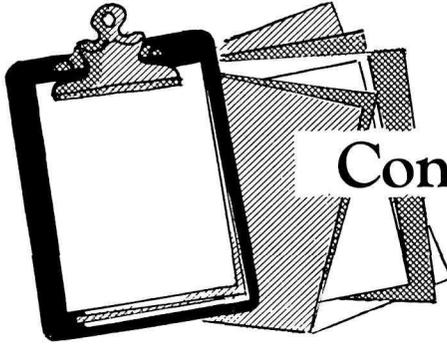
The present system contains 180 areas which are made up of 29 national parks, 83 national monuments, and 68 other units variously designated as historical, military, memorial, battlefield and seashore parks, sites or areas. The total system comprises nearly 22½ million acres of federal land, 13 million of which are found in the national parks and 9 million in the national monuments.

The prime objective of human enjoyment of the areas of superlative natural beauty or historic significance is met by providing sufficient roads and trails to take the motorist and hiker to a fair assortment of the interesting and significant features. An interpretive program helps the inquiring visitor to gain understanding through museums, visitor centers, lectures, campfire programs, guided walks and caravans, roadside and trailside exhibits, and books and pamphlets. Food and lodging is provided in many of the Park Service areas

by concessioners under contract with the Federal government.

How to use the parks and still preserve their natural setting has always been a dilemma facing the National Park Service. Private conservation organizations—such as the National Parks Association—strive constantly to educate the public and thus aid the Service in providing for appropriate use without impairment. To meet the demands of the ever increasing numbers of visitors, the Service has embarked upon a ten-year program (Mission 66) of development and expansion of the physical facilities necessary to handle these pressures with a minimum of harm to the natural scene. Important parts of the program include adding more rangers, acquiring private inholdings and continued protection of wilderness sections of the parks.

The recreation provided by national parks includes wholesome fun, but is more akin to re-creation in the highest sense. For truly these areas are at their best when handled in the manner one would use an art gallery, a museum, or a library. ■



Conservation Education Briefs

Ohio Leads in C.E.

Ohio reports concrete progress in meeting the conservation education needs of public schools, which had been revealed at a 1957 School Administrators' Conference on Conservation Education. The State Department of Education, in cooperation with the Ohio State University and with the financial support of the Ohio Forestry Association, has produced a "Basic Conservation Concepts Chart" currently being released to all grade schools, elementary supervisors and curriculum committees. To augment the chart, steps are being taken to provide a teachers' guide. A two-day conference to bring together teacher-training people, school administrators and conservationists was also scheduled.

Another cooperative project is the Ohio Conservation Laboratory's five-week course for which teachers and youth leaders may get graduate or undergraduate credit. Finally, several school systems were planning one-day institutes in conservation education where teachers could learn from the Agricultural Extension Agent, the County Game Protector, the Work Unit Conservationist and other Soil Conservation Service technicians, Farm Foresters and conservation educationists.

Workshops Given for Teachers

The Conservation Education Association reports that conservation workshops for teachers and camps for children were held this summer in many parts of the country: Arizona State University; University of California, Santa Barbara; Wildwood Nature Camp, Massachusetts (sponsored by Massachusetts Audubon Society); Trenton State College, New Jersey; Buffalo Museum of Science and Conservation, New York; State Conservation Training Center, North Dakota; Ohio Conservation Laboratory; Oregon State System of Higher Education, Portland; Pennsylvania State University; Central Washington College of Education; Western Washington College of

Education; and Olympic College, Washington.

Specifically organized to promote more and better teaching of conservation in the schools and colleges, the Conservation Education Association sponsors annual conferences and publishes a newsletter, which, in addition to current news items, contains concrete teaching aids. For membership information, contact CEA at Eastern Montana College of Education, Billings, Montana.

Among other groups active in the field, is the California Conservation Council, 912 Santa Barbara Street, Santa Barbara, which distributes information and sponsors field schools and scholarships. Nature Conservancy leads the program to establish natural areas for schools (see our Guest Editorial). And a three-year conservation and resource use education project, under the Joint Council on Economic Education of New York, has been made possible by a grant from Resources For the Future, Inc. This project will focus upon improvement of CE through cooperative efforts with state departments of education and teacher-training institutions.

