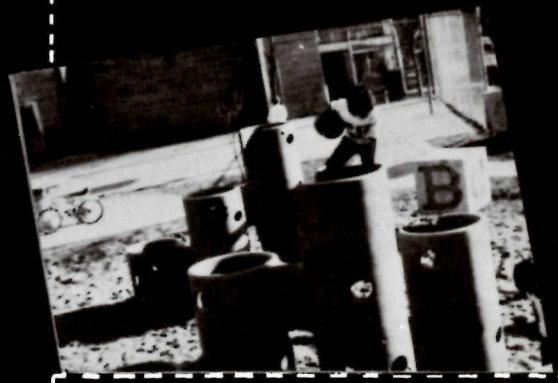

Trends

OCT. NOV. DEC. 1973

Trends

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Articles concerned with studies, concepts, philosophies and projections related to the many aspects of parks and recreation are invited. Illustrative graphic materials, where necessary or desirable, and a brief biographical sketch of the author should accompany text intended for publication. Send all material intended for publication to:

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Vest-Pocket Parks are Alive and Well in Missouri

By Dorothy Bajak

Kansas City, Missouri has 16 vest-pocket parks - and another under construction - because the Jackson County Park Department has had the endurance and know-how to overcome innumerable obstacles. Under the direction of Mr. William L. Landahl, the Department has developed and maintained the parks to make life a bit more pleasant in the inner-city area. Mr. Landahl and his associates admit to making mistakes with some of the parks, but they rectify these errors and apply the experience as they expand the program.

Many city or county park departments are reluctant to undertake vest-pocket parks. As Mr. Landahl says, "They are not a very appealing project for any park department — they add very little acreage to the park system, (an important measure of the success of a park system), and they offer every opportunity for a park department to flounder because they are located in neighborhoods that expose the parks to all of the social and physical ills of that neighborhood. Vest-pocket parks mean high maintenance costs, because they receive heavy use and because they are vulnerable to vandalism; they are located in neighborhoods with high crime rates, they are open to neighborhood toughs and drunks as well as to those who wish to enjoy them. A successful vest-pocket park program has to face these problems. Chances of failures are high, and the apparent results of a few small parks often don't appear to be worth the trouble."

In 1968, the Jackson County Park Department was busy, and certainly did not have to go looking for the trouble that vest-pocket parks would inevitably bring. The Department has been very active in past and present developing numerous areas to meet the recreation needs of Kansas City and environs. In addition to lakes, marinas, trail systems and new park projects, they are involved with preserving historical sites and flood control projects. These activities are intended to

serve all the citizens, but there is little doubt that they actually serve primarily the middle class citizens who have the necessary transportation.

On January 1, 1968, elected County officials—in response to the urging of minority group organizations—agreed that small community-space parks should be developed in the inner city to help meet the recreation needs of the poor. The County Recreation Department felt that if they didn't build the parks, no one else would. And so began the involvement.

The total cost of the project was to be $200,000 for ten parks, with 50 percent funded by the federal government under the HUD Model Cities program. The Metropolitan Planning Commission, with the Jackson County Planning Department and the Kansas City Planning Department, compiled socio-economic data for thirty-two Model City areas. These areas were then ranked as to relative "need" for vest-pocket parks.

The criteria used to rank the thirty-two areas were: population density and measurable trends of increasing or decreasing population; the distribution of age groups within the population; condition of the housing; median family incomes; and the absence of park facilities within the community.

At a meeting of twenty community leaders, the fifteen top-rated areas were considered and the neighborhoods to be selected were agreed on. Subsequently, the County Court decided to expand the program to eleven areas - 10 black and one Mexican-American - and increased their budget to $110,000. Two of the eleven areas chose to split their money and develop two parks, so thirteen parks were built under the original plan.

Mr. Landahl hired a young architect with a background in park and urban planning to serve as coordinator of the program. The coordinator and two architects, one a Mexican-American and the other a Black, formed the core of the staff. They were determined to work with the communities involved to actively recruit neighborhood participation. If there were neighborhood organizations, the county coordinator worked with them. Flyers were distributed by hand to each household advertising a meeting to discuss the parks. At these meetings, the coordinator explained the nature of the parks in these terms:

> "Your neighborhood has $20,000 with which to build a small park or parks, if it wishes to do so. $10,000 of the funds are furnished by Jackson County, and $10,000 by the federal government. The $20,000 will be used to pay for the cost of buying the land, building the park, and paying an architect's fee who will work with you in designing the park. The park must be built on an existing vacant lot within your neighborhood area. We need people to work on a committee that will choose where the park is to be built and what the park would be like. The architect will draw plans from your ideas. You will be limited by the amount of money you have to spend and the availability of vacant land — but the development of that vacant land is entirely up to you. Don't think that all this program can do is put in some swings and sliding boards. Think about what the development of that vacant lot *should do* for your neighborhood. What kinds of things would you like to be able to do there? Would you like some facilities for young children? For teenagers? For families? For the elderly? Would you like to be able to have outdoor dances and movies? Tables and chairs to play cards? Have picnics? Or just rest?"

Attendance at these meetings ranged from ten to thirty people. Committees averaging about seven people were formed in each area. It was hoped that the parks could be built within six months. But it took more than four years to complete the first thirteen parks. The contributing factors to the delay included: communication with neighborhoods, condemnation suits, labor strikes, high bids, architectural problems, slowness of contractors and the determination to stay within the budget.

A major problem was securing neighborhood cooperation. Mr Landahl explained, "One of the underlying assumptions of the program was that the idea of a park would be favorably received in these neighborhoods. That proved to be only partly true. In many of the areas significant anti-park forces developed. Most of the impetus for resistance to parks came from a widespread fear of crime and anti-social behavior that could take place in the parks. Many people feared that the parks would become a muggers' paradise. There was great apprehension that a park would draw large numbers of children and that all or most of these children would cause trouble. Even if only the neighborhood children used the park, there was fear there would be trouble. It was only through the efforts of dedicated pro-park neighborhood groups that many of these parks were built. It took people who lived in the neighborhood to convince others that the park would be "good" for the neighborhood. In some cases site choices were changed after the immediate neighbors had complained that it wasn't fair to place an activity-center for children in the middle of a block occupied by older people. The county, essentially, stood outside of this process of negotiation and compromise. The neighborhood worked out its own resolution of the problems posed by the threat of crime and vandalism in the parks, balanced against the needs of children to have a place to play."

Despite all of the problems, the thirteen original parks were completed and have been used for more than a year, and new parks are being built at the request of other neighborhoods. The average cost of each park has been $25,000 and the size ranges from one city lot to five large city lots. Parks are designed to serve a two to four block area. They are heavily used, primarily by children ages 10-16 who come and go, usually staying about an hour.

The parks generally contain what many middle class people have in their backyards....a clean grassy area with picnic table and a grill for outdoor cooking, play equipment for the children, and some plantings. Basketball is very popular. In almost all of the parks, there's an asphalt area with a basketball court. Often there's a center pole with a basket on either side.

Photos by Jackson County Park Department

" . . . some architects who got carried away with 'good design'. The results came out cold, there was too much concrete."

In discussing the design of the parks, Mr. Landahl said, "Our major problem is that we hired some architects who got a little carried away with 'good design.' The results came out cold, there was too much concrete. Concrete is hard, and difficult to play on. Recently we have jackhammered some of the concrete structures down...taken them out...and opened up the park. For instance, at one park there were a lot of concrete structures. We thought at first it was a cute park, but the kids weren't playing in it. The neighbors who lived around there asked us to remove the large concrete boxes that were stacked up like building cubes because boys and girls were using them for assignation. In another park there was a similar situation where the kids could hide. We had a high-walled maze and it was used more for a bathroom than for play. We're finding out that a park is much better if it's kind of open. If we can have structures where the little kids can think they're

"Concrete is hard, and difficult to play on."

hiding but can actually be seen by an adult, that's satisfactory. We certainly don't want a park that's sterile and completely open."

Most of the parks have small built-in stages, sometimes on the reverse of a handball court. It was hoped that the children would put on little plays, but the stages have not been used. The newer parks do not have stages. Drinking fountains and spray pools are not being installed in the new parks, either. The Park Department bought very good drinking fountains for the first parks, supposedly "kidproof", but the children took them apart quickly. Spray pools were prime targets of vandals, also. They enlarged the holes on the spray heads, which led to huge water bills, and stopped up the pool drains. Operation and maintenance proved too costly and so they have been removed.

" . . . we have jackhammered some of the concrete structures down . . . taken them out . . . and opened up the park."

Parks 14 through 17 have been "in-house" jobs, primarily under the direction of Ron Fuhrken, Landscape Architect. He tries to keep all age groups in mind when designing the parks and believes that everything put into the park should be usable, not just decorative. Mr. Fuhrken said, "In the last ten years many park and recreation people have condemned the old fashioned play equipment...miracle whirls, swings, teeter-totters, etc. but that's what the kids play on. That's what they want. The kids play on the whirls more than anything else. If there was a playground leader at each park to stimulate creative play, that would be a different matter. When you start out you have a lot of naive ideas that you're going to be very creative and have good design, but standard play equipment is what the people use. This is what the middle class people have now in their backyards and it's what these people want in their vest-pocket parks. Some of the manufactured play sculptures work well, but they're generally quite expensive."

"We try to have an active area and a passive area with each park. In one instance, there's an active park across the street from a passive park." Mr. Fuhrken believes that there is no *ideal* design, "It depends on the topography. We take the land and work around that. We try to make something that's attractive, a little different, and provides playing area. Ideally, they should be bigger...there's not enough room for baseball or football."

Park personnel are pleased that practically no injuries have been reported. Originally there were chain nets around the basketball baskets, but tall boys got fingers caught in them when laying up a basket and so the chain nets were removed. Sand is used extensively under play equipment to minimize accidents.

Lawn areas were sodded with KY-31 Fescue and are holding up well under heavy traffic. Small trees are difficult to keep; they don't take the play of children and many have been removed. Park personnel are not upset by this: "We figure that if we plant them and people dig them up and take them home, at least we're beautifying the neighborhood and eventually everybody has a tree."

This statement reflects the attitude prevalent in the Jackson County Park Department. A prime factor in the success of their program is concern for people and their problems. Mr. Landahl said, "Generally, the complaints are fairly legitimate. If they know we're going to check them out and deal with them reasonably, we don't have much trouble." The staff works closely with any volunteers of the area who want to help out, and finds their services very worthwhile. Since the program is not funded for paid recreation workers, the services of volunteers are particularly appreciated.

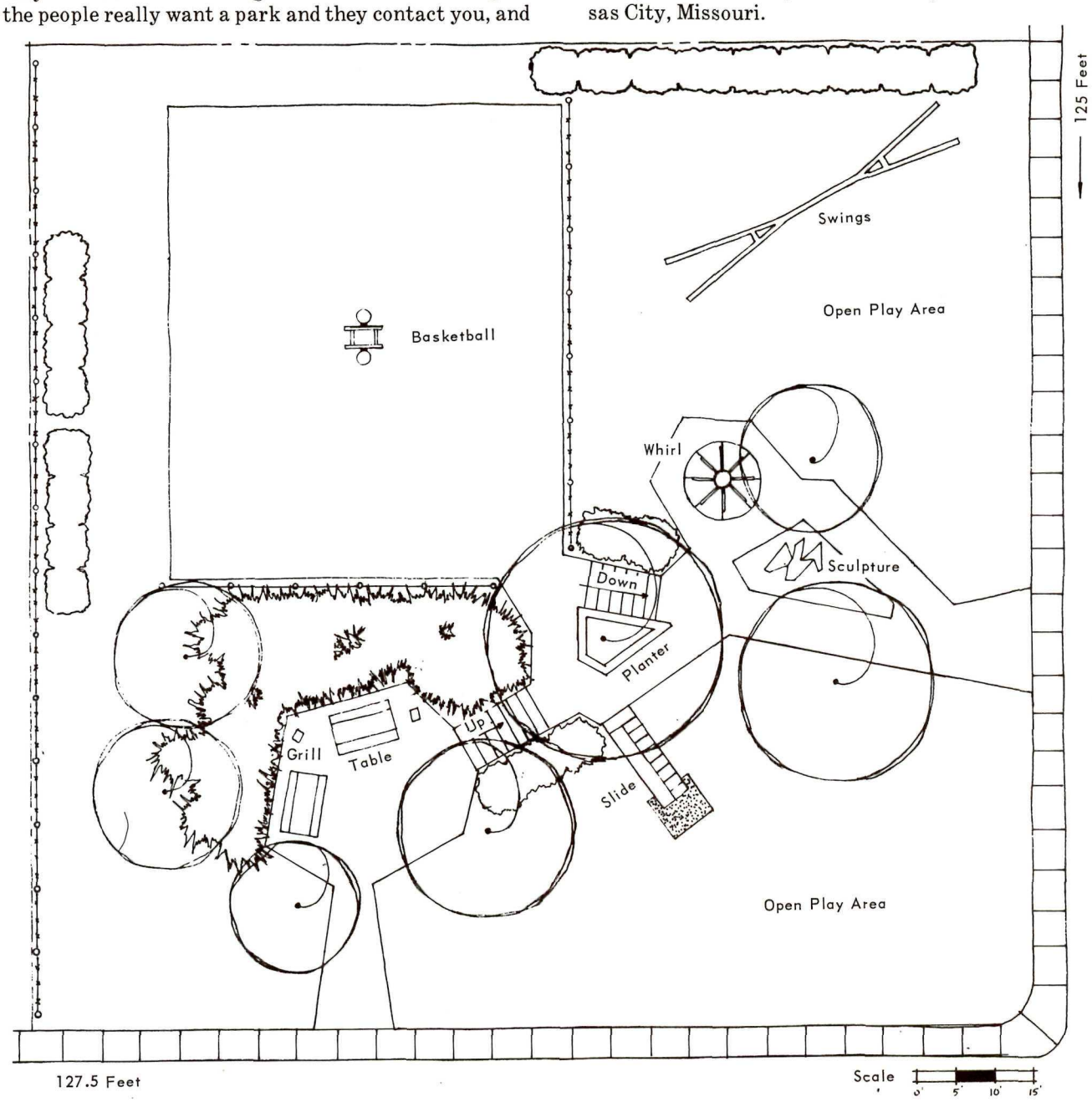
Another prime factor in the successful operation of the parks is maintenance. It is felt that there must be a government agency to maintain the parks. Volunteers and people in the neighborhood won't keep their parks clean. (Middle and upper income people don't and neither do lower income people.) Two men and a truck are

