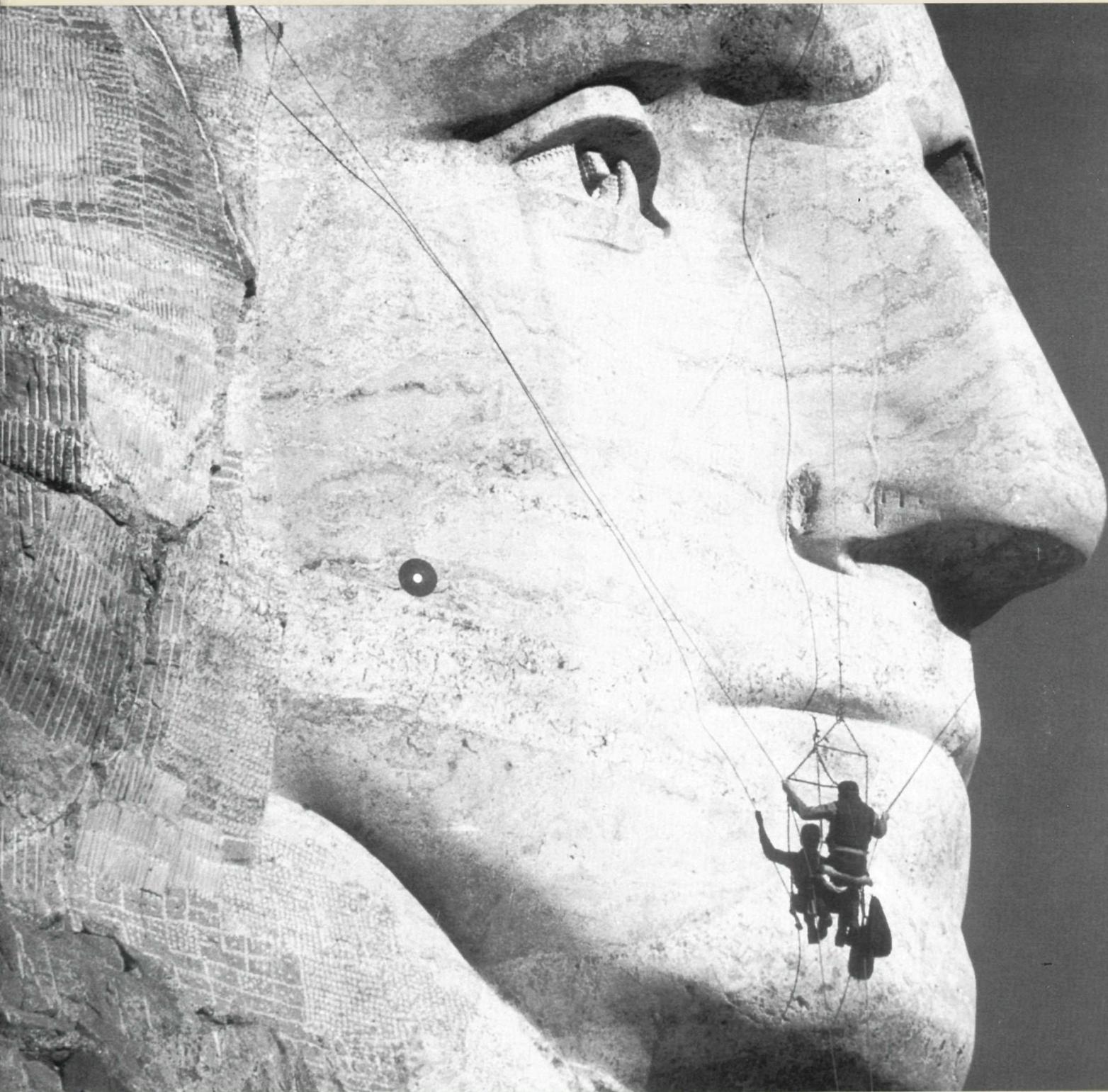


COURIER

NEWSMAGAZINE OF THE NATIONAL PARK SERVICE



VOL. 37 NO. 4

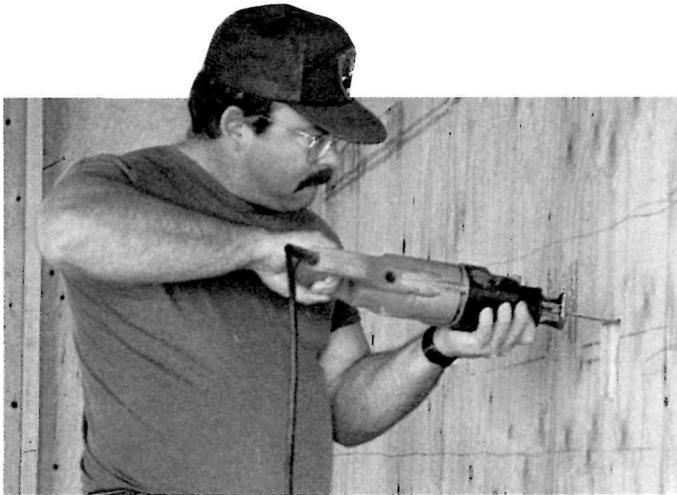
APRIL 1992

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NEWSMAGAZINE OF THE NATIONAL PARK SERVICE

Volume 37, Number 4

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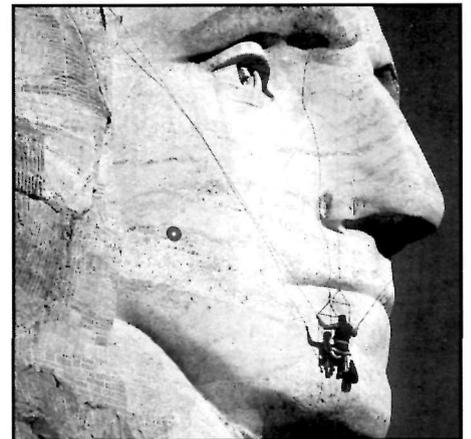
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COVER

Who is that daring NPS employee in the sling seat getting a close up of George Washington's face? Maintenance employee Bob Crisman, photographed by Paul Horsted, makes repairs at Mount Rushmore NMem. On the back cover, Brian Kennedy of Hungry Horse News captures a moment repeated annually at Glacier NP - opening Going-to-the-Sun Road.



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MAINTENANCE WORKERS — PROVIDING THE LIFEBLOOD

As I write this column, I realize an issue of *Courier* focusing on maintenance is long overdue. You're probably having the same reaction. I expect we've all had some appreciation of the importance of the maintenance function, but we may not have stopped to consider the critically important role our maintenance employees play in protecting the parks and making the NPS a successful operation. This issue of *Courier* is likely to open your eyes to both the value of maintenance and the variety of work it covers. Maintenance employees currently make up the largest segment of our full-time workforce—5,000 of our 13,000 full-time employees work in maintenance divisions throughout the park system. They are a major player on the NPS Team.

We all think we know who maintenance workers are and what they do—trail crews, roadworkers, electricians, plumbers, mechanics, carpenters and construction workers. These are the people we most often know about. But I'd like to tell you about some maintenance professionals doing very unusual jobs out there and doing it with the kind of commitment and spirit that's also business-as-usual for other Park Service maintenance employees.

Let's start with Bob Crisman. About twice a year, Bob slips into a sling seat and hangs on for dear life as he's being lowered down the face of Mount Rushmore. If he were to fall, he would drop 6,000 feet, though I understand Bob doesn't like heights and doesn't like to think about that. He's taken on this "daredevil" job for 19 years and isn't quite ready to quit yet. If you're wondering what Bob does up there, he maintains the sculpture by filling in natural cracks in the rocks to prevent water seepage. Bob is only the fifth person to do this kind of work, and he is now training Karl Bachman who will one day be responsible for protecting Mount Rushmore in the same way that Bob has done—an excellent example of the kind of mentoring that is important to the health of any organization.

Here in the nation's capital we enjoy the creativity and dedication of maintenance employees every day in the beauty of the many trees and flowers that grace the parklands throughout Washington, DC. This month, thousands of visitors have been appreciating the cherry blossoms and the work of the Park Service's tree crews. Regional tree crew foremen Don Mace, Kenny Brooks, Gary Corbin and Josiah Procter are just a few of the people who understand and care for the wonderful old trees that are such an important element of the character of this city. Before trees even show that they need help, tree crews are there, pruning, fertilizing, and doing whatever else is needed to keep them healthy. They're our troubleshooters for trees, and thanks to them, Washington lives up to its nickname, "the city of trees."

Ron Martin at Glen Canyon, like a few other of our employees, is certified in underwater blasting, and he practices his art to remove obstructions that are harmful to boaters or other park visitors. He and other "maintenance" divers are also trained to remove hazardous waste, such as discarded car and boat batteries.

Cowhands like Edward Meier and Al Lindig at Lyndon B. Johnson NHP do more than "ride herd." Sure, they rope and brand cows and bale hay. But they also prepare the historic Hereford cattle herd for shows and auction. They're involved in maintaining the genetic strain that was at the ranch during LBJ's time, and are responsible in part for the veterinary care of the 50 or so Hereford cows kept at the ranch.

Bob, Karl, Don, Kenny, Ron, Ed, and the others I've mentioned help make up the "face" of maintenance. But so do Grand Canyon's custodial worker foreman Regina Heiner, Statue of Liberty work leader Mable Good, and Pinnacles trail foreman Lisa Smith. They are among the small but growing number of permanent women employees in our maintenance workforce.



While I've highlighted some of the more unusual jobs, the tasks that each of the Service's maintenance workers perform throughout the park system are all critically important, and none should be taken for granted. Where would we be without running water, lighted and heated buildings, functional roads, and passable trails? The public expects these things and so do all of us who work for the Service. It's our maintenance cadre that makes it happen! At Grand Canyon, husband and wife Delores and Pat Casaus make park visitors feel welcome by seeing to it that the restrooms are clean and in good condition. Bobby Martinez, the Canyon's heating mechanic, is on call 24 hours a day, keeping aging boilers working through cold Grand Canyon winters. Wilson's Creek maintenance worker Derek Kothenbeutel does anything and everything you might imagine to keep a smaller park area well-maintained and putting its best foot forward.

Bruce Barrett, at Voyageurs, is involved in planning for campsites and docks, and then goes out and builds them. And behind the scenes, Wanda Wenzel, the maintenance secretary at Shenandoah, capably keeps the operation on track.

To put it bluntly, maintenance employees make all our other jobs possible. If rangers are the soul of this organization, then the maintenance staff is certainly the heart, providing our lifeblood. Their work reaches into every corner of the parks. They do both the off-beat and more routine things I've already mentioned, and they also have responsibilities that are critical to resource protection. For example, they participate in fire fighting and controlled burns, combat erosion along streams, use integrated pest management to prevent deterioration of historic buildings and build boardwalks so visitors can enjoy fragile resources without damaging them.

As we approach the 21st century, one thing is reasonably clear. As NPS roads, sewer lines and other important components of our infrastructure continue to age and deteriorate, and as pressures continue to increase on park resources and values, maintenance is likely to become an even more critical and significant part of this organization. We will be looking to our employees and tools, such as the Maintenance Management System, to help us cope with the massive challenges we will face. The Maintenance Management System, in addition to being used for work planning, scheduling, and costing, was recently used in the formulation of the FY 1993 budget proposal for the first time. It will also be used to develop information for the upcoming Secretary of the Interior's Initiative for Infrastructure Inventory Analysis which will look at infrastructure decline. This is only one way in which we are harnessing technology to improve maintenance.

To make sure that we meet future maintenance needs, we must make sure that we are recruiting the best people to do the maintenance jobs we need to have done. Then we need to take the talent and energy they bring with them to their jobs and train them to perform at even higher levels of accomplishment. We also should be identifying skilled employees already part of the National Park Service ranks and mentoring them in much the same way that Bob Crisman is doing with Karl Bachman at Mount Rushmore. Recruiting, training, and mentoring bright new talent is the best way to ensure that we will be able to effectively take on the maintenance challenges of the 21st century.

James M. Ridenour

FROM THE EDITOR

In some things, my sister and I resonate on the same frequency. In others, we might as well be strangers meeting for the first time. Mag can do anything with her hands. Wire a lamp—Mag can do it. Put in a sink—Mag can do that too. Replace a rotten porch rail so that it matches seamlessly with the remaining rail—Mag is a pro at that, as well as almost everything else. I watch her work, helping where I can, envying a little her easy familiarity with drills and wrenches. As for me, I can only type, and there is little in the area of maintenance and repair that the ability to type happens to solve.

At the very least, however, I do amuse my sister—she enjoys reminding me of my make-shift attempts to follow in her footsteps. I cook dinner for her also, after a long day in which she has repaired all the things that have broken since her last visit. My admiration of her skills and the food I provide are all I am able to offer in exchange for her sturdy unwillingness to stop until the last loose screw has been tightened into place.

Yet at the root of this difference between us is the same preservation impulse. Mag enjoys finding objects that have lost their function but that she can return to usefulness again. "It just needs a little polishing. It deserves a second chance," I've heard her fondly comment about dented light fixtures I might have passed without noticing. She chooses to preserve, to protect, to take the long view of usefulness, much like Park Service people do. She sees no point in owning something that's not repaired when it needs repair, that's denied the opportunity to keep functioning as long as it effectively can be patched together. In returning value to what has become valueless, she also strengthens her own sense of worth.

In my sister, I see an attitude the Park Service demonstrates on a much larger scale throughout its 361 park sites, one that is shared this month by the chiefs of maintenance and their staffs who stayed up nights to contribute to the April *Courier*. To someone who began planning this issue understanding only the rudiments of what NPS maintenance involves, I read the articles represented here with nothing less than awe. "They're able to do *that*," I exclaimed many times. Yet, even more extraordinary, as I've come to discover, NPS maintenance employees do what's represented here and much, much more.

In his lead article, Rick Shireman roughly tallies the number of facilities the Service maintains: "more than 25,000 buildings and 8,000 miles of roads; 1,400 bridges; nearly 400

dams; 1,500 water and sewer systems; 5,000 residences; millions of dollars invested in heavy equipment and motor pool vehicles; countless thousands of miles of pipelines, cables, and wires." What does all this add up to? A sizeable total, certainly, not only in money but also in time, energy, and concern expended to maintain as much of this inventory in good working condition as park budgets can stretch to cover. Who carries out this extraordinary commitment to usefulness? People not much different than my sister, except that they have been trained specifically to solve some of the larger, more complicated problems that she cannot; people committed to opening roads in spring, to making sure that clean water keeps flowing at water fountains, to stabilizing historic structures so that they continue to stand; people committed to usefulness in all its many forms.

This commitment to usefulness has implications beyond the boundaries of park maintenance divisions, stretching to include most of the disciplines represented in the NPS. Without maintenance employees clearing Going-To-The-Sun Road, the interpretive division would not be able to prepare for summertime use of the visitor center at Logan Pass, something this month's article from Glacier NP makes clear. For Steven Maass from Bent's Old Fort, "[b]eing a cultural demonstrator and carrying out historic preservation work was the most rewarding maintenance experience I have known." As a result he was able to see very clearly the relationship between maintenance and cultural resources. Tim Glass and Steve Griswold drew on the ties between maintenance and all other park disciplines to complete the projects they discuss here. Thanks to the involvement of everyone at Channel Islands NP, the combination visitor contact station and ranger's home, which replaced a quonset hut on the island, could not have been built in so short a time. At Haleakala, Griswold planned the restoration of historic trails, thanks to the help of trail experts from other parks and national forest areas.

What evolves from these and other articles is an indication of how complex and how far reaching NPS maintenance operations are. Repairing a leak in Grand Canyon's trans-canyon pipeline, as Tom Geiger shows, has implications miles beyond the point at which the break is repaired. In a sometimes harsh environment, such technological intrusions can provide very basic ingredients of life, necessary levels of comfort that a recent *Calvin and Hobbes* cartoon hinted at.

The comic strip showed Calvin and Hobbes walking through snowy woods. Calvin com-

plains about human inability to live as simply as animals do. He turns to Hobbes, his faithful tiger sidekick, looking for confirmation that plumbing, heat, and other conveniences make everyone too comfortable. The boy asks Hobbes the purpose of life from an animal's perspective. Hobbes shrugs. "We're here to devour each other alive," the tiger answers simply. The next frame shows Calvin in a darkened living room. "Turn on the lights! Turn up the heat!" he shouts, suddenly aware of the value of technology's protection.

In NPS areas the heat works, as well as other aspects of maintenance operations. They work, and work with relative ease because the people trained to keep them working carry out their responsibilities, pushing back the dark, the cold, the snow, making life comfortable, making it reasonably safe. But that is not the whole story, because maintaining comfort and safety require more—require, on an often unarticulated level, a willingness to contend with the forces that push everything and everyone toward entropy or inertia—the condition in which machines as well as people cease to perform their functions.

Entropy is what my sister cannot tolerate—the inability to move, to work, to carry on with the affairs of life—and, though this may sound a little too philosophical for some tastes, she shares this perspective with those individuals whose skills and inclination push them to repair, to reconnect, to make the dysfunctional functional again. When something is useful, when its gears move in unison with each other, when it carries out its assigned purpose, then a little bit of the animal darkness that all of us animals fear has successfully been pushed back. Light and life have regained a little more territory, and the all-devouring dark has been postponed for a while.