Washington Class Camps Out

A group of teachers from Central Washington College's Elementary School at Ellensburg proved that camping out is an excellent and rewarding method of teaching about wildlife. Early in May they took their fifth and sixth graders for a three-day stay at a Campfire Girl's camp approximately 25 miles west of Ellensburg.

A Forest Service man took the youngsters on walks and taught them how to recognize different types of animal tracks, explained forest preservation and insect damage to trees. A local game protector discussed wildlife habitats, and a college geography professor showed slides and lectured on local geography one evening. A college advanced camping and leadership class provided ample counselors. All agreed it was an invaluable way of providing educational experiences not possible in the classroom, and vividly instilling in the young mind a true "conservation conscience."

Musical Tours of the Parks To Be Broadcast

A series of musical programs for the schools, using the national parks as a background, will be presented as the 32nd Annual Series of Standard (Chevron) School Broadcasts. Available for those in the seven western states, Hawaii and Alaska—and on a limited basis in other areas—the programs will be on the air a half-hour weekly from October 15, 1959 to May 5, 1960.

The series, entitled "Musical Tours of Our National Parks" is devoted to music in relation to the enjoyment and conservation of the scenic beauties, wildlife, plant life and other resources of our national parks. A teacher's manual will be distributed incorporating brief basic descriptions of each of the parks. A wall-size, full-color wildlife map of the United States is inserted in each manual.

Home Study in Conservation

A home-study program to prepare persons as conservation technicians was initiated by the National School of Forestry and Conservation, 2144 P Street, N.W., Washington, D. C. in 1958. This program offers three courses: Soil and Water Conservation; Fish, Wildlife and Park Conservation; and Forestry.

Students include three major groups: (a) men already employed in conservation jobs without previous technical training and without access to residence training; (b) forest and farm owners desiring technical knowledge of forest and field practices; (c) qualified high school graduates seeking a career at the Technician Aide or Assistant (sub-professional) level. Upon satisfactorily completing the home study program, the students have an optional choice of two methods of attaining field competence. They may attend an intensive two-week course in field practice at the school camp in Wolf Springs Forest, Wisconsin; or complete a series of field exercises furnished by the School under supervision of a professional forester, soil conservationist or wildlife biologist. Students who complete the program are given placement assistance and are eligible for appointment as field techni-

cians in federal, state, and private forestry, park and conservation organizations.

Parks Taught in College

A new course entitled "Exploring Our National Parks and Monuments with a Biologist" was given last spring at the General Extension Service of the University of Minnesota, Duluth. Dr. Mark M. Keith, Associate Professor of Biology, reported that enrollment for his 16-hour course was excellent despite the fact that no college credit was given. The course is intended to give supplementary information to teachers of geology or biology, and to provide interesting material for the working man. The material included a description of the location, history, geology and biology of the parks.

It would seem appropriate that a similar course could be added to the curriculum of other institutions which would be valuable in helping to educate the public regarding the significance of these great outdoor laboratories.

Scholarship Deadline Nears

Deadline for receipt of applications for the National Wildlife Federation's 1960-61 program of scholarships and fellowships in conservation is November 1, 1959. Graduate, post graduate and special student fellowships range up to \$1000; undergraduate scholarships up to \$500. Some appropriate study activities might be: teacher training, radio and television, scouting and conservation, curricular problems, farmer-sportsmen relationships, conservation workshop techniques, textbook development, jour-

nalism, and state programs. An applicant need not necessarily be enrolled at an institution of higher learning if his project or proposal has merit in the cause of conservation. Application blanks and further information may be obtained from National Wildlife Federation, 232 Carroll Street, N.W., Wash. 12, D. C.

The California Conservation Council for the past several years has sponsored John Muir Scholarships for teachers and group leaders, providing from \$15 to \$50 tuition at summer field schools such as Audubon Camp of California, Berkeley; Idyllwild School of Conservation and Natural Science, Idyllwild; Santa Barbara Institute of Nature Study and Conservation; West Coast Nature School, San Jose State College. For information write California Conservation Council, 912 Santa Barbara Street, Santa Barbara, California.

