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Experiment at Bennett Spring SP, Missouri

At Bennett Spring State Park in Missouri they're *doing* something about the environment, not just talking. Starting last spring, and continuing through the peak summer recreation season, nearly

270,000 gallons of treated water—effluent from the park's sewerage system—were automatically spray-irrigated over nearly 5 1/2 acres of forest and field adjacent to the system's lagoon site.

This was a departure from the usual method of discharging effluent from a sewerage lagoon. While the normal discharge from any lagoon system is relatively safe, biologically speaking, it is charged with a high level of chemical nutrients. When these nutrients are dumped into a stream, they can over-fertilize aquatic plants such as algae, causing them to grow at an alarming rate and distort the ecology.

Seeking to alleviate such problems, the Missouri State Park Board, as early as 1967, began to study the field to determine how better to cope with the ever increasing environmental impact of an ever increasing stream of park visitors. Borrowing from research done at Pennsylvania State University, they put into effect the spray-irrigation system by which lagoon discharges are, in effect, filtered through forest and farm land, the excessive nutrients being taken up by the vegetation and soil as a form of fertilizer. The water which eventually seeps back to the stream thus contains relatively normal amounts of nutrients.

The Bennett Spring installation is viewed as an experiment, with the Missouri Department of Conservation and the School of Forestry (University of Missouri-Columbia) cooperating to conduct research into many aspects of the process. For example, with as much as 60 inches of nutrient-enriched water falling on the soils and plants in the area each growing season, striking environmental responses are expected. Fur-

(Continued p. 32)

Appropriate Mementos



Superintendent Siglin presents pen sets to VIP Pauline Boardman and VIP Mary Thayer

Superintendent Roger Siglin at the John Muir National Historic Site in California has found an unusually appropriate way to say 'thank you' to the very dedicated and hard working volunteers who have done yeoman guide and information duty in keeping things lively at the site commemorating the great naturalist's contributions to conservation.

Out of a broken limb removed from a locust tree planted by Muir

himself, Siglin had fashioned handsome bases for desk pen sets, including a Muir medallion. Presented to the many friends of conservation who have taken part in the Volunteers in the Parks program in the Martinez area, the desk sets represent a thanks from the Park service—and, in a way, from John Muir himself.

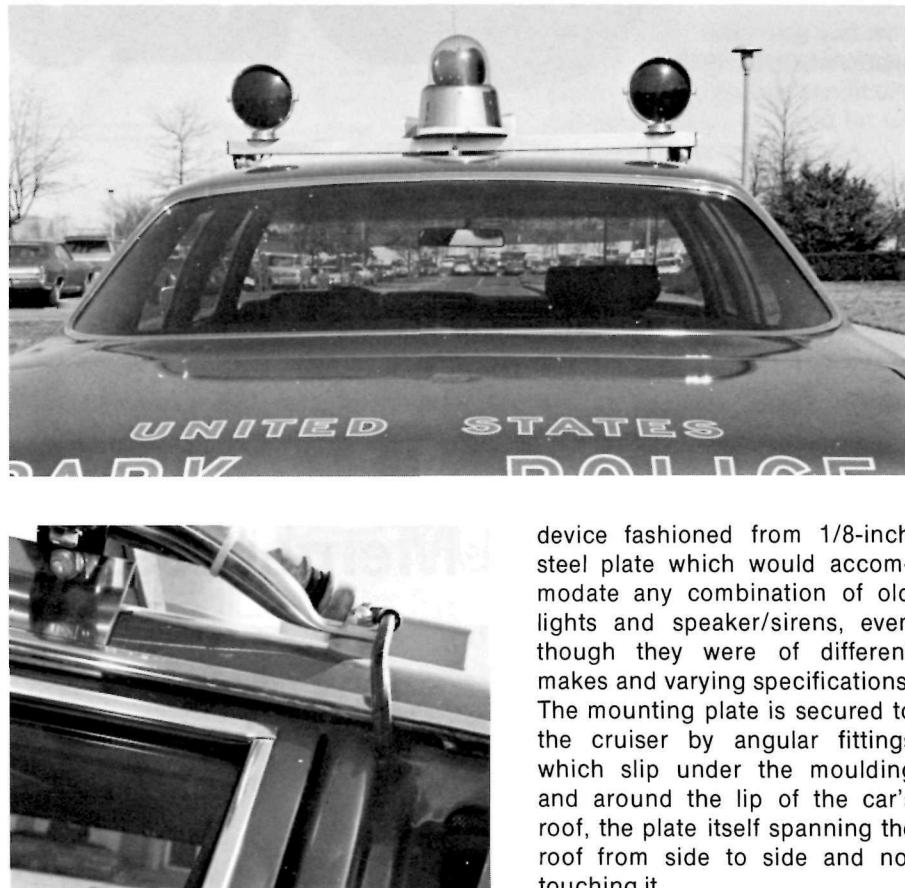
How's that for recycling with imagination? Right on!