Perhaps one of the oddest aspects of this nation's binge to discard rather than repair has been its willingness to affirm uselessness. Discarding something that retains value, then looking around only to consume more suggests a lack of belief in the skill of our own hands to take control and, ultimately, an alignment with entropy. Returning function to an object bespeaks our own individual control over uselessness and, by extension, disorder, inertia, and dark.

Certainly these are the elements that maintenance divisions Servicewide contend with. And because they do, lights shine; roads are cleared; almost impossible projects become possible. We learn and relearn—even those of us who can only type—the deepest importance of the work of our hands.

LEGISLATIVE UPDATE

During February, a total of six bills were introduced by Congress relating to or affecting the national park system; five hearings were held in the House and two in the Senate; the House filed a report and passed a bill which would authorize the establishment of Steamtown National Historic Site; and the Service responded to 32 referrals in which the Secretary had requested the NPS to submit recommendations to Congress or the Office of Management and Budget. On February 24, a new area was added to the system. The President signed into law HR2927, a bill which would establish the Salt River Bay National Historical Park and Ecological Preserve at St. Croix, Virgin Islands.

The publication, *Compilation of National Park Service Laws of the 101st Congress*, has finally been printed by GPO. The document comes in two parts. If you would like a copy, contact Dottie Whitehead in WASO's Office of Legislation at 202/208-3636.

ANNOUNCEMENT

Rocky Mountain Nature Association has its 1992 catalogue of seminars available. For more information, contact seminar coordinator Nancy Wilson, Rocky Mountain Nature Association, Rocky Mountain NP, Estes Park, CO 80517, or call 303/586-3565 ext. 258.

BOOK

Here are the latest from Southwest Parks and Monuments Association: *The Great Encounter, Our National Parks Commemorating the Columbus Quincentennial*, by Bernard L. Fontana, an informative 15-page publication formatted to pocket-size, retailing for \$2.95; and *Flavor of The Hill Country, Texas-German Recipes From the Sauer-Beckmann Living History Farm*, by Randolph Jorgen, 60 pages of recipes and insights into Hill Country life, retailing for \$8.95.

FOR YOUR INFORMATION

Upcoming Issues & Copy Deadlines—If you follow want to know what's going on at the Denver Service Center, the May *Courier* will give you more on that topic. June is scheduled to cover the topic of philanthropy and September has been set aside for natural resources issues. At this point, all other months have been set aside to cover topics of

general interest, though a crafts issue is being considered for October. Use the form below to comment on topics you'd like to see covered. Deadlines for contributions to upcoming issues are as follows:

- May 1 for July
- June 1 for August
- July 1 for September
- August 1 for October
- September 1 for November
- October 1 for December

COURIER ARTICLE SUGGESTIONS:

Check topics you're interested in, then add your own ideas.

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| <input type="radio"/> Civil War battlefields | <input type="radio"/> Biodiversity | <input type="radio"/> Recycling |
| <input type="radio"/> The organization of the NPS | <input type="radio"/> Art in the parks | <input type="radio"/> Telecommunications |
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SERVING THE RESOURCE

THE NATIONAL PARK SERVICE MAINTENANCE EMPLOYEE.

Two o'clock in the morning, fifteen hours into a double shift: standing three feet deep in the rapidly rising waters of the Rio Grande, NPS employees struggled to rescue the victims of a flash flood in Southwest Texas. The rescue had started hours earlier when the dispatcher notified the area supervisor of impending flood levels at Big Bend NP. Local NPS employees contacted park visitors, closed portions of the public use areas, and moved equipment and materials to safety. Now they were desperately working to save two last victims stranded in a small block building on the riverbank.

Were they a couple of park visitors who had wandered too close to the river's edge? Local residents stranded in their home? No, the victims were two vintage Fairbanks Morse water pumps, weighing in at one ton each, used to irrigate fields in the historic district. The rescue team consisted of the Rio Grande maintenance crew.

Perhaps this event was not as dramatic as the rescue of a drowning park visitor. Still, it echoed all the values we expect of dedicated NPS employees. These maintenance workers actively protected the park's resources. They preserved cultural artifacts used in depicting historic lifestyles. After nearly sixteen hours of continuous effort, they proved their dedication by accomplishing a difficult task under unforgiving conditions. These values clearly apply to the diverse number of maintenance employees and the equally diverse jobs they perform in the national parks.

There are many reasons to examine more closely the people and duties involved in maintaining the national parks. Perhaps the best, if least obvious reason, is the similarity between the mission of the National Park Service and a classic definition of maintenance. The Organic Act of 1916 states as our goal: "to conserve the scenery and the nature and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Webster's New Collegiate Dictionary defines maintenance as: "to keep in an existing state, to preserve from failure or decline, to sustain against opposition or danger, and to uphold and defend."

Both the Organic Act and Webster's definition of maintenance refer to the conservation and preservation of

resources. Both note the need to guard against failure and decline of those resources. And both regard continued service as a key to the preservation ethic. More than 5,000 permanent and seasonal NPS employees work to meet both the vision of the Organic Act and the definition of effective maintenance.

This is not an easy job. The national parks contain more than \$50 billion of built facilities requiring maintenance. The list of facilities is staggering: more than 25,000 buildings; more than 8,000 miles of roads; 1,400 bridges; nearly 400 dams; 1,500 water and sewer systems; 5,000 residences; millions of dollars invested in heavy equipment and motor pool vehicles; countless thousands of miles of pipelines, cables, and wires that provide vital utilities to park visitors and employees.

This collection of facilities and equipment is perhaps the most eclectic in the world. It is comprised of highly complex electrical systems such as those at the John F. Kennedy Center for the Performing Arts, the world's largest all-electric building. Unique activities like the repair of the Arch at Jefferson National Expansion Memorial are commonplace for NPS maintenance workers. Voyageurs, Isle Royale and Apostle Islands maintenance divisions nonchalantly handle logistical nightmares that involve moving supplies to isolated backcountry sites by boat, or, if need be, across treacherous ice roads on frozen lakes.

Even at an individual park, the breadth of maintenance activities is mind-boggling. Recently at Grand Canyon, one maintenance crew spent the day hanging by ropes on the Canyon wall repairing a break in the trans-canyon waterline. Another crew worked on the painstaking restoration of the historic Santa Fe Railroad Depot. Still others were bringing online a computerized wastewater treatment system to reclaim all the water used by park visitors on the South Rim.

In addition to traditional blue-collar maintenance jobs, park employees are branching out in new, more technologically demanding fields. Highly complex water and waste water treatment systems now require years of training to operate. Automotive mechanics routinely use computer-based diagnostic equipment for troubleshooting. And across the Service, maintenance employees are using strong educational credentials in the sciences and resources management to meet new requirements in such fields as hazardous waste management, historic preservation and integrated pest management.

The diversity of jobs in NPS maintenance is astounding. The NPS now employs individuals in more than 70 separate job classifications with titles ranging from the more traditional (maintenance worker) to the fanciful (drawbridge repairer). We often talk of the many hats NPS employees wear. Maintenance employees require a millinery shop of headgear: welder's goggles, diver's masks, boat captains' caps, cook's toques, farmer/cowboys' stetsons, and laborers' hardhats only touch the surface.

Many maintenance employees are artists at their trades. Mechanics craft one-of-a-kind bushings for aging snow removal equipment at Glacier NP. Laborers spend long hours in heat and boredom, cleaning comfort stations used by millions of visitors from the Lincoln Birthplace to Yellowstone. Woodcrafters painstakingly match surfaces and textures in historic buildings at Fort McHenry NM and Minute Man NHP. And through it all, maintenance employees are the people who touch the resource, who protect it from damage, who see its needs first, and who care for those needs—perhaps before anyone else notices.

Of all the disciplines, maintenance has perhaps the greatest subliminal effect on park visitors. The visitors may never notice the extra polish on the museum display cases. They may not appreciate the smoothly surfaced roads. Certainly, they give little thought to the work that provides a gush of clean, abundant water from a drinking fountain.

Maintenance workers' best efforts, their shining moments, their true contributions to effective park operations, often go unnoticed. Yet for every gleaming bathroom, there is a custodian who scrubbed a little harder than necessary. For every broad expanse of freshly mowed lawn, there is a tractor operator sharpening the mower blades and adjusting the tension cables to a hair's breadth. For every ounce of crystal clear water, there is a treatment plant operator testing samples and a plumber tightening pipe fittings. And for every mile of trail, there is a trail laborer storing away a pulaski and ax after a grueling day of tread replacement.

These are the people who quietly, and with great pride, make the parks enjoyable for the visitor. These are the employees who provide "first response" care to park facilities and resources. And these are the people who, perhaps more than any others, provide the *service* in the National Park Service.

Rick Shireman is the Servicewide Maintenance Training Coordinator, stationed in WASO.

Current Job Classifications for the NPS Maintenance Division

Electronics Mechanic • Electrician • High Voltage Electrician • Electrical Equipment Repairer • Laborer • Custodial Worker • Mason • Welder • Metal Worker • Sheet Metal Mechanic • Painter • Sign Painter • Plumber • Printer • Woodcrafter • Carpenter • General Maintenance Operator • General Equipment Mechanic • Utility Systems Operator/Repairer • Maintenance Worker/ Maintenance Mechanic • Miscellaneous General Equipment Maintenance Worker • Plant and Animal Worker • Farmer • Gardener • Tree Trimmer/Remover • Miscellaneous Occupations Worker • Rigger • Diver • Drawbridge Repairer • Utility Systems Operator • Sewage Disposal Plant Operator • Sandblaster • Miscellaneous Transportation/Mobile Equipment Operator • Motor Vehicle Operator • Tractor Operator • Engineering Equipment Operator • Small Craft Operator • Miscellaneous Transport/Mobile Equipment Maintainer • Heavy Equipment Mechanic • Automotive Mechanic • Warehouse Worker • Cook • Small Engine Mechanic • General Services Worker • Plasterer • Asphalt Worker • Blacksmith • Motion Picture Projectionist • Sound Recording Equipment Operator • Pipefitter • Bindery Worker • Offset Photographer • Offset Press Operators • Woodworker • Wood Mechanic • General Equipment Operator/Mechanic • Cemetery Caretaker • Navigational Aids Repairer • Pest Controller • Animal Caretaker • Miscellaneous Industrial Equipment Maintenance Mechanic • Air Conditioning Equipment Mechanic • Heating Mechanic • Kitchen Worker • Elevator Mechanic • Marine Machinery Mechanic • Industrial Equipment Mechanic • Miscellaneous Industrial Equipment Operator • Boiler Plant Operator • Water Treatment Plant Operator • Road Sweeper Operator • Crane Operator • Deckhand • Mobile Equipment Servicer • Small Arms Repairer • Tools and Parts Attendant

THE DIVERSITY OF MAINTENANCE EXPERIENCES

Near the end of August 1989, the Kalaloch area maintenance crew in Olympic NP was finishing an accessibility project in the campground. Painting the symbol of accessibility in the parking strip was complete. The final touch was the delivery and placement of the new accessible picnic tables. The last table was in place in site D-35.

The driver of a small motor home stopped to inquire if it was all right to use the campsite. Merrill Owens, the Kalaloch area maintenance worker, responded, "It's ready for use." The motor home pulled into the site.

The man was busy setting up the motor home for their stay. The lady aided their 12-year old daughter from the motor home into a wheelchair. The girl rolled directly to the picnic table and said, "Look, Dad, I can have a real picnic and be at the table with you and Mom."

Dad walked towards Merrill and thanked him for the wonderful campsite. He explained that this was the first time their daughter had the experience of sitting at a picnic table. Mom and Dad continued to express their joy and gratitude to the maintenance crew for the fine campsite.

The excited crew returned to the maintenance area. They told everyone they saw about their experience. Before the day was over, every Kalaloch Area employee had visited D-35. All stopped to share the family's joy with the little girl sitting at the picnic table for the very first time.

Hershel Lester
Olympic NP

The storm had abated and we were anxiously awaiting the report from the trail ranges. It came and our greatest fears had been realized. The 110-foot multispans log bridge on mile 14 of Alaska's historic Chilkoot trail had washed away.

I assembled the trail crew and volunteers and gave direction: hike in, find and cut all the new materials, and rebuild the three log and rock cairns. The task, however, would be monumental. They set about gathering gear and prepared for the long hike in.

On about day five I caught a ride to the site on a supply helicopter and, upon landing, found the crew demoralized, tired and confused. They had been working 16 to 20 hours a day. To my amazement they already had completed gathering all the materi-

als and had constructed the rock cairns. I knew that we could finish the bridge but they didn't, so I took off my shirt and began pitching in. The helicopter would be back.

The crew found new direction and took off with a fury. Lifting off later that day, I remember looking down, seeing the crew standing on the bridge, faces tired and dirty, filled with amazement and pride. They had just learned what I had known already. They were the best.

Peter Bathurst
Delaware Water Gap

The one experience that has stayed with me since I started with the Park Service occurred in the summer of 1978. I was scheduled to work weekends so one of the other crew members could go on vacation. I had been working for the Service two years and, during those two years, had taken training in first aid, CPR and diving. My day started slowly. I was making my rounds, cleaning the maintenance office and shop. From there I had to go pick up trash, clean rest rooms, and check out the lift stations. The morning pressed on and visitation started to pick up. It was about time for me to go to Stilling Basin to clean the beach area. The temperature was rising as fast as the visitors were coming into the park.

The time was 12:30 a.m. I was working on the beach when I glanced up. I saw a crowd of people looking out over the water. I followed their gaze and saw a lot of splashing. One person said, "There's a swimmer in trouble. Do something." I ran back to my vehicle to call for help, grabbed my diving gear and went back. Just as I was donning my gear a young man came out of the water, pulling someone. I helped him and he spoke to me in Spanish. I checked for a pulse and breathing (there wasn't any). I started CPR and could hear the sirens of the ambulance in the background. Just after a few reapportions of CPR, the person started to cough and function on his own. I then turned it over to the ambulance crew. That feeling was great.

Charles P. Colarusso
White Sands NM

White-knuckled with fear in 1963, I rode the roller coaster at Glen Echo Amusement Park and looked out over the parking lot. The last thing on my mind would have been a vision of me almost 30 years later co-designing a \$1.2 million project to remove that parking lot and restore the stream that coursed through a culvert underneath. I didn't even know that there was a stream running through a culvert below.

But on May 3, 1989, a violent flash flood overwhelmed that culvert, flowed over the parking lot, collapsed it, and took 63 cars down the opened ravine. Nine cars ended up 300 feet down stream, spit out onto the floodplain of the Potomac River. During the aftermath, I became part of a design team consisting of landscape architect Lynn Pilgrim, hydrologist Bill Reed and myself. Together we tread new waters, so to speak. None of us had ever attempted to remove 600 feet of culvert buried under 35 feet of earth to restore a stream to a natural condition. We searched for other similar projects to model ours after and found

none. The possibility that it had no precedent finally occurred to us, and we forged ahead on our own.

We used old maps to determine where the stream once flowed, and created a model of the stream design. We included a natural meandering stream, complete with flood plains, riparian vegetation, and two waterfalls. A 100 foot wooden arched pedestrian bridge was added to allow visitor entrance to the park. Once the design was finished, we ran it through computer flood modeling to determine whether the finished product would act like a stable stream. After many changes and one year of drafting 22 pages of construction drawings, we arrived at a final design. The design included exposing remnants of a historic stone amphitheater built in the late 1800s and is currently viewed daily by hundreds of amazed visitors. No one is more amazed than three NPS employees.

Ted Little
George Washington
Memorial Parkway

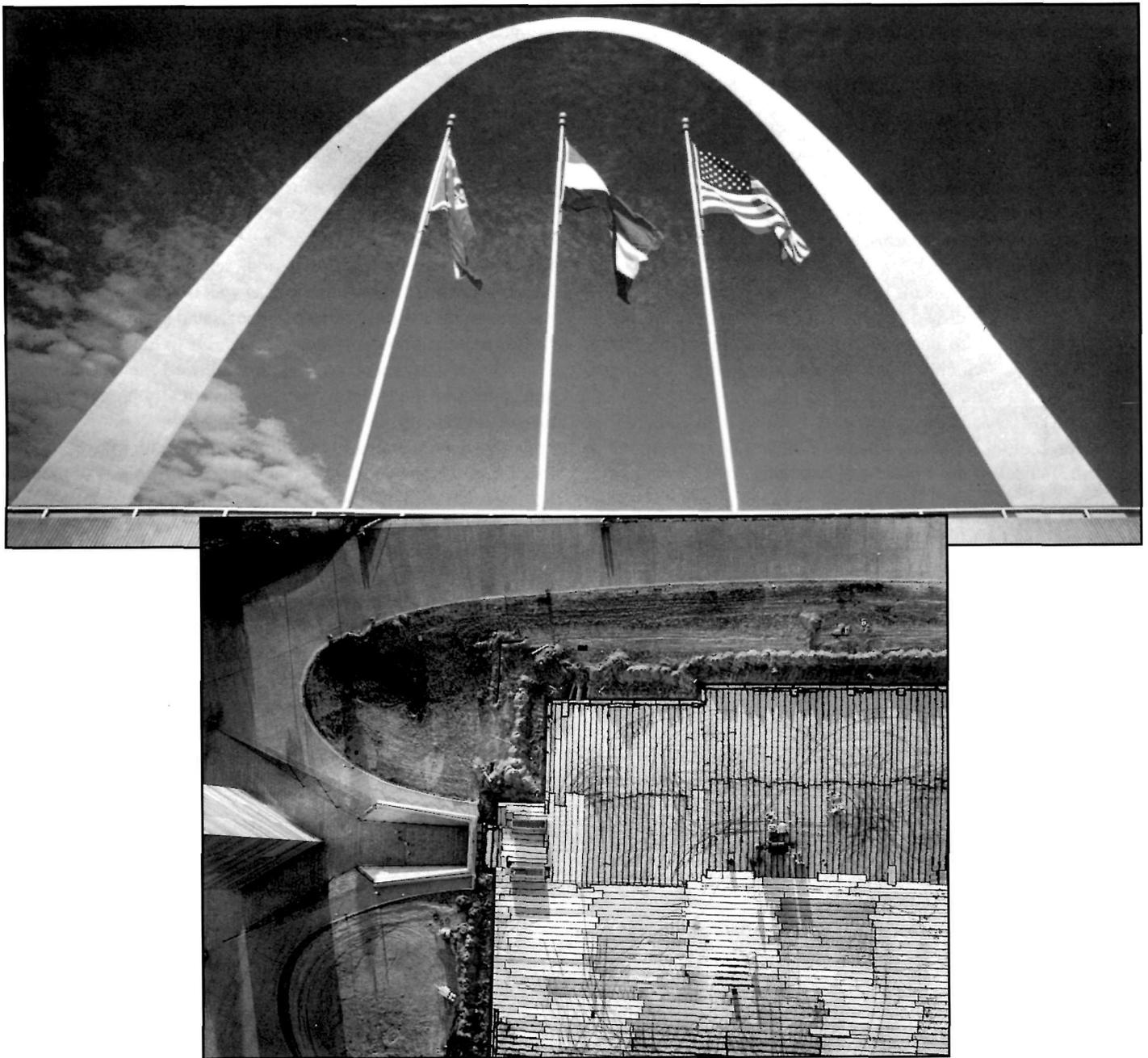
Being a cultural demonstrator and carrying out historic preservation work was the most rewarding maintenance experience I have known. I lived at the Pete Edison Fishery at Isle Royale NP and, during this period, set and lifted gill nets for lake trout, white fish and herring, as well as carrying out historic restoration on a variety of wooden boats and giving informal and formal presentations to visitors. Being able to immerse myself in a cultural environment such as this allowed me to understand and appreciate the cultural diversity this country possessed at the turn of the century.

