



Trends

PARK PRACTICE
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NPS Cover photo by C. W. Stoughton



Keynote address to the Wisconsin Landscape Institute, December 1970.

By RAYMOND L. FREEMAN

The scientists, ecologists, and others tell us that we have approached the point where the continued existence of man on the face of the earth may be in jeopardy. They tell us of the many things we must do to reverse this trend. They tell us it is now or never. In fact, some tell us that it may be too late. Theirs is a dire prediction with pessimistic overtones.

The idea of man facing extinction is not a pleasant one. However, I don't think we should sit back and be pessimistic or take the challenge laid down by these scientists lightly. I believe that we should have an optimistic attitude and say that it is not too late. We can and will do something about it.

The resources on this planet earth have been misused, dissipated and wasted and not recycled as in nature. The natural systems that supply our food and water have been disrupted to the point where they are overloaded to the verge of nearly breaking down and becoming incapable of supporting mankind. This is why the scientists tell us it's now or never. We have to learn to live with and to restore the systems so that they will function automatically as they have done for millions of years.

Where do landscapers fit into this broad picture? All of us have a role to play and can make positive contributions toward an optimistic future for mankind. First of all we are all concerned with man's survival

and then with environment. Collectively we can make a contribution to our survival by making our present environment as attractive and pleasant a place as we possibly can starting now.

We must work to make others aware of the need for a pleasant environment. Magazines and newspaper articles are constantly promoting planned communities, home construction, natural beauty, landscape development, and pleasant living. One of the ways that we can be effective is to work with the magazines, newspapers, radio and television stations to promote our ideas, continually getting the name of the various professions before the public. The public will then realize the contributions we can make are valuable and will turn to us for services, advice, guidance, and assistance.

We must also learn to talk with each other; to call upon each other for the various skills we can each contribute; to open up and maintain communication between the various organizations that represent our special interests.

In the creation of pleasant environments we all have roles to play. Landscape architects are planners and designers. They work with all types of land forms, plant material, and other elements to create a pleasant setting for human activities to be carried on. However, all they do is to plan, design, and develop the drawings to execute these plans. Their work is absolutely meaningless, unless skilled landscape contractors take these plans and execute them using top quality construction materials and techniques, good plants and skilled labor to execute the plans so that a pleasant environment results.

Again, it is of no value to plan, design, and construct a landscape element unless skilled nurserymen, arborists, landscape contractors, and others can maintain these elements and environments. It is their skill that brings a landscape to its full growth and beauty and maintains it that way.

Creating and maintaining a pleasant environment for mankind is a team effort throughout involving many skills and disciplines. It becomes imperative that we talk with each other and find out what the other person is doing. It is important that landscape architects talk with nurserymen and landscape contractors to determine the availability and quantities of plants suitable to do particular jobs and develop long-range programs for maintaining jobs already done.

It is important for the nurserymen to talk to landscape architects and landscape contractors to determine in advance types and quantities of plant material needed for future use. We're talking about years in advance in order for the nurseryman to have sufficient leadtime to propagate, line out, and suitably grow quantities of plant material. It is important for the landscape contractors to talk to landscape architects to anticipate their needs for new types of construction and the use of new materials for future years.

It is important for the arborists to talk with the landscape architects, nurserymen, landscape contractors to put forth their knowledge of plants most suitable for varied environments and their up-to-date knowledge on diseases and pests. Arborists need to make others aware of any new diseases and pests they are discover-

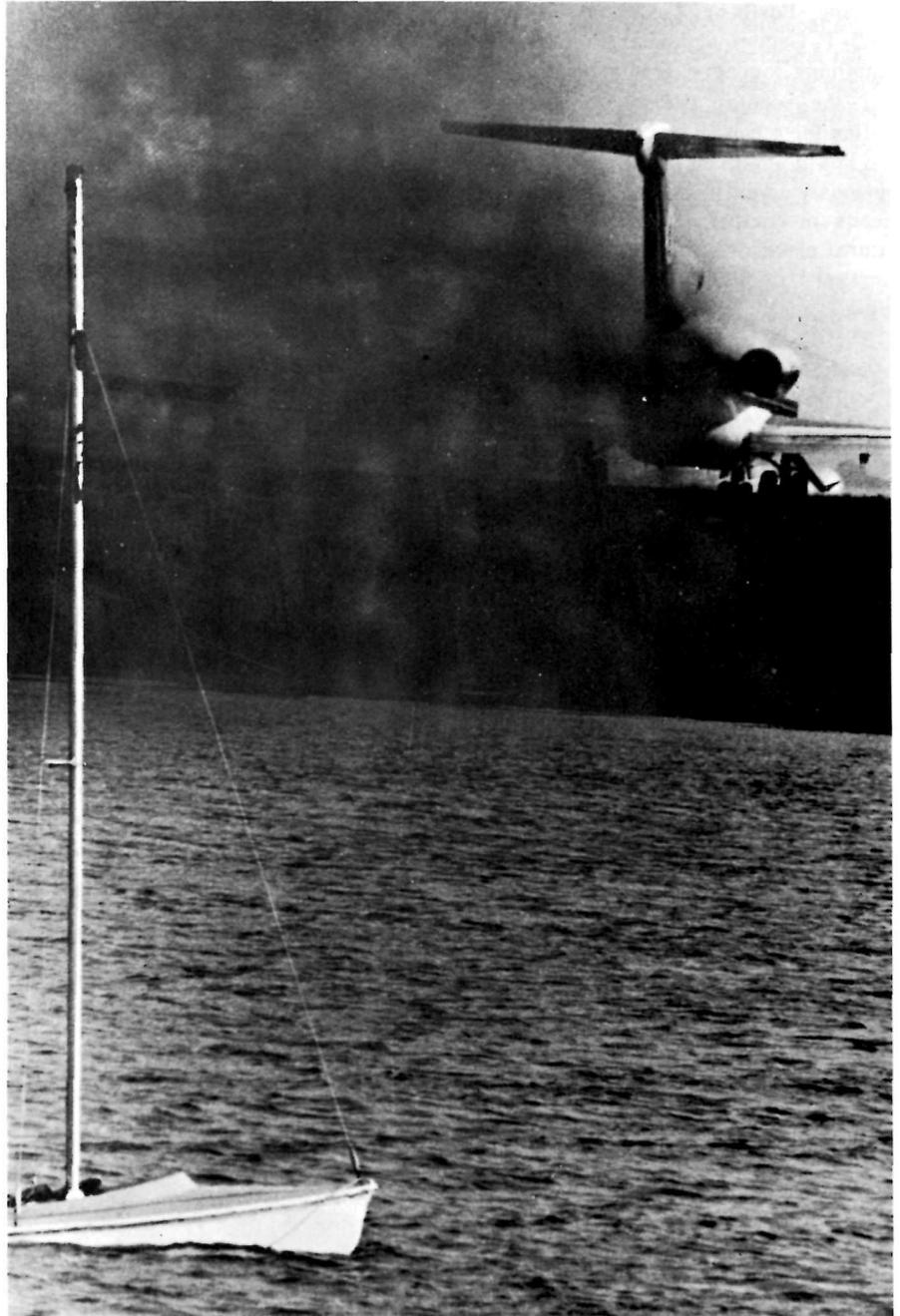
ing. They need to make others aware of species that are resistant to disease and pests, to make the others aware of new techniques for maintaining plant material.

It is important that all of us talk to each other. It is also important that we all talk to the journalists,

newspaper editors, and others to make our skills known and to make our knowledge available to the general public. If we do this, they will have a better appreciation for these skills and a better appreciation of how they can be applied to our environment.

(Continued)

Photo by C.W. Stoughton



Heavy Jet exhausts at the National Airport near Washington, D C.

Now that we're talking to each other, what about some of the specific problems that we are faced with? What about the control of plant pests? A recent article in "Changing Times" magazine on everyday ways to cut down on pollution lists pesticides which should be avoided for home or backyard use. On this list are the common tools of the landscaper's trade. Pesticides such as Aldrin Chlorodane, DDD, (TDE), DDT, Dieldrin, Endosulfan, Endrin, Heptachlor, Lindane, Perthane, Toxaphen, 2,4-D, 2,4,5-T, Captan, and other pesticides containing mercury, lead or arsenic.