assigned full time to the sixteen parks. Trash containers are not used; those put in originally received very little use and did not add to the beauty of the parks. The maintenance crew visits each park daily in peak season to pick up trash and sweep. Mowing and repairs are made as needed. Costs are estimated at $2,000 per park per year, and every year these costs increase.

There appears to be some correlation between maintenance and neighborhood interest. Mr. Paul Frye, Supervisor of the Vest Pocket Parks, said, "Our most recent successful park (receives the most use and has few problems) is in an area where the poeple demanded that we build them a park. Their demands were met and now they see to it that the park is kept up by not allowing vandalism and by helping keep the park clean. Our crew still has to mow, edge sidewalks, make minor repairs and perform general maintenance tasks, but their cleanup work has been reduced and the comments they receive from the neighborhood are rewarding. If the people really want a park and they contact you, and you are able to satisfy their needs, they will see to it that the program is a success."

What effect have the parks had on the neighborhoods? The people do appreciate what the County has done for them and it appears that they don't think it was done for votes or any other ulterior motive. But no big sociological changes have been wrought by the parks, the neighborhoods have not changed radically. There have been reactions, of course. Mr. Landahl observed, "We found that when we took these lots and cleaned them up prior to making the parks, people around them cleaned up their yards, the curbs and streets. There's a certain amount of this now...if we keep our areas clean and trash picked up, the people around do the same."

The Jackson County Park Department did not expect big sociological changes. The administrators of the program are happy with a certain *lifting of the spirits* and will continue in their efforts to provide a "nice backyard-like facility" for inner-city residents of Kansas City, Missouri.



SOLID WASTE DISPOSAL -- Someone else's business

By Don Frifield

-- The problem is too big for the parks alone—and is certainly too big for local authorities and facilities, too . . .

-- Connecticut plans a statewide solid waste disposal system that will relieve the state park system . . .

-- *Any ideas and comments? Send them in and we'll set them forth in a later issue . . .*

Part I

Some generalizations on the Solid Waste Disposal (SWD) challenge, within which the SWD problems of the parks are special aspects of the bigger problem.

It's almost impossible for people in the park management to discuss any particular *park* problem without getting into a *people* problem—which inevitably raises what are called larger issues.

Solid Waste Disposal—so important a category of concern that it deserves these capital letters, and even the initials SWD—is one of those day-to-day problems in the parks which qualifies as a larger issue.

More Americans than ever before are visiting the parks. To most of them, such a visit is incomplete unless accompanied by several tons of automobile, equipment, and supplies—much of which is destined for disposal within the parks, either deliberately or by dint of accident, breakdown, blowout, or negligence.

Americans, according to an estimate of the Environmental Protection Agency, produced 4.3 billion tons of solid waste during 1971, of which 360 million tons were household, municipal, and industrial wastes; 2.3 billion tons were agricultural wastes; and 1.7 billion tons were mineral wastes.

Of this annual total, 190 million tons (5.3 pounds per person per day) are picked up by *some* collection agency—less than 4.5% of *total* solid waste. The other

95.5% keeps accumulating year after year: in city dumps, in sanitary landfills, on the land in general, in the waterways.

By 1980 solid waste collections will rise to 8 pounds per person per day, representing a current increase in solid waste at twice the rate of the American population itself.

The present annual throwaway amounts to 48 billion cans (250 per capita), 26 billion bottles and jars (135 per capita), and 65 billion metal and plastic caps (338 per capita), to say nothing of 7.6 million television sets, 7 million cars and trucks, and 30 million tons of paper.

Convenience materials—to which parks are particular prey—are major aggravators of the SWD problem.

Despite the environmental fervor of our times, the SWD problem is beginning to assume magnitudes that are threatening the very inhabitability of our cities—to say nothing of the much more fragile ecological, esthetic, and sanitary conditions in our parks.

Thus the SWD problem in the parks becomes but a single aspect of the bigger problem, which is hitting people where they live, but not yet with the sense of true crisis that will make them drop everything to attack solid waste.

Park people may disdain the terminology, but a park is an industry in its own right: its business is processing people. People, mostly Americans who don't really want to vacate their standard of living any more than absolutely necessary, make the park business a government-to-people direct relationship.

In processing people, i.e., accommodating them in terms of standard norms and acknowledging their fundamental rights of ownership within the parks, park administrators owe their visitors something more, something almost akin to parenthood: the privilege of preserving the parks from the damage inherent in the vast numbers of visitors and their inevitable wear-and-tear—all with the best will in the world.

This means an effectively ongoing, even unending, supervision of the activities of park visitors in terms of who's doing what, and how, with solid waste: where does it accumulate in quantity, where does it crop up in specific areas, and how can the whole problem be made manageable through information, education, a sense of pride-versus-shame, penalties, whatever.

In some less-than-Orwellian future, park visitors may be required to post bonds or deposits on waste containers, which they'll return when they leave the parks. Solid waste litter is to a park just about what shoplifting is to a store: a drain on its basic raison-d'etre.

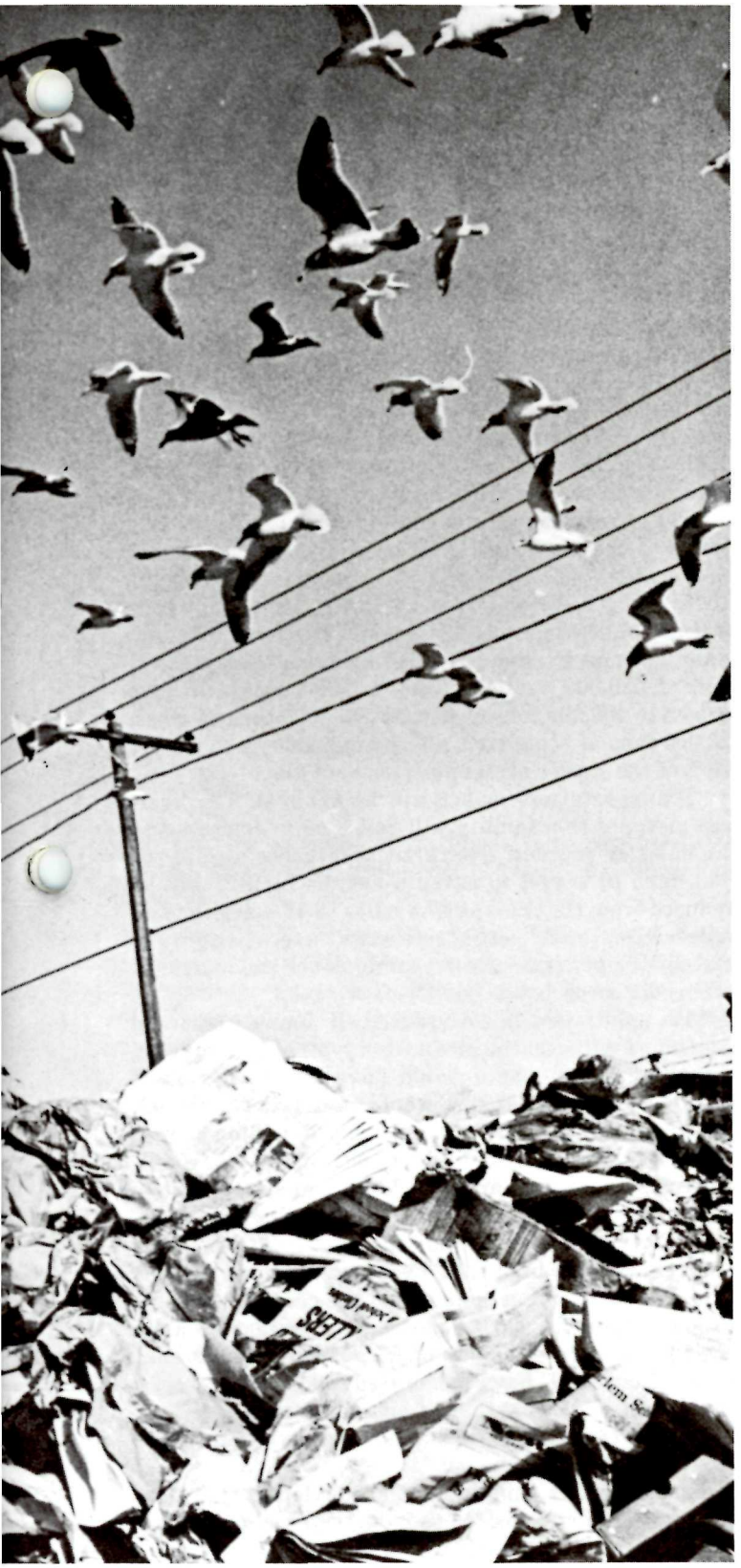
Surely one tempting idea in park SWD would be a few tons of prevention: what people don't bring in, they can't leave around, thus transferring some of the park SWD problem to the larger society, where somewhat more Spartan consumption patterns—hitherto unthinkable—could ameliorate the problem.

Perhaps park visitors should be required to 'rent' a litter bag or other container for a sum that may qualify as noticeable in these inflationary days, $5.00 say—returnable on redeeming the litter container after the park visit ends.

But all this may be deemed either pre-mature or unworkable or even un-American. Such, however, is the

mounting problem of SWD that here, too, the unthinkable becomes worth thinking about. In any event, people, park personnel, and parks themselves present a diversity of challenges that resist easy generalities.

What seems fairly clear to Americans, perhaps above all other people, is that no forseeable technology is



going to solve any of our major social and national problems, SWD included. What is needed, apart from brilliant hardware and systems, is some kind of fundamental human recognition that we must change our *ways*, viz., our *behavior* as well as our technologies.

A changing technology, however, is generally perceived as 'progress,' while changing behavior smacks of 'oppression,' especially where it demands positive action or work not previously required. To ask a family to dispose of its own garbage outside the park would certainly create flak waves—in neighboring areas as well as among park visitors. To dispose of solid waste by excavating park lands, or even by extending them into adjacent oceans, is the kind of megathinking that must await the wisdom of the larger society—along with megaplanning and megadoing and the requisite number of megadollars.

In the meantime, the sheer mass of people and their gear is beginning to bulldoze away many of the basic reasons for having parks at all. Is a park just another man-made facility to be used and consumed, or is it something different from everything man has 'created'?

You've just got to know the answer to this purposely rhetorical question! If a park isn't a place where people can get some relief from the everyday impact of daily life and ongoing urbanism, of getting and spending, then it's less than the least of us expect from it. Whatever else a park may supply in the way of nature's grandeur, bounty, beauty, and abundance, it must add up to a psychic value for those who visit it.

And let's face the nub of the challenge: for every park visitor who walks to the drum of a Thoreau or a Muir, there must be a thousand or more who don't and these range the spectrum between the no-nothing despoiler/vandal/litterbug to the more 'respectable' types who mean no harm, but who leave reminders of their visit in solid terms—not just in the trailer parking area, but even on the tops of the high mountains and in the bottoms of deep canyons, people who carry a lot of 'civilization' with them wherever they go.

Or, for that matter, any park visitor who demands the niceties of life—from a clean bed to a gourmet meal and room at the lodge—makes his own special impact on park and ecosystem: thus garbage, solid waste included, becomes as inevitable as death and taxes. In lodge or tent, a visitor is a visitor is a ...