It also demonstrated to myself, park staff and, I hope, to visitors the importance of cultural preservation. This was of particular importance at Isle Royale whose enabling legislation only dealt with natural resources... Finally they realized that the two "working" fisheries on Isle Royale were the only ones left at the park and along most of Lake Superior that dated from the 1890 to 1950 period. The introduction of the lamprey eel and a changing American diet towards red meat destroyed the old immigrant Scandinavian commercial fishing industry.

I'll never forget chugging out into the lake at five in the morning to set nets, mend the cotton nets, or watch the twin calve moose and mom who were our frequent guests. It was truly a step back in time and worthy of preservation.

Steven J. Maass
Bent's Old Fort NHS

THE DIRTY STORY OF THE UNDERGROUND MUSEUM'S ROOF



View of the first waterproofing membrane application from the top of the Arch, 630 feet above.

The warning from the landscape firm was brief but clear, "I do not feel the new sod stands a good chance of survival." This statement was made about the new soil mixture while the person who issued it was busy replacing the sod atop the roof of the underground museum four months after the waterproofing project had been completed. He could not have known the care, difficulty, and *expense* that had gone into selecting and placing that soil. There is no way he could have appreciated the irony behind the words he had written—the note was perfect for placing on a bulletin board for the amusement of those insiders who knew the "whole dirty story."

In July 1990 a six-acre grassy area beneath the magnificent stainless steel Gateway Arch was cordoned off by a chain link fence. For the next 13 months this area would be off limits to visitors because of the waterproofing project which would be underway. Why? The Jefferson National Expansion Memorial's (JNEM) Museum of Westward Expansion is located in this area—*under ground*—and the roof had begun to leak.

The building was constructed in 1965 and the museum interior completed in 1976. Like most underground structures and most flatroofed structures (a double whammy), the museum was no stranger to leaks. Finally, funds became available and a major effort could be made to repair the roof. All that had to be done was: remove all the soil from two acres of underground concrete roof; seal cracks and joints with appropriate epoxies and sealants; apply a waterproofing material to the roof; and, put it all back together so it would not be a maintenance problem again for another 40 to 50 years.

During the project planning phase it became apparent that the structure had suffered sufficient deterioration to require additional structural reinforcement. The additional reinforcement would allow loading the surface above the roof to its intended design capacity of 100 pounds per square foot. Meanwhile,

however, it was thought prudent to restrict the load on the roof's surface. For two summers, 1989 and 1990, park visitors to St. Louis' Veiled Prophet Fair (an annual July 4 celebration featuring fireworks, food and beverages, entertainment, and *millions* of revelers) were prohibited from entering the fenced area over the roof.

July 1990, workers began removing the soil, which was hauled from the site and recycled for use elsewhere. There was no area within the park to stockpile the amount of material that had to be removed, and the soil from this area was some of the worst. At the end of the project it would be replaced with new material blended from sand and peat according to a strict recipe provided by a soil specialist professor at the University of Missouri.

New waterproofing material was placed over the old. However, we would not do it this way again. It was not possible to remove the soil without causing considerable damage to the existing waterproofing, and repairing the deficiencies left a less than satisfactory substrate for the new application. Finally, the damage was repaired and the new material applied.

So far, so good—and then the rains came. The waterproofing material, a sheet composite of a lower asphalt-impregnated fabric with a nylon mesh upper reinforcement, had been damaged by the small, skid-steer loader used to distribute materials to the installers. As a result, the waterproofing material leaked.

According to the manufacturer's instructions, traffic is allowed on the material, but the twisting of the loader damaged it. The manufacturer/installer agreed to replace the product, however, and the waterproofing was removed down to the bare roof. The application was begun again—this time without traffic. A flood test proved its integrity, and it was accepted.

Meanwhile, down below, the strength of significant beams running the length of the museum, east to west on both sides



Completed section of roof prior to leak testing.

was questionable. All the various ceiling systems frame into these beams, and they were cracking due to relative movements between them. Every structure needs to allow for such movement. If it is restrained, the concrete will crack, which had begun to happen. To insure confidence in the resulting system, and to accommodate the intended design loading, it was decided to reinforce the ceiling/beam junctions, but to do it in such a way as to allow for necessary freedom of movement. Steel angles were fabricated of one-inch thick plate for bolting to holes bored through the side of the beams. The angles (about 300 pounds each) were jacked into place against the ceiling and grouted into firm contact. Using epoxy patching material under the angles, extensive repairs were performed in two places. Strength in these areas had *really* been doubtful.

Back on top, it was time to replace the soil. However, in order to increase the live load capacity, it was decided to put back a lighter material. Where there used to be two to three feet of soil, which had been reshaped several times for drainage, there now would be 14 inches of soil on top of a lightweight, cement-based, closed-cell polymer material. Fourteen inches was selected, because that was the shallowest amount the soil consultant could recommend. Each cubic foot of polymer fill weighed just 35 pounds, almost two-thirds lighter than soil, and, in all, reduced the load on the roof by approximately 5-1/2 million pounds.

Soil replacement began in earnest after Mother Nature calmed her winter fury. The failure of the first waterproofing application prevented an anticipated autumn completion, and left the excavation vulnerable to record ice storms during December and January. (The storms caused \$100,000 damage to the skylights and roof of the park's Old Courthouse, a nearby historic structure, but that's another story best saved for another time.)

As the holiday season came to a close and the ice melted into memory, work began on removing asbestos from the museum. An asbestos survey documented its presence throughout the building, and removal was begun as part of the waterproofing project, starting with the identified highest priority—the ceiling surfaces in public areas. Some difficulty was experienced in establishing a containment, i.e., the plastic-sealed environment built to prevent asbestos particles from leaking outside the work area. The Gateway Arch is a unique structure, and had to be kept open and operational for visitors, as asbestos removal work closed first the north leg and then the south leg. Air flows supplied to the visitor area at the top of the Arch through the operating leg were found to pressurize the space behind the poly plastic at the bottom of the opposite leg and tear it from the walls. This caused concern that if containment were breached during removal operations, asbestos contamination could spread throughout the structure. We knew we didn't have enough money for *that* kind of cleanup. Who does? We solved the problem by closing and sealing doors with tape at the top and bottom, then installing a filtered opening through the plastic to allow it to "breathe."

At last, the soil, sod, and irrigation systems were ready,



The roof was segmented into six areas and covered with two inches of water to prove the integrity of the second membrane application.



Irrigation and drain lines were placed in the "controversial" sand. Here a worker pulls the PVC irrigation line into place on top of the roof. Note foot of Arch in background.

meeting a completion deadline of August 16, 1991. The next day, other construction crews arrived to erect fences, build exhibits, and put up tents, for the 1991 Veiled Prophet Fair, which had been postponed from July 4 to Labor Day. The celebration could now proceed without a worry about how many millions of people would gather to party "on the roof."

Remember the landscape firm's warning at the beginning of our story? It was the waterproofing project's newly-placed sod, damaged by overuse during the annual VP Fair, that our concerned contractor was replacing. Only time will tell whether or not he's right.

Dave Caselli is the JNEM's park engineer.

CONSTRUCTION ON THE HIGH SEAS

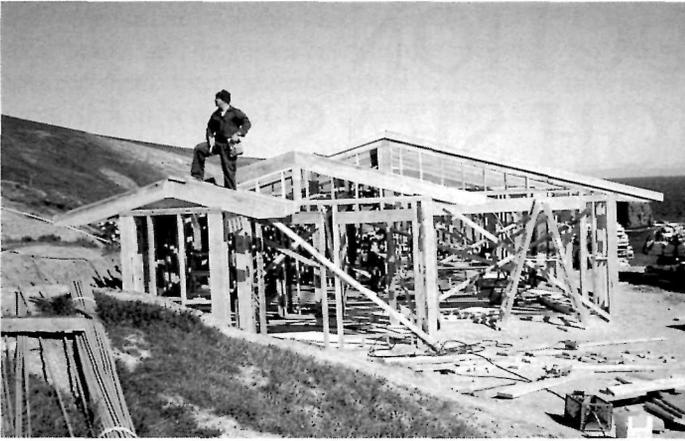
The Channel Islands NP maintenance division recently put the finishing touches on a first-class park house, specially designed by Ace Pacific, A&E contractor to the Western Region. Located on Santa Barbara Island 42 miles by boat from the Southern California mainland, this unique multi-use building features a total of 1,700 square feet, half of which is used exclusively as the island ranger's quarters, with the other half providing bunkhouse space for four short-stay employees and room for a small visitor contact station. The project started in November 1990, when Mike Short, the carpenter on the project, started tearing down the old quonset hut, which previously had served as the ranger's residence after being abandoned by the U.S. Navy in 1962.

About the same time Tim Saskowsky was hired as the new island ranger. Chief Ranger Jack Fitzgerald told him not to expect live in the house that was then under construction because it probably would be under construction for his entire career at Channel Islands NP. Surprise! Tim is comfortably enjoying his home, where he receives requests from eager friends who want to come for a visit. How did this happen so quickly, especially considering the logistical difficulty caused by the island's remoteness? There were a number of people who pulled together to make the project work.

The island's remote location allowed access to the construction site only after climbing a steep foot trail from a boat dock or flying in by helicopter. Approximately 420,000 pounds of



The beginning—old quonset hut that was replaced.



Foreman Kent Bullard takes a breather on the framing timbers of the new house.



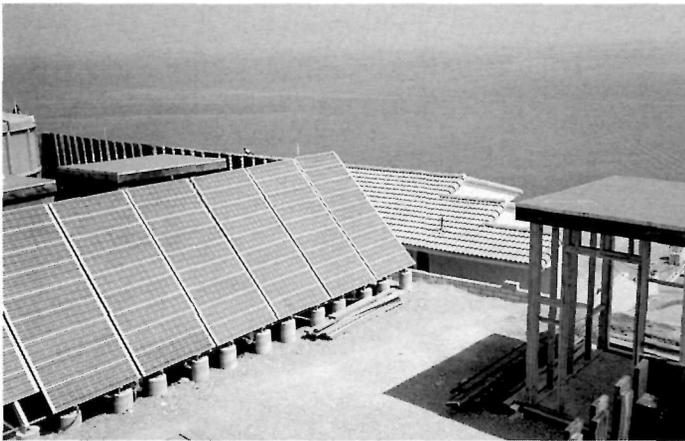
Mike Short and Kim Slininger mix concrete.



Ed Smith works on the frame for redwood deck.



Dispatcher Fred Rodriguez routes the tile floor.



Solar electric field in place.

material was palletized into 900-pound lifts, loaded onto work boats donated by Chevron and Texaco oil companies, transported to the island, and then air lifted to the job site by helicopter—a total of 730 lifts. With no hardware or grocery stores conveniently located nearby, extra care in planning every aspect of the project had to be taken.

There were also the needs of the crew to be considered. For one year island foreman Kent Bullard, maintenance mechanic Kim Slininger, carpenter Mike Short, maintenance worker Eddie Smith and several others endured tours of eight consecutive nine-hour working days. They slept in a 10-foot by 12-foot box, constructed with two-by-fours and covered with old plywood to help keep the constantly howling wind at bay. The kitchen and eating facility was an old conex box. A mix of personalities in close living quarters could have been a big problem but worked out quite well. Kent's main diet consisted of red meat and chocolate covered "ding dongs"; Kim was our "Karma Veggie"; Mike ate power milk shakes while in training for a Triathlon; and Ed was very quiet and ate anything.

Working as a team, these men met a number of construction challenges and thereby stretched their skills. The new structure's



*S*outh side of the completed structure.

special features included 800 square feet of redwood deck in the front facing east, with an *awesome* view of nearby Catalina Island. Exterior walls were 2 inches by 6 inches, with R-19 fiberglass insulation in the walls and R-30 in the ceilings. Anderson double pane, vinyl clad, wood sash windows were installed along with stainless steel hinges for the crank-out portion of the windows and exterior doors. Oak cabinets in the kitchen and bathrooms stand on terra cotta floor tile installed throughout the building, and accented with vaulted ceilings. A low-profile California Mission tile roof was reinforced with brass retainer clips on every field, ridge and rake tile to assure retention during winter's 60 MPH winds. All of the edge, copper gable, and vent flashings were put in place, with only brass nails being used.

Kent, the project's resident "McGyver," installed the solar electric power generation system that uses 108 solar panels and 48 deep-cycle lead acid batteries to convert low voltage DC power into 110/220 volts AC standard household electricity. The system can produce 20 KW of power per day and store 60 KW of power to be autonomous for 3 days. The interior electrical system features all florescent light fixtures and an energy efficient .3 KW (300 watt) per day refrigerator. So far the house is only using about 8 K per week.

The project required the total support of the park, and everyone chipped in. Park rangers, boat captains and their wives worked with the maintenance crew to pour the foundation. Boat captain Dwight Willey, dispatcher Fred Rodriguez, and chief of operations Tim Setnicka laid the floor tile. Earl Whetsell, a former foreman at Channel Islands, came south from Redwoods NP



*M*ike Short at the end of a long day.

for ten days and led the framing crew. Superintendent Mack Shaver ran the nail gun for a couple of days, thus securing the exterior shear walls. Even the author, in his role as chief of maintenance, built the masonry retaining walls. The marine division ran 61 regular scheduled and 22 non-scheduled boat trips to the island in support of the project. With everyone working together, this project was completed in twelve months. Under other circumstances it could have taken at least two years. It was great to be part of a group of people who pulled together to improve park housing as dramatically as this team effort did.

Tim Glass is the facility manager at Channel Islands NP.



SPRING OPENING

THE CHALLENGE OF GOING-TO-THE-SUN.

"It's snowing again. I wonder how much we'll get from this storm?" This question is repeated numerous times throughout the state of Montana during the winter and especially at Glacier NP. Spring comes to the northern Rockies very slowly, and each year's summer visitors patiently wait for the Going-to-the-Sun Road to open so they can experience the splendor of spring coming to the high country and reach Logan Pass.

The process of opening the road usually starts in the month of March in the lower elevations on both the east and west sides of the park. The first twelve miles on the west side, coming up from park headquarters, takes approximately two weeks to open because the snow in this area is only two to five feet deep. Completing this brings the crew up to The Loop area, the beginning of the higher elevations where the work really starts.

The Loop represents the beginning of the true opening of the road for the west-side road crew, and work gets underway only after many safety meetings have been conducted and all employees understand what each is expected to do during a shift on the

road. The safety sessions review avalanche safety, survival, equipment operation and safety. All employees are required to wear a locator while working on the spring opening. These safety sessions are also attended by the ranger staff who discuss rescue requirements. Work on the road is not done at night or when visibility is so limited that the slopes of the mountain peaks can not be seen, because no one can be warned or warn others of an approaching avalanche under such conditions.

An avalanche is the greatest danger experienced by crews during the opening. Indeed the danger is so great that each piece of equipment assigned to the road is also assigned an avalanche watcher. The avalanche watcher keeps an eye on the edge of the road and stays alert to approaching avalanches. The watcher remains in constant radio contact with an operator so that everyone can be notified to get out of the way of any avalanches. The time that the crews have to escape ranges from 30 seconds to three minutes only.