If the popular literature is now calling for a ban on use of these, what are you going to do to control pests? Obviously we must look to other means of control. Biologic controls, natural predators, and other horticultural practices will have to be developed.

It's up to us to investigate new techniques and to condition the users of our services to the need for different techniques to replace the indiscriminate use of pesticides for pest controls. An absolutely spotless lawn, free from all pests may be a thing of the past. Perhaps the need is for us to experiment with new types of grasses, try different types of plant

materials that are known to be disease and pest free. This takes time and effort.

Some of the information we need to develop new techniques is already around. Many of our colleges and universities have been working with plant material for years. They have been developing disease free varieties and investigating those which seem to be hardy and resistant. They have been anticipating the time when we can no longer rely on chemical treatments for the control of all these pests. Maybe we should investigate these other materials now. If we keep talking to each other we can find some of the answers each of us will be seeking.

How about the shortage of plant materials that has developed over the last few years as a result of the roadside development programs spurred on by the interstate highway system? These projects have gobbled up plants at an amazing rate and in many cases commercial nurseries have not been able to keep up with the demand. Several years ago the American Association of Nurserymen in Washington conducted a seminar on this subject. They were attempting to get at this problem to determine its magnitude and see if

something could be done. Catalogs cross-referencing quantity lists of plant material are available all across the country to be used by landscape contractors to let them know where the large supplies of plant material are available. Maybe we should establish an early warning system aimed at predicting our plant needs, five, ten, or fifteen years in the future. Then nurserymen, plant growers, and others could become aware of our needs in time to make their long-range plans for propagation and growing suitable quantities of the proper sizes of desirable species for future use.

We should be growing more native species of plants. Our science advisors are telling us to look to the existing plant communities for the answers to some of our problems. They maintain that these are stable and able to sustain themselves relatively disease free with little or no interference from man. Some ecologists are now considering using native plants only for roadside developments. They maintain that native plants can be established through programs of seeding a nurse grass with plenty of fertilizer and mulch to first hold the soil and prevent erosion and then as native seeds fall on the road

National Park Service Photo





NPS Photo by Fred Bell

duction and put into lawn maintenance. Often when these areas are not developed and maintained to their highest potential, a drab, dull environment is created.

We need to train additional people with our skills. We need to make people aware of the things that we can contribute and attract competent young people to our professions to prevent a shortage of people to develop and maintain our environment.

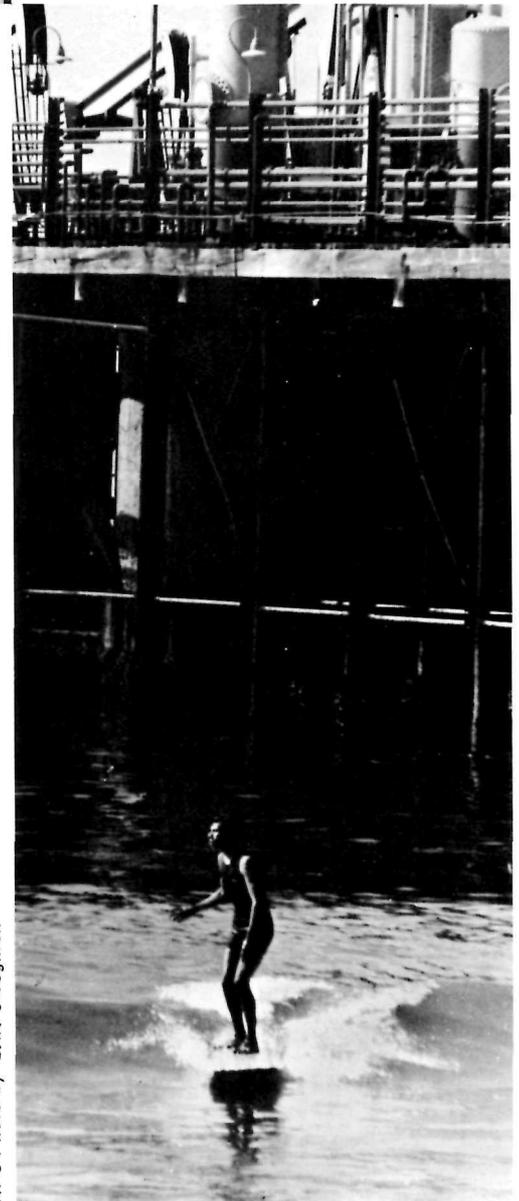
We need to take a look at our own areas. How can we promote our abilities and skills if we operate a junky, loused-up sales and service operation? Have you taken a look at your office lately, at your growing areas, at your lath houses, at your greenhouses, at your sales areas, and at

slopes, going back and reapplying fertilizer and water to help get the native plants to re-establish themselves naturally. This can be supplemented by planting native trees on roadsides.

The State of Texas has developed this native plant concept further through a program of low cost road maintenance. They have also developed maintenance plans for its roadsides limiting the amount of mowing that is to be done. In many areas they are cutting back on the size of areas previously mowed in an effort to get natural regeneration of plants to return as much of their roadsides to a native state as possible. The program originated as a cost control measure and has evolved into one with environmental significance.

Another problem that we should take a look into as a group is the increasing demands for horticultural maintenance. Increasingly, we are seeing more park and recreation areas being developed, more roadside development being done, a growth of industrial complexes.

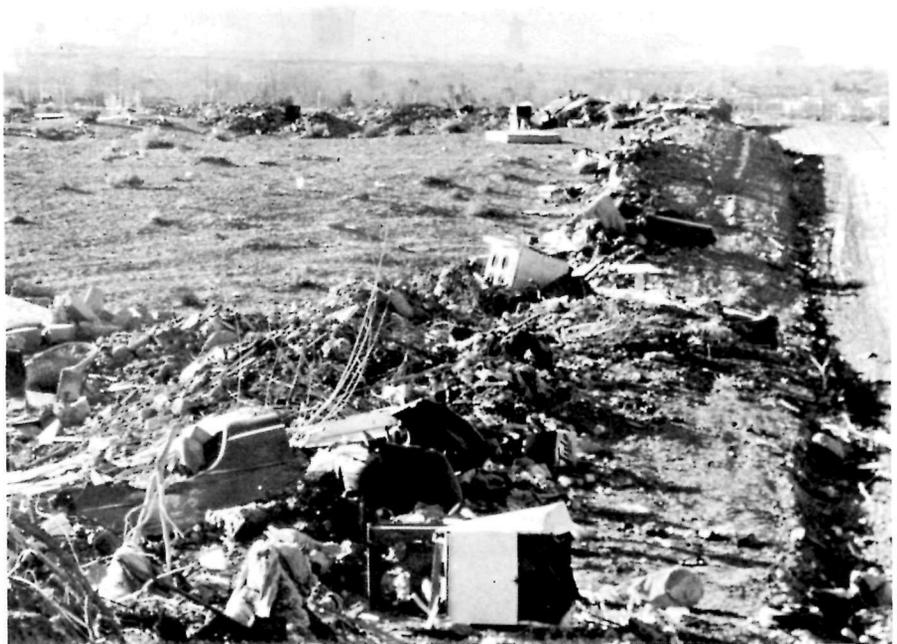
All of these require intensive development and maintenance. With the proliferation of population and the resultant development of housing, subdivisions, planned communities, and other areas, more and more land is being taken out of natural pro-



NPS Photo by C. W. Stoughton

your parking lots? Are they clean and neat, well maintained? Do they reflect the highest capability you have as a businessman?

How about your own lawn at home? Does it reflect good taste and your abilities? How about the equipment you put on the streets? Is it clean, well maintained, painted, and skillfully operated? Do you have noisy mufflers or smoky exhausts? Do you operate noisy chain saws and mowers that drive the neighborhood wild? Are your personnel neatly dressed, in uniform? Do they go about their job in a skillful and competent manner? If they do not, it is hard then to try to convince the public that you are a com-



Oil pollution at Santa Barbara



Roadside litter near Las Vegas, Nev.

