understanding of existing and potential atmospheric conditions in the region, and establish factual information on which to base an effective area-wide control program. Air pollution has been aptly described as a problem of the people, and it seems proper that the public and the business community share in the responsibility for air pollution control.

One of the greatest needs at the present time is to educate the public to the fact that the atmosphere is not unlimited and that air quality is rapidly deteriorating. Leadership is necessary to bring the problem into the open where it can be effectively handled. The sanitarians may view air pollution as an additional duty that can only interfere with their existing programs. Realistically, however, air pollution is an environmental problem — the type sanitarians can effectively handle, and one that is within their jurisdiction as a potential menace to public health. The air surveillance program of the Washington State Department of Health has been made possible by the interest and cooperation of sanitarians in local health departments throughout the state. Air pollution can be handled on a local basis, and it is a challenge to sanitarians to accept their part in coping with this problem before an outraged public demands cleanliness in the air they breathe.

ENVIRONMENTAL SANITATION IN NATIONAL PARK SERVICE AREAS

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Your National Park Service of the United States Department of the Interior brings you greetings, and hopes that while in this area you will have an opportunity to visit some of your National Parks and Monuments including Coulee Dam National Recreation Area, Mount Rainier and Olympic National Parks, Whitman Mission and Fort Vancouver National Historic Sites in Washington, and Fort Clatsop National Memorial, Crater Lake National Park, and Oregon Caves National Monument in Oregon.

Before proceeding with the discussion of environmental sanitation, it would appear advisable to present some basic information regarding the Park Service. The Federal Government has two major conservation organizations that some people confuse, the U. S. Forest Service and the National Park Service. Each has an important part to play in the conservation program for these United States. However, the Forest Service’s function is to provide for utilization of resources without abuse, including grazing, lumbering, and mining as well as recreation, whereas the basic law for the Park Service provides that the natural areas under its jurisdiction are to be kept as closely as possible in the condition God made them. The Park Service is also responsible for keeping other areas in such a manner as to provide full appreciation for the historic and prehistoric events the area commemorates, and for administering recreation areas of national significance.

A word too, is in order about the place of the concession in park operation. Aside from camping and picnicking facilities, provisions for lodging and feeding the visitors are provided by private enterprise. Many of the people who visit the Parks make their primary contacts with the concessionaire at his hotel, lodge, or in the dining room, and believe he represents the Service. Actually, after careful study by Service representatives of a proposed concessionaire’s background, ability to perform, finances, and the like, he is granted a contract to provide necessary services. All factors are subject to careful examination and review by Park Service officials at all times to insure that they are adequate, responsible, and conform to comparable services and prices for areas in the vicinity of the Park. If the visitor does not think the service is adequate or if the prices seem to be out of line, the Superintendent should be informed so that he can take steps to rectify any irregularities that may exist.

ORIGINS OF THE NATIONAL PARK SERVICE

Historically, the beginning of the first National Park was at a campsite in the present Yellowstone National Park, September 19, 1870 where a party had explored the area and was overwhelmed with the wonders they had seen. They agreed that these wonders were too great for any person or group of persons to control, but that they should belong to the people of these United States. A year later, in December 1871, a bill was introduced in Congress to establish Yellowstone National Park as a "public
park or pleasuring-ground for the benefit and enjoyment of the people." The bill was passed and signed by President Grant, March 1, 1872. The creation of Yellowstone National Park was a culmination of some earlier conservation efforts by broad-minded citizens throughout all the United States. The birth of the national park concept and the first national recreational withdrawal of land for public use was accomplished by a bill introduced in March 1864 and signed by President Lincoln in June of the same year which granted the Yosemite Valley and the Mariposa Grove of Big Trees to the state of California upon the "express condition that the premises shall be held for the public use, resort, and recreation, inalienable for all times." In 1890 the lands around the original valley and grove were established as a National Park, and in 1906 California ceded the valley and the grove back to the United States as part of Yosemite National Park.

THE NATIONAL PARK SERVICE TODAY

The National Park Service at the present time consists of some 201 areas with a total area of 26,465,000 acres varying in size from the smallest, Lincoln Museum National Memorial, Washington, D. C. with 0.18 acres to Katmai National Monument in Alaska with 2,698,000 acres. The total number of visitors during 1963 for the Park Service was 102,710,600.