At the start of the operation, the "pioneer" dozer sets out to cut the snow down to a level where another dozer can push the snow over the edge. As these two operations are being accomplished, the end-loader comes up the road and, equipped with a

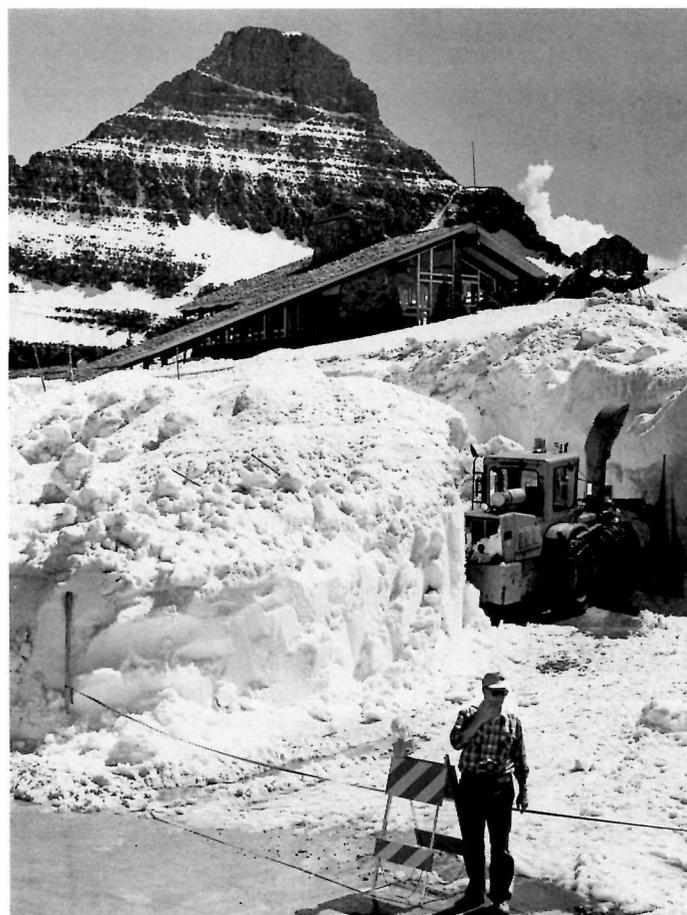


Photos courtesy of Brian Kennedy, Hungry Horse News.

special, park-made bucket, starts the process of picking up the last three feet of snow and dumping it over the side of the road. Extreme care is taken during all operations but especially this one because, for a majority of the road, a rock wall is the only barrier between operators and equipment going over the edge. This entire rock wall has great historic significance and is protected as well as any historic structure can be during this operation. Rotary snow removal equipment can not be used during this operation because the snow that is left on the road surface is so compacted and full of rocks that the augers on the rotary can not cut into the snow, and the rocks damage the augers.

After the end-loaders finish up the snow removal, the final pass for the road is a vacuum broom that vacuums up all the small rocks, sand, and debris left over from the winter. This is the sequence that the west-side road crew follows virtually all the way to the top and their goal of Logan Pass. It is also during this time that the crew can experience landslides and avalanches in areas that they already have cleared off. This requires them to turn around and re-open these sections of road.

The east-side crew also starts in the month of March, opening up the lower elevation roads before starting on the Going-to-the-



Sun Road. Portions of the lower roads opened at this time can experience snow drifts up to 10 feet deep and more than 100 feet long. The east-side crews work up the road to an area just below the tunnel and the big drift area where drifts may reach 40 feet deep and stretch in excess of 100 feet long. Again, the most important people on the crew are the avalanche watchers.

The big drift area, located just on the east-side of Logan Pass, can have more than 60 feet of snow to remove from the road. The snow makes it impossible to see where the road is from the top, so a survey outlines the actual edges of the road before equipment moves in.

Once Logan Pass is reached, the rotary snow plows start working in the parking lot at the visitor center and on the surrounding sidewalks and ramps. Also present, the utility crews activate the water and wastewater systems for the visitor center, which can require digging through 20 feet of snow to reach the shut-off valves. The park's communications technicians reinstall and check radio equipment at this time, while the division of interpretation prepares the visitor center for normal summer operation.

But the opening is not over yet. While this work is going on, the rest of the maintenance crew is busy placing guard logs along the road, which were removed in the fall of the year. These guard logs are used in areas of numerous avalanches, since avalanches take out anything that is put up and these logs are removable.

The final operation prior to officially opening the road is to

vacuum and sweep the road surface of all sand and gravel. Also during this phase, sand bags are placed along the outside and inside of the road to divert snow melt. This is done to prevent it freezing at night and making the road surface slippery the next morning.

If it sounds as if this operation is a cooperative adventure, you are right. It takes all areas of the maintenance division, park ranger division, public affairs, and interpretation to accomplish this operation in a safe manner each year. Safety is the main factor that controls the opening of the road, year in and year out. We are now ready for another season, so welcome.

This article was written by the entire maintenance division. Russ Landt, Gary Yates, Shawn Garrow, Don Tyree, Dennis Holdin and Jack DeWitt deserve special credit.

Snowplows in Yellowstone— A Different Story

If opening roads at Glacier NP is a technological challenge, opening Yellowstone's roads is an exercise in diplomacy. The park has 370 miles of paved road, 52 of which are open year-round. The remaining 318 miles are closed to wheeled vehicles during the winter and snow allowed to accumulate for snowmachine and snowcoach travel. When do these roads open to wheeled vehicles again? The dates represent a carefully negotiated agreement between the park and its gateway communities—Gardiner, West Yellowstone, Cooke City and Red Lodge in Montana, and Jackson and Cody in Wyoming.

Because of these agreements, Tim Hudson, the park's chief of maintenance, knows precisely when snowmobiling stops and road opening has to begin. He knows which Monday in March crews have to bring out snowplow equipment to break through the winter's accumulated drifts. And he has two crews of ten employees each assigned to the project to make sure that all entrances open at the mutually agreed upon time.

But deadlines don't necessarily take weather into account. Jackson and Cody, the park's south and east entrances respectively, insist that their roads open on the same day. The agreed date is May 1, with or without the cooperation of the weather. But at the south entrance where snow depths can reach six to twelve feet, opening the road may take several weeks. Often the crew does well to plow as much as a mile in one day. Scheduling for simultaneous opening at Jackson and Cody also means one

crew has to start its stretch of highway sometime after the other, and this has to be carefully calculated by the chief of maintenance and his staff to satisfy the requirements of both communities. When the weather or human fallibility cause delay, the park has to be able to negotiate the pressure successfully.

Elsewhere in the park, early starts mean that roads opened to draw tourists at the beginning of the season become susceptible to drifting in and have to be uncovered a second time. This, of course, adds to the already complex scheduling of time and money necessary for the snow removal process. At West Yellowstone, the popularity of snowmobiling has encouraged the community to negotiate a special arrangement whereby plowing is delayed a week to extend the snowmobile season. The community then pays whatever overtime is needed for park crews to open the road by the April 15 deadline. The north entrance to the park opens approximately at the same time.

If, as Robert Frost prescribed, good fences make good neighbors, so do roads that are free of snow, at least where Yellowstone's relationship with its gateway communities is concerned. In the interest of maintaining goodwill, Yellowstone crews are out clearing roads while keeping an eye on the calendar again this year.

STOPPING THE LEAKS

CAN WE CONTINUE TO OVERLOOK INFRASTRUCTURE?

Perhaps you've been reading about the deterioration of our nation's infrastructure, which is beginning to get attention at the highest levels of the federal, state and local governments. However, few park visitors realize that infrastructure deterioration is also a serious problem in the national parks. What is infrastructure and why does it matter?

Park infrastructure is neither glamorous nor very visible. It is analogous to the foundation and utilities of a building. If it does its job, the building it supports serves many functions for several generations of users. However, when the foundation or infrastructure begins to crumble, it gets noticed. This nation's infrastructure consists of the permanent (I use this word with some hesitation since nothing lasts forever), man-made facilities—roads, bridges, electric, water and sewer systems—on which society depends for basic services. A park's infrastructure consists of the same types of facilities—roads; trails; landscaped grounds; water supply, treatment and distribution systems; sewage collection systems and treatment plants; electric generation and distribution systems; telephone, radio, microwave and satellite communications systems; all types and sizes of buildings and any other "permanent" facilities on which we depend for operating parks, serving visitors and protecting resources. If we want to continue to benefit from park infrastructure we must be willing to put the necessary resources into operating and maintaining it, rehabilitating it and even removing and replacing pieces of it that are no longer economical to maintain or that no longer serve our needs.

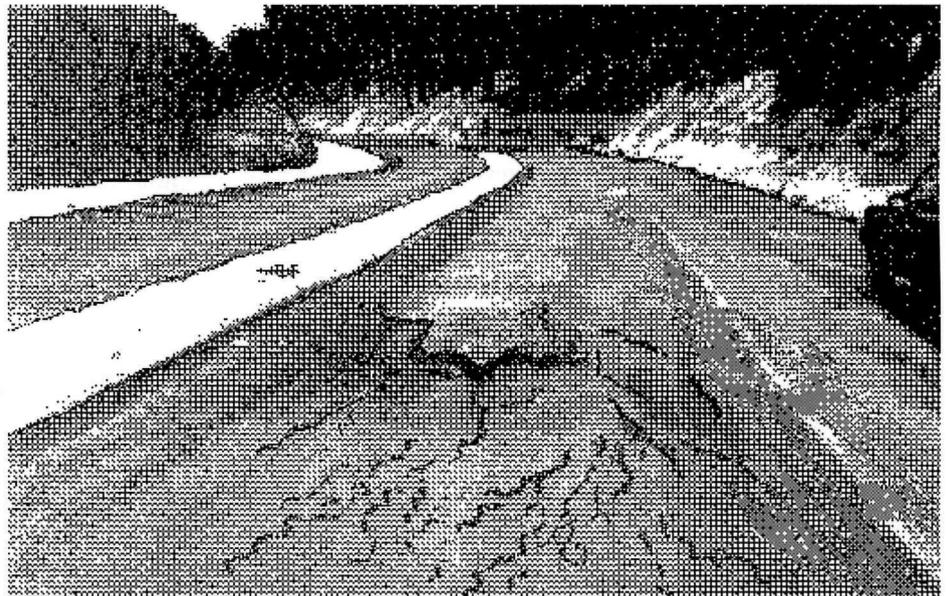
The facilities which make up infrastructure share some common features:

- they are time consuming and expensive to plan, design, and construct;
- they cost money to operate and maintain in useful service;
- eventually they will need to be expanded, rehabilitated or replaced in order to serve their intended purpose;
- some amount of maintenance must be performed in order to achieve the lowest possible "life cycle cost";
- these facilities have been purchased with taxpayers' money—as "caretakers of the public trust" we need to ensure that facilities last as long as possible and that they are as economical to construct and maintain as we can make them.

Roads, trails, and buildings are among the more visible forms

of infrastructure. We notice when the painted surfaces of buildings become dingy or begin to peel, and we certainly notice when a building roof develops a leak and precipitation finds its way into a part of the building that we use. Unfortunately, few of us notice other signs of deterioration, such as road or trail drainage that needs repair, or roof surfaces beginning to wear out but not yet leaking. Water and sewer systems also are fairly invisible when they are working. The same is true of electric distribution, telephone, radio, and other utilities. We only realize how important these utilities are when they begin to malfunction and no longer serve us reliably.

Most of the components of park infrastructure are at least 20



years old, and many components are much older than that. The national park system also includes many historic structures that are very expensive to maintain. Facilities that still serve administrative and public uses often were constructed more than 50 years ago. Park housing needs now are getting attention but, at current funding levels, it will be several years before all house trailers are replaced and older housing units rehabilitated. Beyond that, the need for improved employee work areas has not yet been addressed. Many trailers are used year round as offices, and many maintenance operations make do with adapted temporary buildings. Water distribution systems have old, corroded piping that spring leaks. These leaks often are hard to locate and repair. Sewage collection systems develop infiltration (ground water leaking into cracked pipes and manholes), and cause sewage treatment plants to treat more water than they should. Underground fuel storage tanks in many parks are old enough to leak at almost any time, causing serious environmental consequences and costly clean-up. Communication systems

dependent on older electronics begin to malfunction more frequently, often when communication is most needed—when someone's life or safety may depend on it.

Continued infrastructure deterioration affects all of us, whether or not we are aware of the extent of the problem. We are aware of the need for major park housing improvements and frustrated when program funding can't keep up. The Federal Lands Highway Program is helping to fund road rehabilitation, but the available money is enough to keep up with the deterioration. If park housing and roads, which are fairly visible forms of infrastructure, need more funding than is available, imagine the maintenance needs of utility systems that are underground and thus out of sight.

A consequence of deteriorating infrastructure is increased operating costs. These increased costs come at a time when funds are already tightly budgeted. Only the more visible repairs can be handled. Present estimates show that the backlog of needed infrastructure repairs to NPS facilities exceeds \$2 billion. The cost of rehabilitation and repair continues to increase the longer funding is deferred.

The extent of infrastructure deterioration is difficult to communicate to people with non-technical backgrounds. If those of us who have first-hand, day-to-day knowledge of the problem have difficulty communicating the "pay me now or pay me *much more* later" aspects of facility maintenance and infrastructure deterioration within the NPS, imagine how much harder it is for our managers to explain it to those who need to hear, those both inside and outside the National Park Service. We can say that we want to protect the government's investment (approximately \$50 billion) in these facilities. We can say that we need increased funding to minimize the life cycle costs of these facilities. However, if the intended audience has trouble believing that the problem is as serious as we say and that a solution is possible and worth working toward, then no matter how eloquent the presentation, communication will not be effective.

If we are to reverse infrastructure deterioration, we need to find ways to better interpret the conditions and needs that result from facility deterioration. Some of us will have to learn more about the problems, while others will have to find better ways to explain what they already know. Even though a problem the size of this one may seem insurmountable, we must use our ingenuity, as well as every opportunity available to contribute to the solution. If we work together, the deterioration can be reversed—indeed, must be reversed—because the National Park Service requires these facilities to accomplish its mission.

Charles Newton is the Buildings and Utilities Foreman at Shenandoah NP.

Drinking Water, A Full-Time Job

Many people take drinking water for granted. Turn on any faucet and it's there. But what happens if it's not? People can do without almost anything but water.

Shenandoah NP has an abundance of good water, thanks to numerous springs flowing down from the top of the Blue Ridge Mountains, some of them producing more than 100 gallons of water per minute. Twenty-seven water systems exist in Shenandoah NP, each of them linked to a spring. The larger developed areas at Skyland, Big Meadows, Lewis Mountain and Loft Mountain all have drilled wells for additional water sources to supplement spring flow.

Ten water systems are located at overlooks along Skyline Drive. They each use a spring as their water source, with gravity flow (no pumps) through underground piping to a drinking fountain. During the winter season these water fountains and their chlorinators are drained and shut down to prevent freeze damage to pipes and equipment.

The park also operates three hydraulic ram pumps that use water flow and pressure to pump spring water to higher elevations. These ram pumps use no electricity and require very little maintenance once adjusted for the spring's water flow.

Federal regulations require disinfection (usually by chlorination) of all drinking water. The park uses a liquid chlorine solution, chlorine tablets, or iodine crystals as disinfection chemicals. Every water source has chlorinator or iodinator equipment that add disinfection chemicals in the proper amounts. Regular checks of the chlorine or iodine levels at various points in each water system enables us to adjust for proper disinfection, comply with state health department and EPA regulations, and avoid taste problems.

Water samples, collected from each system twice a month, are analyzed for bacteriological contamination at the state health department laboratory. In addition, all the springs, wells, and reservoirs are inspected weekly to make sure everything is in good working condition. These inspections include checks of the water storage reservoirs, which range from 5,000 to 200,000 gallons, and may be built either above or underground. Springs can be visited on foot, and are usually located 10 or 15 minutes from a road. The chlorinators and iodicators also have to be refilled with the right amount of disinfection chemicals on a weekly basis.

Most of this is handled by the park's one full-time water plant operator, whose job it is to keep all 27 water systems working properly. Some of the larger water systems require even more effort, having to be checked daily, a requirement that adds up to more than two work years of effort annually parkwide. To ease the load, most park utility crew members have been cross-trained in water plant operation. They work as a team with the water plant operator to provide some of the best drinking water in the country.

What does this all add up to? Clear, cool, good tasting water when you turn on a faucet, water that's available effortlessly, or apparently so. Next time you're in the area, we invite you to visit Shenandoah NP—not just to enjoy the scenery, but also to sample the water for yourself.

Steve Richards

TRANSCANYON WATER LINE



Transcanyon water line troubleshooters Mel Martinez (left) and David Lopez tackle water line breaks like the one pictured above.

Maintaining Grand Canyon's transcanyon water line provides unusual challenges in an interesting, and sometimes dangerous, environment. No one understands this more than "aces" David Lopez and Mel Martinez, who repair the line.

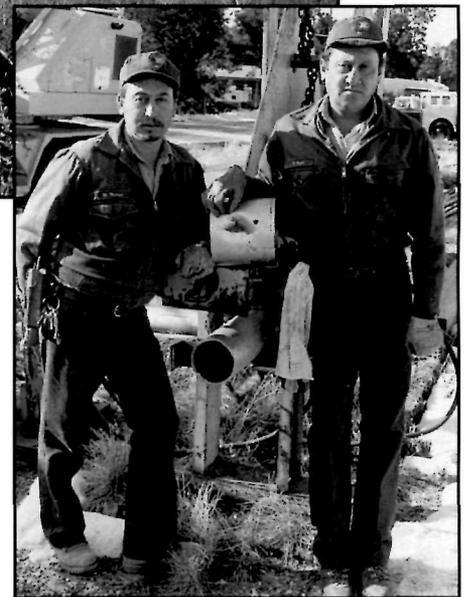
David and Mel are a team of specialists whose normal duties include the maintenance of water distribution and wastewater collection systems on the South Rim, but when the pipeline breaks, the aces respond. Their first order of business is to arrange for a helicopter to transport them and their equipment to the break site. First stop for the helicopter is the isolation valves on either side of the break. Here Lopez and Martinez use the valves to empty the line. The pilot takes off again to deliver the aces to a landing site near the break. A break in the narrow, high walled section of Bright Angel Canyon called the Box means that no nearby landing sites are available and that the pilot has to deposit David and Mel further from the job site. The aces may have to hike several miles before they reach the break.