NPS Photo by C.W. Stoughton

petent practitioner of your trade.

If you are doing all of these things, why not let the public know that you use a no-lead gasoline to operate your equipment; why not promote conversation through your advertising; why not teach the public how to make compost piles for recycling many of their wastes? Why don't you promote the idea of using kitchen fats and bird feed to help feed birds and build up their populations for more effective natural pest controls?

Could your place of business become a collection point for the recycling of waste materials? How about forming a collection center for your area for the recycling of old newspapers? One ton of paper recycled is equal to approximately seventeen trees (pulp size) saved from cutting. In many communities salvage firms are providing containers at collection points for the specific pickup of paper. If such a collection point does not exist, perhaps your place of business could become one. It is good conservation sense and also good business sense to get people to come to your area.

How about instructing your clients and customers in the proper use of water for lawns and trees and shrubs? Is it really necessary for them to apply as much water as they do for lawns or can you give them the proper

NPS Photo by C. W. Stoughton

instructions? If we are going to get others to get involved with the problem of pollution and become aware of environment, we're going to have to take a leadership role. We have to examine ourselves first to find out what we are or are not doing and adjust our schedules, workloads, activities, and practices accordingly. Once we have done this, we can begin to beat the drum to get others to follow suit. In this way we can take positive action and begin to do something now.

If you personally want to become more informed, there are some publications that you can get which will help you. These are "Environmental Quality," which is the first annual report of the new Federal agency—The Council on Environmental Quality. It is available from the U.S. Superintendent of Documents, Wash-

ington, D.C. 20402, and it costs \$1.75.

Another publication available from the Superintendent of Documents is "Community Action for Environmental Quality." It is a comprehensive citizen's guide and costs 60 cents. Another publication is called "Eco-Tactics." This is a paperback pocketbook published by the Sierra Club. It is available on many book stands.

Another publication which will be available this fall is on the functional uses of plant material. This guidebook is being developed by the National Park Service and the American Society of Landscape Architects and will be published by the Superintendent of Documents. It will explain how plant material works as air conditioners, acoustical controls, wind controls, temperature controls,

solar radiation controls, and humidity controls. The guidebook will be a good example of a governmental agency and a national society working cooperatively to do a job toward improving our environment.

The next step is to communicate. Communicate with your neighbors, your fellow practitioners, others who are in the same and related fields, with your newspaper editors and publishers. Communicate your message through your business. Then practice what you preach through a good operation and through personal activities.

No one person, agency, organization, or business alone can do the massive job that needs doing. It is going to take the cooperative activities of everyone, for if we don't begin to clean up the mess on our space ship earth now, we or our children or our grandchildren probably will never get another chance.

NPS Photo





Photos by W. S. Spradley



The Development of a Mobile Environmental Education Program ¹

Laurance S. Rockefeller recommended that the National Park and Recreation Association consider as a top priority item the "education for use and enjoyment of the environment."²

To witness, however, the potential of our Nation's parks that remain unrealized is disheartening. Careful examination reveals that many of our local, state, and national park's biophysical resources are seldom used to full potential. The focus of this article is on how we are not using many of our parks. We should view our parks in terms of the total possible effect that their resources could have on the American citizenry. We should also consider the subsequent implications for the future.

¹ Adapted from a paper presented at the Park and Recreation Workshop, Department of Recreation, Southern Illinois University, June 1969.

² Opening General Session, The Congress for Recreation and Parks, October 1966.

Creating Environmental Awareness

By B. RAY HORN

The aim of this article is to illustrate the process of creating the conditions that encourage an interaction between people and the biophysical resources of local, state, and national parks. Often, activities are carried on within a park's physical boundaries with very little involvement of the participants with the biophysical environment itself. The process of involving people with parks may be called "environmental education," which may be more accurately defined as the process of recognizing and clarifying the values, attitudes, and concepts necessary for the understanding and appreciation of the interrelatedness among man, his culture, and his biophysical environment. Environmental education, moreover, entails practice in deci-

sion-making about issues concerning environmental quality.

The process of creating environmental awareness can be energized by recreation and park professionals through the use of a mobile environmental education facility. The mobile facility may be a portable storage box, a small trailer, a medium sized step-van, or a large moving-van. Whatever the size, the mobile facility can be a catalyst for involving people with the park's environment. Before a mobile facility can be a catalyst, however, the recreation and park professional must understand (1) the capabilities and limitations of such a mobile facility, (2) the functions of leadership for an environmental education program, and (3) the potential of a park as an outdoor laboratory for

environmental education and enjoyment.

CAPABILITIES AND LIMITATIONS OF THE MOBILE FACILITY

The mobile environmental education facility is not a program. The facility is an intermedium or tool that makes programming for human needs easier. Since the mobile facility is a tool, the facility itself does not do anything. People, through the guidance of trained leadership, perform the doing. Similarly as a screwdriver has been designed to turn screws but can be misused to chisel wood, the mobile facility has been designed for a specific use but can be misused, if misunderstood. Indeed, since a quality program is primarily

dependent upon quality leadership, the effectiveness of the mobile environmental education facility is likewise dependent upon good leadership.

Because the facility is mobile, program materials can be easily transported from park to park with little time or effort. Since everyone cannot travel great distances to become involved in a central program or use central facilities, the mobile unit increases participant counts by moving the program to the people. Moreover, the mobility enables the sponsoring agency to maximize use of its equipment and, therefore, eliminate unnecessary purchasing of expensive equipment for each small park. With a mobile facility a sponsoring agency stretches the tax dollar and increases citizen participation.

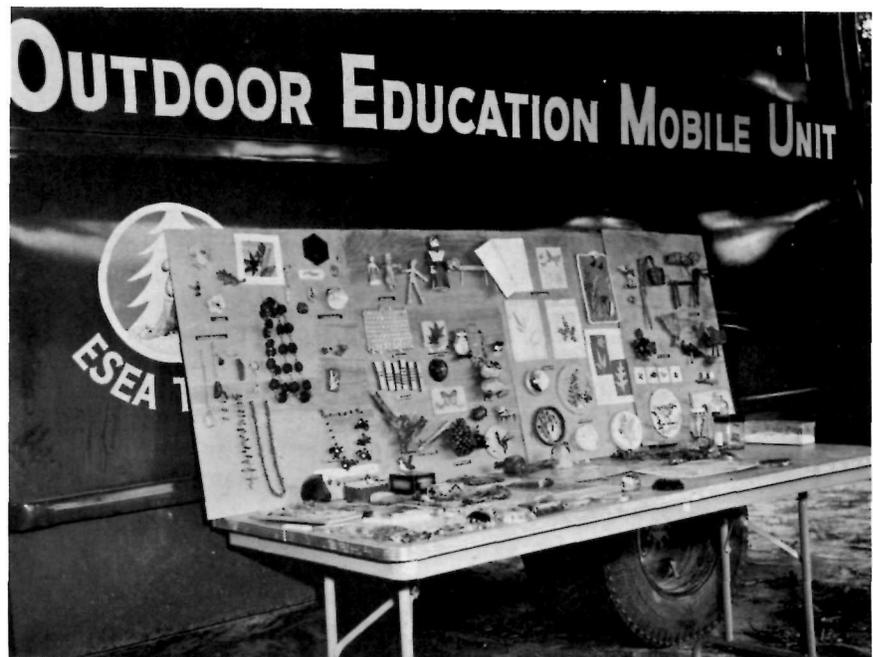
A mobile facility has other advantages. For example, requests are often made for park and recreation agencies to involve a great many citizens as rapidly as possible in an active, involving, and advertive recreational activity. Park and recreation specialists are frequently called upon to provide emergency programs and to provide them quickly. The mobile facility is designed to serve a need whether emergency or routine. It can be quickly moved to where interest or circumstance demands, whether to the barren and cement laden parks of many inner-city areas, to Central Park, or to pristine Yosemite Valley. The versatility of the environmental education mobile facility for emergency or routine programming in local, state or national parks is unlimited.