No foreseeable enlarging of the parks, nor any believable limitation on the number of visitors, will do much more than mildly mitigate the SWD problem—until people themselves, through some combination of education/proselytizing/discipline/motivation, create more parks for their growing numbers, better technologies to cope with their unavoidable impact, and behave in accordance with high regard for the parks and what they mean.

In the meantime, tactical coping with the SWD problem is the best we can hope for: the grand strategy still lies somewhere in the wings, waiting for all of us to care enough to begin elaborating it.

The tactical job is best described as the job we're doing today, whatever its merits and demerits, whatever the reasons why it may not be satisfactory to any of us. No one has precise statistical figures for parks per se—city, state, national—but they are the most sensitive areas in our land, where every litter bit hurts more per pound—arguably—than it hurts elsewhere.

How one environmentally-conscious state, Connecticut, hopes to cope with Solid Waste Disposal as part of an overall environmental program. How Connecticut's state parks cope with solid waste.

Of all the industrial states where the solid waste disposal problem is most pressing, Connecticut is furthest along in elaborating the big plans the challenge demands. Under outgoing Connecticut Commissioner of the Department of Environmental Protection, Dan Lufkin, working with General Electric has come up with a statewide solid waste disposal program that promises to be 'revolutionary' in cutting across traditional jurisdictions and practices.

A 1971 state law gave the state itself responsib lity for long-range SWD programs. The prime idea is 'resource recovery,' or 'Why waste waste?'—and the hope is that the figurative SWD albatross can be persuaded to fly.

The Connecticut Department of Environmental Protection has unveiled a 20-year, $295-million blueprint for a solid waste disposal system. It calls for Connecticut to build 10 "resource recovery plants" at the rate of more than one each year beginning in 1976. The plants will separate bulk refuse into reusable materials such as aluminum, glass and ferrous metals, which will be sold. What little remains will be carted away to landfills.

The state plans to build 45 centers where garbage will be collected and shipped to the recovery plants by truck, barge or rail. The plans also call for the overall reduction of landfills from 144 to 32 and for 18 new regional landfills for a total of 50 landfills.

Once the system is built, annual operating costs are expected to be around $50 million. The system is to become self-supporting through user fees and the sale of recycled waste.

Briefly, the system works like this: Incoming refuse will be shredded to eight-inch particles, then sent through a series of vertical zig-zag passages where an upward blast of air will separate it into light and heavy materials.

Lighter materials such as paper and plastic will be carried up to a storage bin while dirt, rocks, glass and metal will fall into another. The lightweight matter eventually will go through a "combustible separate" where embedded glass and inert particles will be removed. What's left will be shredded to one-inch particles and stored for fuel.

Appropriately enough, it's GE's Space Division that came up with the SWD plan; it's hoped that the proper mix of technologies, possibly highly innovative and destructive of present techniques, will prove cost-effective and attractive to the public—even though it may mean entirely new habits of SWD for towns, cities, counties, and individuals.

The summary of the proposed plan prepared by General Electric states:

"The most striking change will occur in the method of waste disposal. Between 1973 and 1985 the total waste produced will grow from 3.2 million tons per year to 5 million tons. Today, about one third of that is handled by incinerators, the remainder is landfilled. By 1977, 8 incinerators will have ceased operation even though the waste generated has climbed to 3.7 million tons. Nineteen percent of that waste will be going into resource recovery plants. Landfill consumption will decrease even with increased waste. By 1980 the tide of refuse will have risen to 4.1 million tons, but just about half of that will go to resource recovery plants. By 1985 virtually all incincerators in the state will no longer be needed. Resource recovery processes will be operating on 4.2 million tons out of a total of 5.0 millions tons generated.

"The consumption of land for landfill use will have dropped from the estimated current rate of 192 acres per year to 31 acres for commercial and residential waste and 46 acres for construction and demolition in 1985. The 1985 fill material will be basically inert, bringing an end to the leaching problems of fills.

"The growth of resource recovery can be measured in terms of the materials and energy being produced for sale. In the first full year of operation, 1977, the system will recover 72,000 tons of ferrous metals, 47,000 tons of glass, and 4,000 tons of aluminum. The energy recovered will amount to the equivalent of 650,000 barrels of oil. In 1985, this will have grown to 406,000 tons of ferrous, 267,000 tons of glass, 23,000 tons of aluminum, and enough energy to supply 10% of the state's present electrical power.

"Transportation impact will be minimal. The average distance to a facility will be 6.3 miles compared to 3.8 miles at present. The furthest distance a collector will have to travel to reach a system facility will be reduced from the present 17.8 miles to 15 miles. The increased cost of collecting refuse will average approximately 40¢ per person per year to cover the increased travel distances to the facility.

"Air pollution will be reduced. If Connecticut had continued with the burn and bury strategy, roughly one third of the waste would have been incinerated. Assuming the incinerators would meet Federal air pollution requirements, this would dump 15 million pounds of particulates, 5.96 million pounds of hydrocarbons, and nitrous oxides, and 1,047,000 pounds of carbon monoxide into the atmosphere. The baseline system design cuts out essentially all the particulate emission and reduces the unburned hydrocarbons and nitrous oxides to 2.51 million pounds and the carbon monoxide to 860,710 pounds yearly. The baseline system has a net energy recovery efficiency of 56.2%. This means that Connecticut will have generated additional energy equivalent to 780,000 tons of oil even after the energy necessary to run the trucks and operate the resource recovery plants is deducted."

Implicit in this thinking is the conviction that government authority wedded to industrial techniques are essential to success, that the problem is bigger than the usual small-scale government units can cope with. A state authority in charge of SWD is envisaged.

In the meantime, the Department of Environmental Protection has the delicate task of persuading local SWD authorities to make their own current plans in awareness of the long-range program that is forthcoming: in other words, to think 'regionally' rather than

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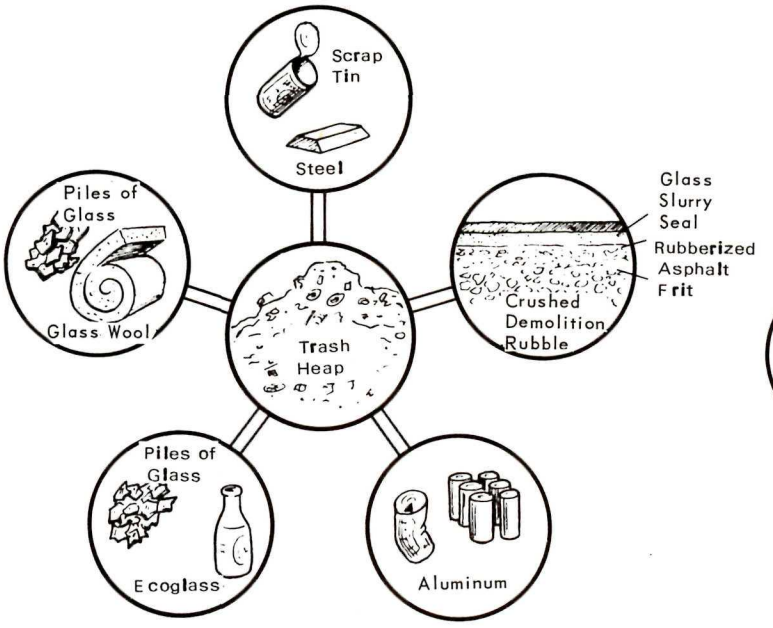

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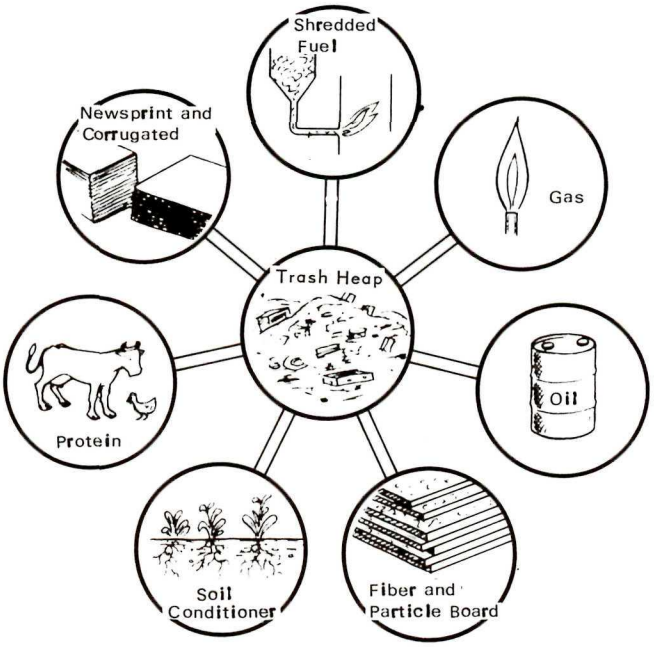


'locally,' or in terms of 'fitting in' any new facilities with a master plan that is not yet even on the drawing boards.

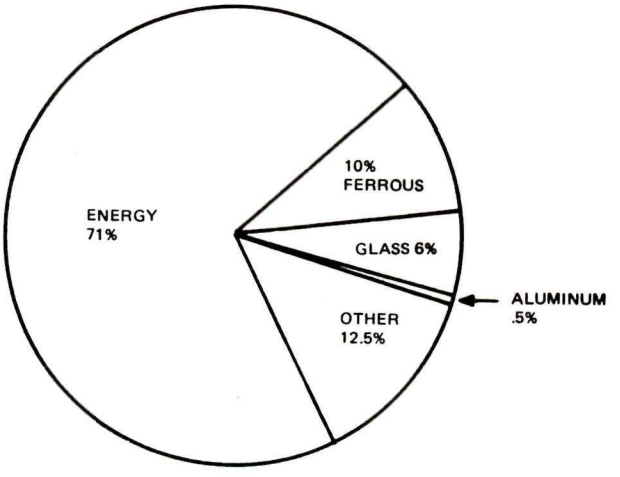
Basically, Connecticut's plan for SWD relates the problem to such concepts as an inventory of solid waste generation; an assessment of current and possible SWD technologies; a perspective of the impact of new plans on the environment itself, but also on commerce, natural resources, industries, employment, and present-day interests/activities/responsibilities.

Americans, however, have lived with huge plans for a long time—involving such programs as highway construction, Medicare, poverty, education, and quite a lot else: we of all people on earth know enough to reserve all kinds of judgment until we see working systems producing recognizable benefits. SWD technologies promise much, but in the short run we all get older.

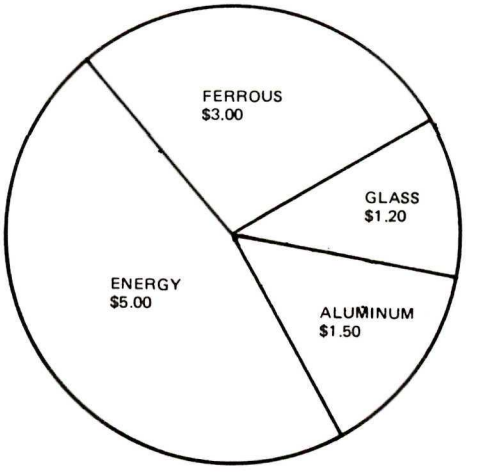
Moreover, the idea of SWD as a park problem as well as a problem of settled areas exists marginally at best. Take the definition of solid waste by Connecticut's Director of the Office of Solid Waste Management Programs: 'Urban ore,' he terms it, citing potentially high recovery rates of valuable materials.