At the present time the Park Service organization consists of the Washington Office with the Director and his staff establishing the general policies and six regions which in turn are responsible for the overall administration of the various field areas. The design and construction of all facilities, including roads, trails, buildings, various utilities, and the like are under the supervision of the Division of Design and Construction with offices in Philadelphia, San Francisco, and the National Capital Parks in Washington, D. C. The San Francisco office is responsible for all such activities west of the Mississippi.

Each area is administered by a superintendent. Under him are personnel responsible for the several divisions of protection, interpretation, and maintenance.

There are several agencies that cooperate with the Park Service in the design, construction, and operation of the areas and of their facilities. The two principal cooperating agencies in the field in which we are interested are the Bureau of Public Roads of the Department of Commerce which assists in the design and construction of the main roads in the Parks, and the Public Health Service of the Department of Health, Education, and Welfare, which cooperates in all sanitation activities.

Environmental sanitation requirements exist, of course, in all areas throughout the Park Service. However, this paper will concentrate on the activities in the Western Region with which the writer is more familiar. The Western Region includes the seven western states and consists of 31 areas with a total area of 12,936,000 acres, varying in size from Sitka National Monument in Alaska with an area of 54 acres to Katmai National Monument with the acreage mentioned before. During 1963 there were over 11 million visitors to these 31 areas. The 1964 fiscal year operating budget for the Western Region totaled $9,198,000, of which $4,338,000 was for the maintenance and rehabilitation program, including $2,000,000 for buildings, grounds, utilities, and sanitary facilities, and a little over $2,250,000 for roads and trails. The maintenance-rehabilitation program varied from a minimum of $5,000 for a single area to a maximum of $820,000 at Yosemite. Thus, it will be seen that the operation of the Park Service in the Western Region is no small business.

There are three types of jurisdictions exercised by the United States over areas administered by the Park Service: exclusive, concurrent, and proprietary.

Exclusive jurisdiction is the broadest type wherein the state has ceded exclusive jurisdiction over the entire area to the United States regardless of the ownership of the land. In such instances, state laws as such have no application or effect within the area.

Concurrent jurisdiction is that of two powers over one and the same place. It is secured by a cession from the state or by reservation in a cession of what would otherwise be exclusive jurisdiction. The effect is to enlarge the proprietary jurisdiction of the United States by granting it authority to control activities which otherwise would be outside its field of authority. Concurrent jurisdiction, however, involves substantially less authority than does exclusive jurisdiction.

Proprietary jurisdiction exists by virtue of ownership alone. Regardless of whether the state cedes or grants to the United States jurisdiction of any type or form it cannot affect the Federal title or interfere with the protection, use, and control of the area by the United States. Federal laws and regulations for the reasonable protection, control, and regulation of the property of the United States in such areas are paramount to those of the states.

COOPERATION WITH THE PUBLIC HEALTH SERVICE

In view of the different types of jurisdiction it would appear advisable for the Park Service to deal with one agency regarding public health problems that are encountered in National Park areas. The Public Health Service is the agency of choice for this purpose. It has issued an Administrative Guide covering its role in the Park Service activities. This paper includes much of the material published
in this guide. The guide lists the following among the services provided by the Public Health Service to the Park Service: protective sanitation surveys including water supplies, milk supplies, food service establishments, facilities for sewage and refuse disposal, and insect and vector control; review of plans of important sanitary facilities; and field studies and surveys when requested. The Park Service reimburses the Public Health Service for these environmental health services including personal services and travel expenses.

In areas covered by exclusive jurisdiction the normal operating procedure is to conduct Park Service activities independently of the state and local health authorities. An exception to this procedure is commonly made when the effluent from a sewage disposal plant discharges to a water course that flows beyond the Park boundary or when the effluent will be conveyed to a watershed outside the Park boundary. Under these conditions the state pollution control agencies involved are normally contacted regarding the degree and type of treatment to be provided and the point of final disposal when the disposal plant outlet discharge is beyond the Park boundary.