WHAT DO YOU KNOW ABOUT PARKS?

1. Crater Lake (Oregon) is thought to have been formed by Mount Mazama's having blown its top off, as did Katmai in Alaska.
 True False
2. The spoonbill, ibis, alligator and sawgrass are characteristic of what park?
3. Which species are not found in Great Smoky Mountains National Park?
 Bear Bobcat Turkey
 Kaibab Squirrel
4. Most petrified forests were created by sudden burial of living trees under volcanic outpourings.
 True False
5. Where are rain forests found in the national parks?
 Hawaii Virgin Islands Everglades Olympic
6. Yellowstone is the only place in the world where geysers are found.
 True False
7. In which park are both caribou and wolves found?
 Rocky Mountain Isle Royale
 Mt. McKinley Grand Teton
8. Most arches in Arches National Monument, Utah, were formed primarily by wind erosion.
 True False
9. How long ago was the oldest visible strata in Grand Canyon laid down?
10. How was Devil's Tower, Wyoming, formed?
11. Which are the two foremost enemies to the giant Sequoias?
 Fungi Lightning Fire
 Insects Man
12. How was Half Dome (Yosemite National Park, California) formed?
 Earthquake and faulting Glaciation
 Lightning Exfoliation
13. Mesa Verde's early Pueblo Indians left their homes in about 1300 A.D. because of:
 Flood Drought Tribal warfare
 Earthquake
14. Which was the first national park?
 Yellowstone Yosemite
15. Who was the first director of the National Park Service?
 Teddy Roosevelt Gifford Pinchot
 Stephen Mather Frederick Law Olmstead, Sr. John Muir
16. How many units are in the national park system?
 29 180 230
17. The U. S. national park system was modeled after the British.
 True False
18. Are all areas incorporated in the system by special act of Congress?
19. What is the difference between national parks and national monuments?
20. Each state should offer a representative area as a national park.
 True False
21. Which state has the largest state park system?
 Mich. Maine Calif. New York
22. Logging of mature trees is permitted in our national parks as well as in our national forests.
 True False
23. Which comprise a greater percentage of the total U. S. land area?
 national forests national parks
24. How much of America's 5400-mile ocean coastline is included in the national park system?
 3% 10% 25%

(Answers on Page 16)

CLASSIFIED ADVERTISING

20¢ per word—minimum \$3. Payment must be enclosed with all orders.

WAMPLER TRAIL TRIPS—Hiking and riding trips in wilderness areas of National Parks and Forests of California and Arizona, also Old Mexico. Year around calendar of activities for men, women and families. Many, including beginners, come alone—make lasting new friends. Write for details: Box 45, Berkeley 1, California.

MEXICO—*Barranca del Cobre*, scenic canyon home of the Tarahumara Indians—Oct. 18-Nov. 13, \$275 for two weeks; *Holiday Peak Climbing*, major and minor peaks—Dec. 20-Jan. 2 or 9, 1960, \$275 for two weeks. Both extremely unusual for back country adventure. Write Wampler Trail Trips, Box 45, Berkeley 1, Calif.

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Descriptive pamphlets and Mission 66 proposals for each national park and most national monuments are available free from the National Park Service, Washington 25, D. C. Also available are two recent surveys of our shoreline facilities: "Our Vanishing Shoreline"—a survey of Atlantic and Gulf Coast areas—and "Pacific Coast Recreation Area Survey."

The Government Printing Office (hereafter abbreviated GPO), Washington 25, D. C., has many publications on sale, such as "Areas Administered by the National Park Service", January 1, 1959 (20¢). Request Price List 35, 1958.

Many free and inexpensive reading materials, posters and audio-visual aids, as well as other services, may be secured by writing government and private organizations concerned with conservation and resource-use education:

American Forestry Association, 919 17th St., N.W., Washington 6, D.C.