That done, the pilot then delivers two helicopter slingloads containing a gasoline operated jackhammer, MIG welder, argon gas bottle, electric generator, sawsall and assorted tools. The pilot slingloads the tools as close to the site as possible. Due to

unpredictable winds and close clearances aces David and Mel sometimes must wheelbarrow these items a considerable distance to the break site.

Erratic wind currents in the Box have been known to make routine maneuvers dangerous both for the pilot and those on the ground. Irregular winds blow the ship one way or the other. Like a pendulum the slingload swings. During a pipeline break a few years ago a pilot jettisoned a slingload to avoid crashing into the canyon wall. Fortunately everyone escaped injury and the equipment suffered only minor damage.

Having already interrupted water flow, Mel and David are able to expose the damaged section of pipe. They excavate an area around it large enough to enable them to remove the damaged portion and prepare to weld in a new one. After removing the damaged section they carefully measure the space it occu-





Martinez and Lopez at work on a pipe break.

ped. The process up to this point usually consumes a full day's work, making it time for the aces to return to the South Rim.

Day Two finds David and Mel cutting and bending a replacement section of aluminum pipe. This task is not as easy as it might appear. Of course they have the damaged section for a guide, but because the expansion and contraction of the line, as well as pressures from earth movement over the years, the pipe may move axially, laterally, or in both directions once it is cut. Thus it is impossible to follow an exact pattern for its replacement. Since the new piece will be welded in place it must fit precisely. The aces carefully fashion a replacement section and return to the break site to continue repairs.

After the aces replace the damaged section they slowly pressurize the line and check for leaks. Since the line normally operates at pressures exceeding 1200 pounds, the loss of pressure, then repressurization sometimes causes stresses that create a second rupture. It is not uncommon to experience two or more breaks in succession. If there are no leaks by this time, the aces call it a day.

The third morning Mel and Dave fill the excavation area,



David Lopez pauses for a drink from the water line.

then load tools and equipment in sling nets for the flight out. With the repair accomplished, they return to the South Rim continue whatever project they abandoned to respond to the pipeline break.

Park maintenance also faces pinhole leaks in the transcanyon line, possibly caused by moisture getting between the pipe and outer tape wrap. Until very recently maintenance repaired pinholes in the same manner as a rupture. Now, a Denver, CO, company is custom building two-part clamps to simplify pinhole repairs. Each clamp costs the park nearly a thousand dollars. Due to less helicopter time and wages spent when clamps can be used, NPS saves at least two thousand dollars per repair.

As the 12-1/2 mile section of the transcanyon water line nears the end of its useful life the Park Service again is looking for alternatives. Regardless of the option chosen, maintenance most likely will remain an interesting, challenging proposition.

Tom Geiger has been the Canyon's Building and Utilities Foreman for the past year. Previously he served Yellowstone NP as its Electrical Foreman.

Grand Canyon Geology and the History of Park Water Systems

South Rim water storage is 13 million gallons. To ensure water for fire protection, the Service closes the park to visitation when the storage level drops below 4 million gallons. A rate of use exceeding 565,000 gallons per day works out to approximately fifteen days' storage. That may sound like a long time, but in 1983 a rockslide destroyed a large section of pipeline in a steep area. Transcanyon water line experts David Lopez and Mel Martinez spent seventeen days, from daybreak to dark, before water again flowed. In this instance, countdown to park closure was a matter of hours, not days.

The Colorado River cuts east to west through an enormous plateau made up of sedimentary layers of sandstones, shales and limestones. Though nearly horizontal, these layers dip slightly southward. The upper strata are generally highly pervious. Snowmelt and rainfall percolate freely downward, hundreds to thousands of feet, until encountering impervious layers that direct flows to the south.

This makes capture of water in wells difficult. Southerly flows result in very few springs on the south walls of the canyon, with several exceptions only along north-south transecting faults. In contrast to the South Rim, the north side exhibits some very significant springs. Still, the South Rim historically is where most of the visitation, development and consequent demand for water have occurred.

The most significant fault transecting the canyon, comprising what has become known as the Cross Canyon Corridor, is the Bright Angel Fault. This fault intercepts groundwater flow from below the North Rim at Roaring Springs. Water from Roaring Springs has been used to supply the North Rim since 1928, and the South Rim since 1970.

Tourism to the South Rim began in the 1880s. Visitors, and water for their use, arrived by horse-drawn wagon from Williams, AZ. In 1901, the Atchinson, Topeka and Sante Fe Railroad built a 50-mile spur line from Williams to the South Rim, where they delivered water by tank car.

In 1932, halfway down into the canyon at Indian Garden, the Sante Fe Railroad constructed a station to pump water from a spring to the South Rim. By the late 1950s spring output no longer could meet demand. Sante Fe Railroad again delivered water to augment the supply.

Following an exhaustive study of alternatives, a contract for the 12.4-mile transcanyon water line and associated facilities was awarded to Elling Halvorsen Inc. and Lents Inc. of Seattle

Washington. In 1965 Halvorsen and Lents buried 8-inch diameter seamless aluminum pipe beneath the first five miles of the North Kaibab Trail from Roaring Springs and 6-inch pipe the remaining 7-1/2 miles to Indian Garden. The pipeline follows the Bright Angel Fault, an area of very rugged terrain accessible only by helicopter or by the mule trail built over much of the line.

To support the pipeline over Roaring Creek construction workers built a footbridge and slung the pipe below. They used the same technique at nine crossings of the Bright Angel Creek. To take the trail and pipeline across the Colorado River, contractors built a 522-foot-long suspension bridge.

In 1966, as construction neared completion, a 15-inch rain over the Bright Angel Canyon resulted in a disastrous flash flood that destroyed much of the finished pipeline and most of the North Kaibab Trail. The \$2 million contract became a \$6 million project that included replacing the damaged pipeline, rebuilding 11 miles of washed-out trail and providing flood control for Phantom Ranch. Finally in 1970 water from Roaring Springs flowed to Indian Garden where the 1932 pump installation relayed it to the South Rim.

In the early 1980s park staff and DSC designers focused on the aged 2-1/2-mile section of line between Indian Garden and the South Rim. Because of rockfall, slides and transient pressure surges this mostly exposed section broke frequently. The design team studied possible routes and available technology. They determined the best option to be a method developed by oil field engineers—a curved, directional borehole drilled down from the South Rim, emerging from the cliff face near the Indian Garden pump house. This 5,100-foot section of pipeline has a nitrogen-filled, seamless casing effectively sealing the pipeline from the environment.

Since its completion in 1986 this installation has required no maintenance. Not so the remaining 12-1/2 miles of pipeline. There, park maintenance staff have experienced two or three pipeline breaks per year, most in the area known as *The Box*.

The Box is a five-mile section of Bright Angel Canyon typified by high walls and a narrow, twisting corridor. Through the length of the pipeline, and especially so in the Box; Halvorsen and Lents used a hydraulic bender to aid installation of the line. Cold bending weakened the pipe at the outside radius of the bend where it later occasionally failed.

Tom Geiger

A DAY IN THE LIFE...

HOW MAINTENANCE EMPLOYEES SPEND THEIR TIME.

I start at 7:00 a.m. at the Little Sand Bay Maintenance Shop. As I drive to work I usually listen to the weather report. You see, I have to decide if I can get my boat to the islands to drop off the maintenance workers or if we stay on the mainland and work. My supervisor and I will make this decision usually by 7 o'clock.

We work four ten-hour days because of the time involved in getting to and from the work site (between 10 and 60 minutes travel time). If we were working at the outermost islands we would only have six hours of actual work time in an eight hour day. Also the expense of getting to the work site is the same when we work six hours or eight hours at the site. We chose to



work four ten-hour days, giving us at least eight hours at the job site and saving fuel from one round trip each week.

The wind is what I have to watch the most. If we have wind, I have to know what direction it is blowing and how big the waves are or how big they will get. If the wind produces more than three- or four-foot waves at a dock, I probably can't dock at that location. If the wind does not keep me from leaving the mainland docking facility, I can usually get workers to one or more of the islands because some of the docks are protected from various wind directions.

Putting the supplies and equipment on my boat is my biggest concern each morning. If we forget something it means we don't work on that item that day. My boat is a 21-foot aluminum hull boat with a 225-horse outboard motor. I travel at about 26 knots on a calm sea. As the waves increase in size, my speed decreases.

Today is water sample day, so while my boat is being loaded, I take five water samples at Little Sand Bay. I leave Little Sand Bay (maintenance headquarters) and take George, Clyde, Dave and John to Sand Island, ten minutes away. While at Sand, I take a water sample at the campground. I return to Little Sand Bay

for Jeff, Lionel, and Marvin. I drop Jeff at Raspberry Island (20 minutes out) and take Lionel and Marvin to Rocky Island (40 minutes out). I collect water samples at both Raspberry and Rocky while I'm there. There are only nine more islands to visit for water samples. This must be completed and delivered to park headquarters by 1:00 p.m. After lunch, I go to Stockton Island (40 minutes from Bayfield) to work on the solar power lighting system. When I complete that, it is only 3:00 p.m. My next stop is Manitou Island (20 minutes away) to repair the gas-powered refrigerator. After making that repair, there is just enough time remaining in the day to return to Rocky for Marvin and Lionel, stop at Raspberry for Jeff, and take the three of them back to Little Sand Bay. I only have one more run. I have to go to Sand Island and bring in George, Dave, John, Clyde.

When I get back to Little Sand Bay it is 5:00 p.m. There is enough time to fuel the boat for tomorrow's run. Let's see—that's 154 miles and 59 gallons of fuel. I might make it to the shop in time to hear a good joke before we go home.

James M. Carlton
Apostle Islands NL

Today, much like every other day during the year, maintenance activities at Big Hole NB begin with custodial duties at the visitor center, a check of the water system operation, trash collection at the picnic areas, and overall preparation for the day's visitors. Today, however, the maintenance division has received another trailer-load of lodgepole pine trees through a U.S. Forest Service contract. The maintenance staff of two CCC



crew members, 2 seasonal laborers, a couple of volunteers, and I, will hand peel this last load with draw knives and hatchets, as we have done the previous 450 trees. The poles will be erected at the site of the Nez Perce camp, where in 1877 the 7th U.S. Infantry and civilian volunteers attacked a sleeping village of Nez Perce. Because of the extraordinary natural beauty of the

valley as seen from the campsite, it was decided years ago that interpretation should avoid large scale intrusions on the sweeping vista. Thus, the poles will be assembled as bare tipi frames, on the exact location of 54 tipis 114 years ago. Survivors of the battle provided the tipi locations on hand drawn maps, but today we'll use a computerized laser transit to reestablish the sites. The stark frames will allow a panoramic view of the Big Hole Valley and surrounding mountains, but still serve as a grim reminder that in the midst of this beauty, a tragic event took 118 lives.

Earl L. Hempstead
Big Hole NB

Webster's Dictionary defines "desert" as a wild, uninhabited and uncultivated tract, an arid wasteland. Death Valley does not readily fit the definition, though portions of it do. To me, Death Valley is an area of always changing beauty from Badwater, located 279 feet below sea level, to Telescope's Peak with its 11,049-foot elevation, a difference of more than two miles. Found within the 2,067,795 acres of the monument are a wide variety of habitats, from salt flats and sand dunes to pinyon pines at the higher elevations. Names like Black or Funeral bless the surrounding mountain ranges. Places such as Dante's View, Badwater, and Racetrack are all synonymous to Death Valley.

What initially brought me here was the challenge of maintaining 210 miles of paved road; 290 miles of maintained dirt and 4x4 roads; 2 paved airstrips; 15 miles of unpaved trails; the quarter-mile paved trail; and half-mile boardwalk. The roads and trails system at the park is maintained by 10 very dedicated, loyal employees, everyone of whom was quick to realize that the isolation of the monument and the vast distances between various destinations are as demanding on the maintenance operation as the elements.

Because the nearest city with available equipment and materials is 140 miles away, I often found the maintenance operation revolved around the bi-monthly town runs. These required a lot of preparation, countless phone calls to vendors, price quotes to determine the best buy for the money, hard work to satisfy all of the procurement regulations and, of course, an administrative commitment to process the paper trail to Las Vegas and back. In retrospect, I do believe the inability to run down to the closest vendor when I forgot that one essential item or that one part that could be replaced in minutes encouraged our ability to plan ahead, organize work and keep options open for those one or two "what ifs."

The other challenge of the monument is the elements. Though Death Valley is statistically one of the hottest, driest places on earth, it does receive a welcome 1-1/2 inches of rain on the yearly average. Unfortunately this sometimes arrives all at once, causing power outages, heavy flooding and havoc on the road system.

With the temperature from April to September ranging from 108 to 128 degrees, proper equipment maintenance and servicing is a must. At these temperatures a minor oil leak turns into a serious problem; 90-weight gear lube runs like water; coolant

systems reach maximum temperature under a normal load; and air conditioners work overtime trying to maintain a bearable temperature. Dust is another problem; at times our landfill resembles the surface of a distant planet.

Under such extreme conditions, the welfare of employees can become as great a concern as the maintenance work to be done. Daily operations start at 6:00 a.m. during the warmer months;



temperatures by 11:00 a.m. fast approach the daily high and we know it is time to start pacing ourselves and paying extra attention to every move we make. Due to fatigue and the potential for accidents everybody works together and knows their limits.

I don't mean to suggest that Death Valley wholly fits the definition I cited. Quite the opposite. There is more water at Furnace and Cow Creek than on the South Rim of the Grand Canyon. You just need to learn to live with the elements, just as you would in NPS areas with heavy snow and temperature extremes that fall far below zero, or urban parks with traffic jams, rush hour traffic and long commutes.

I have been fortunate to live and work in a wide variety of NPS areas. Death Valley is an area of great beauty and of challenging extremes. If I were asked if I would do it again, there would be only one answer: "you bet."

Keith U. Butler
Theodore Roosevelt NP

MAINLAND TRAILCREW AT HALEAKALA

HOW ONE PARK ASSEMBLED A TOP-NOTCH CREW.

In the winter of 1992, a two-year project began to reconstruct and rehabilitate portions of Haleakala NP's historic trail system. Through the years, a great deal of work had been accomplished but, as budgets eroded and skilled employees retired, maintenance was deferred. Trails lost their original tread to erosion, which also caused drainage structures to fail.



Finally, the park decided to use mainland trail expertise, and during the winter of 1990-91. David Karplus, one of Western Region's experienced and innovative trail leaders, worked with the park to see if high Sierra techniques could be applied to the different climate and geology of Hawaii. David built drainage structures, including waterbars and dip drains, to protect new sections of trail tread which were checked in place by retainer bars and further protected by inside drainages. He constructed retainer bars of rock, and where materials were limited, experimented with retainer bars of pressure treated wood. A year later, all these sections stood as paradigms for the trailwork of today.

Following our optimistic evaluation of David's work, we requested cyclic trail money in 1991 for a two-year project. Once the project received funding, interest intensified among Western Region's trailworkers, many of them laid off or on furloughs during the mainland's more severe winter months. What better way to spend an unemployed winter than to be in Hawaii doing what you know best?

We recruited Dave Kari, a trail leader from Yosemite, to come on a detail. The rest of the crew were selected based on experience and expertise: two other trailworkers from Yosemite (Brian Ward and Heidi Matson), two U.S. Forest Service crew leaders from Yoiyabe and Siskyou National Forests (Mark

Manda and Mark Hanson, formerly trail workers in Yosemite and Kings Canyon NPs, respectively), two volunteers from Kings Canyon NP (Sean Gephart and Catie Stephenson), and finally a backcountry ranger-turned-cook from Sequoia NP (Dario Malengo). The crew is joined by Haleakala maintenance staff whenever possible.

The first year's plan is to spend four ten-day sessions working out of three of Haleakala's backcountry cabins and conclude the "season at Kipahulu—the park's coastal district. Ten-day sessions give the crew members long weekends to explore Maui and the other islands of Hawaii. Work has been planned to concentrate on the Halemau'u trail, the Sliding Sands trail, the trails near Paliku to the park boundary at Kaupo Gap, and trails in the rain forest at Kipahulu.

HALEMAU'U. The Halemau'u Trail is a beautiful stretch laid out in the 1930s by CCC labor crews. Frequently in clouds and vegetated by low lying brush and grasses growing on the steep pali (or cliff) walls, it begins at 8000 feet in elevation and, after reaching the rim, descends to the crater floor via a magnificent series of switchbacks. Many fine sections of historic rockwall hold up the outer edge of the trail and numerous waterbars built to control drainage. But when these waterbars failed, sections of what Hawaiians call "setrock" were built to inhibit the loss of trail tread. Now many of these setrock sections are beginning to fail also.