Where concurrent or proprietary jurisdiction exists, the Public Health Service may provide liaison between the Park Service and state health authorities covering environmental sanitation problems.

**Operation and Maintenance of Sanitary Facilities**

The Recreation Advisory Council, consisting of Secretary of the Interior Udall; Secretary of Commerce Hodges; Secretary of Agriculture Freeman; Assistant Secretary of Defense Paul; Secretary of Health, Education, and Welfare Celebrezze; and Administrator, Housing and Home Finance Agency, Weaver, has issued a series of Recreation Advisory Council Circulars. Circular No. 3, dated April 24, 1964, outlines areas of consolidation and cooperation between agencies having administrative responsibility for an area and the qualified health personnel or health agency having jurisdiction. These areas of joint cooperation include steps to:

1. Insure that the operation and maintenance of sanitary facilities are in accordance with applicable requirements or regulations of Federal, state, and local health departments.
2. Certify the quality of all food and drink products served to the visiting public.
3. Control animals and insects harboring disease vectors or capable of transmitting diseases to humans.
4. Control environmental factors relating to communicable diseases.
5. Provide accident prevention services.
6. Prevent air and water pollution arising from recreation facilities.
7. Detect and control all other environmental hazards.
8. Train and periodically inspect personnel responsible for the operation and maintenance of concessioner and sanitary facilities in order to assure compliance with applicable health regulations.
9. Assure implementation of adequate water safety measures.

Environmental sanitation in National Park areas cover many specific areas of interest to sanitarians. One might state that on a greater or lesser scale nearly every problem met in environmental sanitation occurs in one or more of our National Park areas. Some of the aspects of environmental sanitation are discussed in the balance of this paper.

**Water Supply**

Water supply requirements vary from small individual ranger outposts and small high mountain camp areas through a wide range of size and location to areas like Yosemite Valley where there are facilities similar to those found in a medium-sized city or in Death Valley where water availability is limited as to location, but in some cases, surprisingly enough, is large in capacity. The water supply systems include the works and auxiliaries for collections, treatment, and distribution of the water from the source of supply to the free-flowing outlet of the ultimate consumer, be it campground hydrant, employee's residence, or concessioner facility. Sanitary protection is concerned with all parts of a water system which comes within the above definition. However, for practical purposes attention may be concentrated mostly on those portions which have to do with sources, treatment, and distribution of the water.

Surface water supplies are frequently used as sources of water for Park Service developments, and in some rather rare cases such supplies are used without treatment. The untreated surface water supplies generally originate in heavily forested areas uninhabited by man, and they are therefore subject to a low degree of contamination by trespassers or animals. Other areas have springs as a source of supply and in many areas the source of water may be either surface or deep wells.

Where possible the use of untreated water supplies is limited to underground waters not subject to any possibility of contamination and meeting in all respects the requirements of the Public Health Service Drinking Water Standards as determined by frequent sanitary inspections and laboratory tests. The elim-
ination of the use of all untreated waters is a goal toward which the Park Service is striving and as rapidly as possible adequate treatment for all Park Service water supplies will be provided within the limitations imposed by available funds. In the majority of cases, contaminated water supplies can be made safe for drinking purposes by means of simple chlorination or its equivalent. Where chlorination is considered impractical for small, relatively pure surface water supplies, consideration is given to the use of wells, springs, or infiltration galleries.

Sampling schedules have been established for the various Park Service areas. In general, during periods of heavy use samples are taken from each system at a minimum of twice a month with an immediate and thorough checking of unusual or bad results. Arrangements are made with laboratories operated by the state or local health authorities for the bacteriological examination of water samples. Copies of these tests are forwarded to both the Public Health Service Regional Office and the Western Regional Office of the National Park Service with the results being summarized annually to determine whether or not the supply continually meets the requirements of Public Health Service Drinking Water Standards. When a supply fails to meet the standards, the Public Health Service recommends appropriate action. The Western Regional Office cooperates with both the Public Health Service and the superintendent to insure the proposed improvements are installed as rapidly as funds can be made available.