Old Lights & Speakers Now Used

A good, practical idea is saving the government money—and earned a \$100 award for David M. Shaw, mechanic at the Brentwood shops of National Capital Parks in the District of Columbia. It started with Lieutenant Ralph D. Howell of the United States Park Police telling Shaw about a problem: how to use previously acquired emergency equipment such as warning lights, and combination light-and-siren-speakers on the new police cruisers which soon were to be delivered. From the design of the new cruisers, it was obvious that such equipment no longer could be roof-mounted, but would have to be secured to some sort of bar arrangement.

Although some new emergency equipment was being ordered along with the new cars, Howell told Shaw it was considered highly desirable, from a cost saving standpoint, to arrive at some way of continuing in use the older, but in still good condition, emergency fittings.

In just a few days, Shaw came up with an answer—a mounting



device fashioned from 1/8-inch steel plate which would accommodate any combination of old lights and speaker/sirens, even though they were of different makes and varying specifications. The mounting plate is secured to the cruiser by angular fittings which slip under the moulding and around the lip of the car's roof, the plate itself spanning the roof from side to side and not touching it.

Plastic Liners Don't Slip Now

The distasteful necessity of removing garbage *by hand* from a full container, in order to retrieve the plastic liner which has slipped to the bottom, can be a thing of the past says Kerry C. King. King is a laborer at Delaware Water Gap National Recreation Area and he's suggested a simple, inexpensive (except for time, *non-expensive*) way of holding those liners in place.

He cuts king-sized rubber bands from old truck-sized inner-tubes. One of these big rubber bands is placed around the lip of the container and securely holds in place the excess length of the liner which overlaps the brim. Short (one inch or so) pieces of

half-inch doweling, taped to the inner side of the band every few inches, make it easy for the refuse collector to slip his fingers under the band, roll the band down a few inches to release the filled

liner, replace it, then roll the band back up over the edge of the new liner, securing it in place.

King won \$25 for his idea and morale is up in the refuse collection operation!

Beeswax OK! Soap Better?

Spencer Greenhill of the Michigan Department of Natural Resources in Paris (Michigan, that is) reacts to Grist item about using beeswax to ease driving of nails as follows: Use regular bar soap. It lubricates as well as beeswax.

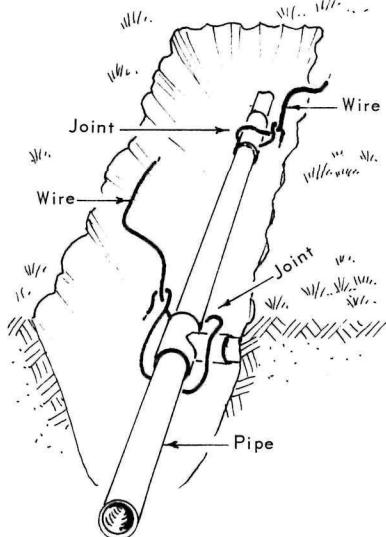
But, it can cause a small amount of rust (*) and that gives the nail added holding power. Voila!

(*) Editor's note:

Hygroscopic attraction, right?

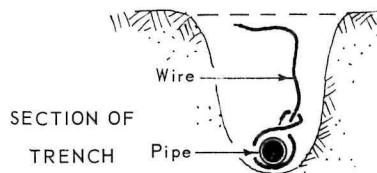
Wire Helps Locate Pipe Joints

When Donald M. Black, Chief Park Naturalist at Joshua Tree National Monument lays a pipe line, he makes sure he can find it again comes time for maintenance or servicing. Here's how.