The crew began work on the eroded ruts of the Halemau'u switchbacks by repairing and constructing waterbars. Waterbars were backed with setrock and the actual drain also reinforced with setrock. The long ruts between the pali walls and the historic rock walls along the trail's edge had retainer bars constructed in them and the trail filled with crushed rock and finally soil. In many sections along the pali, inside drains moved water along the restored trail tread to the nearest waterbar below, and then off the trail. In spite of the steep, intimidating terrain, adequate materials for construction were found on the pali slopes by carefully lowering rocks to the trail below. The final layer of soil for the trail tread was found in abundance right where the years of eroding water had deposited the original tread—below the outflow of the waterbars and drains. The soil was hauled back onto the trail using five-gallon buckets. The crew also rekeyed many sections of setrock and reconstructed the footing of several historic walls.

SLIDING SANDS TRAIL. This trail presents an entirely different environment and set of problems. It descends into the crater from the 10,023-foot summit of Mount Haleakala along a steep slope of bare volcanic cinders. As the name of the trail implies, these cinders tend to move with the elements. Long-time backcountry users recount storms during which sections of trail



entirely disappeared and four-foot high signs and hitching rails were buried overnight. The upper four miles of trail presents one of the most difficult trail problems I have ever seen. Construction materials are scarce because most of the cinders are very small and erosion, once begun, can accelerate in a short time into off-trail gullies more than four feet deep. The natural drainage in this cindered area is sheet runoff—the water runs off the crater rim evenly over the entire surface. With the establishment of a graded trail on the cindered slopes however, the sheet runoff is intercepted and runs down the trail. The resulting erosion of the trail tread is bad enough, but what's worse is that when the water is finally turned off the trail at dips in the grade (constructed waterbars are infrequent), the resulting concentrated flow causes severe erosion off-trail below the drainage point. A distant view of trail switchbacks shows gullies dripping off the trail like gullied tracks of tears, while no gullies exist above the trail. All too obviously the gullies originate at the trail. Some of the most severe of these trail-caused gullies are more than four feet deep at their origin, and hundreds of feet long. The enormous trailwork challenge here is to imitate the natural sheet runoff pattern by installing frequent drains, whether they be dips in the trail or constructed waterbars.

PALIKU AREA TRAILS. Trails leading to the park boundary at Kaupo Gap suffer some of the most severe trail tread erosion in the park, with ruts of three or four feet deep that extend up to 100 feet. Other places have eroded through to rough volcanic



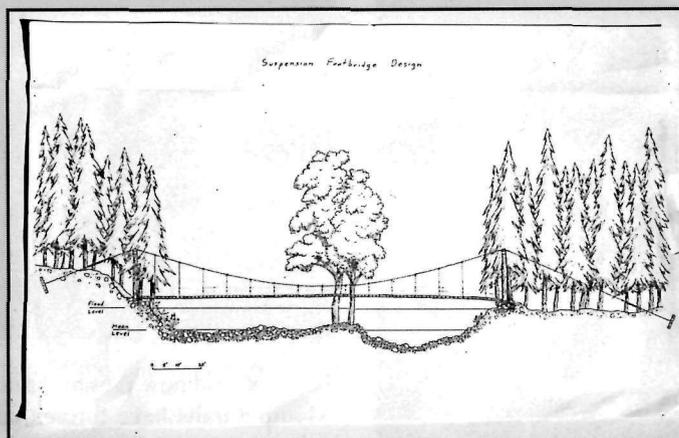
bedrock, and now present hazardous footing to hikers and stock. Multiple trails have formed adjacent to these sections as back-country users avoid such hazardous sections. The drainage problems need to be solved here and the original trail tread restored as much as practical, using retainer bar checks to hold crushed rock and tread material in place.

KIPAHULU. Work began in March at Kipahulu where the trail winds through dense bamboo rainforest as dark as night even on a sunny day. During the summers of 1990 and 1991 more than 1,000 feet of boardwalk were built as a YCC project over wet rainforest bogs to eliminate the impact of hikers walking through mud. The boardwalks confine trail use to a constructed corridor and allow natural vegetation to thrive below and around it. The drier parts of the trail between boardwalk sections are rough and rocky—drop-offs into small stream crossings or rocky ascents over small ridges. Amazingly, this trail in the Hawaiian rainforest presents straightforward rockwork problems and solutions for high Sierra trailworkers. Abundant materials and opportunities exist for classic drywall rockwork. As one of the rangers said, now visitors won't be disappointed when the falls are dry because they can take pictures of the trail.

Haleakala is looking forward to a productive "season" using visiting expertise to assist with its trail work. My trips to other parks suggest that similar problems exist on trails throughout the Park Service, where maintenance budgets are stretched and expertise scarce. As managers, first, let's not forget our trails and, second, remember that there is expertise that can be tapped in many large parks for short assignments.

Stephen Griswold is chief of maintenance at Haleakala NP on Maui. He is the author of the Sequoia and Kings Canyon Trail Handbook, published in 1990.

Building A Better Footbridge



Woods Creek Crossing in Kings Canyon NP had a reputation as the most hazardous crossing on the Pacific Crest trail until the completion of a 140-foot cable suspension footbridge in 1988. The creek is not large, nor is it deep, but it is swift and cold in the spring when hikers arrive determined to continue to the Canadian border. Several have been swept downstream while crossing at high water, and others have lost backpacks and supplies.

In early 1987 planning began to span the crossing with a footbridge based on a Pacific Northwest Regional Office design. A proposal and environmental assessment went before Sequoia and Kings Canyon's environmental committee and was approved. Blueprints allowed for variable spans of up to 150 feet, but a survey determined that only 140 feet was required, but that the north tower needed to be ten feet higher than the south.

Work began as soon as melting snow allowed. A crew moved into the backcountry, 18 miles from the road's end, to begin the concrete and rock footings. By August, the footings on both sides of the creek had been completed. The crew moved to the Kings Canyon maintenance yard to begin prefabrication of the towers and other wooden components.

One of the reasons for the specific location of the bridge was the proximity of nearby bedrock in which to anchor the main cables. A problem developed, however, with the north anchor rods, which were to be mortared in place. It proved to be impossible to drill a straight, three-inch diameter, four-foot deep hole in the bedrock. Inevitably, the hole curved downward with the weight of the drill bit and gasoline-powered jackhammer. A number of other solutions were explored, but none could overcome the curvature of the holes. The crew decided to wrestle with the problem during the winter, and resume construction the following season.

Various solutions were investigated, including the possibility of blasting two holes in the bedrock. Blast!? What about the environmental impact? How can anything be blasted into place? Well, if any crew could do it, it would be the Kings Canyon crew.

Construction picked up again shortly after a Memorial Day weekend snow left the tower pieces covered with white on the banks of Woods Creek. During the previous week, a Lama helicopter brought them to the site (each north tower leg weighted 1500 pounds), as well as other heavy components. The remaining tools, materials, and equipment were packed in on mules.

Blasting began on the bedrock anchor rod sites by carefully loading the already drilled holes with small charges of mixed binary explosive. After each lightly loaded shot went off, the pieces were collected (usually very near the site), reconstructed on the bedrock, and then numbered so that they could be mortared back together once the main cable anchor rods were in place. It worked. The rods were embedded in a cement block inside the bedrock and one of the crew's expert rock workers reconstructed the bedrock around them—undetectable except for a few minor seams that would disappear with weathering.

Positioning the prefabricated towers on site went smoothly. On a sunny day in early June, a high line was rigged and they were ready to be raised. A chainsaw-powered winch and hand-operated grip hoist helped raise the north tower slowly to vertical. The tower was secured in place and attention turned to the south tower, which also went up without a hitch. Suspender cables then were attached to the two main cables on the ground before raising them up and over the two secured towers. The grip hoist took up the slack and gave final shape to the bridge—two upright towers with the classic draped main cables and suspenders between them.

The bridge opened in July 1988, and has been successfully used by thousands of hikers ever since. A challenging, difficult project, it could not have been completed successfully without the combined dedication and careful thought of dozens of people—from the professionals in the procurement office to the packers and trailworkers of the Kings Canyon backcountry crew. The bridge is an example and symbol of what can be accomplished when a park and crew is committed to coming up with a solution.

Stephen Griswold

WORK IN PROGRESS

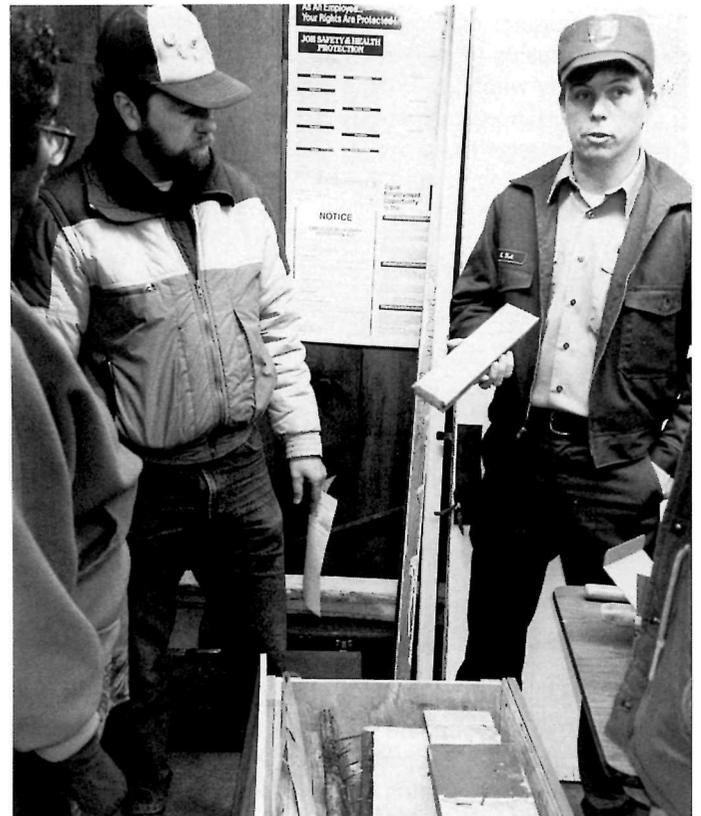
The Williamsport Training Center (WPTC) not only helps to preserve historic preservation skills and quality craftsmanship but also provides a ladder of growth for those engaged in these activities. The Center has been in operation for fifteen years, and the number of individuals who can attest to its beneficial influence on employees and historic structures are scattered throughout the Service.



WPTC has grown to employ more than 38 people committed to preservation. Together they will complete more than 40 logistically difficult or contractually hard to define preservation projects throughout the park system in 1992. The Center intentionally pursues a challenging diversity of varied craft projects involving NPS historic structures because of their training benefits. In its fifteenth year of existence, it continues its dedication to life-long learning in the building trades through "hands-on" project work. The Center also offers formal preservation and crafts training sessions to NPS maintenance workers, and employs master preservation professionals on the permanent and temporary staff who oversee and mentor NPS craftspeople in the one- to three-year programs the Center offers.

To strengthen career development beyond the resident internship program, the Center includes maintenance employees at client parks in the project team for shorter periods of time. At Colonial NHP's Burcher Cottage maintenance workers James Cox and Elmer Crocket work alongside the Center crew. Working under close supervision, maintenance staff improve skills, gain a sense of accomplishment and "ownership" of the project, and develop experience-based sensitivity to historic preservation work.

WPTC exhibit specialist Dan Matteson examines a sample of Burcher Cottage flooring held by Colonial NHP maintenance foreman Robert Holt. A permanent staff member at the Center,



he is also project leader for the Colonial work. Dan's responsibility includes carefully identifying and labeling all fabric samples collected, delivering them to the park curator upon

completion of the job, and preparing a comprehensive project completion report that documents the work produced, materials used and sources for future replacements, project costs, and other information.

Carpenter Archie Kendle began six years ago as a temporary NPS employee. His skill and ability, enhanced largely by experience gained while working on Center projects allowed him to compete successfully for a permanent position at the journeyman level. Workers and program participants at the Center have opportunities to work on some of the most challenging projects anywhere in the country. For those willing to commit themselves to the mobility requirements and demanding production schedule, the program offers tremendous opportunities for career advancement.



The pressures of complex historic preservation projects requires participants to master preservation philosophy and techniques quickly within the context of a well refined and practiced work ethic. Maintenance worker Trainee Binh Nguyen entered the Center's worker trainee program through a co-operative education agreement with the Harpers Ferry Job Corps. This new



program, focused on entry level training in the preservation crafts, will prepare him and others for a maintenance career in National Capitol Region parks. More than 25 individuals have earned a WPTC graduation plaque since 1977. This year the Center staff has committed itself to graduate and certify an additional 50 preservation specialists from a comprehensive training program by the year 2000.



Preservation ethics are practiced on a team basis. Following the pre-construction conference with the client park to review project goals, the project team then assumes on-site accountability for identifying, retaining, and preserving historic fabric on every cultural resources project the Center undertakes. A team approach to recognizing and resolving preservation challenges fosters each individual's communication skills, time management, and workload assessment capabilities. The reward is evident in this project crew proudly standing in front of their recently completed masonry work at Lock #1 of the Potowmac Canal, Great Falls, MD.

Master mason Dominic DeRubis describes work in progress to Dorthy Printup, the Center's new training coordinator. Dorthy coordinates the timing and duration of attendees in the "crossover" programs with ongoing projects. An employee development plan (EDP) is normally the best way for park maintenance people to identify skills development training needs. A training announcement, usually issued each winter, solicits competitive placement for this particular Williamsport pro-



gram. Successful applicants are then evaluated on their competencies and an individual training plan developed to suit their needs.



Preservation specialist trainee Pete Glover prepares to paint the lintel above the Riley Building entrance at Harpers Ferry NHP. Every worker contributes to safety and accident prevention. Management renewed safety as the Center's number one priority in 1990. A rigorous safety program was developed and implemented, a safety plan drafted, and safety made a critical element in supervisors' performance standards, among other approaches. Safety awareness produced a beneficial result in 1991; lost time due to injuries was eliminated. All Center employees were rewarded for their efforts with a special group award presented by the HFC manager in March 1992.

Safety awareness produced a beneficial result in 1991; lost time due to injuries was eliminated. All Center employees were rewarded for their efforts with a special group award presented by the HFC manager in March 1992.

Carpenter Howard Gross displays one of the twenty-four reconstructed 6/6 window sashes he built for installation at the Thomas Stone house near La Plata, MD. This project involved the complete reconstruction of a gambrel roof with six dormers



and associated windows previously destroyed by fire. Projects such as this one or the restoration of exterior architectural details of the Keeper's Dwelling in Apostle Islands NL demand high skill levels to produce or repair historic building elements compatible with the historic context. At the Apostle Island project, carpenter helper Billy Hendrick back-primers decorative wood shingles before installation on the Keeper's Dwelling.



Often difficult logistical requirements demand Center project crews to become creative problem solvers. In most cases where the logistics are a major barrier to success, as was the case with the unloading of project materials at Devils' Island (Apostle Island NL), it's impossible to complete a project without the active participation and support of the host park. A less obvious benefit is the interpersonal relationships forged with park staff. Delivering material to Devils' Island quickly acclimated the Center crew to the obstacles maintenance staff face daily. Such recognition improves the sensitivity and understanding of Center trainees for the realities of park maintenance and the limitations that must be overcome to successfully preserve park resources for future generations.

Tom McGrath is chief of the Williamsport Preservation Training Center.

An Idea Whose Time Has Come

Traditionally, the beauty and history of national parks has inspired artists and craftspeople. NPS employees and their families are no exception. At parks all across the country members of the multi-talented NPS "family" display considerable talent in both the fine arts—painting, sculpture and the like—and traditional crafts such as basketry, pottery, and woodcarving.

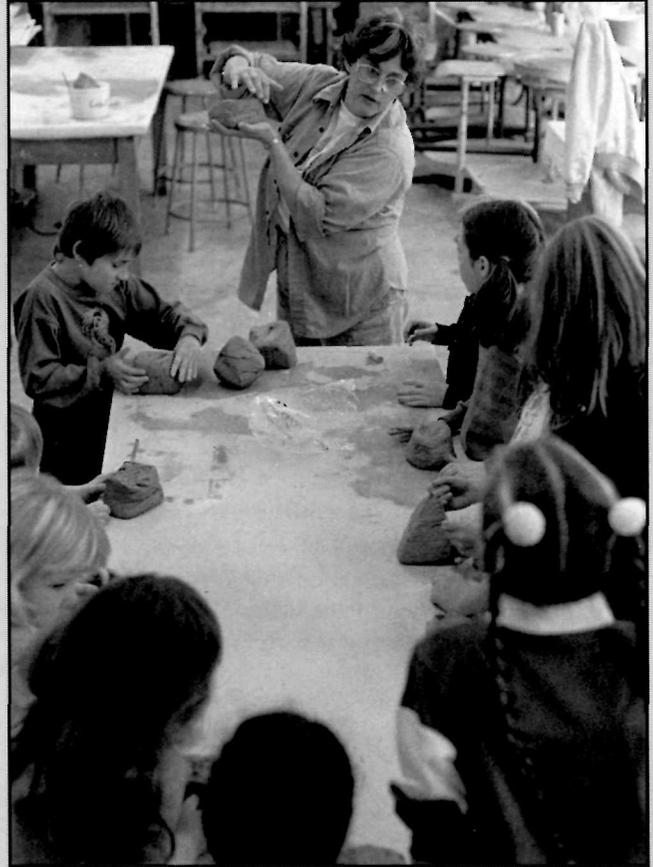
But once their creations are completed, what's next? Where do they market them? This question is a tough one, partly due to individual inexperience in locating and reaching agreements with firms that sell such products, and partly due to the mobility of NPS people who may be making sales in one part of the country when they are asked to move and thus lose their markets. The Association of National Park Artists and Craftsmen (ANPAC) is being organized to showcase and promote the work of such artists hidden away in parks across the country.