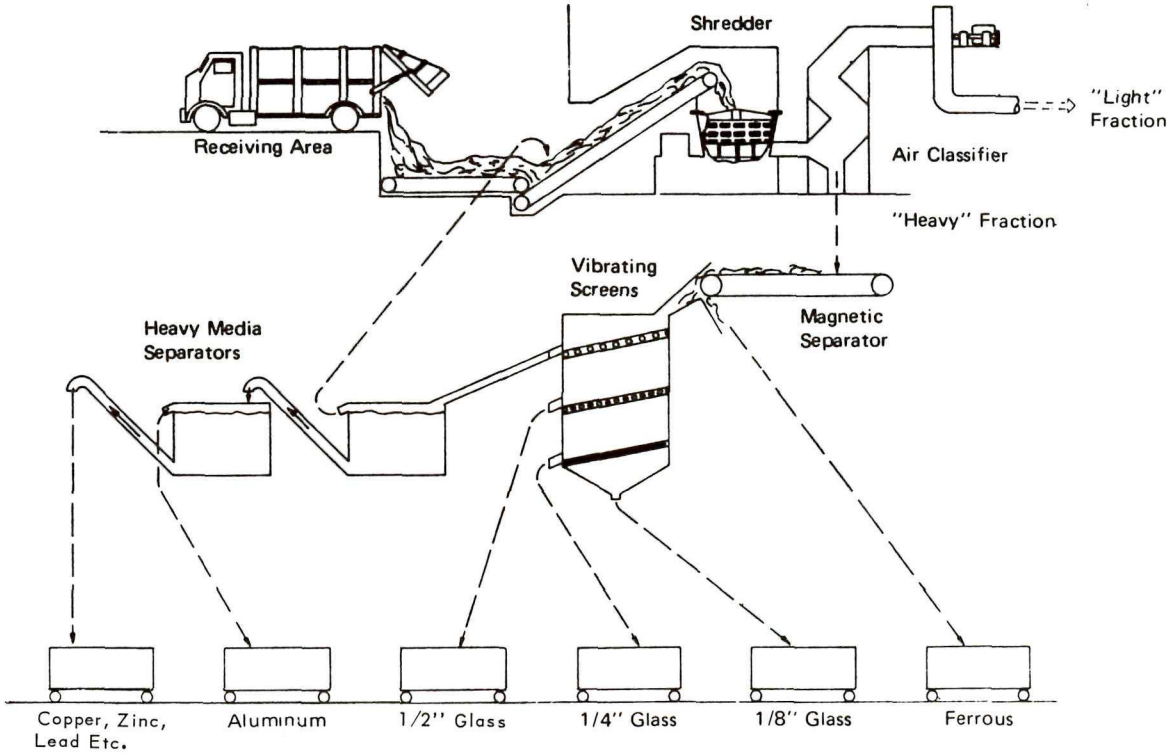
WHAT'S IN A TON OF WASTE

BY WEIGHT



BY VALUE





PROCESS MATERIAL RECOVERY SYSTEM

To Director Robert L. Schulz, solid waste is 'America's Only Growing Resource.' In a series of papers and interviews Mr. Schultz made a number of points on SWD that, conceivably, could have special relevance to park people:

- Replace the 'Get Rid of It' philosophy with a 'Let's Use it!' philosophy. With solid wastes some 20% 'resource-recoverable' today, this percentage must rise if 'profit potential' is to become attractive. New technologies, still to be determined, are called for.

- Such SWD technologies can decrease pollution, ergo reduce environmental degradation, while at the same time conserve resources.

- The basic government role is to supply the legal authority, to oversee the public interest, and to lend the entire SWD technology a magnitude and a scope that would make it significant from the outset.

- The private enterprise role would consist of the traditional 'risk-taking,' plus the system design, management, and day-to-day operation within its purview.

- The mix of the public and private sectors would break new ground for 'interdisciplinary' government-industry cooperation in attacking social problems in general.

- A major problem, beyond the SWD technologies themselves, resides in 'something new,' i.e., the government proclivity for 'the traditional ways of doing things' that 'frequently have a hammerlock on budget processes.' Thus Connecticut, even within its single Department of Environmental Protection, must reconcile new SWD technologies, programs, and policies with older, established air and water programs.

What tends to make all this an interesting jurisdictional question of the near future is Director Schultz's concept of solid waste:

> '... almost every kind of waste that we process eventually ends up as solid waste—not only our garbage, refuse, and junk, but also sewage sludge, which is the end product of waste water treatment; liquids such as septic tank pumpings and waste oils; and soot and fly ash, which are often cited as air pollutants, are all considered to be solid wastes. In short, solids are the irreducible form of all wastes and everything that is not actually a gas, end up classified as solid waste.'

The most limited of imaginations has little trouble in foreseeing jursdictional questions in such a definition: not only which department—air, water, land—of an environmental agency of any kind, but who may be generating the solid waste and where it passes on its way to some kind of SWD technology, not only via air, water, and land but across political and geographical jursdictions.

Practically all foreseeable SWD technologies involve recycling, which is incineration with a resource-recovery intent. Whether these good intentions will suffice to raise the low image of incinerators per se is a matter awaiting the actual systems design and the location of recycling facilities—to say nothing of the cost-effectiveness/resource-recovery/better-SWD totality.

In all the U.S. there are only about 300 municipal incinerators, recovering no more than 8-10% of the more than 200 million tons of waste collected every year by public and private agencies. Most are either poorly designed or inefficient or both, tending to be highly visible and undeniably ugly as they pollute the air first, then the land and water as the pollution comes to earth. Moreover, they're so costly to operate that sanitary landfills are clearly preferable—as long as the land, a limited resource, can cope with solid waste, a growing resource.

Still, incinerators, even as they work today, reduce solid waste by some 50%. Scrubbers and precipitators can render emissions at least acceptable under current federal standards and regulations.

And, somewhere in dozens of urban horizons, are incinerators that will raise steam, recover minerals, and provide the 'thermal processing' that will turn solid wastes into fuel to power generators and provide energy. All this, however, is an enormous subject in itself—larger than park people can cope with on any practical near-term basis.

Whether Connecticut's SWD activities will affect the state parks in any significant way remains to be seen. At this writing, the statewide scope of SWD, designed for maximum recovery of materials and energy when and if GE's statewide recommendations materialize, is bound to affect Connecticut's present SWD system at the state parks.

The Connecticut State System conducted a survey of refuse disposal practices in 1970. Twenty of the existing 64 parks (23 more are proposed) had on-site open-face dumps. Two operated sanitary landfills. Of the remaining 42 parks, 18 used community disposal sites, 11 disposed of refuse at the onsite dumps, and 12 parks generated no refuse at all.

There were also 12 recreation areas in state forests. Two of these operated open-face dumps. The other 10 areas used community sites.

Compaction and cover equipment was shared when available—only a few times a year at most sites. Most of the parks generated only a few yards of waste every week, and an imposing variety of trucks shifted to solid waste from each park to the disposal sites.

Looking back to this set-up, senior sanitarian Thomas H. Pregman, of the Solid Waste Management Programs staff in the Department of Environmental Protection, sees 'excess manpower' as only one of the inefficiencies of the SWD system.

Basically, these resided in the limited SWD technology of a lot of trucks making a lot of trips.

The present SWD system in the Connecticut state parks and recreation areas, which Mr. Pregman considers quite an improvement, is itself but an interim program that awaits the GE recommendations. As of mid-1973, several open dumps in the parks and forests were closed after a rodent-baiting program, giving way to three regional sanitary landfill operations serving 19 park and forest recreation areas.

Regional SWD facilities—serving the parks and forests along with everyone else—are seen as part of the forthcoming statewide SWD system that will eventually free the state parks and forests per se from SWD activities.

Two of Connecticut's largest parks—both along Long Island Sound—have special SWD facilities. Sherwood Island State Park has installed a trailer-compactor unit operated as a transfer station; solid wastes go directly to the nearby municipal incinerator. Hammonasset Beach State Park uses the Lodal Train Transfer System, which utilizes a 'mother truck' (sic) to pick up solid waste at two neighboring parks before dumping the total load at a nearby community disposal site.

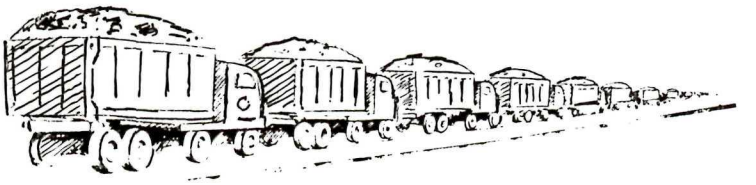
Mr. Pregman highly recommends using these trailerized containers, especially early in the morning before the public is about, by which time the mother truck is off and running to pick up the trailers at a convenient spot for disposal transfer during the most active times of day.

Currently, Connecticut hopes to use this system for a 10-park area in the northwestern part of the state, which is now involved in separate transfer to one of the three sanitary landfills noted above. The state parks department also employs a smaller packer truck to collect on a regional basis from five of the other nine sites using these landfills, thus freeing a good number of personnel and vehicles from day-long refuse collection duty.

Mr. Pregman believes this system allows for more efficient collection in the parks and has resulted in better environmental protection. Moreover, when and if the statewide SWD system comes into effect, he believes the present methods will 'fit in.'

What the Connecticut park system wants most, Mr. Pregman says, is to get out of SWD completely. This sentiment, re-echoed nationally, portends the larger and larger regional, statewide, and even national SWD systems that may eventually respond to the problem.

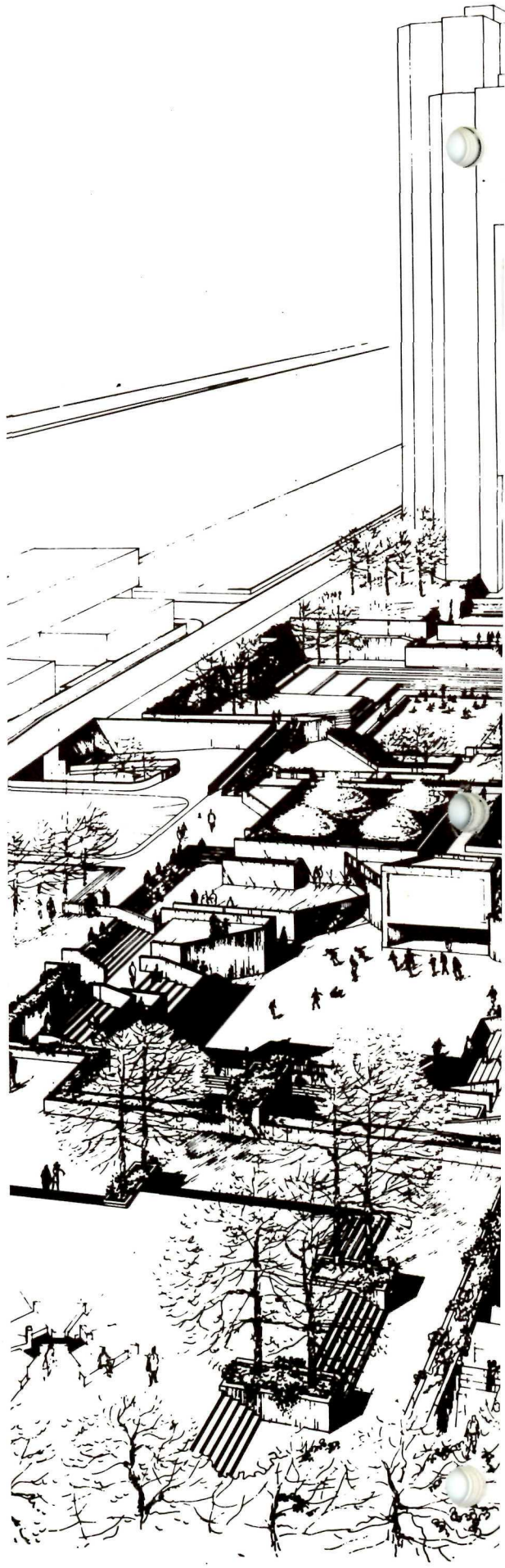
'Solving the problem,' an ancient American ethos confronting just about any problem, may be out of the question in terms of American custom, tradition, folklore, and habits of consumption. Come something akin to a revolution in the kind of people we are, SWD will always be a persisting challenge: our rising population alone will whittle away at the effectiveness of any ecological/environmental remedies we may put into practice—and even Zero Population Growth (ZPG), can have little effect unless consumption/disposal patterns change drastically. New technologies may turn out to be only partial, temporary responses to the problem.



THE HARLEM RIVER BRONX STATE PARK

An experiment in urban recreation

By Dorothy Bajak



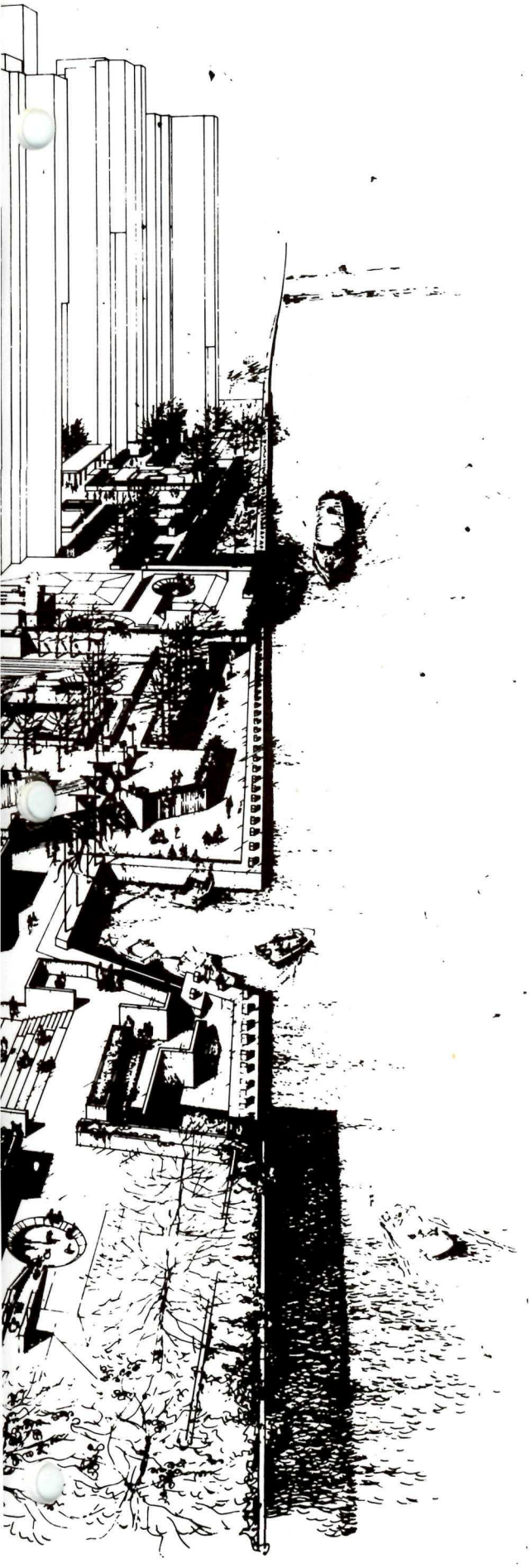
There is a new park in the Bronx borough of New York City. The "new" feeling permeates the park, from site tfansformation to program planning. The creators hope that the Harlem River Bronx State Park will provide new answers for some urban recreation problems.