Around each joint or connection he loops one end of a length of plastic-covered copper electric wire. The other end of the wire is long enough to reach nearly to ground level, but, as the trench is back-filled, this end is bent so that it lies beneath the surface 4 to 6 inches, and horizontal to it.

When there's a need to relocate the line, or more specifically a joint in the line, it's relatively easy to skim 4 to 6 inches of dirt in the vicinity of the line, pick up the wire, and then follow it down to



the joint. Contrast this to digging "blind", however, when you might locate the line, but have to dig many feet in either direction, without knowing for sure you're headed toward a joint.

Black has even "codified" his wire finders to further assist in maintenance and repairs. He uses different colors of plastic covering for different utilities. For example, white identifies L.P. gas lines; blue, water; red, electric; and black, sewer lines. Furthermore, wire gages are used to identify pipe sizes. Thus, #14 wire indicates 1/2 inch pipe; #12, 3/4 inch; and #10, one inch. A series of knots can be used to indicate sizes of larger pipe. For example, 4 knots in a black-covered wire indicates a 4-inch sewer line.

Mr. Wilder Has Ideas

In a recent issue of Grist appeared a story about a better way to clean garbage cans. The idea came from Earl E. Wilder, who is a maintenance man at Big Basin State Park in California. Earl was tickled to see his idea in print (and with a \$25 award he won, too) so he's come up with some more hints he'd like to share with Grist readers—and he's loaded with ideas! Here are two. More will follow in later issues.



Earl's boom in action



Front, display board



Back, movie screen



Back, doors shut

DUMP TRUCK RIGGED TO MOVE FIREPLACE: Six by six timber acts as boom, is counter-weighted by ballast at forward end of truck bed (out of picture, right). Bumper, of tubular stock, slides into channels on truck. Fireplace—approximate weight, 500 pounds—is rigged to boom when bed of dump truck is lifted. When bed is dropped (as in picture) fireplace is ready to travel.

FIRE CIRCLE MOVIE SCREEN: The doors swing shut to protect the screen surface against weather and vandalism. Speakers for the public address system are mounted at either side under the overhanging roof. The reverse side of the screen enclosure is put to use, too. It's a display case, with hinged plexiglass-glazed doors, over pegboard which affords versatility in mounting display material. Projector goes on post (center of visitor seating area) which has power outlet and remote control cord (in lockup recess).

Sidewalk Snow Melting Prevents Accidents, Saves Money

Thousands of people tramp the sidewalks each day outside Federal Hall National Memorial, bordered as it is on three sides by Pine, Nassau and Wall Streets in the heart of New York's financial district. And in wintertime, those sidewalks, nearly 400 feet of them, used to get snowy, icy, slippery. At the least, Park maintenance workers spent hours shoveling snow, scraping, blading, salting, sweeping slush, at a considerable cost in man hours. But, worse, people sometimes fell, and the Government entertained tort claims.

Maintenance Supervisor Frank J. Furdyna had an idea. He knew that new sidewalks soon were to

be laid completely around the historic site. So he proposed that a sidewalk heating system be installed, embedded in the new concrete, and that this system, activated by dropping temperatures and precipitation outside, would melt and evaporate the snow as it fell, keep the walks clean, and both save man hours and prevent accidents.

His suggestion was adopted, and it's worked out as he predicted. Snow removal's a thing of the past, as are accidents due to falls on ice, the government's money ahead—and so is Furdyna. He pocketed \$100, less the usual deductions.

The heating system, which was installed under contract, consists essentially of a piping network, laid 2 inches below the surface of the new 6" thick sidewalk slab, through which a heated, anti-freeze solution is pumped. The piping was laid on 1' centers in longitudinal loops across the width of the walks, with the overall length of each walk along Nassau, Pine and Wall Streets being divided into sub-networks varying in length from 14 to 25 feet. The Schedule 40 pipe, varies in size, 1, 1 1/4, 1 1/2 or 2 inches, depending upon whether it is main line, branch, or actual loop within the sidewalk.

KEEP IT SIMPLE By Herman E. Schlerf, Chief District Ranger California Department of Parks and Recreation

"Keep it simple and make it unique and as maintenance-free as possible" were the instructions given District Carpenter Marvin Christner, who designed and constructed the new restroom at F.K. Lane Memorial Grove in California's Humboldt Redwoods State Park.