ANPAC invites artists and craftsmen to join a guild limited to park employees, alumni and their families. The guild will serve as a clearinghouse to unite the arts and crafts producer directly with possible sales outlets. The association will enable sales to be directed to the artist without disruption in the event of a transfer from one park to another.

The driving force behind ANPAC is Claudette Pridemore, a former crafts gallery manager and an artist who has exhibited in watercolor, wood sculpture, and other media. She is the wife of Franklin Pridemore, assistant superintendent at Great Smoky Mountains NP. According to Claudette, "This is an idea whose time has come. We are going to initiate this movement to recognize the skilled artists and craftsmen within the NPS family."

One of the things that sparked Claudette to action was the opening of a Gatlinburg, TN, gallery by friends, Mary Dale Swan and Erich Richter, in October 1991. This roomy two-story showroom called the American Showcase Gallery will be the site of the first exhibit of juried art, compiled by ANPAC members, and the first stop in a traveling exhibit going to many prestigious museums and galleries.

To become a charter member of ANPAC or to obtain for more information, write Claudette Pridemore at 290 Park Headquarters



Winnie Utterback demonstrates the art of making "rock boxes" at the Arrowhead School in Gatlinburg, Tennessee. Winnie's husband is a northern district ranger at Great Smoky Mountains NP.

Road, Gatlinburg, TN 37738; or phone 615/436-6856. Annual dues are \$20 per person, with entry forms, show notices, and bylaws sent upon payment. Make checks out to ANPAC.

Association of National Park Artists and Craftsmen

290 Park Headquarters Road
Gatlinburg, TN 37738

(615) 436-6856

Annual Membership Dues:
\$20 per person

Name _____

Address _____

Park _____

Phone _____

• Circle one: [Employee] [Family] [Alumni]

• Circle one or more media:

Oil, Watercolor, Wood, Stone, Metal, Glass, Fiber, Mixed media, Folk art, other

NATIONAL PARKS FOR THE 21ST CENTURY

On April 8, the Steering Committee presented its final report, "National Parks for the 21st Century: The Vail Agenda," to Director James Ridenour, thus completing its primary responsibility to formulate, for the Director, recommendations for improved park system stewardship. The Steering Committee report offers a candid evaluation of the National Park Service and the national park system. It tells us both the good and the bad news of where we are, provides positive suggestions for where we can go, and a simple warning of where we will end up if we don't pay attention now.

THE CHALLENGE. The report summarizes our current condition by focusing on the organization and human resources of the NPS, and on the resources and values of the national park system. First the good news: the *National Park Service* has as its greatest strength its employees. In addition, the heritage and recreational resources of the *national park system* are recognized as the finest in the world. As such, they engender broad-based public support which encourages Congress to look to the NPS to manage new outstanding resources. Now the bad news: NPS effectiveness is being weakened by a decreasing employee morale caused by eroding professionalism, limited resources for resource management, and a sense of isolation from decisions that count. Also, the management of the national park system requires a more diverse skill pool than presently available to address a diverse range of public values. Our inability to meet the challenges of diversity is diluting our capabilities to communicate our message, to manage and, in some cases, to protect our resources.

A VISION FOR THE FUTURE. The Steering Committee report points out that the NPS has reached a crossroads in its history—the Service must change if it is to continue to meet the most fundamental aspects of its mission; and, changes must begin soon or we will risk losing aspects of our national heritage. The symposium provided an opportunity for reflection and change—the rest is up to all of us.

In the spirit of Vail, the Steering Committee proposed that the NPS specifically adopt six strategic objectives which would, if adhered to, describe a fully capable agency, able to carry out its responsibilities now and in the future. The proposed strategic objectives are: *resource stewardship and protection* (the primary responsibility of the NPS must be protection of park resources); *public access and enjoyment* (each park unit should be managed to provide the nation's diverse public with access to

and recreational and educational enjoyment of the lessons contained in that unit, while maintaining unimpaired the unique attributes it contributes to the national park system); *education and interpretation* (the NPS is responsible for interpreting the contribution of each park unit and the overall park system to the nation's values, character and experience); *proactive leadership* (the NPS must lead in local, national and international park affairs, actively pursuing the mission of the national park system and assisting others in managing their park resources and values); *science and research* (the NPS must engage in a sustained and integrated program of natural, cultural and social science resource management and research aimed at acquiring and using the information needed to manage and protect park resources); and *professionalism* (the NPS must create and maintain a highly professional organization and workforce).

The specific recommendations made by the Steering Committee are those which are most likely to further the achievement of the centrally important strategic objectives. They are, in the Committee's view, the most crucial actions that can be taken to ensure the ongoing protection of the national park system and the heritage resources we are charged with protecting.

The Steering Committee challenges the Service and every NPS employee to set a progressive course of development and change that will allow for implementing new ideas and taking advantage of new opportunities. The Vail strategic objectives and recommendations should be considered a living document guiding each of us to explore the future of the Service with the same conviction with which we protect and preserve the resources and values of the national park system.

Pam Matthes is the new NPS liaison with the Office of the Assistant Secretary for Fish, Wildlife and Parks. She was formerly NPS/WASO Water Resources Coordinator.

Garrison Inducted Into Hall of Fame



Lon Garrison addresses members of the National Federation of Federal Employees in May of 1962.

Lemuel A. (Lon) Garrison was elected, and formally inducted into the National Recreation and Park Association (NRPA) Hall of Fame last October. The honor was bestowed posthumously at the NRPA National Congress in Baltimore, MD, in recognition of his dedication to the management of this nation's recreation resources.

Lon's 55-year career in outdoor recreation resource management filled the years 1929 to 1984; 40 were with the NPS. The last ten years of his life Lon served as an educator at Texas A&M University. A 1926 graduate of Stanford University (CA), he applied his psychology and economic skills to the human side of resources management throughout his long and productive career.

In 1932 Lon became a seasonal ranger in Sequoia NP, then three years later, a permanent ranger in Yosemite NP where he scientifically dealt with problems of crowding and resource deterioration. Between 1939 and 1964, he served as assistant superintendent at Glacier and Grand Canyon NPs, superintendent at Hopewell Village NHS and Yellowstone NP, and chief ranger in Washington, DC, where he was appointed by former Director Conrad Wirth to chair the Mission 66 steering committee. He earned a Meritorious Service Award for his efforts in the successful Mission 66 program. Lon also helped to write the Leopold Report for the management of wildlife in national parks and justified a chief scientist office in Washington, DC. In 1963 he became regional director in Omaha, NE, transferring to Philadelphia in 1965. From 1970 to 1973 when he retired, he directed the Albright Training Center in Grand Canyon NP.

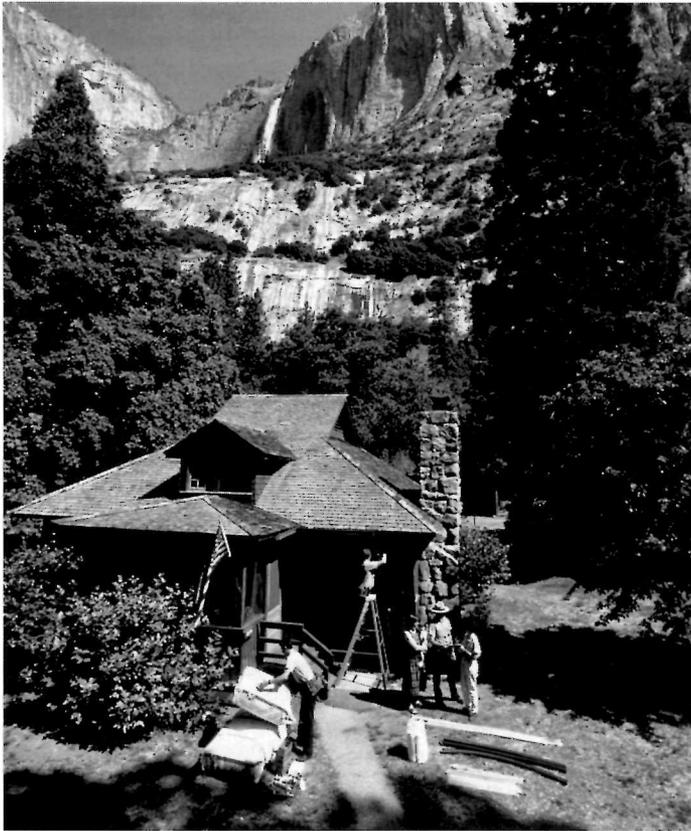
Lon was president of the National Conference on State Parks

(predecessor to National Society for Park Resources), established NPS partnerships with state park directors, and served on the NRPA Board of Trustees. He was a guest lecturer at nine major universities and a guest professor at Texas A&M. During his lifetime, he published more than 250 articles on parks, fishing, youth activities, travel and humor. His legacy to parks and recreation is clearly evident in his autobiography, *The Making of a Ranger: Forty Years with the National Parks*, which can be purchased for \$11.95 (soft cover), postage and handling included, either from Karen Garrison Reyer (La Espeula Ranch, HC 75, Box 270, Lamy, NM 87540), or E&AA (P.O. Box 1490, Falls Church, VA 22041).

Numerous professionals supported Lon's candidacy. Former NPS Director George B. Hartzog, Jr., described Lon as, "[a]...mentor and inspiration—richly deserving a signal place of honor among the leaders of the park and recreation profession." Dr. Frank Craighead, renown ecologist, said, "[Lon's] approach to management—one based on and fortified by research—is an outstanding and lasting contribution to the advancement of the park and recreation movement." Dr. Robert Espeseth, associate professor at the University of Illinois, described Lon as, "the epitome of a park professional and a model to be emulated not only in the NPS but the park profession in general."

On October 20, 1991, Lon took his place next to Stephen Mather, first director of the NPS, in the NRPA Hall of Fame (2775 South Quincy Street, Suite 300, Arlington, VA 22206). The Garrison family, Karen and Lars, extend their appreciation to all who contributed information leading to Lon's induction.

Richard Crysdale



In February 1991, Pacific Gas and Electric Company initiated a six-month conservation plan in partnership with the National Park Service at Yosemite NP that aimed to reduce electric energy consumption by 15 percent (an average residence uses 1500 KWH annually) and reduce wood burning smog in the Valley by 50 percent. Major focuses of the plan were residential, commercial, and vehicle pollution. As a result of the project plan, 213 homes were weatherized, reducing by two-thirds the number requiring further attention.

The project completed the following: 190 homes caulked; 393 doors weatherstripped; 296 aerators installed; 213 low flow shower heads installed; more than 200 water heater blankets and 6,072 linear feet of DHW pipewrap added; and 62,504 square feet of insulation installed including R-values of 11, 19, 30 and 38. The insulation was completed only in attics and floors, which were the most accessible at this

time. Dollar value of the work was expected to reach well over \$150,000, a tremendous savings for NPS.

The next plan on the horizon for Yosemite is a proposed cooperative demonstration project showcasing emerging electric transportation technology. The goal is to initiate a program to abate noise and emissions, and evaluate the side effects of park popularity on the air quality.

The Clean Air Vehicle (CAV) Team at Pacific Gas and Electric is studying the feasibility of using a GM electric battery-powered (15 passenger) unit in Yosemite NP. If feasible, one unit could be purchased for field testing. The park would use the vehicle, which Pacific Gas and Electric would monitor for three years. New technology for 20- to 30-passenger buses will be reviewed and, if joint participation is secured, two to four units could be tested in Yosemite, during a three-year program.

Ellie Chamberlin

In an effort to improve the wilderness experience in the central and southern Sierra Nevada Mountain Range (CA), the U.S. Forest Service and the National Park Service announced new group and stock limits for wilderness areas in the Inyo, Sequoia, Sierra, Toiyabe, and Stanislaus National Forests and Sequoia/Kings Canyon and Yosemite National Parks. The new limits culminate a two-year study of appropriate party size and stock use within the 16 wildernesses administered by these agencies. Effective January 1, 1992, a standardized maximum group size of 15 people and 25 head of stock

was instituted in these wilderness areas. This has been done to improve social conditions, provide consistency in administration of wilderness areas by different agencies, and to allow users to be able to plan a multi-area wilderness trip under this policy. In the past, the maximum group size allowed on different forests and parks ranged from eight to 25 people, and created confusion when the group crossed a forest or park boundary.

Lisa Dapprich

Establishing regional maintenance advisory committees in the early 1980s was possibly one of the superior accomplishments of NPS regional chiefs of maintenance. To accomplish this, regional chiefs secured support from regional directors, deputy regional directors, associate directors for operations, and other significant regional office staff. The full cooperation of this group insured the establishment of maintenance advisory committees that enhanced regional maintenance programs.

Membership in a maintenance advisory committee can be as simple as an election by peers and/or nomination by a regional chief, followed by a vote. The committees try to involve a spectrum of park chiefs representing large, medium and small parks, as well as those having a good rapport with regional staff.

From the beginning, the committees have gathered and disseminated information valuable to regionwide maintenance, and provided the regional office with a field perspective on issues affecting the entire region. They also perpetuate and improve the professional image of the maintenance division, improve communication and cooperation through

committee action, assist in providing workable solutions to problems, work with regional office staff to set directions, support new thrusts and policies for field implementation, coordinate and implement annual regional maintenance workshops and assist the regional chief of maintenance in the preparation of position papers for the regional director.

Committees can be as diverse as the regions they represent. Not all committees function the same and, in fact, some regions have yet to establish a committee. However, those regions with committees usually have supportive park superintendents who understand that these groups help represent them at the regional level. Most superintendents desire representation on a committee and are willing to absorb the membership cost.

During the past few years committees have addressed the following issues: housing, affirmative action, training, budget formulation, equipment replacement, priority setting, maintenance management system, and classification standards. Teaming up chiefs of maintenance with regional office staff to focus on such issues can only spell success.

Andy Anderson

Assateague Island NS (MD)

Superintendent Roger Rector welcomed 150 attendees to the park's 25th anniversary celebration. Sharing the platform under a dazzling fall sky were Senator Paul Sarbanes, Senator Barbara Mikulski's Eastern Shore representative Cindy Bierge, and

Representative Wayne Gilchrest among others. NPS officials unveiled a plaque of Stephen Mather, which one day will rest on the observation deck of the proposed visitor center. This Barrier Island Museum and Visitor Center was described by one of the speakers as envisioned to become "the finest barrier island interpretive and

study center along the entire Atlantic and Gulf coasts."

In other news from Assateague, the national seashore recently hosted its second science conference. The event brought together scientists, park professionals, and interested members of the public. Director Ridenour provided the tone for the two days

with his opening remarks. He spoke of the great need for an arsenal of sound information to assist in park management, as well as the importance of forming partnerships with other agencies and groups to stretch limited funds and complete necessary research.

The 1968 Architectural Barriers Act, the

1973 Rehabilitation Act, and the 1990 Americans with Disabilities Act were mandated by Congress to enable people with disabilities to enjoy the same programs and freedom of access as the rest of the population. Consequently, **Indiana Dunes NL** took on retrofit projects that included ramps to facilities and beach areas, new walks around steep grades, and curb cuts. In restrooms, sinks and toilets were lowered or replaced

and stall configurations redesigned. At Lake View, the recent installation of a mechanical life provides lower level and beach access to the mobility impaired. The mechanical life was the park's solution to a complex set of environmental and aesthetic requirements to provide lower level access. More than \$200,000 has been programmed and obligated for accessibility projects in the past two years.

Pete Amodei

One of the most interesting cultural demonstrations at Lincoln

Boyhood NMem (IN) is the growing, processing, and the spinning of flax. This early 19th century occupation intrigues visitors since it is rarely practiced anywhere in the United States anymore.

At the memorial, in early spring, ground is plowed and harrowed, and the flax seed sown. After a three-month growing season, the flax is pulled, tied in bundles, and "retted"—exposed to moisture to loosen flax fiber. Retting dissolves certain gums in the plant that bind the fibers to the wood and destroys the thin-walled tissues surrounding flax fiber. Flax can be "dew retted" or "pond retted." Flax is spread on grass to "dew ret." In moist warm weather retting may be complete in approximately ten days. Dew retting is entirely dependent on the weather and, therefore, uncertain. Almost all the better grades of flax depend on "pond retting," which requires only 5 or 6 days if water temperatures are 80 degrees or more. After retting flax must be "wigwamed" to dry.

Flax then is "broken" on a flax break. Bundles of flax plants are carefully cracked to loosen the fiber from the woody cork that makes up most of the plant. Next the flax is "scutched." Bundles of flax are scratched or rubbed on a scutching block (a piece of wood shaped like an upside down V, with a scutching knife (a wooden knife approximately 15 inches long). Next the bundles of flax are "hatched" with the teeth of the hatching board/flax comb. Scutching and hatching removes the woody plant fiber; what remains is tow or flax fiber, ready to be spun into linen thread and woven into clothing.

Twelve steps make up the growing, processing, and spinning of flax tow into linen. Thus, what looks simple at the beginning actually is an involved operation that extends from from plowing to sewing the finished article, and it requires 5 to 6 months to complete.