The Park was officially opened on August 15, 1973 by Governor Nelson A. Rockefeller and other officials of New York State who have been working since 1967 to bring state parks to New York City. In his remarks, the governor recognized the fact that the Park was made possible through the cooperative efforts of local, state and federal governments in establishing and funding the project. He noted that the Park would not only provide recreational facilities "in a swift-moving, pressure cooker society" but would also provide a place where people could "check their cares at the gates. . .where they can refresh the spirit and renew the soul."

Many of the traditional concepts about parks and recreation are no longer workable in the large urban areas of our country. Open spaces devoted primarily to sports activities have fallen victim to vandalism and misuse. Many recreation planners feel that the urban setting should involve a broader range than outdoor games, pools, etc. which have been traditional activities of most parks. It is felt that there must be a commitment on a broad scale, to serve the community with a wide range of activities.

New York City park personnel have been aware of these problems and have been adapting sites and programs to meet changing needs. But the City is large, and areas in need of attention outnumber available City funds and personnel. In the south and west parts of the Bronx the need has been particularly great, and New York State is building the new Park so that the quality of life in that area can be improved.

At ground-breaking ceremonies in 1971, Mr. Lawrence C. Burr said, "We are not in competition with the City to see which can bankrupt itself first by building the largest number of parks. We are seeking to increase both facilities and services among residents of this state park region, particularly in those areas which are underserved and underdeveloped."



New York State has a good—and extensive—park system, but almost all existing parks are accessible only by automobile. Planners decided that the state should serve urban neighborhoods where people don't have cars. The traditional concept of the state operating only in the hinterland regions while doing nothing about recreation needs of the urban regions was deemed obsolete, and so the nation's first state park within a city was conceived. While the park will be open to everyone, it is designed to serve primarily the surrounding community.

On June 2, 1972, Governor Rockefeller signed a bill enabling the State Park Commission for the City of New York and the Urban Development Corporation (UDC) to develop a state park and residential community on the banks of the Harlem River. The 23-acre site stretches 3,000 feet along the river between 176th and 180th Streets. Fuel depots and automobile junkyards were levelled with bulldozers as the first step of the transformation. Plans call for housing to comprise 4 of the 23 acres. There will be 1,655 units for low and middle income tenants, including senior citizens, ready for occupancy in 1974-75. A day care center for 100 pre-school children will be included in the complex as well as a mini-shopping center and decked parking facilities. A combined elementary and intermediate school for 1800 students will be built utilizing the airspace above the Major Deegan Expressway.

The park will be completed in phases. The first two construction phases, costing about 10 million dollars, were started in April, 1971 and will be completed in 1973. These include:

A three-level Community Activities Center with double gyms, locker space, lecture and craft rooms, snack bar, staff offices and terraces.

A swimming complex consisting of an Olympic-size pool, diving pool, children's pool and toddler's pool, with a combined capacity of 2,000 bathers.

Bulkheading to reinforce 2,000 feet of riverbank.

Pedestrian and bicycle paths along the river.

Improvement of road access on West Tremont bridge, now going over Major Deegan Expressway and Penn Central tracks, plus construction of new access bridge with UDC.

The pools began operation on Opening Day, but extensive work remains on the Activities Center, road accesses, etc. Future phases will be completed when funds are available. These will provide softball diamonds and basketball courts, picnic areas, bulkheading of an additional 1,000 feet of waterfront and an environmental education and cultural center at the northern end of the Park.

The Harlem River Bronx State Park will be operated by the State Park Commission for the City of New York with Mr. Claude Shostal as General Manager. Mr. Richard Ortiz, a 29-year old Bronx resident is Director of the Park. The staff, upwards of 100 people including seasonal personnel,

Photo by Bill Mitchell

General view of swimming pool and recreational facilities building at Harlem River Bronx State Park — the first state park in New York City.

will be divided among three areas: Maintenance, Security and Program. All three are deemed critical. Maintenance will be constant and thorough because it is hoped that a clean and attractive area will be a source of price to the community and will lead to efforts to preserve the beauty.

To provide upmost safety without a police-state atmosphere, security is handled on two levels. There is a basic corps of 15 State Park Police, well-trained and equipped, who will provide prompt strict enforcement of rules. The traditional police are supplemented with paraprofessionals called community relations assistants, neighborhood youth in their teens or twenties, whose purpose is to stop trouble before it starts. They circulate among their peers in efforts to prevent vandalism, promote community pride and keep little squabbles from growing into big fights.

In the program area, the Park hopes to be particularly innovative. As an example of plans to depart from conventional methods, Mr. Ortiz cites the projected swimming program. The pools can be heated and will be bubbled over during the winter months to allow year-round operation. The conventional system of "Pay a fee—25 cents—and Swim" is in effect most of the time, but additional programming is planned. Plans include:

1. A time will be set aside for senior citizens to enjoy the warmed water and improve their physical fitness.

2. An ongoing program for handicapped people will be set up. Park personnel are working with colleges in the area to make arrangements for their students to assist with the activities which will use the pool in off-peak hours.

3. Since no grammar schools or junior high schools in the area have pools, it is hoped that an arrangement can be made to bring children to the pool through the winter on a one-morning-a-week schedule.

4. Instruction will be provided in swimming, first aid and lifesaving.

5. Swimming meets will be organized throughout the year.

The Community Activities Building is not completed, but will offer activities for all age levels. The Building will contain a senior citizens' center, a teenage center and a preteen center while other rooms will be used for classes and activities requested by the community. The Program Coordinator, Ms. Shirley Morris, indicated that programs will start as facilities become available. Meanwhile, there is a great deal of activity in the program area.

Ms. Morris stated that all facilities will be utilized by all age groups and both sexes. Activities will be planned in the game room and in the gyms to insure utilization by females as well as males. Activities for families are planned, as well as tournaments in ping pong, pool and other competitive sports. Classrooms will be used for crafts and performing arts instruction; for example, an audio-visual class is planned where participants will shoot film and then show their results at the Park.

Photo by H. Bernstein Assoc., Inc.

Overall view of the park looking North. In the immediate foreground is a parking area for a housing complex. An olympic-size swimming pool, diving pools, and community activities building are in the center. The globe and tower belong to New York University. Land just beyond the NYU property will be developed in future phases as a part of the park.

A Leader's Club has been formed comprised of young teenagers who have shown an interest in the Park, contributing effort and ideas on a day-to-day basis. During the first week that the park was open, five neighborhood women volunteered to help and were given assignments.

Mr. Burr, Assistant General Manager, has said that the indoor and outdoor programming will try to "work with problems of recreation in a comprehensive manner. The Park must participate cooperatively not only in developing sound bodies with physical skills; it must at the same time create personal inner resources demanded by the times in which we live."

The State Park Commission is seeking extensive community involvement so that the park will really be an instrument of community fulfillment and enrichment. In staffing, high priority has been and will be given to Bronx residents at all levels. The majority of present employees have been referred by neighborhood groups. A community Advisory Board has more than thirty Bronx leaders working in areas of Public Relations, Maintenance and Operation, or Program. This Board participates actively in planning and carrying out Park activities. A task force on program services has been at work for some time. The task force is made up of representatives of colleges in the Bronx, environmental education institutions in the Bronx, cultural groups, public schools and other community organizations. The force will present a proposal to the Advisory Board suggesting program guidelines which reflect the needs of the community.

The planners hope that the Park will be "more than a recreation area. The role of the park will not be limited to serving individuals and groups interested in direct services, but will become a means of dealing with larger community problems and providing a needed structure for collective expression and action."

In all stages of planning, the State Park Commission has been working with New York City parks personnel. The City has looked at building plans and made recommendations regarding building changes such as wider doors, circulation flow and access to locker rooms. Materials that have proven vandal-resistant in City parks have been incorporated into the new park. Program coordination will be ongoing to insure that there will be no duplication. The Harlem River Bronx State Park will fully utilize the City Park Department's resources such as mobile recreation vans and travelling theatre productions. The New York City police department has been very helpful in the planning stage and will be vital to successful operation of the Park. Neighborhood groups such as Y's and settlement houses have been contacted for assistance, and arrangements have been initiated with the Bronx Botanical Gardens and the Bronx zoo for program liaison.

What will be the future of the Park? How will the plans work out in actuality? Larger questions are up for answering . . . Can an "institution" thrive in a disadvantaged community? Is it possible to relate to alienated youth so that they will become involved in improving the program rather than destroying the facilities? Mr. Shostal has said, "We're making every effort to involve them—to make it their park—one they can be proud of. If we can't reach them, then there's a bleak future for urban areas." Today, in the Bronx, there are many dollars and many people working for a future that is bright.

Some capacity theory for parks and recreation areas

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Photos by Bureau of Outdoor Recreation

BY RENDEL B. ALLDREDGE

I. THE CAPACITY PROBLEM

Public patronage of Federal recreation areas rose from fifty-four million visits in 1940 to eight hundred thirty-four million in 1970. Simple extrapolation of the rate of increase forebodes a public use level of over *fourteen billion* visits in the year 2000! These millions (soon to be billions) of visits are made by people who are picnickers, campers, sightseers, boaters, swimmers, sunbathers, hikers, birdwatchers, amateur and professional naturalists, bicyclists, rockhounds, history buffs, mountaineers, students, scholars, water skiers, yachtsmen, snorklers, scuba divers, archaeology buffs, wanderers, and idlers. Their transects of the population include the virtuous and the sinful, the destitute and the opulent, the genius and the dolt, the black and the white, the hippie and the square.

The amount of land (space and resources) on which these millions (to become billions) of visits occur is not extensible without limit. Indeed, many recreation, sites, resources, or facilities are not extensible at all.

The consequence of increasing public use that is being made of the limited resources must be clear. Indeed, the consequence is twofold: the recreation resource itself will be abused or destroyed beyond its power to provide recreation experience; *and* the congestion of human beings on the lands and waters will reduce the recreation experience to a nominal or non-existent state.

The problem to be addressed is: what is the capacity of any given park or recreation area? What is the limit in terms of either the number of persons occupying the area at any one time, or the number of persons who flow through the area during any specified period of time, such that the recreation area retains its identity as a recreation area?

This paper devotes itself first to defining what is meant by the capacity of a recreation area solely in terms of its ability to absorb public use, and, second, to determining that capacity in terms of managerially meaningful cardinal numbers. It leaves the problems of what to do about situations where public use encroaches upon or exceeds capacity to other endeavors.

II. CONCEPTUAL CONSIDERATIONS

At the outset, it is important to set forth a definition of recreation area capacity which has a single, clear, and specific meaning. Note that, for purposes of this paper, the terms "park" and "recreation area" are used interchangeably. A distinction is not necessary here. Moreover, the definition of capacity must be such that the capacity of any recreation area can be unambiguously and definitively determined. This turns out to be difficult, if not impossible.

The concept itself is slippery. The definition differs according to the way one refers capacity to things (resources) or people. The measurement of capacity depends on the time period over which the measurement is to be made.

Aggregate Public Use Patterns. Recreationists may be said to "use" a recreation area in one of two ways. They either occupy it or they flow through it.

Very broadly, areas which feature kinesthetic recreation are occupancy-type areas. Thus, people go to a recreation area to play, sit, eat, and/or drink. While there, they occupy, for a more or less extended period of time, a certain parcel of land. For such areas, capacity limitations occur in terms of space and the size of facilities. Capacity measurements occur as cardinal numbers.