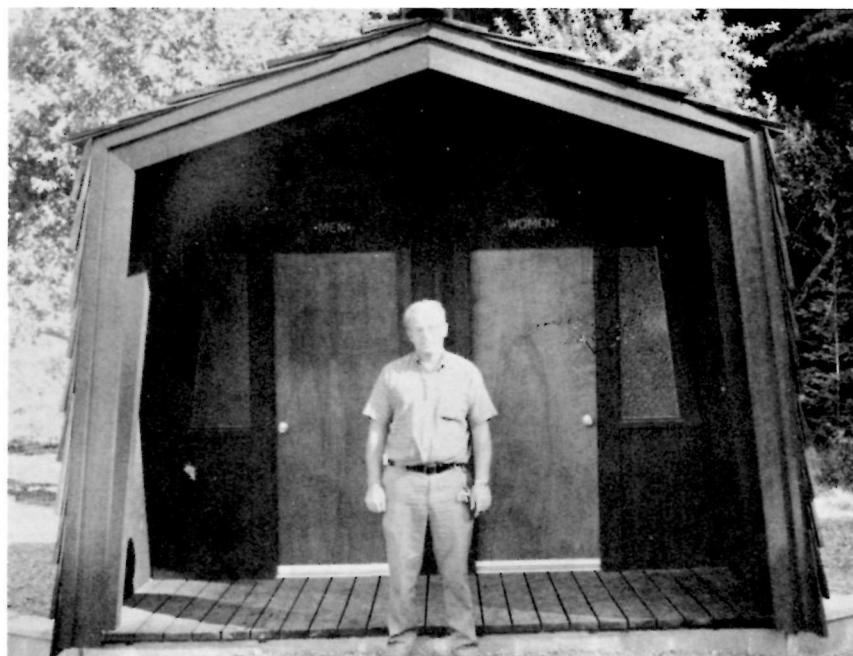
The restroom is part of a new rest stop facility which includes a gravelled parking area, water, and picnic tables. This replaced the old, worn out restroom.

Funds for construction were donated to the California State Parks Foundation by the Sacramento Kiwanis Club. Labor for brush clearing and construction of the "stob and rail" fencing was provided by Ecology Corpsmen from the State Division of Forestry's Humboldt Ecology Center at Weott. Funds for Corps labor were provided by a U.S. Bureau of Outdoor Recreation grant from the Land and Water Conservation Fund.

The redwood shake-sided "gambrel" shaped building fits unobtrusively into the redwood

scenery alongside of the Avenue of the Giants, just north of Phillipsville, and is the first State Park facility on the "Avenue" where northbound travelers can stop and stretch their legs after leaving the freeway.

Many compliments have been received on the new rest stop, not the least of which came from Director William Penn Mott, Jr. and California State Park and Recreation Commissioners when they visited the District recently.



Gunport Safety Without Disturbing Historic Structure

The open gunports at Fort Christiansvaern, key attraction at Christiansted National Historic Site in the Virgin Islands, were a very real safety hazard. A child could easily fall through such an opening, were it left unguarded.

Charles B. Sigler, Jr., Superintendent of the installation, with his responsibility for elimination of any hazard threatening the safety of both visitor and staff alike, was very aware of danger. And moved promptly to counter it.

Ideally, of course, he would have removed the threat by filling the opening with a cannon on its carriage—the historic reason for the gunport in the first place. But, unfortunately, this ideal solution is presently not feasible—there simply are not on hand enough authentic cannon to fill all the gunports in most forts. But cannon are recovered restored from time to time; and that consideration influenced Supt. Sigler's course of action.

Because he could, of course, have installed permanent safety bars in the vacant gunports, entailing cutting into the ancient walls, inserting the bars, and mortaring them in place. They would be permanent, and defacement of the surrounding walls would be permanent, too, scarcely to be undone should a cannon become available for placement.

Some sort of portable safety barrier was considered. But this, too, was considered undesirable, both from the standpoint of appearance and safety. (Temporary barriers have a way of disappear-

ing, despite vigilance!) Granted, this solution would have protected the walls against defacement or alteration.

