

RESOURCES

Some findings and conjectures from recent research into resource development and use

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We command nature by discovering and obeying her laws.—SIR JULIAN HUXLEY, in *A Redefinition of Progress*

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Troubled Oil Across the Waters

ARE THERE REASONS to ask whether a long-run free trade policy for oil in Western Europe is being built upon a protectionist policy for the same commodity in the United States? Sam H. Schurr, director of RFF's energy and minerals program, suggests that there are. In a paper given during Christmas week at the New York Meeting of the American Association for the Advancement of Science, Schurr notes a subtle interdependence between these two apparently contradictory policies.

Both the United States and Western Europe, he notes, have become more dependent on oil as a raw material of energy, and for the same reasons: oil's price advantage; its unique qualities as a fuel for automobiles, planes, and other devices powered by internal combustion engines; and its superiority over coal in several other uses. Beyond that the situations in the two areas are quite different.



THE UNITED STATES, rich in both coal and oil resources, imports oil because foreign oil is cheaper. In recent years consumption of oil has been about 15 per cent greater than domestic output, and doubtless would have climbed considerably higher if that relationship had not been maintained artificially by governmental policy restricting oil imports. Concern over national security is prominent among the reasons underlying this policy.

Western Europe has large coal deposits and practically no oil. Nevertheless, long-run policy of its governments apparently is based on an expectation

that because of diversity in foreign sources of supply they can continue to expand imports of low-cost oil without impairing their security. It is true that some governments have discouraged the shift from indigenous coal to foreign oil as a means of moderating distress in coal mining regions, but these moves are all of a temporary nature. By 1958 imports of fuel from outside Western Europe had reached almost 30 per cent of its total energy consumption.

The published statements indicate, Schurr writes, that "existing United States and European policies are flatly contradictory in their evaluation of the security problem. However, I believe that there is in fact a subtle interdependence between the two policies in the sense that some of the assumptions underlying the recently formulated European policy reflect conditions which might not exist except for the policies pursued by the United States in recent years. . . . The Europeans are not unaware of the fact that this country uses much of its oil capacity at only a fraction of its full potential. I believe that it is implicitly assumed that this extra capacity in the United States will continue to exist and can therefore be regarded as providing an ultimate security safeguard for Europe.



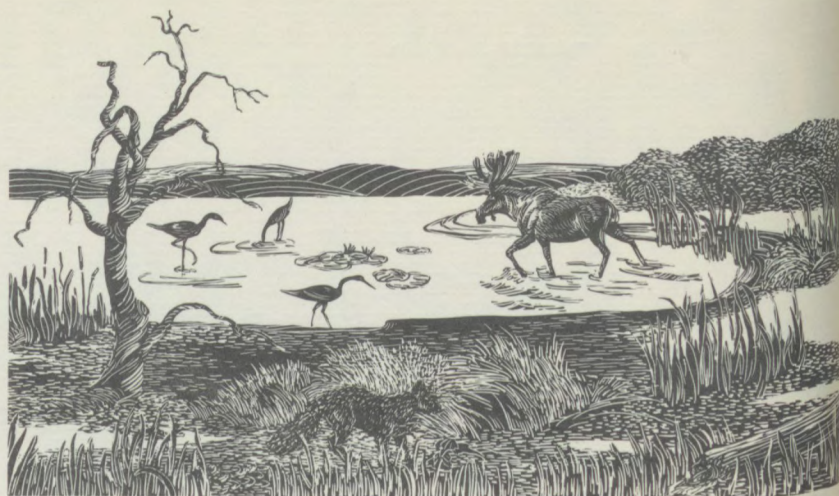
"If this is the case, it is important to recognize that the maintenance of such excess productive capacity depends on continued investment in domestic oil exploration and development. But would current levels of domestic investment be maintained if the United States were to drop its own import restrictions? Equally important, the assumptions in regard to the prices at which Europe could buy oil are based on a world market situation strongly influenced by the fact that the United States, by far the world's leading consumer of oil products, seriously restricts the entry of foreign oil.

"IF INDEED Western European energy policy is dependent on the present oil import policy of the United States this means that a free trade policy for Europe is, in part, sustained by a protectionist policy in the United States. The really disturbing point is that this interdependence is unintentional, and even unrecognized.

"The current import policy of the United States, a cornerstone in this structure, cannot be taken for granted. It is under constant attack from many quarters, especially since it involves higher energy costs to the American economy than would a policy of greater freedom in importation. Moreover, the oil import policy runs counter to the broad foreign trade policies according to which the United States attempts to conduct its economic relations with other countries.