Chlorination equipment for the disinfection of water supplies where the flow is variable at the proposed points of application of chlorination is designed to proportion the flow of disinfectant to the flow of the water. When simple chlorination is used the Park Service tries to maintain 0.05 to 0.2 parts per million of free residual chlorine in the treated water after a contact period of at least 20 minutes in the distribution system beyond the point of chlorine application. This does not mean that it is mandatory that a chlorine residual exists in all parts of the distribution system.

Sewer Systems

Sewage disposal facilities in the Parks offer a wide divergence of methods. Obviously the most elemental and the one in use in much of the backcountry is the ordinary pit toilet. With the larger areas, and particularly those with greater visitor use, the sewage disposal facilities grow in complexity from simple pit toilets to septic tanks with subsurface absorption systems, to major systems, such as the activated sludge plant serving the Yosemite Valley area, the high rate trickling filter plant serving the Yosemite El Portal area, and the extended aeration plant serving the Sequoia Ash Mountain residential area. The Park Service is beginning to make more effective use of sewage lagoons which in many cases can give the most economical and the most satisfactory disposition of sewage.

In the design of sewage disposal systems the Park Service is programing for the preservation of surface and ground waters and where necessary the restoration of such waters to the best possible condition consistent with the public health and welfare, the propagation and protection of fish and wildlife, and the recreational developments of these areas. Since many of the streams and lakes in Park Service areas have not been adversely affected by developments, its objective is to preserve these waters to the highest standards consistent with reasonable and beneficial future developments.

In designing new sewage disposal plants consideration is given to the method of treatment to provide the degree of purification desired and to the best location for disposal plant sites. In the northern states operations are frequently on a seasonal basis with the utilities taken out of service during the winter months. Under such circumstances it is generally considered infeasible to design a sewage disposal plant that will provide for bacteriological treatment, including sludge digestion units, due to the conditions under which they will operate and the time required to reseed these facilities.

The Park Service is reluctant to design sewage treatment plants requiring a great deal of mechanical equipment when other methods will serve the same purpose, inasmuch as available funds for maintenance, repair, and operation are limited.

The general policy regarding the installation of ordinary pit privies, masonry vault privies, and chemical treatment for developed areas such as campgrounds, picnic areas, etc., requires these facilities to be installed only for temporary use or until funds become available for the construction and/or maintenance of modern sanitary facilities. The principal use of privies is in isolated areas such as trail shelters and the like when the installation of modern sanitary facilities is considered infeasible or impractical, or in developed desert areas where water is scarce. A good example of the use of lined pit privies is at Jumbo Rocks Campground in Joshua Tree National Monument. The soil is rocky making excavation difficult and expensive. By using a steel tank with a small amount of liquid and chemicals the unit is kept in a relatively sanitary condition and may be pumped out periodically as required. Thus far the Park Service has found it impractical to use burnout treatments due primarily to the very expensive initial costs of such units.
Septic tanks with subsurface tile systems are the most common type of sewage disposal in the Park Service areas as this type of construction has normally proved most economical and practical. The Park Service experience has demonstrated that septic tanks and subsurface tile systems give satisfactory service for many years when properly designed, constructed, maintained, and operated. The principal reason for unsatisfactory operation or for the failure of septic tank systems is inadequate inspection and cleaning. Each area is required to check each septic tank at least once every six months to insure that neither the bottom of the scum nor the top of the sludge gets too close to the bottom of the outlet baffle. If these accumulations become too great solids will flow from the tank and clog the disposal area. When the sludge and scum are removed from septic tanks or masonry vault privies the material is drained to an adjoining sludge bed, buried in uninhabited places selected for this purpose, or emptied into a sanitary sewer system. Such wastes are never emptied into storm drains or distributed into any stream or water course. In those isolated areas where septic tanks are operated on a seasonal basis the tanks may be drained to an adjoining sludge bed at the end of the visitor season. Although the undigested sludge and scum can be offensive when withdrawn the dried material can easily be disposed of prior to the start of the next visitor season. This method of operation is primarily satisfactory where the areas are not accessible to the public during winter months.