The Superintendent persisted. He wanted fool-proof safety, and an attractive, harmonious appearance, but without disturbing the ancient structure itself. His answer—pairs of metal bars pre-shaped at the ends into angles which cinch snugly into place over the tapered sides of the gunport, and are held there in place under compression, without any modification or disturbance of the walls themselves.

The "secret" of Sigler's bars is in the way they are installed. A pair of the bars, their pre-shaped angles flaring away from each other, is hand-held in place at the height selected for it in the gunport opening. (Usually, two pairs of bars are sufficient to guard each port.) Next, large C-clamps are put in position about each end of the pair of bars (just inside the sides of the opening) and then tightened until the bars have been brought flat together, the flared, angular ends tightly wedging themselves in place by compression on the tapered sides. Final step is drilling, bolting the pair of

bars together, removing the C-clamps and going on to the next pair.

Fourteen gunports at Fort Christiansvaern were protected by the bolted metal bars at a modest cost of \$77.50 for materials and 3 1/2 man-days. The result—safety bars that are "permanent" until they need to be removed for a cannon; that are unobtrusively attractive and in harmony with the ancient structure; and that guard without damage or disturbance of the existing walls.

Color-edged Labels Sort Files

Bernice S. Phillips, secretary at Chickamauga-Chattanooga National Military Park (Georgia) had an idea about filing—and it's a good one, because it's saving time and won her an award.

She'd noticed that, after the usual cut-off of the office files (on the 3 year cycle), the inactive files, now in separate filing drawers, were consulted almost as frequently as were the newer, active files, at least for a 9 to 12 month transition period. This meant a lot of jumping from file cabinet to file cabinet, with a loss in time and some accompanying frustration.

So, she proposed, rather than transfer all the inactive files to other drawers, simply change color of the edge labels of the new files as they're prepared. For example, if the preceding period (January '69 to January '72) had its files marked with green-edged labels, by using red-edged labels from January '72 on, the two periods are immediately set off from each other. Thus is averted the need to hop from drawer to drawer as the contiguous periods are consulted.

Simple, huh? But it's the simple idea that saves time and money—and wins money awards!



Carrying Board for Extension Cords

If you've ever tried to untangle the coils of a long, heavy duty extension cord, tried to lift the cord from a truck and found it wrapped around tools, or have had to walk back to the power outlet to plug an extension cord back in—then Max D. Jacks has an idea you're looking for. He's a maintenance-man at Badlands National Monument (South Dakota) and he'd had his fill of problems with extension cords.

So he suggested—and then carried out his suggestion—that carrying boards be made for the several long, heavy duty extension cords which must be used by employees working at projects about the area, often several hundred feet from the nearest power outlet. His boards are of 1 x 6-inch stock (or similar), are about 3 feet long, and each is fitted with a pair of one or 1 1/2-inch dowels which are angled out from each other like the legs of a stool. The cord is wrapped around and around these dowels, something like a king-sized bobbin.

One of the two dowels is mortised into the board near its bottom end and acts as third leg (the other two being cut into the board) so that the board can be



set up in a nearly vertical position. The other dowel is set in from the upper end of the board about 6 inches, with a hand grip being cut into that end. Jacks' boards are of two types: one strictly for carrying and storage; another fitted with a female receptacle, into which the workman at the end of the line plugs the power tool he is using.

It is this latter feature which makes the carrying boards particularly useful. No longer need the workman drag long, heavy lengths of extension cord behind him as he moves about the job he's working on. Instead, he plugs into the female receptacle of the carrying board and has only the length of the tool's cord to worry about. Finally, being plugged into the female receptacle of the carrying board, and *not* dragging on the end of a long, long extension, the workman no longer need find that he's pulled the cord out of the socket away back there—with a subsequent loss of time and temper spent in walking back and re-plugging into the outlet.

They like his idea at Badlands—and Jacks is award money ahead to prove it!

How to Get Rid of Fronds Without Really Trying

They're smart in Hawaii. Come January and February, it's tree trimming time at the City of Refuge National Historical Park in Kona. Did you ever try to unload on somebody—anybody—coconut fronds? One or two, great for decoration, but a whole bunch of them, who needs them?

Burn them—in this day of air pollution concern? Uh uh. Shred them—in a shredder that burns fossil fuel? Uh uh. To the rescue, Maintenance Supervisor Henry Hua. Spread 'em out across the gravel road leading to the park administration building and picnic areas, he said, and let the



wheels of park traffic break them up. And it works! The vehicles pass over them again and again, and soon, hefty center stem in-

cluded, they're pulverized, and back they go to soil—and *that's* good ecology, too!