Each season our interpretive staff conducts dozens of special cultural demonstrations related to the early 19th century Indiana Lincoln knew. Because they are advertised as "hands-on" educational programs, we expect a lot of questions and visitor participation. However, the annual barrage of questions concerning the flax demonstration continues to surprise us. We have discovered that visitors will not leave until they have fully quizzed the farm staff on all phases of flax production, or until they personally have performed many of the flax-making steps. They will not leave until they find out what "that black-colored wooden machine is" or "where flax comes from" or that flax is really linen. "You mean flax is a plant that actually grows and you grow it?" observes one visitor. "This is amazing. How did you ever learn all this?," exclaims another.

The success of this educational program like the many others conducted by the interpretive staff at Lincoln Boyhood NMem indicates that the visiting public wants historical authenticity as well as involvement. "Hands-on" living history cultural events, if properly researched, organized, and equipped are one of the best ways to provide for visitor enjoyment and education.

There was a lot of rappin' at Federal

Hall NMem when Manhattan Sites celebrated Dr. Martin Luther King Jr.'s birthday in January. More than 300 young people and adults, including Congressman Bill Green, attended the festivities, which included a dozen budding rappers who competed for prizes and, more importantly, recognition.

The Federal Hall rotunda, site of gatherings by Colonial Americans to discuss important issues 200 years ago, reverberated with the syncopated rhythms of this modern era as the young people ranging in age from 14 to 28 performed their original raps to the theme of racism, racial equality, and nonviolence as espoused by Dr. King.

The winning rap by a 15-year-old student from Queens, NY, earned the grand prize of \$1,000 worth of merchandise donated by corporate sponsors including records, clothing, and other gifts. She also earned the chance to appear on a popular New York radio station. Second and third prizes were awarded to rappers from Long Island and Manhattan.

More than 73 young people submitted entries to the Park Service from which the 10 finalists were chosen.

The contest was the brainchild of Manhattan Sites Superintendent Georgette Nelms and was built on the traditional and popular Martin Luther King essay contest for students in the North Atlantic Region.

"We wished to do something different. We wanted to attract young people through music," she said. "Some people questioned whether a national landmark such as Federal Hall was suited to a rap contest but we felt from the start that such a competition and the drawing of people from all walks of life, especially young people, was the most fitting and appropriate since the Bill of Rights, which Dr. King called upon often, was drafted at the Federal Hall site."

Manny Strumpf

NEWS

Normal D. Ward is the new engineer in charge of the maintenance division at Carlsbad Caverns NP. Formerly the operations engineer for Deerlodge National Forest, he has extensive experience in design, construction and maintenance of all types of facilities, including roads, trails, buildings, and utility systems.

Karen Tinnin has been named the new chief of interpretation and visitor services at Harry S Truman NHS (MO). She replaces Regina Jones-Underwood who transferred to Independence NHP last fall.

Richard Ring, a 20-year NPS careerist, has been appointed superintendent of Everglades NP (FL). He replaces Bob Chandler, now Grand Canyon NP (AZ) superintendent. Ring comes to this position from the superintendency of Delaware Water Gap NRA (PA/NJ) where he managed varied conservation and environmental programs. As Ring leaves this assignment after four years, he signs off on long-deliberated regulations that will give the Delaware River full water quality protection. Ring also served as the first superintendent of Gates of the Arctic NP & Pre.

MOVES

Sandra Key from Greater Yellowstone Coordinating Committee to U.S. Forest Service; **David Clark** from Ozark NSR (MO) to U.S. Forest Service; **Charles Remus** from Great Smoky Mountains NP (TN/NC) to Voyageurs NP (MN) ranger; **Michelle Rotter** from Glacier NP (MT) to Isle Royale NP (MI) personnel assistant; **John Sherman** from Jefferson NEM (MO) to Cape Lookout NS (NC) ranger; **Beverly Albrecht** from Indiana Dunes NL (IN) to William Howard Taft NHS (OH); **Tammy Benson** from Jean Lafitte NHP (LA) to George Washington Carver NM (MO); **Jack G. Oelfke** from North Cascades NP (WA) to Isle Royale NP (MI); **John Sacklin** and **Mary Hektner** moving as dual careerists from Redwood NP to Yellowstone NP, John as the management assistant and Mary as the management biologist; **Nancie Ames** from Zion NP (UT) to Wind Cave NP (SD) administrative officer; **Brian Strack** from Big Cypress NPre (FL) to Wind Cave NP general foreman, and **Ross Rice** from Glen



Yosemite NP VIPs Jack Phinney (left) and Theresa and Thomas Bennett were Take Pride in California award winners this past January.

Canyon NRA (AZ) as Wind Cave NP chief ranger.

Note: If you are interested in this section continuing, send news of transfers or promotions to NPS Courier, P.O. Box 37127, Washington, DC 20013-7127.

AWARDS

Yosemite NP was well represented at the annual Take Pride in California awards ceremony held in January. Long-time Volunteer-in-Park (VIP) **Jack Phinney** won in the Individual category, and VIPs **Thomas** and **Theresa Bennett** won in the Federal Government category.

Phinney, 70, from Torrance, CA, has worked in the Division of Interpretation since 1983, accumulating more than 8,000 volunteer hours. Jack has been especially instrumental in design, construction and installation of exhibits at the Happy Isles Nature Center. The Bennetts, from California City, have worked as campground hosts since 1983, donating more than 1300 volunteer hours patrolling campgrounds to resolve problems and make sure food is stored properly to prevent bear and other wildlife problems. Theresa Bennett also has assisted with the Junior Ranger program.

Yosemite Park and Curry Co. received a 1991 Take Pride in California award for its environmental education programs. The award was presented for a series of self-financed programs begun in 1974 to educate park visitors, employees, and area residents about the park's

natural and cultural history and to encourage actions to reduce their environmental impacts. Among its accomplishments, the Curry Co. developed Trivia Test flyers for placement in Yosemite hotel rooms to involve park visitors in learning about the park, followed-up by Did You Know cards on restaurant tables. The Curry Co. programs also emphasized recycling, which resulted in up to 5,762 tons being recycled and the use of landfills reduced by 94,042 cubic yards, as well as a variety of other educational efforts.

The 1991 Regional Safety Achievement Awards were selected by the regional committees, with the following recipients selected: **Alison Clark**, Independence NHP (PA); **Richard E. Carrier**, Apostle Islands NL (WI); **Sara Craighead**, Manassas NBP (VA); **Arthur Olson**, North Cascades NP (WA); **Greg Moss**, Virgin Islands NP; **Dennis J. Turay**, Lyndon B. Johnson NHP (TX); **Chuck Young**, Point Reyes NS (CA); and **Fire Island NS** (NY) received NARO's safety award.

Once the regional recipients were determined, a committee composed of employees from various Washington Office disciplines reviewed the nominations and selected the recipient of the Director's Safety Achievement Award. The 1991 award went to **Dennis J. Turay** for his special efforts in developing and instructing a 40-hour training course for tour bus drivers in the park as well as for his own personal commitment to the safety program. The award will be presented at the park on April 29 by SW RD John Cook.

The **Mid-Atlantic Region** is the first recipient of the Inter-Region Safety

Achievement Award, re-established with the publication of the revised NPS-50, Loss Control Management Guideline. The region was selected for its establishment of a regional safety committee, implementation of an employee safety complaint system, and allocation of funding for safety training at regional and park levels. **Dan Sullivan**, the region's safety manager, also requested an evaluation of the effects of smoke on wildland firefighters, which prompted research by the National Institute for Occupational Safety and Health.

RETIREMENTS

Some 200 persons paid tribute to **Ronald N. Wrye** upon his retirement as deputy re-



gional director of National Capital Region (NCR). A native of Pennsylvania, he succeeded Robert G. Stanton, now NCR's regional director. During Wrye's 33-year NPS career, he served in a number

of positions that earned him a reputation as an excellent administrator and manager. Joining the Service in 1961, he was Harpers Ferry NHP (WV) acting superintendent, Greenbelt Park (MD) park manager, Prince William Forest Park (VA) superintendent, and regional chief of maintenance (1974-1977).

Wrye left the Washington, DC, area to become assistant superintendent of Yellowstone NP (WY), superintendent of Acadia NP (ME), and superintendent of Shenandoah NP (VA) before taking the NCR deputy regional director position. During his career, Wrye received the Department of the Interior's Meritorious Service Award.

At a gala send-off at Fort McNair Officers Club on January 24, Ron thanked those who had shaped his life and career: former NPS Director Russ Dickenson, former NCR Regional Director Jack Fish, John Townsley and Ben Howland (both deceased), his father whom he described as "big and strong with a handshake like a vise...a worker [who] taught me how to work," his mother, and his wife, Marcia, "my partner of 34 years, the mother of my children and the greatest supporter I have ever had."

Wrye and his wife, Marcia, retired to Shady Lane Farm (Rt. 5, Box 183D, Louisa, VA 23093).

DEATHS

Kenneth B. Grisgby, 38, was killed in a one-car accident March 8, just outside Big Bend NP (TX). He was the park's trails foreman and had been at Big Bend since 1987. An army veteran, he has worked seasonally at a number of parks. Superintendent Rob Arnberger said "Ken was an outstanding trails foreman who looked at trailwork with an artist's eye contouring trails to take advantage of special features and vistas. He had a great love for his work and the Big Bend country." He is survived by his mother, sister, two brothers and a grandmother.

Funeral services were held on February 8 in Omaha, NE, for NPS retiree **Lillian Kelly**, 64. She had been the Midwest Regional Office's payroll supervisor before her retirement in 1982 after 19 years of federal service.

Steve L. Williams, 60, an NPS employee, died in February. He is survived by his wife, Louise, a son, a daughter, six grandchildren, his mother, two sisters, one brother, and numerous nieces and nephews.

Leroy (Rusty) Rust, 71, a native of Yosemite NP, died January 10 after battling colon cancer. Known as the "unofficial mayor of Yosemite," Rust was born in an Army cavalry hospital in Yosemite Valley 71 years ago. He grew up in a tent cabin and left Yosemite only to attend Fresno State College and to join the 10th Mountain Division which fought as ski soldiers and mountaineers in World War II. One of his companions in the 10th Mountain was David Brower, the famed conservationist.

California state ice skating champion in 1933, 1934 and 1935, Rust held titles as speed, pairs and figure skating champion. He became a ski racer and national giant slalom champion (1956). He founded the Yosemite Winter Club ski team in 1949, and was coaching youngsters on the team only a few weeks before his death, some of them children of former club members. Rust retired in 1991 as postmaster of the Yosemite Post Office, a job he was appointed to by former President John Kennedy. Ed Hardy remembered that Rust called himself "the middle-class millionaire" because of the pleasure he took in living and

working in Yosemite. Rust is survived by his wife, Jane, a son, a daughter, and several grandchildren.

Clifford C. Flynn, 76, passed away May 10, 1991, in St. George, UT. He was born and raised in Tuskahoma, OK, and he spent more than 33 years in federal service, retiring in 1973 as Organ Pipe Cactus NM chief of maintenance, a position he had held for seven years. He worked with the CCC from 1935-1940, then joined the NPS in 1941 at Grand Canyon. Cliff is survived by his wife, Theda, a son, a daughter, eleven grandchildren, and one great-grandchild.

Nancy Cooke Blauvelt, 49, died February 5 at her home in Upper Marlboro, MD. She had cancer. Nancy, a native of Front Royale, VA, transferred from the National Park Service to HUD in 1980 as a rehabilitation management specialist. During her active NPS career she served as chairwoman of the NPS Federal Women's Program Committee, and as the Washington Office rep and Education Trust Fund officer on the E&AA Board.

Nancy was a member of the Moravian Church Vietnamese Refugee Committee, National Park & Recreation Association, Capital Area Park & Recreation Executives, Inter-Agency Council on Consumer Representation and Women in Housing and Finance. Among Nancy's honors were two HUD certificates of merit, including one for her work on testing and abatement of lead-based paint.

She is survived by her husband of 30 years, Robert Blauvelt, Jr. (9401 Grandhaven Ave., Upper Marlboro, MD 20772); her children, Kristen and Robert III; a sister and two brothers. Memorial donations in her memory may be made to the Nancy Blauvelt Memorial Fund, Department of Housing and Urban Development, Room 7164, 451 7th St., SW, Washington, DC 20410, where a college education fund has been established for her son.

BUSINESS NEWS

The 1916 Society is planning a reception/ dinner for August 25, 1992, to celebrate the 76th anniversary of the National Park Service. Details to follow in the next *Courier*.

■

Some time ago, NPS alumnus and E&AA life member D. J. Bishop drafted an agreement with then E&AA Chair Lorraine Mintzmyer between Travel Square One and E&AA to donate 3 percent of net sales of any travel purchased by E&AA members from Travel Square One. Donations were to be deposited in the Education Trust Fund, and travellers could deduct this as a donation from their tax return. Nevertheless, even though this benefit was advertised on several occasions in *Courier* and other ways, Travel Square One had to terminate the agreement due to a lack of sales.

MEMBER NEWS

Lew and Bobbye Farr took a 59-day freighter trip to Africa two years ago, during which time, according to Lew, they observed animals, revolutions, and some South African social progress. This June they plan to depart on a similar jaunt down the west coast of South America, also by freighter. Once again Lew will be packing his camcorder to document the trip. He retired in 1975 as DSC's assistant director for manpower and organization.

■

E&AA Life Members Bill and Ida Maude (Coggins) Featherstone (1112 Trace Place, Carlsbad, NM 88220) were married December 21, 1941, in the church where they grew up. On December 22, 1991, they celebrated their 50th anniversary at the Grace Episcopal Church, with a reception hosted by the women of the church following a service in which their two sons participated.

Although Bill earned his bachelor's in 1937 and his master's in 1946, Ida waited until after their sons were grown, to return to school. At the age of 53 she received her bachelor's degree in elementary education. Then when husband Bill retired from the Park Service in 1977 as the environmental coordinator for the Rocky Mountain Region, the couple decided to take a grand tour of Europe, which included a "private performance" by Ida, who played the

Baroque organs in several of the European churches they visited. Next came a cruise to Puerto Rico and the Panama Canal, as well as a two-week Alaskan tour. They also enjoyed the Amazon in 1988. Their most recent trip came in 1990 in the form of a train ride through Mexico's Copper Canyon.

When they aren't enjoying travel to exotic places, Bill serves as a volunteer tax preparer for the IRS program, Volunteers in Tax Assistance. Ida volunteers as a storyteller and is a member of the Roadrunner Stamp Collectors. They both continue to work in the literacy program.

■

Carl and Meraldine Walker ordered the 75th anniversary edition of the *Historic Listing of National Park Service Officials*, revised May 1, 1991, by Harold P. Danz. Along with their order, they sent a note, expressing regret that they had missed the E&AA Reunion in the Smokies, but said they are looking forward to the next reunion tentatively planned for Yosemite NP in September 1993.

Wayne Cone sent his thanks to Harold Danz and the others involved in the Historic Listing, which he called a "useful publication." Jim and Eileen Thomson also received the Historic Listing, and advised that they had just returned from Hawaii where they attended what has become their annual tennis camp on the Big Island at Kona. They also visited Hawaii Volcanoes NP and spent time with their son and daughter-in-law on Oahu. Now they're back in Washington State to the "old routine."

■

Bob Standish, of Chevy Chase, MD, who retired in 1981 as editor of Parks Magazine, reports that treatment for his bladder cancer has been successful. Some further treatment still is required, but he has been assured the procedure should be tolerable compared to the chemotherapy he has had to endure. "My hair and my strength have returned," he stated in a recent letter, "and I am living a normal life—that is, a life normal for a man my age who has been through the medical mill. All is well and Lois and I rejoice at our good fortune."

■

Christine Rockrise, married to David Springer-Brown, lives in Seattle. Formerly with DSC, she owns a planning and design company, which, this past year, has expanded

into Montana and Hawaii. She writes that their "big trip" this year was camping in New Zealand, and that they have just returned from a holiday in Mexico. Christine's father was also an NPS employee—in the San Francisco Planning and Design Office.

■

Eldon and Karen Reyer have settled into their new home, La Espuela Ranch, HC 75, Box 270, Lamy, NM 87540, southeast of Santa Fe. They have an adobe brick home on five acres of mesa land with a 360-degree view of seven mountain ranges. The Reyer family includes their older daughter, Kareen, her two daughters, three horses, a donkey, three dogs and two cats. Kareen attends the College of Santa Fe in Environmental Management. The Reyers' younger daughter, Maureen, and her husband, Gilbert, live in Denver where he is a deputy sheriff and Maureen works for a property management firm. Eldon continues to enjoy his horse pack trips into the Pecos wilderness with his dog, Kally. Karen keeps busy with her computer and granddaughters Inger and Ashleigh.

■

Burt Coale wrote to say he was pleased that the January *Courier* printed Lorraine Mintzmyer's eulogy to Howard Baker. He reminisced that during his tenure as public affairs officer in the Midwest Region, Howard Baker followed his career with a keen eye. After both men retired, they still met for lunch simply to stay in touch.

■

Don Spalding (P.O. Box 4748, Arcata, CA 95521) is improving after major surgery and ensuing ailments.

■

Castillo de San Marcos NM Super-intendent Gordie Wilson is enjoying life in St. Augustine. His wife, Cindy, grew up in a Navy family and lived in St. Augustine for several years. For her, the move to St. Augustine was a kind of homecoming. The Wilsons had the opportunity to meet members of Eastern National Park and Monument Association's board during its annual meeting, held this year in Jacksonville. The group toured the Castillo, and Wilson met Herb Kahler who served as superintendent of the Castillo from 1933 to 1939.



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