The mobile facility supplies exploratory equipment to stimulate investigation of a park's biophysical resources. The facility carries an array of environmental study kits (water testing kits, weather kits, etc.); human sensory extensions (temperature guages, hand lenses, etc.); and reinforcing follow-up equipment (field manuals, publications on pollution, etc.) The equipment excites young children as they explore temperature changes, and the equipment quickly attracts youth as they compare, contrast, and map the differences between open-space and closed-space environments. The supplied equipment also encourages adult sensitivity as they focus upon noise pollution by donning blindfolds.

Photo by Ronald Williams



A playground leader familiarizes himself with the Southern Illinois University mobile environmental education equipment trailer.



A step-van stimulates environmental involvement through creative nature activities.



This inside view of the step-van also shows equipment used to gain a perspective of a park's biotic community.

Unfortunately, as indicated by the apparent apathy of many Americans toward environmental programs, large segments of our society have been inadvertently conditioned not to carefully observe natural and man-made surroundings. Though each of us nourishes over one-million microscopic nerve endings that specialize in informing the human decision-making apparatus about our environments, many of us seem almost totally unaware of the complexity and interrelatedness of the worlds at our fingertips. We are, as a culture, relatively insensitive to our surroundings, hence making environmental involvement and intelligent decision-making difficult.

The equipment within the mobile environmental education facility is designed to increase environmental sensitivity, the requisite to eventual understanding. The equipment is designed to extend and vitalize the human sensory antennae to see, touch, hear, taste, and smell the overlooked but critical threads of nature. Focusing on certain vital aspects of our environment, the equipment is carefully selected to function as a tool to environmental concept development upon which sound conservation legislation is based. Senator Henry Jackson has indicated that "Citizens and governmental decision-makers cannot be expected to appreciate the urgency in a need of which they are unaware. They cannot be expected to support expenditures to achieve goals they do not endorse, or understand."³

UNIQUE FUNCTIONS OF LEADERSHIP FOR THE PROGRAM

An environmental education program leader should operate within specific measurable objectives and should work within specific conceptual frameworks which accurately portray an ecological percept of the environment. If the leader does otherwise, then the effect of the program can be void of benefit or even be aversive.

The mobile facility is designed to assist the leader in encouraging certain attitudes toward discovery, inquiry, and the enjoyment of the sensations of our biophysical surroundings. To misuse the facility is human atrophy, the prevention of the satiation of an inherent environmental curiosity. The facility's potential is usually limited only by the restrictions placed by its users. A leader, therefore, must know what the equipment's purposes are and how the equipment can be used before he can maximize outcomes.

The general aims for generating a people/environment interaction are (a) to create within the individual a perceptual awareness of his surroundings and (b) to create an attitude that will evoke additional sensitivity and inquiry beyond the moment.

Accordingly, a participant should learn to recognize his environment as an intertwining complex of an endless web that is not only the ligature to survival of lakes, rivers, and forests but also is the bootstrap of his own survival. A visitor to a park should be encouraged through an active program to seek out the interdependent elements of his environment and fit them together. "Only by realizing and emphasizing the complexity and interrelatedness of the human environment," writes Raymond Dasmann, "can we succeed in the future in keeping it a fit place for people."⁴ Also paramount in investigations are the placing of meaning and value on what is observed, the clarifying of feelings toward findings, and the drawing of useful conclusions upon which decisions must be based.

There should emerge a concern for what may happen to the participants as a result of having been in the park. This is often overlooked. After being exposed to the park's biophysical resources, the participant should depart with a better attitude toward that environment than before exposure. If an improved attitude is not developed, then that park may not be around much longer. To yield maximum benefit, exposure to

³"Recreation and a Quality Environment," *Journal of Health, Physical Education, and Recreation*, Vol. 40, No. 6 (June, 1969), p. 31.

⁴*Ibid.* p. 32. Dr. Dasmann is director of environmental studies, The Conservation Foundation, and is author of *Environmental Conservation* (New York: John Wiley & Sons, Inc., 1968).

an environmental resource should have carryover value for decision-making beyond the immediate sensation.

Participants should learn to explore as independently as possible, again encouraging carryover. The environmental education program leader should be a guide and partner in discovery and enjoyment; he should be a companion in growth and in understanding. The following are other desirable characteristics of an environmental education program leader:

a) He poses problem questions about environmental issues and concerns in order to orient and motivate the participants to wonder about their environment.

b) He discovers the knowledge levels and interests of the participants and discovers the attitudes that the participants have toward environmental quality and natural-resources use.

c) He is familiar with the use of the sensory equipment and field reference materials within the mobile unit.

d) He provides active guidance and supervision of the participants to encourage investigation of the park's resources.

e) He allows for individual and group discovery through various discussions and activities which recognize individual concerns and stimulate thinking about environmental issues.

f) He communicates a positive attitude toward discovery learning, reflecting enthusiasm, tactfulness, and confidence.

g) He provides multi-sensory experience which includes touch, smell, taste, sight, and hearing.

h) He encourages the participants to become actively involved in problem-solving and decision-making situations.

i) He evaluates experiences to determine whether or not objectives are being met and enjoyment and positive attitudes are being demonstrated by their participants.

j) He uses accurate ecological and resource-use concepts and relates them to the concerns of the participants.

k) He exemplifies responsibility in the use and care of materials, equipment, and environment.

PARK'S POTENTIAL AS AN OUTDOOR LABORATORY

Though quality leadership is an aspiration of every agency, someone must first discover the resources available in a park before the leadership can begin interpreting the biophysical environment. The outdoor leader should, therefore, begin by making an inventory of what the park has to offer. He should complete a site-survey which includes all man-made and natural resources. Also, he should determine the population that the park services. In other words he should know the distance people will travel to use the park and participate in the program. The service area will vary according to numerous factors—such as the esthetic attractiveness of the area, the kind of leadership offered, the ease of access to the area, and the competition with other attractions. Service zones are not static because they vary with conditions: they grow with recreational and educational attraction and they shrink when attraction diminishes.

To determine the existing community interests, the environmental educator should list every organization within the service area and learn its purpose. To present a program without considering community needs would be analogous to fishing without bait on the hook. Furthermore, there may be the best mobile environmental education program in the nation; but if no one knows about it, then it is of little avail to the public. In sum, discover what your agency can do for your participants and then tell them about it. Coordinate your efforts with other agencies and programs concerned with environmental problems. Make a master calendar of all related events throughout the service area. Identify possible resource consultants and request their assistance. Most significantly provide first-time visitors to the park with a positive and enjoyable experience into the mysteries of the biotic web of life.

Although a mobile environmental education program may be quantitatively small at the beginning when compared to other programs, the influence it could have on environmental attitude development might be qualitatively large. A park is a natural laboratory, functioning as a bridge to more distant fields. The answer to