Decal Tour Signs Save Money

Decals, obtainable from 3M, are being mounted on plywood and used to mark the route of the tour road for Yorktown Battlefield at Colonial National Historical Park (Virginia). There are 41 signs marking the tour, and until now they were made of cast aluminum. Some are lost or vandalized each year, and when all have been replaced by the decal-plywood combination, the Service will have realized a savings of \$6,697. And Park Service Painter Robert M. Fletcher will have pocketed an award of \$200 (less the usual deductions) because the decals were his idea in the first place.

Fletcher had noticed the need for sign replacement each year, and he knew that the cast aluminum markers cost \$180 each, and required annual repainting at a cost of \$10 a sign. He learned about the availability of decals, supplied by 3 M Corporation, and that the decal-plywood sign would cost the government only \$23 each, with no repainting being required. So, he suggested. His suggestion was adopted. Both the Service and Fletcher are money ahead. That's the name of the suggestion game!



Old method



New method

Spray Away Dust Problem

The feet of the hundreds of visitors which each day moved along the trail and through the rest area of Mt. McKinley in Mammoth Cave National Park (Kentucky) used to stir up dust. The culprit was the fine clay and sand which made up the trail. Once stirred up it settled over benches, floor and rest rooms. The corrective action—regular sweeping up and brushing away the dust hardly improved the situation at all, guides and visitors alike complaining about the *clouds* of dust this sweeping caused!

Maintenance Worker Thomas B. Webb found a solution—at a modest investment of only \$11.95. He proposed the use of an \$11.95 pressure type sprayer with which a fine water mist would be sprayed over the trail and surrounding area. Result—the dust is kept down, its settlement on benches, floor and rest rooms is drastically cut back, and no longer need regular sweeping be accomplished, with its clouds of dust.

Mammoth Cave is saving a man hour each day through reduction of sweeping, visitors no longer complain about dust pollution, and Webb is award money ahead.

Calcium Chloride Kills Weeds at "Chick-Chat"

Caretaker Lewis R. Fincher, at Chickamauga-Chattanooga National Military Park, has come up with an idea that's saving money, using a waste product effectively, and improving the looks of the Park's walkways. The idea's short and simple—use excess calcium chloride to kill weeds and grass between cobblestones and flagstones.

Each spring, the Park finds itself with some calcium chloride left over from its snow removal program, particularly in the Lookout Mountain District. By its very nature, its ability to draw moisture from the air, calcium chloride

cannot be held over from winter to winter. With the rise in temperatures and humidity upon the advent of spring and summer, the chemical soon would become a sodden mass—a waste product.

Perceiving this, and knowing calcium chloride's effect on vegetation, Fincher proposed that it be used, as required, to kill off at the start of each season, weeds and unwanted grass between the flagstones and cobblestones of the area's many walkways. Acting upon his suggestion, he applies the salt in small quantities to the exposed grasses and, within a few days, the chemical absorbs mois-

ture, turns liquid and attacks the plant life, effectively killing it off for the season. The only adverse, but temporarily so, effect of the program—the surrounding stones look wet while the hygroscopic action is taking place. But, with the first rain, the solution is washed off, and the walkways present an attractive, weed-free appearance.

Not only has Fincher's suggestion made effective use of a former waste product, it also is saving man-hours, through elimination of hand weeding or burning-off—and for his idea, the caretaker's award money ahead!