The use of sewage lagoons or stabilization ponds is a comparatively recent development and in many circumstances is the most practical and economical way of disposing of sewage wastes. As you probably are aware, this type of disposal consists of a relatively water-tight basin into which the raw sewage is deposited. Normally there is a depth of three to five feet of water in such a lagoon. During the summer months there is a rapid growth of algae resulting in aerobic action disposing of the sewage wastes without odor. Even during the winter months there is some aerobic action so that a properly designed unit can work the year around. Thus far the design of oxidation ponds is based largely on empirical formulae and data. Both the Public Health Service and the Park Service are continually investigating the operation of these units so that eventually more precise design data will be available.

**Refuse Disposal.**

Wherever a group of humans collect there is always the problem of refuse collection and disposal. In the smaller areas the disposition is relatively simple but with the larger areas the quantity becomes excessive and disposition becomes difficult. Refuse includes all garbage, rubbish, ashes, and other putrescibles and non-putrescible solid wastes except sewage. Proper sanitation consists of adequate storage, collection, and disposal of refuse essentially for the control of rats and insects and for the prevention of nuisances. Another factor that complicates the storage of large quantities of refuse, particularly garbage, is the bear problem. At one time in most of the larger parks the garbage was deposited at a central dump and each evening the bears from near and far gathered for their evening meal. Good wildlife management frowns on this procedure and there are comparatively few if any areas at the present time in the Park Service that have the so-called nightly or public feedings for the bears at the garbage pit.

The Park Service has the major responsibility of providing for the collection and storage of refuse, although in some areas the concessioners have some of this responsibility. The disposal facilities are generally provided and operated by the Park Service.

An attempt is made to keep all garbage in durable, water-tight, non-absorbent, and easily washable receptacles with close fitting lids and adequate handles. These containers are kept covered pending removal and are of adequate capacity and provided in sufficient numbers to hold all garbage that accumulates between collections. In areas with a bear population adequate provisions must be made to keep the bears out of the garbage cans. Many different devices have been used and the Park Service has just designed a durable, effectively anchored collecting can that it believes will foil the efforts of the bears. The Park Service has used garbage can liners in some places with mixed results. Probably some of the difficulty with these liners is that too light weight material has been used. In other places the Park Service has experienced difficulties resulting from theft of these liners.

The final disposition of the garbage varies in the several areas. Except in the major parks the disposal is usually by sanitary landfill methods, occasionally after burning the combustibles. The three types of landfill include the trench, the ramp or progressive slope, and the so-called area method. Regardless of the type of sanitary fill it is essential that the material be compacted into the smallest practical volume by a crawler type tractor followed by a prompt covering with a layer of earth to prevent the escape of odors and the outbreak of fire, and to exclude rodents and discourage bear incursions.

Incineration is an effective means of refuse disposal in many of the areas. Its adoption is particularly desirable where suitable land is not available for landfill purposes and where bears are a...
problem. Care must be taken in the location to result in the minimum of intrusion on the natural scene. When used provision must be made for adequate disposal of ashes and non-combustible materials and the design should be such as to provide for the washing and storage of garbage cans.

Some of the areas have installed garbage grinders. This applies particularly to some of the concessioner developments. This is a practice that the Park Service does not particularly encourage because the grinding of the garbage and the disposing of it in the sewer system increased the load to an extent where expansion of the existing sewage systems might be required. The use of garbage grinders will not eliminate the need for either a sanitary landfill or an incinerator as normally garbage is only a relatively small percentage of all refuse.

In some areas the separation of garbage and combustible material has been tried. The garbage is disposed of by either burial in a previously prepared trench or by disposal to farmers or others for hog feeding, the combustible materials being burned in suitable enclosures. The use of garbage for hog feeding has not been universally satisfactory. In general, it should be used only in areas located in states requiring minimum heat treatment prior to use for hog feeding.