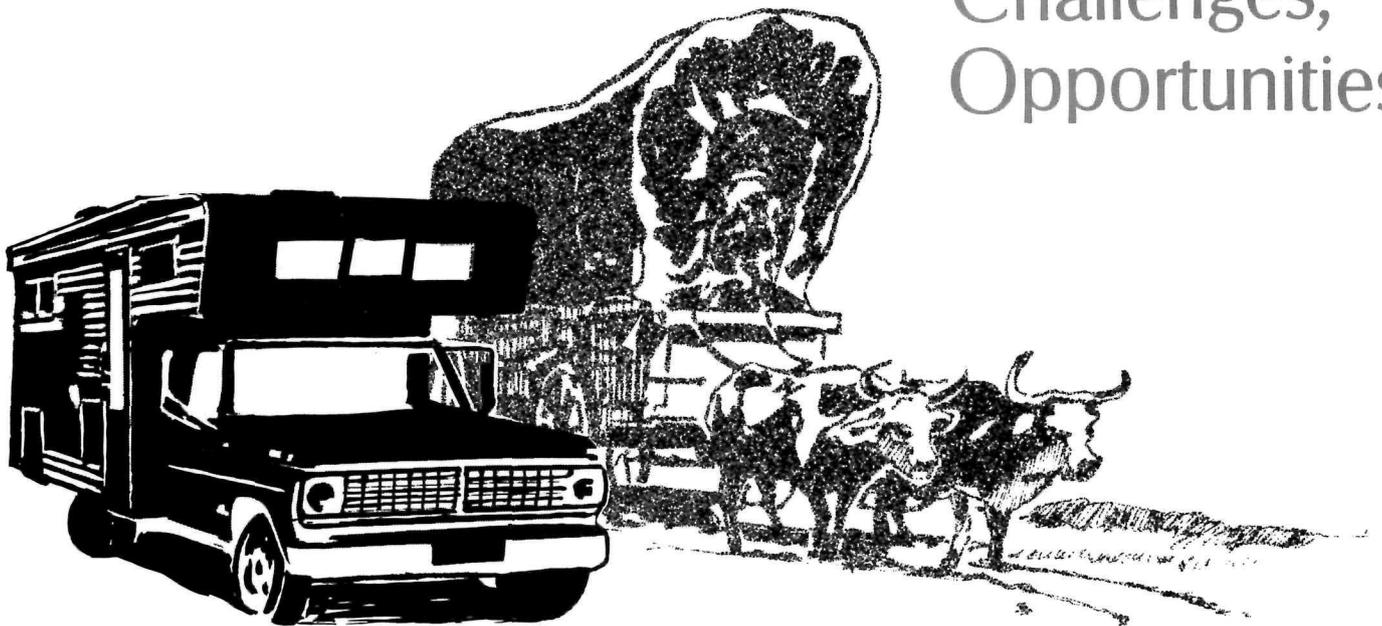
the question of whether or not park and recreation professionals can bother spending the time to involve the American citizenry in sensitivity training to their surrounding environments and related social problems is that they cannot afford to do otherwise. It is now such a priority that many forward thinking states have already made it a matter of public school law. Why must park and recreation professionals procrastinate until it becomes legally mandatory in park and recreation programs? Perhaps it will be too late.

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Interpreting The American Landscape . . .

Values,
Challenges,
Opportunities



By ROBERT BADARACCO

A story is told about a professor of entomology at an eastern university whose special area of interest was the Order Coleoptera—beetles.

One morning, two of the professor's colleagues from the university's social science department were walking down the long, formaldehyde-smelling corridor of the natural science building. As they approached the entomologist's office, they decided to stop in and invite him to coffee. The entomologist

was deeply engrossed in his work. In one hand, he had hold of a small, metallic-green scarab beetle, and with the other hand he was holding a small hand lens, intently counting bristles on the beetles legs.

As the social scientists entered the room, they looked about at the stacks of glass-covered boxes, each containing scores of pinned insects. One social scientist, finally achieving eye contact with the involved entomologist, grinned

and asked, "Howard, how can you spend so much time looking at beetles?" The entomologist looked up, thought for a moment, and replied matter-of-factly, "They're damned interesting!"

Thousands of automobiles speed daily across U.S. Interstate 80 which links San Francisco and New York City. As the Interstate follows the Platte River through Nebraska and Wyoming, how many cross-country travellers are aware that they are following the route

of the Oregon Trail? How many realize that this was the way to the West? How many think of creaking wagon trains, immense herds of buffalo, and hostile bands of plains Indians?

One day, some time ago, in the Coast Ranges near my native San Francisco, I led a group of parents and children on a natural history field trip. It was early winter, and the new California rains had saturated the ground, sending up a surge of green annual grasses. I saw a wet piece of cardboard lying flat on the ground, and said to the group, "There will probably be some slender salamanders under that cardboard." I asked a small boy to turn it over. In doing so, he was amazed to find three, tightly coiled slender salamanders beneath. "How did you know," he asked in surprise. I knew because I had been studying and collecting salamanders in the San Francisco Bay Area since I was a small boy. A certain intuition based on acquired knowledge and past experience told me. In this instance, I had learned how to see.

Patapsco State Park occupies the valley of the Patapsco River on the outskirts of Baltimore. For decades Patapsco has been little more than a cool picnic ground. Yet it has a history of Colonial industry, commerce and transportation. But the picnicker sees little of his cultural heritage at this picnic site.

All this is to say that if the American is to enjoy the full potential of the American landscape, whether it be in his community, along the open road, or in public parklands, he must somehow acquire the means to see and understand.

Looking is not the same as seeing, just as listening is not the same as hearing. Each day most of us look at many things in this world of ours, but we fail to really see. Impart to an individual the means to appreciate and you enrich his life.

A word about appreciation. We have come to use the word "appreciate" loosely. Appreciation derives from seeing, not just looking. What is appreciation? Four definitions follow: "to admire greatly," "to judge with heightened perception or understanding," "to be fully aware of," and "to increase the value of." Can we really hope for much more out of this earthly life? Love, itself, not only for things but for ideas and for others, can well be encompassed by these meanings of the

word, appreciation. Half a millenium ago, Paracelsus said, "He who knows nothing, loves nothing...but he who understands also loves, notices, sees...."

BEYOND EDUCATION

Beset as we are today by a complicated world, technology, specialization, and a detachment from our natural world and perhaps our cultural heritage, how do we provide the average person with the means to comprehend and appreciate the environment that is his?

An easy answer is education. But formal education is presently limited in its ability to impart the information, much less the sensitivity, necessary to enable one to fully appreciate the natural environment.

The explosion of information and new knowledge which increasingly confronts us is, itself, a barrier to the acquisition of an understanding of all things. A monumental mass of information has dictated specialization. The individual has been left an alien in his own natural environment. One could spend a lifetime in school today and still lack the capabilities for fully appreciating his natural world.

There is a better answer. We can provide people with "magic spectacles" which would enable them to see beyond the cardboard on the ground, beyond the interstates, beyond the picnic grounds. These spectacles are the interpreter, the link between the man and his environment. The interpreter of natural and human history provides the magic looking-glasses in a form of extra-formal education which enables the person to see.

The interpreter is a translator (is not interpretation translation in the strictest sense?) of the not understood into the meaningful. The interpreter is, or should be, present at the site or place which holds some special but not apparent meaning for people. The interpreter is the local expert who shows people around. He is a naturalist, historian, host, and story teller.

Yet, it may be asked, how can the interpreter be expert as geologist, botanist, zoologist, historian, and so forth? He cannot. But he has had some training in all these fields—and in communicative skills—and he knows how and where to find answers in specific situations. He is not restricted by the

tunnel vision that may be peculiar to the subject area specialist. He can go to the subject area specialists, find out what to them is most significant in their subject fields, and then integrate, synthesize, and meld all aspects of a given site or situation into a meaningful whole. The interpreter is critical and selective. His task is to unveil the forest and let it be seen through the trees.

Extra-formal education has become an important aspect of modern day life. It surrounds us on all fronts. The well-written, beautifully illustrated, large format nature books that have filled the market in recent years are a significant means of this extra-formal education. So are the Disney-type nature films and the full color television documentaries that have done so much to enrich our lives and bring closer the natural world.

The park or field interpreter, however, remains the personal element or means in this assemblage of extra-formal educative methods. And it is here, in the field, where so much remains to be interpreted and where so few interpreters are found that the real challenge exists.

Conventionally, interpreters in the field have dealt with nature trails, historic sites, visitor centers, exhibits, pamphlets and other forms of public contact. We need more of this. Most of our parks and recreation areas remain essentially un-interpreted. Yet there are new challenges and unconventional approaches which will fall upon future interpreters to develop.

LOOKING AHEAD

Must the millions of people who travel annually across our interstates and state highways remain ignorant of stories they speed by? Must they find meaningful interpretation only in national and other public park areas? Can these people be reached in the course of their hasty travel? I think they can, but not by present-day conventional means.

Suppose, for example, that at points of interest along our highways, small repeater-transmitters were located, tuned to a citizen's band on automobile radio frequencies. As a person zips by Scott's Bluff on the Oregon Trail, the story of that landmark is unfolded by means of a taped commentary or dramatization. Might this be more interesting than repetitive news broadcasts, com-

mercials, and the music the traveller listens to to occupy his time?