"Even if the apparently contradictory energy import policies of the United States and Western Europe result in a consistent overall policy, the balance thus achieved cannot be viewed with equanimity. The policy balance will continue to be precarious and fraught with dangers for the Western world until both Western Europe and the United States develop their energy policies within a common framework, with agreement about the assumptions upon which policy is based, and a clear understanding of the consequences of change."



WILDLIFE IN THE PARKS

WHEN EUROPEAN COLONISTS came to America they found an abundance of game and proceeded to slaughter it. They wiped out, over much of their original ranges, the elk, the bison, the muskox, the bighorn, and the grizzly bear.

Of birds now extinct or all but extinct the great Trumpeter, largest of swans, and the largest of woodpeckers, the Ivory Billed, offer lamented examples; so also the Passenger Pigeons which flew in clouds that darkened the sky. They were slaughtered by the millions for hogs to eat, perhaps, or just "for sport," and the last of these wild pigeons died in 1914.

The California Condor, a vulture, and the largest of all American birds, with a wing-spread up to nine feet, although innocent of all habits contrary to man's interests, has been almost exterminated through wanton shooting by "sportsmen," by poisoners, and by the change to farm cultivation in some areas. There are now perhaps no more than fifty or sixty of these great birds in the West.

Why, some may ask, be so solicitous about preserving or restoring wildlife? We have fared very well, say such as these, without the Passenger Pigeon and the Eskimo Curlew. Could we not live well enough without the Trumpeter Swan, the Whooping Crane, and the Wolverine?

To "practical" people of this sort it is generally useless to speak of the beauty and wonder of birds on the wing, or the need of pre-

serving all but vanished species as a living link in biological research.

Better it is, then, to say truly when seeking support for preservation and renewal along these lines, that many birds have an immediate value in keeping down the number of insect pests that threaten farm production.

ALL NATIONAL PARKS today—except a corner of Grand Teton—are wildlife sanctuaries where no hunting is allowed, and often special care is taken to preserve species threatened with extinction.

This problem of maintaining balance in "outdoor zoos," so popular with the public, is one which has plagued Park administrators for many years. Even in the 'teens of the century, the Buffalo Ranch in the Lamar Valley of the Yellowstone, feeding protected herds was both costly and troublesome. Demoralized buffaloes were hanging around the haystacks too much and foraging too little. The bulls devoted too much energy to fighting, and twice nearly killed the buffalo keeper. A hundred of these idle surplus bulls had to be disposed of by 1915.

Measures to put down predators likewise led to an overstocking of elk in the Yellowstone and elsewhere. Animal diseases among protected animals increased, often in related patterns. In places, bears grown thin and of angry temper were found to be infected with tapeworm, which they got from infected fish. Park and Fish

and Wildlife veterinarians have plenty of trouble, once a preservation policy gets out of hand.

Greater trouble, sometimes approaching disaster, came of animal overpopulation destroying the range. Removal of animals to areas less overlaid presents grave difficulties. Bears are particularly dangerous to handle during trucked transfer. They will sometimes break their teeth and claws trying to tear their way out of traps and cages.

When all such measures fail, the Park Service as a last resort has been obliged to delegate rangers as hunters, and give the carcasses to Indian agencies or other federal agencies.

We have as yet no acceptable solution to this dilemma. The Malthusian doctrine, often pooh-poohed by cheerful sentimentalists, applies with relentless severity to wildlife.

Excerpted from *Our National Park Policy*, by John Ise, to be published soon by The Johns Hopkins Press. Mr. Ise's research was supported by an RFF grant to the University of Kansas.



I HAVE EMPHASIZED the practical reasons for a changed policy on atmospheric research. I also might have followed the President's Science Advisory Committee as it reported on outer space—we must accelerate research to maintain, or recover, prestige abroad.

But I like to think that neither of these is the best motivation. Our firmest ground for action, and the surest road to final success, is a compelling, unselfish need to know—to know all that the application of reason can tell us... If we are able to plan these scientific programs in terms of the strategy of knowing, then inevitably all else must follow.—Edward A. Ackerman in *Science and Resources*, a collection of essays on the prospects and implications of technological advance, published by The Johns Hopkins Press.

Dilution, Pollution, Or a New Solution?

GREAT AS WILL BE the increases in quantities of water required by households, industries, and other large users, the biggest future problem for the country as a whole will be how to deal with pollution. This is the belief of Nathaniel Wollman, University of New Mexico economist who made the Resources for the Future preliminary study that recently was published by the Senate Select Committee on National Water Resources. Twenty years hence, he warns, more fresh water may be needed for diluting flows from waste treatment plants than for all other uses put together, unless meanwhile we can find much better ways of preventing pollution or of treating sewage and other waste-laden water.