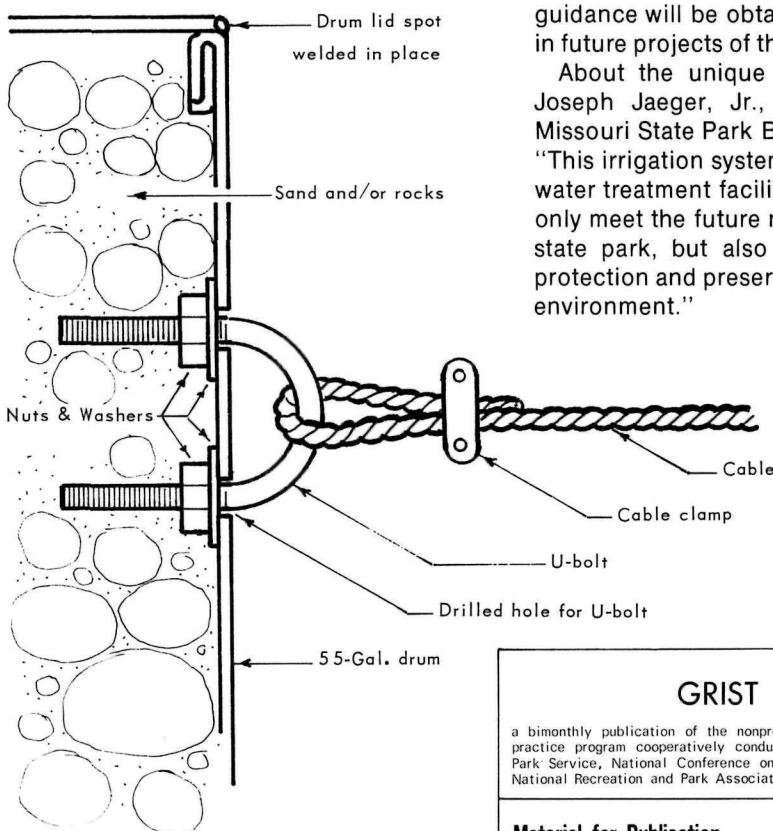
Drums Serve as Gate Posts

Closing off certain roads and trails to vehicular traffic is a problem most park rangers share. But when the terrain is too rocky or the soil too shallow to set regular gate posts, the problem's tougher. Finding posts pulled out of the ground because they weren't set deeply enough is not an unheard-of event! (Some guests *will* have their way, never mind signs, posts, and barriers!)

Park Ranger James T. Graham, Jr. at Delaware Water Gap National Recreation Area has found a way to foil such trespassers. It's working and it has won him an award.

His idea, like many good ideas, is simple and relatively modest in cost. He secures empty 55-gallon steel drums (inexpensive, sometimes discards) positions one at each side of the trail to be closed, fills them with rock and dirt, strings a cable with reflectorized warning sign between them, and he's got a barrier. And vandals can't pull out these "gate posts"; they're just too heavy to move or topple. (Two lengths of pipe run at right angles to each other through holes in the bottom of the drums, projecting out about a foot, make toppling a virtual impossibility!)

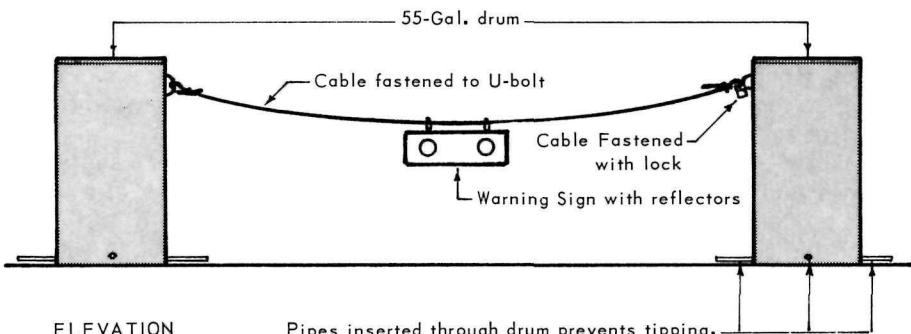
The cables between the drums are secured to U-bolts which are fitted to the drum walls before they're filled with ballast. Clamps fasten the cables to the U-bolts, with a locking arrangement sometimes used at one end if there is need to drop the barrier at times.



DETAIL OF CABLE ATTACHMENT

To further thwart the would-be vandal, the lids of the drums may even be spot-welded in place, preventing that person from unloading the drum and moving it.

It takes some doing, but we can protect our parks against even the most determined miscreant!



Experiment at Bennett Spring SP, Missouri

(From p. 25)

thermore, by determining just what species of plants and trees thrive under such irrigation conditions, guidance will be obtained for use in future projects of this type.

About the unique experiment, Joseph Jaeger, Jr., Director of Missouri State Park Board stated: "This irrigation system provides a water treatment facility which not only meet the future needs of this state park, but also insures the protection and preservation of the environment."

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