Travellers on air lines are indulged with all sorts of devices and placebos to while away the time—stereo headsets, movies, cocktails, and games. Below the jet aircraft at 30,000 feet, however, spreads the land itself in awesome panorama. If the passengers spend as

potential there is here for development of live, thoughtfully prepared, interpretive commentaries on the landforms, topographic regions, history and our cultural backgrounds, just begging to be interpreted to the jet traveller. Why must one be left to read about Custer's Last Stand in a history book when he flies over the Little Big Horn River?

areas across this land go essentially unappreciated simply because no one has thought to develop the interpretive story and put it into action.

Too often, the interpretation outside our national parks which does exist takes on a "bug and bee" approach, a sort of continuation or field extension of elementary biology rather than a serious



Yosemite National Park

little time as they do looking out the windows, it is most probably because they don't have the vaguest idea of what they are looking at.

Note sometime the intense interest in jet passengers when the pilot aboard an airline occasionally pipes over the intercom, "There's Yosemite Valley on your left" or "We are now crossing the Mississippi River." What tremendous

One of the most challenging aspects of environmental interpretation today is finding "stories" or themes in areas that are interpretively "undiscovered." Such places are unfortunately common—unfortunate because these areas should be now in the process of active interpretation. Yet, in terms of environmental understanding, state parks, regional parks, municipal parks and recreation

or integrated attempt to unfold and portray an area's inherent and unique ecological and historical features.

Creative interpretation is much like good newspaper reporting. There is always a good story; all you have to do is find it. Or as James Gordon Bennett of the New York Herald Tribune is supposed to have said when he sent Stanley to find Livingston in the heart of darkest Africa, "If we can't find news, we'll make news."

The American Public Executive:



By HARLAN CLEVELAND

The business of the public executive has always been to bring people together in organizations to make something happen in the public interest. What that something was to be, and where the public interest lay, was traditionally a "given" in his life and work. The ultimate aims were set by the whims of kings or bishops, the compromised wisdom of citizen legislators, or the calculations of political generals and generalist politicians.

But in our own time, in the United States of America, something odd has happened to the role of the public executive. It is still his business to bring people together in organizations to make something happen in the public interest. But what that something is, and where the public interest lies, is ultimately for himself to judge.

The public administrator's new ethical burden is only part of the fallout of invention, innovation, development, modernization, or whatever you want to call the accelerating complications around us. New functions for the executive, and a new executive style, are also children of complexity.

I am presuming in this article to describe the changes that the American public executive is bound to feel in his functions, his workdays, and his purposes. But, first, we had better update

New Functions, New Style, New Purpose

our analysis of the environment of executive complexity in which he lives and should be in a good position to see what is happening, for he tackles more unprecedented problems and manages more large systems than anyone else.

The Multiplication of Decisions

From the public administrator's angle of vision, the striking thing about the process called "development" is the rapid expansion in the number and variety of public-interest decisions required to be made from day to day. I do not know how to count them, and neither does anybody else, so I will assert with confidence that since the beginning of this century, topics to which governmental authority and administration are applied have increased by a factor of several hundred. Each year that goes by, the pell-mell pursuit of scientific truth further multiplies the subjects about which governments have to make decisions.

Before the atom was split, public authorities did not have to decide about the testing and control of nuclear weapons, or think about insurance against nuclear accidents. Before we knew that we could get to the moon, nobody was seriously working on the politics and law of outer space.

Until the first earth satellite was launched, no parastatal agency was budgeting for a global communication system and the Weather Bureau was not planning a World Weather Watch.

Only when powerful drugs were invented that could change the balance of nature and affect human personality did governments think hard about rationing their use and controlling their effects. Until most people had to live in or near cities, the problems of urban transport and congestion and pollution that worry us now worried us not. Before the scientific revolution in farming and medicine, there was not, effectively, a "world food problem" or a "world health problem"; there was merely a regrettable prevalence of starvation and incurable disease. Now that something can be done about these ancient afflictions, decisions have to be made by somebody to do or not to do that something.

These new kinds of decisions do not seem to displace the older kinds of decisions; they are, by and large, additions to the quantum of public responsibility. To get the expanding volume of decisions made, new social forms had to be invented. They are strikingly different from the public organizations of even fifty years ago—and from our inherited image of what big organizations are like.

Decision-Making in Modern Organizations

Modern organizations must of course, be big enough to encompass the enormous issues arising in a continental industrial society. And growing size seems to be directly correlated with (a) the wider dispersion of real power inside each organization and (b) more sharing of responsibility with outsiders.

The large pyramid of authority with all control at the top, which is still celebrated in song and story, does not survive in the developed

industrial state. What develops instead is a congeries of large organizations in which control is loose, power diffused, and centers of decision plural. And the more each organization is conceived by its managers to be affected with the public interest, the wider is the range of other organizations which are deeply involved in "its" decisions.



Decisions are thus typically a committee process, as much in totalitarian as in free societies: "collective leadership" is not an index of democratic feelings but a technical imperative of bigness.



What is involved here is not just devolution of the decision-making authority. In our largest organizations, the executive almost never writes a letter he signs, or signs a letter he writes; but that is only an index of vertical size. The point is that size also multiplies the horizontal span of specialties and interests which need to be brought into each decision. New appointees to top positions in

government are often appalled at the way their options are narrowed by lateral brokerage among their professional subordinates before important matters are pushed up for "decision." The "technostructure" which Galbraith has discovered in American industry, and which he says makes all the decisions, is old stuff to students of governmental process.

Even when a "decision" seems clearly within the jurisdiction of a single organization, the person in whose name it is announced is expected to consult, and to be seen to consult, with all the relevant kinds of expertise and all the concerned interests. It is not enough for the President to announce a tax program; he must produce in its public support his financial and economic advisors. If he proposes a measure of national defense, the Joint Chiefs of Staff, the Secretaries of State and Defense, and the leading congressional specialists on foreign affairs and armed services must have been visibly brought into the decision process.

At every level of government, the complexity of the subject matter widens the circle of executives whose special knowledge is essential or whose oxen are gored. In every community, and notably in the metropolitan areas, a new pattern of leadership now spreads the power to affect the community's destiny, breaking the leadership monopolies traditionally held by businessmen, business lawyers, and early-arriving ethnic groups. In the new competition for influence, any group can play; the ticket of admission for its leaders or hired professionals is now skill in organization and a working knowledge of intergovernmental complexity. For every decision is shared with other groups, and every major improvement—a new hospital, a downtown plaza, a poverty program, a community college, a metropolitan water plan, or whatever—involves the creative manipulation of multiple public authorities.

It is true that the degree to which leadership is collective varies according to the activity that is administered. The spectrum of public administration still ranges from organizations where at least some formal orders go down the hierarchical line, to organizations where

nearly everything is done by lateral bargaining. A Marine platoon, a family business, or an established local trade union are still to be found at one end of this spectrum, and the administration of hospitals, research laboratories, and academic faculties are still somewhere near the other end. But in the process of modernization the whole spectrum shifts—away from the more formal, hierarchical, order-giving way to doing business and toward the more informal, fluid workways of bargaining, brokerage, advice, and consent.

Aptitudes and Attitudes

The modern public executive thus has to learn to move in a fluid environment. To the beginning student of administration, or the detached observer if any, the large-scale organizations of our big democracy may still look like square and static diagrams on a two-dimensional chart. But to the practitioner they feel like chemical reaction in a liquified solution. It must have been a perceptive analyst of modern administration who first said that a task of public management was as difficult as nailing Jello to the trunk of a tree.

If you look around at the American public executives who are managing our destinies these days, you do not find that they share any coherent set of ideas. But you do find that they have in common a set of aptitudes and attitudes which are clearly necessary to the administration of complexity. It goes almost without saying that they enjoy complexity, relish change, and have a talent for self-induced optimism. Less obvious, perhaps, are the other priceless ingredients of fluid executive drive:

They have brains, and like using them.

They are “low-key” people, with high boiling points and soft voices.

They feel responsible for their own sense of direction.

And because they have learned to swim around in their environment, they feel free.