American Nature Association, 1214 16th St., N.W., Washington 6, D.C.

Boy Scouts of America, National Council, New Brunswick, N.J.

Camp Fire Girls, Inc., 16 E. 48th St., New York 17, N.Y.

The Conservation Education Association, Eastern Montana College of Education, Billings, Montana.

The Conservation Foundation, 30 East 40th St., New York 16, N.Y.

The Garden Club of America, Conservation and Roadside Committee, 15 E. 58th St., N.Y. 22, N.Y.

Girl Scouts of the U.S.A., 155 E. 44th St., N.Y. 17, N.Y.

The Izaak Walton League of America, 1326 Waukegan Road, Glenview, Ill.

National Audubon Society, 1130 5th Ave., N.Y. 28, N.Y.

National Education Association, 1201 16th St., N.W., Washington 6, D.C.

National Wildlife Federation, 232 Carroll St., N.W., Washington 12, D.C.

Natural History Assns. in each park.

Sport Fishing Institute, 413 Bond Bldg., Washington 5, D.C.

State Conservation or Fish and Game Departments (in each state capital).

State Departments of Education (in each state capital).

U.S. Department of Agriculture, Forest Service and/or Soil Conservation Service, Washington 25, D.C.

U.S. Dept. of Health, Education and Welfare, Office of Education and/or Public Health Service, Washington 25, D.C.

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Colleges and universities offering instruction in forestry and wildlife management are listed in the *Conservation Yearbook*.

FILMS AVAILABLE

16 mm.—Color and Sound
For rental at \$5 a showing.

The Wilderness Alps of Stehekin (N. Cascades, Wash.)	—30 min.
Great Basin Range (Snake Range, Nevada)	—30 min.
This Is Dinosaur	—30 min.
Wilderness River Trail (Dinosaur N. Mon.)	—30 min.
Painted Canyons (Bryce, Grand and Zion)	—45 min.
Canyon Country (\$2.50) (Grand Canyon)	—13 min.
Yellowstone: A Ranger's Story	—28 min.
Geyser Melodies (Yellowstone)	—11 min.
Glacier Park Studies	—22 min.
Two Yosemite (\$2.50)	—15 min.

When ordering, indicate title(s), date of showing, address, and amount of check enclosed. Contact: National Parks Association, 1300 New Hampshire Ave., N.W., Washington 6, D.C.



Student Conservation Program

The Student Conservation Program of the National Parks Association is a work and education program aimed at enlisting the volunteer services of conservation-minded students—high school, college and graduate—in assisting the National Park Service to carry out its obligation to maintain the natural beauty of the parks while serving visitors.

The program offers these opportunities to each qualified student:

- (1) to extend his own education through actual field experience;
- (2) to learn the principles and problems of the national park program by working directly with the National Park Service;
- (3) to acquire experience useful for any future private or governmental positions related to natural resources;
- (4) to be awarded academic recognition for participation in the program—depending upon the student's prior arrangement with his college department.

The program has just completed its third summer of operation in Grand Teton National Park, Wyoming, and Olympic National Park, Washington. Seventeen college students and graduates served as park staff or research assistants at Grand Teton, and thirty high school boys (15 years or older) carried on an outdoor work program constructing nature trails and rehabilitating over-used park areas in Olympic. In addition, two special grants were made to college graduates for independent research under the Olympic Park Biologist.

The SCP is financed from sources outside the Park Service such as garden clubs, conservation groups, and foundations and is underwritten by the National Parks Association. Further information regarding this program and applications for next year may be obtained by writing: Student Conservation Program, National Parks Association, 1300 New Hampshire Ave., N.W., Washington 6, D. C. ■

Employment Opportunities in National Parks

The uniformed employees of the National Park Service—the park rangers and park naturalists—are the most familiar and most numerous national park employees. There are some 700 permanent personnel in these categories in the Service's 180 areas over the nation, augmented each summer by a similar number of seasonal men. Other specific professional and technical fields represented in the Service include engineering, architecture, landscape architecture, biology, forestry, geology, American history, natural history and archeology. In addition, there are a variety of general administrative, fiscal and clerical jobs. Park rangers are not to be confused with the forest rangers who work for the U.S. Forest Service.