Parks which feature sightseeing attractions are more aptly deemed "flow" areas. Visitors arrive, look, obtain edification or inspiration, and move on. Capacity limitations exist in the form of constraints on free

National Park Service Photo

"Flow Area" George Washington Birthplace NM

U.S. Army Photo

"Occupy Area" Lake Sidney, Lanier, Georgia

movement and as processing times—the number of minutes or hours required to see, learn, and feel. Capacity measurements occur as rates rather than as pure numbers of people.

The Non-Impairment Criterion. The recreation area capacity which is sought to be defined and measured in this paper is that number (or flow) of recreationists which can be permitted to enter or pass through an area for an indefinitely long period of time without significantly altering the recreation producing potential of that area. Thus, we are endeavoring to search for the maximum total potential yield of recreation experience which a particular tract of land, with its fea-

tures and facilities, can produce over its whole life. The maximum yield within any time period may be constrained by a number of factors. Among these are the ability of biota to recover from seasonal abuse during the intervals between periods of peak use, the possibility of developing alternating public use areas, so that periods of lying fallow can be set aside, and the intrusion of people into the recreation experiences of fellow recreationists.

Definitions of Capacity. Parks are not envisaged in this paper as tracts of land and bodies of water having certain biological, geological, or historical features on which a varying assortment of recreationist conveniences have been installed. Recreation areas are conceived, rather, as *repositories* of the *capability* to produce certain specifiable kinds of public enjoyment services. The services produced vary from the spiritual to the kinesthetic. The particular mix of services which may be taken from any particular recreation area varies with its enbounded physical resources, it size, location, climate, altitude, historical association, and so on.

The goal of recreation area management is to develop and operate the area so that, over a time period of indefinitely long duration, the maximum possible total public enjoyment *can* be produced. This management goal is similar to, but not identical with, "maximum sustained yield." The latter notion conveys the idea of a long continuing *constant* high level yield or harvest. On the other hand, maximizing total production of services over the entire life of the asset (the recreation area) permits wide amplitude in the actual or potential or permitted yield of services during any particular period of time. The total yield over total life concept thus permits accommodation to the periodic patterns of public recreation behavior, and for such aberrations as centennials, with intervening periods for resource recovery.

Given the total-potential-yield-over-whole-life criterion, it is necessary to define the maximum permissible yield for any period of time. That is, it is necessary to define the term "recreation area capacity." Three definitions are required, one for each of the three factors involved in the production of public enjoyment. These three factors are: the recreation resources (lakes, lands, mountains, memorials, etc.); the installed recreationist amenities (parking areas, trails, comfort stations, food dispensing establishments, etc.); and the recreationists themselves. The following definitions are offered:

1. *Facilities Capacity:* the maximum number or sustained flow of recreationists which can be contained in, or "processed" by, the installed visitor facilities at one time or during some given time period. This is an engineering definition. Alternatively stated, facilities capacity is the engineered *number* of people which installed facilities can handle. Facilities capacity is comparatively easy of determination.

2. *Resource-Bearing Capacity:* the maximum instantaneous number, or sustained flow, of recreationists such that the physical (natural) resources of the park will not be irreparably impaired for future public use. Resource-bearing capacity is mainly a biological conception. However, archeological and historical objects cannot tolerate more than some level of use without suffering permanent degradation. Alternatively stated, resources bearing capacity is the ecologically-determined *number* of people the biota or historical resources can withstand while maintaining, or being restorable to, their "unimpaired" state. The determination of resource bearing capacity is fairly straight-forward in theory, but it is both delicate and time-consuming in practice.

3. *Visitor-Carrying Capacity:* the maximum instantaneous number, or sustained flow, of recreationists in, or through, an area such that the total public enjoyment generated is greater than that generated by any other number or flow of recreationists. This is a socio-economic conception. The most important variable in this conception is congestion. Alternatively stated, visitor carrying capacity is the socio-economically determined *number* of people which maximizes total social benefit. The determination of visitor capacity is elegant and complex both in theory and in method.

Concepts ought not to be defined in a philosophic vacuum. They should have operational practicability. The operational impact of the above definitions of recreation capacity rests in the assumed existence of a public policy which asserts that, upon the capacity of a recreation area having been reached, management will institute some kind of procedures to constrain public use from any further increase. Thus, the reaching of capacity is a signal for action.

But, for any recreation area, all of the three definitions provided above will apply. The biota can withstand so much use and abuse; the facilities can process only so many persons; and human congestion can be tolerated only up to some level. It is important, therefore, to set forth some action criteria. Which definition shall be the governing one in any set of circumstances? Should a distinction be made between conditional and absolute capacities? —between temporary and permanent capacities? The following criteria scheme is suggested:

1. The absolute capacity is Resource Bearing Capacity. Under no circumstances should public use be permitted to exceed it. Moreover, resource bearing capacity represents the upper limit in planning and installing facilities.

2. For any given operating period, whichever of the three definitions produces the smallest capacity figure is the managerially controlling definition for that operating period.

3. Considerations of park or recreation area planning and development suggest these action criteria:

a. If FC<VC<RBC, expand installed facilities until FC = VC.
b. If FC<RBC<VC, expand installed recreationist facilities until FC = RBC, and constrain public use to the RBC level.
c. If VC<RBC<FC, eliminate or reduce installed visitor facilities at least until FC = RBC, and preferably until FC = VC.

d. If VC<FC<RBC, eliminate or reduce installed visitor facilities until FC = VC.
e. If RBC<VC<FC, retire or close down facilities until FC = RBC, and constrain public use to the RBC level.
f. If RBC<FC<VC, retire or close down facilities until FC = RBC, and constrain public use to the RBC level.

Adjustments in Capacity. It will become clear upon brief reflection that the capacity of any recreation area, determined according to any one of the definitions, is not frozen for all time. Capacities will be determined and fixed for specific time periods of pre-established duration.

Facilities capacity may be changed either by constructing new, or closing down old, visitor conveniences. Resource bearing capacity may be changed by policies, regulations, and controls which alter the people-to-equipment ratio (the primary operatant is, of course, equipment—private vehicles, camping equipage, and the like). Thus, resource bearing capacity varies in the same direction as the people-to-equipment ratio is made to vary. Visitor capacity can be changed by visitor flow controls which alter recreationist turnover rates during the relevant time period.

It is not among the purposes of this paper to explore and catalog the precise contrivances or methods by which capacity can be changed. Here, capacity will be assumed to be fixed for the time period during which operations are to be undertaken, In other words, we shall be concerned with recreation area operations covering such a short time period that new construction, operating procedures, and methods of resource protection cannot be changed. Thus, for the remainder of this paper, it will be assumed that it is not possible to alter recreation area capacity.

Within this constraint, we now turn to the derivation of principles and procedures for measuring recreation area capacity.

III. DERIVATION OF A MODEL FOR DETERMINING VISITOR CAPACITY

The first steps in deriving a scheme for determining the visitor capacity of a recreation area are to set forth the premises on which this scheme to be derived will be based and to indicate the methodology to be employed in performing the derivation. As to method, we shall initially lean heavily on specially constructed hypothetical, but nonetheless realistic, situations. They are hypothetical in the sense that they cannot be clearly identified with any particular recreation area or recreation event existing or occurring in fact. The reason for employing situations abstracted from reality is not to write a piece of fiction but to fix analytical attention on the critical properties involved in the derivation of capacity measurement procedure. Reality all too often obscures rather than clarifies. Special circumstances adhering to a known recreation area will, of necessity, cause the principles and procedures derived to be modified to accommodate to those special circumstances. But the principles and procedures can most clearly be understood if the conditions unique to particular situations are removed from view.

As to premises, we shall assume, in the hypothetical world we have constructed, that recreationist behavior is affected solely by the variable, propensity, motivation, or change under analytical consideration at a particular point in the analysis. This means simply that, for analytical purposes, we attend to one variable at a time. All other elements, even if they are really variable, are assumed not to change. More specifically, we shall be concerned for the most part in the remainder of this paper with one particular variable: the *number* of persons occupying a recreation area at one particular time.

At several points in the derivation, we shall assume that all other factors affecting recreationist behavior are neutral, non-existent, or unchanging. Of course, as the analysis proceeds toward building measurement *methods* (as distinct from measurement *principles*) we shall progressively relax the premises and lower the level of abstraction. When, ultimately, we turn to the prescription of procedures, we shall have returned wholly to the real world.

With these preliminary remarks, we turn now to one means of deriving a procedure for measuring the Visitor Capacity of a recreation area. It bears reiteration that the goal is to find that number of visitors which, for any recreation area, will produce a higher amount of total public enjoyment than will be produced for any other number of people.

A. *The Simplest Situation*

Let us engage in a hypothetical (but not entirely unrealistic) mental exercise. Imagine an area that is pure wilderness. Let the purpose of the wilderness area be the production of the maximum amount of "wilderness experience" for all of the persons who may enter it. Let the time period for the analysis be an arbitrary one described as follows: the period opens with totally vacant wilderness area, and visitors are assumed to enter, but no departures occur until after the close of the period. Next, assume that the intensity (quality, enjoyment . . .) of the wilderness experience can be indicated on a single scale of variable, namely, comparative solitude. Thus, the thrill of pristine nature, the visceral pleasure of exercise, and so on, are ignored. The only variable to be considered is solitude. Thus, personal enjoyment of the wilderness is assumed to be *inversely,* and solely, correlated to the number of persons present at one time in the wilderness area

Consider a wilderness area devoid of human occupants. One visitor enters. He experiences uncontaminated solitude. His enjoyment of the wilderness is, *ex hypothesi,* the highest possible that can be obtained by a person in the wilderness.

Suppose now a second person enters the wilderness. The two may or may not confront each other during their stay, but let us assume that each is somehow aware of the other's presence. The enjoyment of the first visitor is perceptibly, though not seriously, reduced by the mere presence of the second. Similarly, the enjoyment of the second is a wee bit less than it would

have been were it not for the presence of the first. Solitude is no longer absolute, but comparative solitude is very high. So the total enjoyment of the first and second visitors, taken together, is greater than that of the first alone.

A third person enters the wilderness. The same phenomenon occurs. The third person's wilderness experience contains just a little less enjoyment than that of those who preceded him. And again, the experience of the first and the second are weakened ever so little by the presence of the third. The likelihood of any one of the three intruding on the other two is sufficiently remote that solitude is substantially maintained. To reiterate, the lesson to be drawn from this hypothetical sequence of hypothetical wilderness lovers visiting a hypothetical wilderness is this: even though the arrival of the second visitor reduced the per person enjoyment from its previous level, the total enjoyment obtained by the two visitors was more than that obtained by one alone. Similarly, the arrival of the third visitor caused the average enjoyment to be reduced, but the total enjoyment obtained by the three visitors was more than that obtained by the preceding two visitors.

Suppose now we replicate the process of adding wilderness area visitors one at a time indefinitely. What happens in the process of doing so? Because a wilderness area is a pretty big place, a rather considerable number of persons can be scattered around so that the addition of one more visitor does not cut into the pleasure of his predecessors very much. But, *ex, hypothesi,* each succeeding visitor obtains less pleasure than his predecessors did before he arrived, and his arrival provoked a slight reduction in the pleasure of each of his predecessors.

It would seem clear that, for some time, each new visitor's enjoyment adds more to the total enjoyment of all the visitors considered together than he takes away from them. In other words, each new entrant results in a *net* increase in total public welfare or pleasure or enjoyment.

But the process of increasing total public enjoyment by adding visitors does not continue indefinitely. At some point in the number of added visitors, some visitor arrives whose pleasure from the wilderness experience is at a level (due to the reduction in the quality of solitude) where the addition of hiw own pleasure just equals the decreases in enjoyment which his entry imposes on the group occupying the wilderness. So the entry of that particular visitor *neither adds to nor subtracts from* total public enjoyment.

Suppose new arrivals continue to add to the number of persons already occupying the wilderness area. Each additional visitor will now obtain less enjoyment than his presence subtracts from those already present. Theoretically, visitors could continue to enter the wilderness until, at some point, the mutual intrusion and congestion having grown so great, the solitude experience reduces to zero. At this point, the enjoyment of the last arrival is zero, and he has, by his coming upon the scene, reduced the enjoyment of *all* of his predecessors to zero. At this extreme point, the enjoyment produced by the wilderness area is precisely equal to its production of enjoyment when there were no visitors. That is, zero.

Where does maximum total public enjoyment occur? It occurs at the point where the enjoyment obtained by the last arriving visitor precisely equals the decrease in enjoyment his arrival brought upon his predecessors considered together. Until that number had been attained, each additional visitor added more enjoyment than he took away. After that number had been attained, each added less enjoyment than he took away. Clearly, the point of equality between gain and loss in enjoyment makes the Visitor Capacity of the wilderness area. When that point has been established, the task of determining the Visitor Capacity of an area has been completed.

B. *The Derivation Illustrated*

A hypothetical numerical example may clarify the derivation of the maximum total public enjoyment and serve as a vehicle in extending the purely theoretical principle toward practical application in real-life situations. The table below tells the tale.