The Obligation to Think

In times past, it was sometimes said that a good executive could always

hire brains, the implication being that other executive qualities were really more relevant. Thirty years ago, Chester Barnard listed intelligence last, and it seemed reluctantly, among the talents the executive required. There are still executive-training programs which teach that the executive's main task is to get good men and delegate them full responsibility for clearly defined pieces of the work to be done.

Modern complexity has rendered this conventional wisdom both unconventional and unwise. Nowadays, the best executives are the men and women who know that it is a mistake to ask for “completed staff work” on important matters, and who immerse their own minds most deeply in the decisions they make.



The executive's work, after all, consists in meeting a series of unforeseeable crises on the road to an undefinable objective. It helps to plan, that is, to try to foresee the unforeseen; but the planned-for contingency never happens—something else happens instead. So the planning produces, not a usable plan, but a better-trained group of people who can continuously adjust their analyses to changes in the real world, and winnow for the responsible decision-makers (usually plural, as already noted) the choices that simply cannot be fudged or postponed.

This process requires all the specialists and staff assistants to have some understanding of what it is like to be an executive and what it takes to frame a decision that will “stick.” But it also means that the

ultimate decision-makers must themselves participate in the planning, measure the options, and filter the imagined consequences of each through their own personal computers, which are their own brains.

The objection is sometimes made that the problems of a modern organization are too complicated for any one executive's mind to absorb and master. The objection is without merit. The human mind is an unimaginably intricate, phenomenally rapid, and extraordinarily sensitive computer, able to take in millions of observations, weigh them according to their multiple relevance, store them in a memory of fantastic dimensions, retrieve them with enormous speed and accuracy, reorganize them into options, come up with a line of action, and transmit the necessary implementing instructions to other parts of the body, all in a fraction of a second.

A recent incident in a crowded airport can serve as a pale illustration of the mind's indescribable capacity to cope. On the “down” escalator during a rush hour, a family of small children stumbled and fell over each other at the bottom. In the circumstances they were destined to be crushed by the rest of the crowd on the escalator, falling on them in a heap. But one man in that crowd, who happened to be a military officer with a mind trained to the analysis of complex situations, calculated the choices and came up with a relevant answer in a second or two. He turned around on the descending stairway and shouted to its passengers to walk rapidly upstairs, as the escalator kept moving down. In a moment, the children had unscrambled themselves and were safe. An alert free mind had triumphed over “destiny” again.

If the executive is not himself plowing through the analysis, there is no sense in which he is “making” a “decision”; he is merely presiding while others decide. The obligation to think hard is the one executive task that cannot be delegated. And this means that the modern executive has to be reflective, curious about ideas—something of an intellectual, not only by education and training but by instinct and temperament as well.

The more the modern executive has to wrap his own brain around the

corner of complexity that he is hired to manage, the more he finds that a certain style of leadership works best. The trademarks of this modern style are the soft voice and the low key.

I have recently had occasion to visit a number of military commands related to the North Atlantic Treaty Organization (NATO) defense system—armored divisions, fighter squadrons, and warships at sea. It is noticeable that the men who are running things in our Armed Forces find little need for a loud voice or a parade-ground manner. They seldom shout; if they want to reach large numbers of troops, they speak quietly and let electronics do the amplifying. Even with subordinates, an officer seldom raises his voice; some even frame vertical orders as “suggestions,” much as a dean would deal with an academic faculty.

A growing proportion of each officer's time is spent in dealing laterally with people not subject to his orders anyway. A captain who calls in air support for his beleaguered company is not dealing up and down a chain of command, but negotiating across several chains of command. The colonel “in command” of an air base may find representatives of fifteen or twenty different United States military organizations camping on the two square miles of “his” base. None of the officers in charge of these operating tasks is responsible to the base commander; they deal with him laterally, as a tenant deals with a landlord.

The proposition can be generalized: the more complicated things get, the more every person working in a large organization is clearing horizontally with people he cannot order around and who cannot order him around. In short, military administration is more akin to hospital management or the academic administration of scientific research than it used to be.

The more critical the function and the more split-second the timing, the more likely you are to find in charge executives with quiet voices who manage by indirection and understand the importance of loading onto each staff member the maximum personal responsibility for the successful operation on the whole system. If you sit above the flight deck of a modern

aircraft carrier, watching the “air boss” at work, you find him depending heavily on the extemporaneous originality, the ability to adapt known procedures to unknown emergencies, of every member of his staff. He is responsible for the whole process of catapulting planes from the deck and landing them safely on the deck; it is an intricate and dangerous function. Yet, the air boss infrequently gives an order; most of the time, he is monitoring a complex but familiar procedure, and intervening only when, with his wider knowledge of the system as a whole, he sees trouble developing which the men running around on the deck cannot yet see. Since the flight deck in use is a noisy place, the key participants in its complicated choreography are wired for sound. The air boss can hear what



they say to each other, and that is how most of the work gets done; the boss can pre-empt a decision, wave off an incoming plane, or call up reinforcements to handle a momentary crisis, if, with his wider knowledge, he judges it necessary to intervene. But the system would not work at all if it depended on cumbersome vertical recommendations and approvals. Most of the time, the air boss is watching, calculating, thinking ahead—and letting the training and sense of responsibility of each man carry to completion a drama in which the actors are too busy to feel dramatic and too professional to feel anxious about how complex it all is.

A “low-key” style works best for the modern public executive because the administration of complexity is conducted at such high tension; the

more complex the system, the higher the tension. Organization is not people, but their activity in concert, as Barnard put it. But if diffusion of power and collective leadership are the secret of success in large-scale administration, the public executive's primary problem is not to get people to cooperate. Most people do that all too readily. His problem instead is to construct a web of relevant tensions, and then maintain within it a fruitful friction between staff members “representing” all the specialties and interests that have to be stirred together to accomplish the executive's purpose.

The tensions he encourages must, of course, be drained as far as possible of their emotional content. The complex technical processes of modern industry require close attention and instant intercommunication, and people who get too easily excited are likely to get in the way.

What sets the “developed” off from the “underdeveloped” societies is precisely the presence in societies at later stages of development of large numbers of people capable of depersonalizing their relationships in order to play an executive role. A “developed” society, crammed as it is with complex systems of reorganizations, requires of each executive that he act in each office he holds in the way in which it is functional for a person in that position to act. He must be able to deal with other executives in the system not merely as himself, but as surrogate for a specialized function or a special interest. He must be able to argue forcefully with colleagues without “taking it personally” when his view does not prevail.

In the more personalized cultures or the less developed lands, the executive's family or his tribe or his regional affiliation still tends to override his loyalty to the function he represents in society, and this clogs the complex system with too many considerations that are extraneous to it. In the developed industrial cultures, an official may come to his task from Texas politics or from a trade-union background or from a Proper Bostonian tribe, but for purposes of his official task, these elements of personal background are supposed to be subordinated to the

fact that he is the deputy assistant director of this or that. That is why a main purpose of education in the developing nations is, or at least ought to be, to imbue people with attitudes that enable them to function as specialized parts of large complex systems.

The Definition of Goals

In the new environment of executive complexity, the reflective men with the soft voices find that there is plenty of responsibility to go around. Packaged with their new functions and their new style, they are discovering new ethical burdens. For the first time in the story of man, the public administrator is more responsible for defining the purpose of his work than anyone else is.

From prehistoric times until the day before yesterday, leadership in public affairs was exercised by a comparatively small number of strong men. Their aim in contending for political power was, then as now, a polity with themselves in charge. Once in power, the changing objects of organized society were established and announced from the top, which is to say by the strong men.

The more successful strong men collected as advisers the most intelligent men they could find, to suggest where to go and how to get the followers to follow. The professional managers—sorcerers and warriors and public administrators—hired out to the most congenial bidder, or were pressed into service by force. They probably originated most of the “policy” that emanated from the top, but did not themselves presume to be responsible for the goals of statecraft.