The National Park Service is a career service and administrative positions are filled by promotion. All permanent positions, with few exceptions, are subject to civil service rules and regulations. Examinations are given from time to time in all eleven civil service regional offices. Information on this (including some details of education and experience needed) is available at your local post office.

Applications (Civil Service Form 57) for seasonal employment with the National Park Service as seasonal park rangers, ranger-naturalists, ranger-historians and ranger-archeologists (minimum age 21) should be sent between January 15 and March 1 to the park superintendent in the area in which you wish to work. Thirty park areas offered possibilities in 1959. Other government jobs (minimum age 18) include trail crew, maintenance, blister rust and fire control positions.

Summer employment is also offered by private concessioners who operate hotels, restaurants, shops and other business enterprises in the parks. Application must be made directly to the concessioner involved. Lists of private concessioners and of parks offering seasonal government employment can be obtained from the National Park Service, Washington 25, D.C.

Employment opportunities in your state's division or department of state parks can be determined by contact with that agency in your state capital. Information on employment with related federal government agencies can be obtained by writing: Forest Service, Department of Agriculture, Washington 25, D.C.; Bureau of Sport Fisheries and Wildlife, Department of the Interior, Washington 25, D.C.; and your State Soil Conservation Service. ■

Answers

To Quiz on Page 13

1. False. Geologists believe that the cone collapsed when support of the summit was weakened by ejection of great quantities of pumice and lava and by drainage of molten rock through subterranean cracks.
2. Everglades, Florida, the only park in which swampland species are preserved.
3. The Kaibab squirrel is found only on the north rim of the Grand Canyon.
4. False. It is believed that in most petrified forests, including Petrified Forest National Monument, Arizona, the trees died of natural causes and were later covered by sediments containing a large amount of volcanic ash. Silica in the ash was picked up by ground water and deposited in the cell tissue of the wood. In Yellowstone, however, the trees were entombed by volcanic materials in the upright position in which they grew.
5. Hawaii and Olympic.
6. False. Yellowstone has the largest concentration of geysers in the world, but New Zealand and Iceland have widely known ones, and a few others are scattered around the world.
7. Mount McKinley.
8. False. Heavy water erosion along master cracks in 300-foot layer of Entrada sandstone isolated great fins or slabs—sometimes 20 feet thick and 100 feet high. Water entering secondary cracks at right angles to the slab face loosened great blocks of the sandstone, which due to freezing, thawing and pull of gravity, broke away, leaving holes or windows. Continued erosion and weathering (including wind action) wear arches thinner until they fall, leaving remnants standing at either end.
9. More than a billion years ago.
10. The most recent theory is that about 50 million years ago molten rock was forced up from deep within the earth and cooled not far below the surface. As the surrounding rock has slowly eroded away, this intrusion has been exposed.
11. Lightning and man. *Sequoia gigantea* have great natural resistance to fungi, fire and insects. Yet their roots, extending over a wide area, are extremely shallow and may be injured by sightseers.
12. Primarily exfoliation. As with all Yosemite's domes, when overlying layers of rock were worn away, the release of pressure caused the great granite blocks to swell and develop a system of cracks as if trying to shed their outer layers. Weathering causes these shells to peel off like the layers of an onion. But with Half Dome, a second zone of vertical cracks also caused sheets to peel off parallel to the sheer face now visible. The Tenaya Glacier may have plucked some thin sheets, but the main exfoliation probably took place later.
13. Primarily because of a 24-year drought. Neighboring tribes may have attacked at this time, but are not thought to have been a decisive factor.
14. There is controversy over whether Yosemite or Yellowstone should be considered the first national park. Yellowstone was set aside by the federal government in 1872 as a "public park and pleasuring ground." Yosemite Valley and the Mariposa Big Tree Grove, while set aside in 1864 "for public use, resort, and recreation" to be "inalienable for all time" was turned over to the State of California's administration. The area surrounding these state grants became Yosemite National Park in 1890, and in 1905 these state grants were returned to the federal government to become part of the national park.
15. Stephen Mather became first Director of the National Park Service in 1917. Pinchot led the forest conservation movement under Teddy Roosevelt. Olmsted Sr. is considered the originator of the essence of the national park concept back in 1864. Muir was founder of the Sierra Club and wrote extensively on the Sierra Nevada.
16. The National Park System is composed of 180 acres set aside by the federal government for scenic, historic or recreational values. These areas are administered by the National Park Service of the Department of the Interior.
17. False. With the establishment of Yellowstone, the U. S. started a new idea which has spread around the world.
18. No. National monuments may be established by Presidential decree on land owned or controlled by the U. S., under authorization of the Antiquities Act of 1906. National historic sites may be proclaimed by the President or by the Secretary of Interior under the authority of the Historic Sites Act of 1935. National parks and all other units require Congressional authorization.
19. National parks have been established to preserve an assemblage of outstanding primeval features, which, taken together, constitute superlative scenery. National monuments were established to conserve a particular geological or biological feature.
20. False. National parks and monuments must be of the highest quality. Admission of lesser quality areas would lower the standards of the system, and make difficult its defense and protection. (In the past, the economic or prestige motive has on occasion prompted states to advocate unworthy areas as national parks.) Such lands may well be used for state parks and recreational areas, for which there is a great need.
21. New York leads with over 2 million acres. Next is California with 563,000. Then Maine with 207,000 and Michigan with 177,000.
22. False. National forests are managed under a system of "multiple use" which includes timber cutting, grazing, mining, and recreation. By contrast, national parks seek maximum preservation of the natural processes. Only the minimal facilities necessary for administration and visitor convenience are allowed.
23. National forests, with 167 million acres. National parks comprise only 22 million acres, or $\frac{3}{4}$ of 1 percent of the total land area of the United States.
24. About 3%.