INSECT AND RODENT CONTROL

The Public Health Service assists in insect and rodent control, particularly to assure adequate vector control. A primary feature in the problem of rodent control is the importance of sanitation including proper garbage disposal, food storage, harborage elimination, and rat-proofing. Sanitation is essential to the permanent control of flies, rats, and mice. The use of insecticides and rodenticides is considered supplementary to sanitation. The Park Service is reluctant to use insecticides, rodenticides, or any control chemicals, and before any may be used the field area involved prepares a survey and study followed by recommendations to a committee in the Regional Office. After a careful analysis of these data by this committee all of the information is forwarded to Washington with the Regional Director's recommendation. Based on these facts and recommendations the Director refers the question to the Federal Pesticide Advisory and Review Board before he determines whether insecticides may be used in the particular case in question. Each proposed usage of insecticide follows the same procedure.

SWIMMING POOLS

The concessioners have provided swimming pools in a few areas in the Western Region. The pamphlet, Recommended Procedure for Design, Equipment, and Operation of Swimming Pools and other Public Bathing Places, as published by the American Public Health Association, is the basic guide for design and operation of swimming pools. Appropriate tests are made to insure that the water meets satisfactory bacteriological standards and that it is sufficiently clear to permit a black disc 6 inches in diameter in a white field to be clearly visible from the sidewalks of the pool at all distances up to 10 yards when the disc is placed at the bottom of the pool at the deepest point.

HOUSE TRAILERS AND CAMPERs

The use of trailers is becoming more and more important at all Park Service areas. Trailer courts per se are not provided, but trailers are permitted in campgrounds where adequate space is available. In general no special facilities are provided for trailers except that in a few of the parks provision has been made for service areas for dumping sewage from the trailer installation. In one or two of the parks concessioner facilities have been installed to take care of trailers, including sewer, water, and power connections. The operations of such facilities are similar to and under the same supervision as other public facilities furnished by private concessioners.

PRIVATE INHOLDINGS

Private inholdings are located in some of the parks with exclusive jurisdiction. In such areas sanitary facilities are subject to such regulations as the Park Service believes necessary. Normally such regulations are similar to those of the state and/or county in the immediate vicinity of the park. Frequently the assistance of the county health officer is obtained to see that the installations conform to those in the surrounding country.

MILk AND FOOD SANITATION

Milk and food sanitation, particularly such features as pertain to the concessioners, are under the general supervision of the Park Service. The Milk Ordinance and Code, the Frozen Desserts Ordinance and Code, and the Food Service Sanitation Manual, all developed by the Public Health Service, are used as the basic regulations.

In effect the Park Service has delegated to the Public Health Service the inspection and certification as to purity of milk, fluid milk products, and frozen desserts. This will be discussed in more detail by the representative of the Public Health Service at this conference.

Periodical inspections, normally once a year at the beginning of the visitor season, are made of all the
concessioner's food service establishments. Special circumstances may dictate more than one inspection per season. The inspection, usually made by a Public Health Service consultant, representatives of the protection and maintenance divisions of the Park Service, and a representative of the concessioner, includes wholesomeness and protection of all foods, the health and cleanliness of food service personnel, the sanitary design and cleanliness of food equipment and utensils, and the provision of satisfactory maintenance of all sanitary and other facilities pertaining to the storage, preparation, and serving of food. Before leaving the area, the Public Health Service consultants discuss their findings with the park superintendent and his staff and emphasize the importance of having defects corrected as soon as possible.

Conclusion

From this discussion it is quite evident that virtually all phases of environmental sanitations are inherent to a greater or lesser extent in areas administered by your National Park Service. The engineers of the Park Service, together with engineers, sanitarians, and other consultants of the Public Health Service are exercising eternal vigilance to insure that health standards are maintained at the highest level at all times. In addition, constant research is being undertaken so that constant improvements may be made in environmental sanitation to the end that the health of the visitor to your parks and monuments will be protected at all times.

ASSOCIATION AFFAIRS

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LOOKING WEST—A view of Hotel America in the Heart of Constitution Plaza. This is site of 1965 convention.

A SOUTHWESTERN VIEW—of some of the new construction in downtown Hartford.

One of the nation's most attractive shorelines is the New England Coast—and it's always at its best in autumn. Everywhere, there will be displayed nature's own show of brilliant colors, as seen only with the changing of the fall foliage. Once a guest of Hartford, a visitor will find it difficult to move on, for this historic old city has many famous shrines of the Revolutionary War days to keep one busy for weeks.

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