Let us imagine that it is possible to measure the human enjoyment of solitude in a wilderness setting. This would mean we can attach a number to each person's wilderness experience, that number corresponding to the amount of enjoyment he obtained.

It will at once be objected that the pleasure derived from a wilderness experience (or any other kind of recreation experience) is purely an internal psychological matter and not capable of mensuration. This is correct. But we are not concerned with whether or not enjoyment can be measured in some exact way. We simply pretend that it can be measured in order to construct an imaginary example to illustrate a theory and to develop a practical methodology. It will be shown later that the practical application of the theory to real-life situations does not require, and makes no use of, any device for measuring personal enjoyment. So, let's not get up-tight about the suggestion that we might be about to measure something that cannot be measured.

Suppose the first visitor to the wilderness area in our example above obtains 36 units of enjoyment as long as he is there all alone. For fun, let us denote those units of enjoyment as "enjoyils." The second visitor arrives. His presence reduces the enjoyment of his predecessors to 34 enjoyils each, and he obtains a like amount of 34 enjoyils. The arrival of the third wilderness lover reduces the enjoyils of each of his predecessors to 32 each, and he obtains a like amount of enjoyils (32). For simplicity, let each successive entrant depress average enjoyment by two enjoyils.

The table tells a complete story. Column (1) shows the number of persons present in the wilderness area. Column (2) shows the number of enjoyils obtained by each person then in the wilderness; i.e., column (2) shows average enjoyment. Column (3) records the total number of enjoyils received by all of the people then present in the wilderness area (Column 1 multiplied by Column 2). Column (4), "Incremental Total Enjoyils," shows the number of enjoyils added to (or subtracted from) Total Enjoyils caused by the entrance of each successive wilderness visitor.

It will be quickly discovered that Total Public Enjoyment occurs where Incremental Total Enjoyils equal zero—in this example, when the tenth visitor has entered. It is obvious that this is true generally: Total Enjoyment is at a maximum when Incremental Total Enjoyment reaches zero. This is necessarily true because each visitor entering before that point has caused total enjoyment to increase, and each visitor entering after that point has caused total enjoyment to decrease. Thus, the point where Incremental Total Enjoyment is equal to zero marks the visitor Capacity of the recreation area.

The table is followed by a graph, "Recreation Experience, the Simple Wilderness Case," in which the figures in Columns (2), (3), and (4) of the table are plotted against the number of recreationists in the wilderness, on the horizontal axis, and the number of enjoyils received by them on the vertical axis. For graphic convenience, enjoyils for the "Average" and "Incremental" curves are measured on the left-hand vertical scale, and enjoyils for the "Total" curve are on the right hand scale.

The graph shows clearly that total enjoyment reaches a maximum when Incremental Total Enjoyment is equal to zero. The intersection of the Incremental Total Enjoyment curve with the horizontal axis marks the number of visitors corresponding to the Visitor Capacity of the wilderness area.

It is unrealistic to believe that, in a wilderness area, the addition of a single visitor will really affect the enjoyment of those who have preceded him. This is obviously true of the second or third or fourth or . . . visitor. A wilderness area is such a large area that the second entrant will have no real effect on the first. However, suppose that we read the "Number of Recreationists" axis on the graph not as 1,2,3,4, . . . but as 10, 20, 30, 40, . . . or 100, 200, 300, 400, . . . or 1,000, 2,000, 3,000, 4,000, . . . Thus, it may be that the first 20 visitors will be unconscious of the effect on them of additional entrants until 30 have entered the wilderness; or the first 200, until 300 are hiking around; or the first 2,000, until 3,000 are tramping the trails.

Suppose the horizontal scale is read in hundreds in place of in units. Then the capacity of the wilderness area, in this example, is 1,000 + 50. That is to say, the Visitor Capacity is somewhere between 950 and 1,050 visitors. Similary, if the horizontal scale is read in thousands, the Visitor Capacity of the wilderness area of our illustration falls somewhere between 9,500 and 10,500 visitors. The example is now somewhat more realistic.

It will probably be agreed that such ranges are sufficiently small for purposes of making appropriate management decisions. This means that we do not have to know the Visitor Capacity of a recreation area down to the last digit. We need know it only with that degree of precision (within those margins of "error") appropriate to know when Visitor Capacity has been exceeded. The numerical ranges suggested above are certainly precise enough for that purpose.

RECREATION EXPERIENCE, THE SIMPLE WILDERNESS CASE.

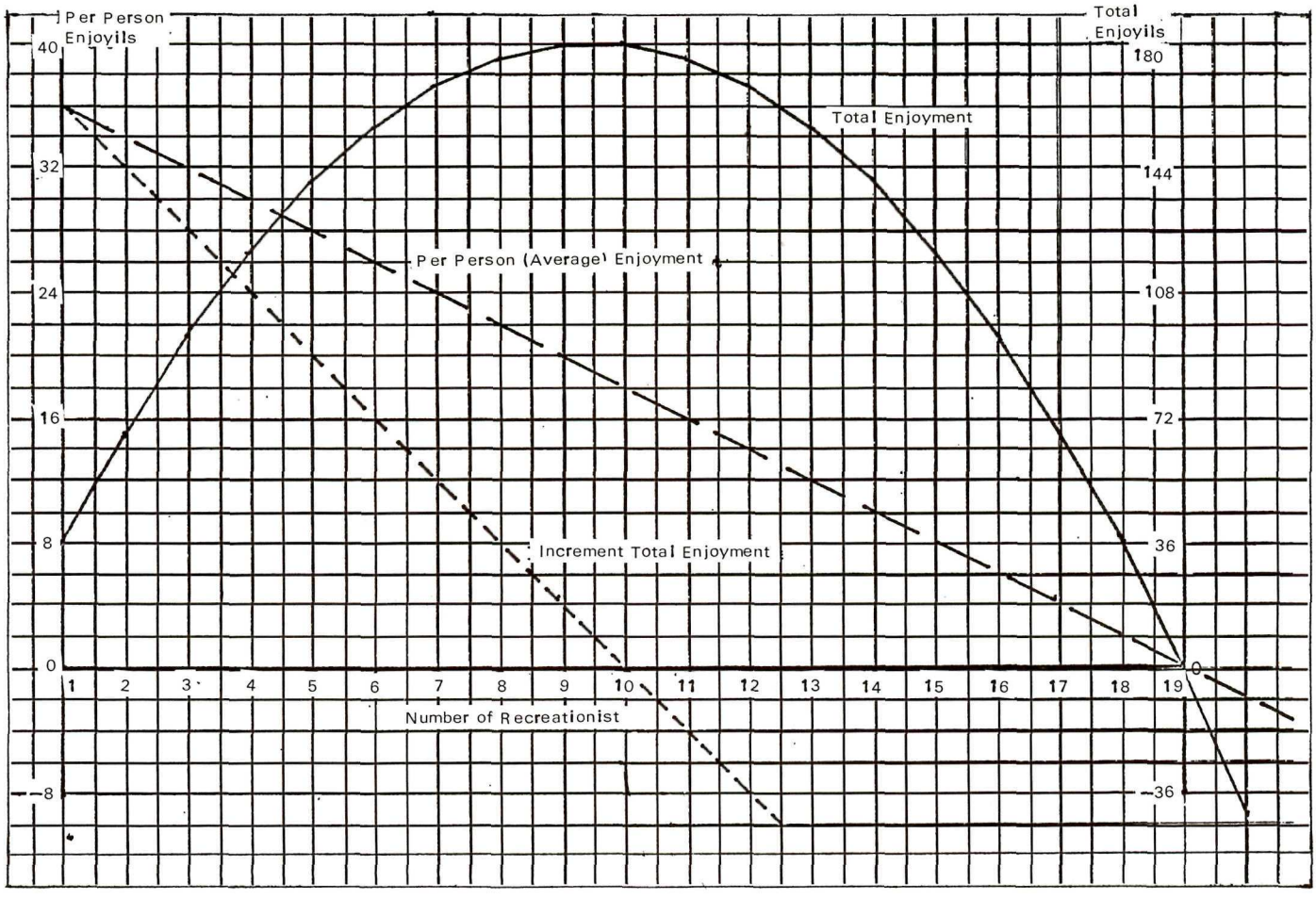
Col. 1 No. of Visitors —V	Col. 2 Per Person Enjoyment (Enjoyils)	Col. 3 Total Public Enjoyment	Col. 4 Incremental Total Enjoyment
0	0	0	0
1	36	36	36
2	34	68	32
3	32	96	28
4	30	120	24
5	28	140	20
6	26	156	16
7	24	168	12
8	22	176	8
9	20	180	4
10	18	180	0
11	16	176	-4
12	14	168	-8
13	12	156	-12
14	10	140	-16
15	8	120	-20
16	6	96	-24
17	4	68	-28
18	2	36	-32
19	0	0	-36
20	-2	-40	-40
21	-4	-84	-44

C. *The General Case*

Another step toward realism can be taken by dropping the notion that average enjoyment begins dropping immediately after the first person enters a recreation area. Indeed, it may very well turn out that the company of other people enhances the recreation experience.

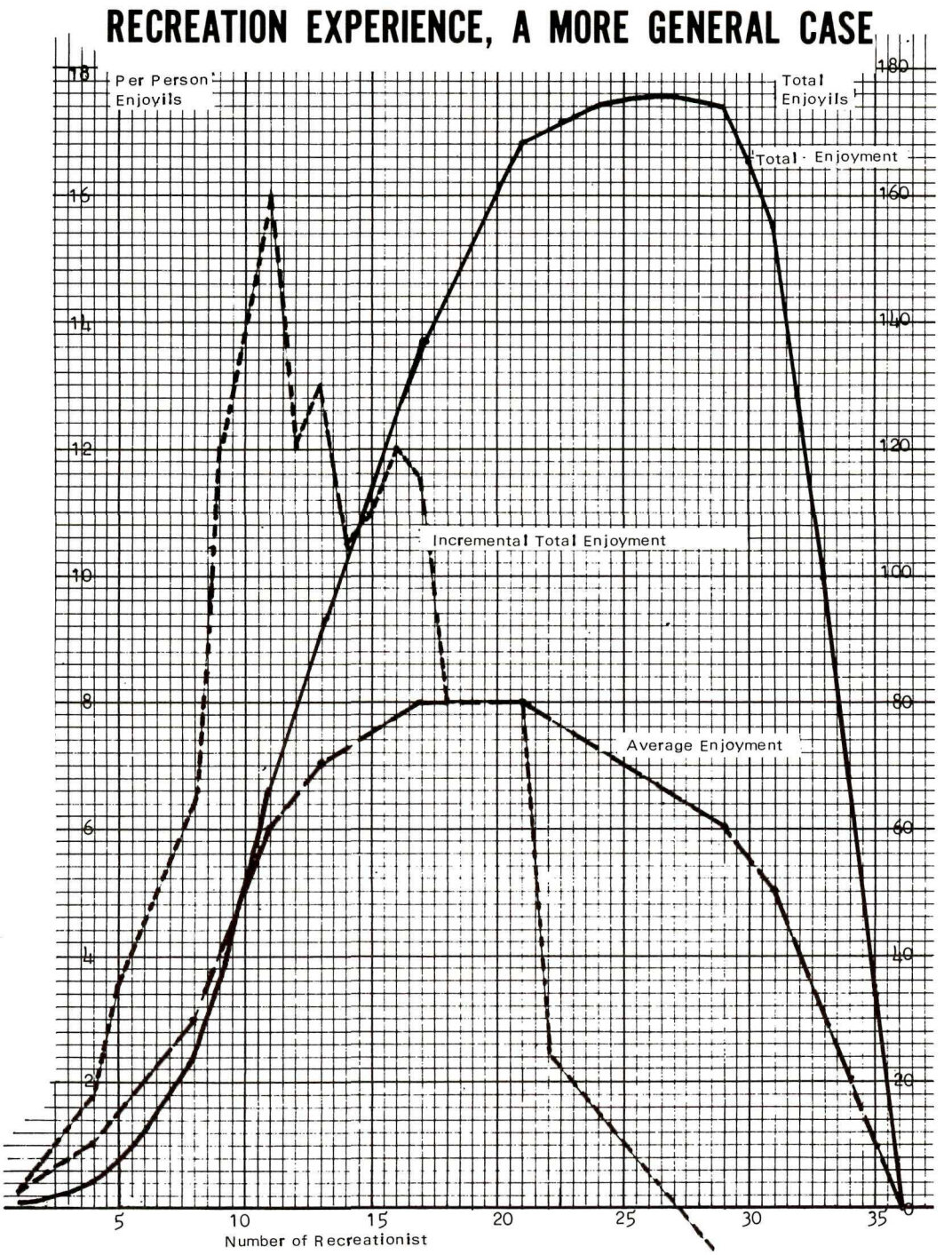
Consider, for example, a large lake or reservoir where swimming is a major activity. The interests of personal safety dictates the real need for other visitors in the immediate vicinity, so that their presence increases the quality of the recreation experience. The wilderness case is probably unique in having an Average Enjoyment curve which is negatively sloping throughout its length. Thus, one suspects that an Average Enjoyment curve which shows a reduction in enjoyment for every entrant after the first one, is applicable only to the wilderness case. In all other cases, it may be assumed that the company of other adds to the quality of the experience by virtue of erasing a sense of loneliness, by permitting (even encouraging) the sharing of recreational, inspirational, or educational experiences, by justifying the furnishing of visitor services (guided tours, nature talks, opening of food service facilities, and so on).