QUESTION: How can I help?

ANSWER: You can purchase copies of this issue and place them in schools and libraries in your town.

CHRONOLOGY

- 1864—Lincoln signed Conness bill granting to California Yosemite Valley and the Mariposa Big Tree Grove "for public use, resort, and recreation" to be "inalienable for all time."
- 1865—Frederick Law Olmsted set forth national park principles.
- 1870—Washburn-Langford-Doane expedition and Yellowstone campfire. Area suggested as national park.
- 1872—Yellowstone established as first national park.
- 1890—Yosemite, Sequoia and General Grant areas made national parks.
- 1905—Yosemite Valley and Mariposa Grove added to Yosemite National Park.
- 1906—(a) Preservation of anthropological areas started with Mesa Verde prehistoric cliff dwellings. (b) Antiquities Act passed to preserve nation's cultural heritage.
- 1912-13—Hetch-Hetchy Valley in Yosemite exploited as dam site.
- 1916—National Park Service formed.
- 1917—Stephen T. Mather made first director of the National Park Service.
- 1918—Secretary of Interior Lane's "policy letter" set forth standards for selection and treatment of parks.
- 1919—National Parks Association formed as private educational group to further public understanding of parks.
- 1930—Branch of Research and Education established in Park Service.
- 1933—Roosevelt's Reorganization Act consolidated all federal park activities under National Park Service.
- 1933-41—New Deal relief programs—Civilian Conservation Corps, etc.—afforded opportunities for park improvements, but put great responsibility on those who sought to maintain natural areas unimpaired.
- 1935—Historic Sites Act defined policy of preserving historic places. Branch of History established.
- 1940-45—World War II. Commercial pressures to invade parks under "essential for liberty" guise.
- 1945—Travel boom. Use of parks jumped about 100% over 1941. Lack of funds to keep up parks and expand interpretive programs.
- 1956—10-year Mission 66 program initiated to meet park needs.
- 1966—80 million visitors predicted for national park system.
- 2000—1¼ billion visits predicted for national parks alone.



Mitten Park Fault (2000 foot syncline) from Harper's Corner in Dinosaur National Monument, Utah-Colorado

Philip Hyde