If these public executives wrote about their work, it was “how to” stuff; the earliest book of record on personnel administration was written by a man who served local princes in China 1,700 years ago. It is a valuable literature; of the codified insights which serve us today as general theory in public administration, the most durable seem to be the legacy of reflective practitioners from Lao-tse through Machiavelli and Clausewitz to Barnard and Nicholson and Appleby. But the angle of their vision was that of a senior servant, civil or military. The purpose to be served was the Prince—the growth of his

sway, the perpetuation of his power, the conception and prosecution of his program. The first concern of the political leader is necessarily the enhancement of his own power, as Richard Neustadt says of the American presidency; and most philosophers of civil and military service have not allowed themselves, or been allowed, to forget it.

Thus, down through history, the environment of hierarchy, with its sharp distinction between policy and administration, enabled the professional administrators to finesse the question, “Where are we supposed to be going, anyway?” There was an ethic of effective manipulation, leaving to others the choice of a general sense of direction.

“Whate’er is best administer’d, is best”; in half a couplet Pope captured a philosophy for the administrators of all time—until our own time.

But nowadays, for the public executive in a modern complex system, it is different. “Policy,” for him, turns out to be largely the decisions which he himself negotiates with other public executives. The broader guidelines that he needs are not available from oracle or priest or political boss, and often not even from the “higher” levels of an increasingly nonhierarchical hierarchy. If he asks where he, or his organization, or America, or the world, is and ought to be heading, he finds that his best authority on the subject is himself. If he cannot figure out in what direction to push his fraction of the public business, the frustration of running hard toward indefinable goals will sooner or later drive him into some less demanding line of work.

For those executives of middle age who step into government from other pursuits, the first experience with fuzzy goals can be traumatic. If the new public executive came from a private company not deeply involved with government, he will not have spent much time and energy on defining goals and projecting purposes; the self-justifying purposes expressed in the balance sheet, the competitive position, and the reaction of those who use the company’s products serve him well enough as distant targets for day-to-day executive work. Moreover, he can, without undue philosophizing, relate other more “public” purposes to his company’s aims—either because the company is deemed

to serve them automatically (full employment, prosperity, a better America, a favorable balance of payments, a stronger defense), or because the public purpose is deemed to override the company’s admittedly narrower goals (as when he pays his corporate tax and subjects his product to the government’s standard-setting authority).

But take the same business executive and elect him mayor or ask him to run his state housing program or appoint him Secretary of Defense, and he perceives an enormous change in the environment. Instead of spending most of his time and effort in working toward objectives about which nobody is arguing, he finds himself presiding at meeting after meeting in which the real agenda, hidden or overt, is a question: “Where are we supposed to be going, anyway?” For some executives, this state of affairs carries its own exhilaration; the confusion of purposes adds to their own discretion and enhances their sense of freedom. But for others, who persist in regarding ill-defined aims as an abnormal condition to be instantly corrected, the frustration builds up and the desire to serve wider purposes drains away. They may then echo the sardonic comment of a former Army Controller. The art of public management, said General William Reeder shortly after his retirement, consist of issuing orders based on inaccurate, incomplete and archaic data, to meet a situation which is dimly understood and which will not be what the issuer visualizes, orders which will frequently be misinterpreted and often ignored, to accomplish a purpose about which many of the personnel are not enthusiastic.

“Principles” Are Too General

There is, of course, no lack of general principles to which the public executive can relate his work. He can readily find some general formulation of a sense of direction in a book of scripture, of philosophy, or of law; he can find whatever such formulation best rationalizes what he has decided to do next. New principles of universal application do not need to be

The Public Executive's "Ethical Hunch"

written, by him or by his ghost writer—they have been uttered already by the Old Testament prophets, the teachers and saviors of the world's great religions, the ancient Greeks, and the eighteenth-century philosophers.

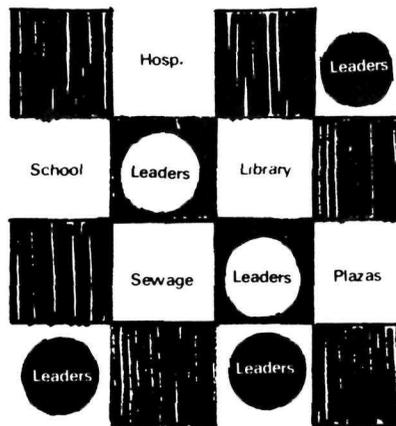
When, in the last year of his administration, President Eisenhower appointed a Commission on National Goals, that wise and sophisticated group commissioned a hundred studies, held several long meetings, and concluded that it was hard to improve on the Declaration of Independence. When they came right down to it, the commissioners held these truths to be self-evident: that all men are created equal, that they are endowed by their creator with certain unalienable rights, that among these are life, liberty and the pursuit of happiness; that to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed.

Jefferson and his colleagues were clear that they were writing for "all Men." And, indeed, the modern piece of paper on which these ideas about freedom are most persuasively and authoritatively expressed is not a private manuscript penned in the dead of night by some monastic scholar, but a very public document called the Charter of the United Nations, a tract pasted together by politicians and public executives in a dozen international committees, which in time became a state paper ratified by a hundred nations through a hundred constitutional and unconstitutional processes.

These liberal doctrines have proved out well, we Americans naturally feel. They provided both the motive power and the governor for our efforts to tame a continent and build a great nation. They somehow justified the science and technology that created the complexity in which the American public executive pursues his *metier*. But they do not, of course, provide the answers to the tactical questions of the day—whether to deploy an antiballistic missile system, how to cope with riots and poverty and discrimination, what to do and who should do it in Berkeley and Newark and the Congo and Vietnam. They are even less helpful in deciding how to chair a committee meeting or whether to hire Miss Zilch.

"Next steps" have always been the executive's stock in trade; what sets the modern public executive off from all of his predecessors is the seemingly limitless opportunities inherent in his very next steps in the years just ahead of him, to affect whole societies for good or ill—if he can only tell the difference.

Increasing knowledge is breaking down the distinction between human conduct and natural events, an Indian philosopher-scientist has recently said. He meant that more and more human behavior can now be explained in mechanical terms. But the converse also applies: as man learns more about the mastery of his environment, he is privileged to apply his free will to its increasing mastery.



For we do live at a very specialized moment in mankind's long ascent toward civilized behavior. It is clear enough now that a kindly God has placed in our brains the technical genius to meet before long all the basic physical wants of mankind—in North America and Europe in our lifetime, in the rest of the world in the lifetime of our children. Without a single new scientific discovery or insight—and what a conservative assumption that is!—we know how to limit most of the hunger and disease which has been the chief preoccupation of society's political leaders and administrators through the millennia of unremembered time.

At the same time, a God who seems to believe in self-help has placed in our brains the intellectual equipment and social skills necessary to organize people on a scale large enough and complex enough to put our full techni-

cal know-how to work in solving the "whether" and choosing the "what." We are not yet doing this at all well, either in urban affairs or in international relations. This is the sense in which the American public executive is exploring the new frontier of a great society where the puzzle is not whether we can manage enough progress for everybody, but what kind of progress we want to manage.

And at this moment in history, with that taste for irony that has always characterized the story of man, we have used our technical and administrative skills to invent and perfect the power to end it all—or, in the alternative, to make the experiment endless.

So during the years immediately ahead, public executives in the more developed societies, and especially in the United States of America, will have less priestly guidance and more obligation to take far-reaching decisions than ever before. No one will have to carry the ethical burden all by himself—the collective processes that are natural to complex systems will take care of that. But if nobody is fully in charge, everybody is partly in charge; for making the choices and taking the chances just ahead, every public executive will be more dependent on his personal moral gyroscope—his own ethical hunch—than ever before.

We have been prepared for these choices and chances by an uncounted infinity of mutations, by half a million years of human evolution, by a dozen millennia of history known and surmised, by a brief but brilliant period of systematic thought—through Chinese human relations, Greek logic, Indian philosophy, Christian ethics, Western science, and the rest. From all this teaching, we know that the choices are ours, that there is no shelter from the social fallout of science, that we cannot duck the questions it raises, nor turn them away, nor refer them to higher authority nor leave them unanswered.

And of all the men and women who face this frontier, it is the public executives who will carry the greatest responsibility, and will be rewarded by the liveliest sense of freedom. For it is they who make the crucial choice: which people to bring together in organizations, to make what happen, in whose interpretation of the public interest. ▼