RECREATION EXPERIENCE, THE SIMPLE WILDERNESS CASE



Consequently, in the general recreation area case, the Average Enjoyment curve rises (has a positive slope) after the first entrant. Each new visitor obtains more enjoyment than did his predecessors before he came on the scene, *and* his arrival on the scene enhances their enjoyment of the recreation area. However, the phenomenon of increasing average enjoyment does not continue indefinitely. Some point in the aggregation of recreationists is reached where the addition of another visitor has no effect on his predecessors. They are indifferent to this presence. This attitude of indifference is likely to continue for some time as the recreation area "fills up." Hence, the Average Enjoyment curve is level (or flat) over a considerable range of visitor occupancy. The length of this range varies widely from recreation area to recreation area, depending on its size, the variety of its features or activities, its topography, and its vegetation.

But again, indifference does not continue indefinitely. As more visitors arrive, some mutual intrusion on the activities of each other occurs. Queues begin to appear at snack bars, comfort stations, boat launching ramps, and site reservation counters. The "noisy kids" at "their" table impinge on the genteel conversation at "ours." The Average Enjoyment curve begins to tip down. As more people enter the recreation area, the negative slope continues. Eventually the downward gradient becomes more and more steep. Queues are extended, tempers flare, and social abrasion ensues. Congestion becomes hyper-congestion, and average enjoyment eventually goes to zero—possibly even becomes negative.



The second graph, "Recreation Experience, A More General Case," illustrates this phenomenon. Notice the plot of the Total Enjoyment curve in comparison with the Average Enjoyment curve. The latter initially rises, then levels off, and then declines slowly, followed by a precipitous decline as the number of recreationists rises and congestion sets in. The Total Enjoyment curve rises over the entire range of the rising Average Enjoyment curve.

The most interesting feature is the fact that the Total Enjoyment curve continues to rise, albeit slowly, *after* the Average Enjoyment curve has begun to fall. The Total Enjoyment curve does not reach its maximum and begin its decline until the Incremental Total Enjoyment curve has declined to zero. Notice that number of visitors corresponding to the zero point on the Incremental Total Enjoyment Curve (27 visitors in the example) is near to the number of visitors at which the Average Enjoyment curve increases the steepness of its downward slope. In realistic terms, this point (ITE = 0) occurs when congestion has become pervasive and oppressive.

In the more general case illustrated in the second graph, the Incremental Total Enjoyment curve traces a rather jerky path. The jerkiness is due to the fact that the Average Enjoyment curve was plotted to a discrete arithmetic series of data similar to that employed for the wilderness case. The particular discrete series employed for the illustration caused the Average curve to make a series of oblique corners rather than going around nice smooth curves. If, instead of plotting changes for 37 individual visitors, we had plotted *indi-*

vidual changes in enjoyment for 370 or 3,700, or 37,000 visitors, the Average, Incremental and Total curves would all have appeared as smooth curves. But their relative shapes and positions would have been very much the same.

The following statements are true in all cases:

1. Total Enjoyment is at a maximum point where Incremental Total Enjoyment equals zero. That is to say, the Visitor Capacity of any recreation area occurs when the Incremental Total Enjoyment of the visitors arriving there equals zero.

2. The maximum point on the Total Enjoyment curve is to the right of the maximum point on the Average Enjoyment curve. This means that, as the occupancy of a recreation area increases, average enjoyment will have begun to decline (and usually will have been declining for some time before Total Enjoyment reaches its highest point). Said otherwise, Total Enjoyment continues to increase after Average Enjoyment has begun to decline. The more gradual is the downward slope of the Average Enjoyment curve, the farther to the right of its downturn point will be the maximum point (Visitor Capacity) on the Total Enjoyment curve.

These are important analytical results. The meaning of total public enjoyment of a recreation area has been made analytically precise. The relationships among Average, Total, and Incremental enjoyment and their connection with the total volume of public use of a recreation area have been made clear.

The target of recreation area management is to find, for any given mix of natural or historical resources and facilities, that number of visitors corresponding to the maximum point on the Total Enjoyment curve. We know two things for sure about that maximum point. It occurs in the region of the negative sloping portion of the Average Enjoyment curve. It occurs at the zero point on the Incremental Total Enjoyment curve.

It has been shown how we can now determine Visitor Capacity *analytically*. How can we find it *operationally?* How can we convert the analytical apparatus we have contrived to the actual, on the ground, derivation of an exact *number* of real people in a real recreation area—a number which we will be able to state with assurance represents the Visitor Capacity of the recreation area? We now consider those questions.

IV. DETERMINATION OF VISITOR CAPACITY

A recreation area attains its Visitor Capacity, the above discussion demonstrates, when the following three analytical events occur:

1. Total Public Enjoyment is at a maximum (by definiton);
2. Incremental Total Enjoyment is zero; and
3. Average Enjoyment is declining.

It may be useful to enlarge a little on our understanding of the relationship between (2) and (3) above. Keeping the graphic picture in mind, can we say anything more than merely that the Incremental curve becomes zero somewhere in the region of the negative slope of the Average curve? The answer is, "Yes."

If, from the maximum level (or point) on the *Average* curve, the decline as we move to the right were to occur as a constant amount of enjoyment for each added visitor, the downward slope would be a straight line all the way to the point where the Average curve goes to zero. The simplest case was like that. Then the Incremental curve will cross the zero enjoyment level (the horizontal axis) half-way between the maximum and zero points on the Average curve. The more gradual is the constant downward slope of the Average curve, the "longer" it takes for Incremental enjoyment to fall to zero. This is quite obvious logically—formal mathematics would simply make the idea more rigorous.

But observation of human beings suggests that the decline in Average enjoyment will proceed downward in a very gradual line only until "fun" simply begins to disappear. Adding more visitors means the eventual creation of congestion. As more and more recreationists become conscious of the intrusions of others on their freedom of action, on their view, or on their use of facilities, Average enjoyment will decline more steeply. Notice that, when Average Enjoyment is declining, Incremental Enjoyment is dropping much faster (twice as fast in the case of straight lines). As the decline in Average Enjoyment becomes more steep, the drop of Incremental Enjoyment will become truly precipitous. Thus, when the recreation area "fills up," Average Enjoyment begins to pitch down more markedly, and Incremental Enjoyment drops precipitously to zero. To reiterate, when Incremental Enjoyment has fallen to zero, the Visitor Capacity of the recreation area has been reached.

Returning to full reality, the question is, "How can we find the point at which the Total Curve is at its highest point, the Average Curve pitches down steeply, and the Incremental Curve crosses the zero level?" The answer is to be found, not in the imagination, conjectures, prejudices, or aspirations of recreation area managers, nor in the exhortations of environmentalists (however noble their motives may, in truth, be), nor in the blandishments of the promoters of mass recreation opportunity. The answer is to be found in the *behavior* of the recreationists themselves, and in their response to the recreation situation in which they place themselves. In short, the public which uses the recreation areas tells us when their Visitor Capacities have been reached.

What recreation area management must do is to learn to understand what it is being told. Recreation area management must learn the language of public behavior. The remainder of this paper is concerned with some suggestions on how we might go about learning and understanding the meaning of public behavior as it is related to the Visitor Capacity of recreation areas.

A. *The Statistical Survey*

There is a nearly irresistible propensity among behavioral scientists, whenever they need to gauge the public temper, to resort to one of their most powerful

research tools—the statistical survey. Simple or elegant sampling designs are invented, questionnaires are contrived, and interviews are conducted. One asks the visitors a series of questions, and from his verbal responses the scientist hopes to deduce what the visitors think or feel to be the capacity of the park. If one follows this inviting method for the problem at hand, the determination of Visitor Capacity, he confronts a number of difficulties, among which are the following:

1. Questionnaires are designed for individual respondents. We ask an individual how he feels, thinks, or acts about a particular real or hypothetical situation. The problem of recreation area capacity is one of aggregate, *not* individual, reaction or behavior.

2. Resort to statistical survey methodology alone would entail the laborious replication of surveys for each park for which an estimate of Visitor Capacity is required.

3. The handling of "response errors" in interrogating what are basically psychological states is fraught with imprecision and controversy. Responses are heavily weighted with the notion of how the respondent thinks he "ought" to feel, rather than how he does feel.

4. To precisely identify the volume of recreationists present in an area constituting its capacity, a series of surveys, each conducted at different levels of occupancy, would appear to be required.

5. Respondents would be required to respond verbally to verbal questions on matters about which they hold many purely emotional and largely unconscious feelings. Trustworthy responses can be elicited only from those whose feelings have become clearly conscious and, at a minimum, capable of verbalization. It is not likely that trustworthy responses can be segregated from untrustworthy ones.

B. *Rigorous Observation and Analysis of Aggregate Behavior*

The statistical survey methods aim to elicit information from recreation area users directly from them in verbal responses to verbal questions. The engineering of subtle devices for extricating such information from persons (held captive for interview in the midst of having fun in a recreation area) can be avoided by designing formal rigorous schemes for collecting observations on behavior.Both collective behavior and the behavior of individuals within large aggregates of people would be included. Recording and analyzing that behavior against a scale of numbers of visitors in a recreation area would provide the scenario for capacity determination.

The fundamental proposition, perhaps a truism rather than a proposition, is straightforward. Individual and aggregate behavior vary with the size and compression of the aggregate. In order to characterize the behavior of a mass of persons for any purpose, one identifies and defines signals given off by that mass, measures their frequency, disperson, and pinpoints their incidence. He then draws inferences about the particular state of that mass.

For example, consider a mass of people in an auditorium. Every eye is on the speaker. No one is shifting his position seeking a more comfortable posture. There is no coughing. There is no whispering. A handful of latecomers remain standing in the rear, obviously refraining from disturbing the proceedings by finding a seat in the auditorium. An observer infers that a conditon of "rapt attention" pervades the congregation.

In the case of outdoor recreation areas, we are looking for signals that indicate a condition of Visitor Capacity to exist. In our technical parlance, we need a list of those signals from which we can infer that Incremental Total Enjoyment has become zero. The strength of each signal is measured against a series of levels of recreation area occupancy. There is provided here an annotated list of public behavior characteristics, with some indication of the sort of signals that would be given off as the zero point on the Incremental curve is approached. These characteristics should be studied with respect to their frequency, dispersion, contagion, incidence, and intensity, and should be related to the level of occupancy at which they occur.

1. *Queue formation:* Per cent of those persons intending to join a queue who are dissuaded from joining it by virtue of its length, etc.

2. *Littering:* A marked increase in the amount of litter discarded other than in provided receptacles.

3. *Loitering:* A marked increase in the percentage of visitors wandering more or less aimlessly, seeking an opportunity to participate in activity available except for the congestion caused by other visitors engaged in that activity.

4. *Turnover:* Significant changes in the mean length of time visitors remain in the area.

5. *Resource Abuse:* Changing relative frequency with which visitors walk or drive into restricted, unauthorized, or protected areas.

6. *Acrimony:* Changes in the relative frequency of visitor complaints to area officials concerning the behavior of other visitors.

7. *Mobility Constraints:* Appearance of bottlenecks in vehicular or pedestrian traffic routes.

8. *Accidents:* Changes in the incidence of accidental damage to personal property caused by actions of visitors.

9. *Visitor Inquiries:* Changes in the frequency of visitor inquiries about nearby accessible alternative recreational opportunities.

The above are offered not as the ingredients of a prescription but as indicative of the sort of variables to which rigorous attention could be given. Professional students of mass behavior will doubtless be able to produce a list of variables that is both longer and, perhaps, of more critical significance.

One ventures the conjecture that, when a schedule of critical variables has been identified and used,it will be found that they will signal the appearance of a capacity condition more or less simultaneously. Thus, comparatively abrupt changes in the relative frequency or character of littering, in queue behavior, turnover, bottlenecks, etc., will all occur at about the same time. The convergence of abrupt changes in these variables would suggest that zero point on the Incremental Total Enjoyment curve is being approached and that the public occupancy is in the neighborhood of Visitor Capacity.

This paper has essayed to display a theory of Visitor Capacity determination and to point toward its practical application. Much more analysis, both sociological and statistical, is requisite to its being made truly operational. We might be well advised to get on with it.

Capacity ? Yosemite NP

National Park Service Photo