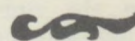
True enough, Wollman says, water can be reused, so that total use in an area can be larger than total supply without necessarily creating a shortage. "If all water-deteriorating elements could be removed by treatment, a region's water supply could be used over and over. The limits of water use would be reached only when the last drop of water escaped from the region by evaporation, was discharged into the sea, or otherwise became physically unavailable."

But there are reasons why this ideal cannot now be even approached in practice. Aside from cost (and treatment becomes progressively more expensive as greater percentages of waste are removed) there is, with present methods, a physical top limit. Water that has carried organic waste undergoes chemical changes even with complete sewage treatment. High-level treatment itself induces a secondary oxygen demand; nitrogen and phosphorus in the treated water stimulate growth of algae; when these die and decay the water tastes and smells unpleasant and its dissolved oxygen content falls too low to support the fish and other animal and plant life that a healthy stream should have.

The chief remedy at present is to add clean water to the effluent

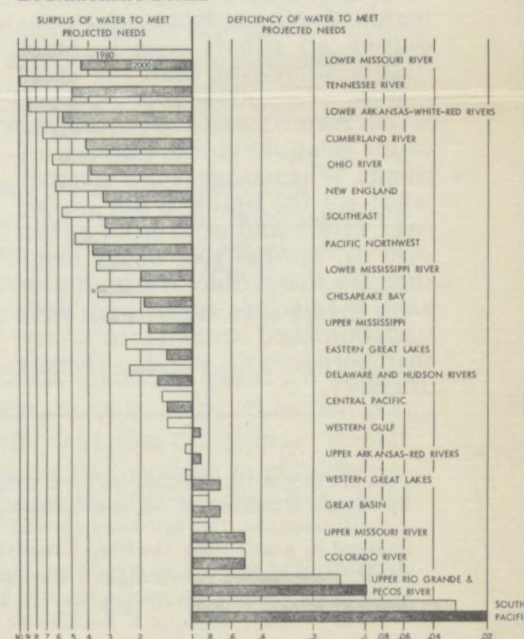
of treatment plants. "A systematic relationship can be established among the uses to which water is put, the resulting amount of waste materials, the level of water treatment, and the quantity of stream flow needed to maintain a designated oxygen content."

Such a relationship was worked out in the course of the study, taking an average of four parts of oxygen to a million parts of water as a desirable minimum, and assuming various levels of treatment ranging from 50 to 97½ per cent removal of waste materials and what appear to be reasonable increases in population and indus-



THE CHART BELOW, reproduced from Wollman's recent study, shows what the future picture might be like if national water development programs should emphasize treatment more than storage and if expected increases in population and economic activity should not be accompanied by large changes in (1) allocation among major uses, such as agriculture, industry, and households; (2) pricing policies for water; and (3) technology of water use and pollution abatement. Estimates of maximum supply assume as much storage as seems technically feasible. Estimated minimum flow requirements are the sum of net losses from all types of use and of amounts of fresh water needed for waste dilution to restore an average of four parts per million of oxygen.

RATIO OF PROJECTED MAXIMUM WATER SUPPLY TO PROJECTED DEMAND IN 1980 AND 2000—LOGARITHMIC SCALE



trial activity by 1980. Wollman concludes tentatively that by that year—for the nation as a whole though not in all regions—more than 60 per cent of the required flow would be for waste dilution unless in the meantime better and cheaper methods are developed to forestall or treat pollution.

== Passages ==

IT IS PREPOSTEROUS to suppose that the people of one generation can lay down the best and only rules of government for those who are to come after them, and under unforeseen contingencies. At the time of the framing of the Constitution the only physical forces that had been subdued and made to serve man and do his labor, were the currents in the streams and the air we breathe. Rude machinery, propelled by water power, had been invented; sails to propel ships upon the waters had been set to catch the passing breeze—but the application of steam to propel vessels against both wind and current, and machinery to do all manner of work had not been thought of. The instantaneous transmission of messages around the world by means of electricity would probably at that day have been attributed to witchcraft or a league with the Devil.—*U. S. Grant, Personal Memoirs, 1885*

THE QUESTION of questions for mankind—the problem which underlies all others and is more deeply interesting than any other—is the ascertainment of the place which man occupies in nature and of his relations to the universe of things. Whence our race has come; what are the limits of our power over nature and of nature's power over us; to what goal we are tending; are the problems which present themselves anew and with undiminished interest to every man born into the world.—*Thomas Huxley*



METROPOLITAN AMERICA

NEW YORK STATE is head-water country. The Iroquois knew this 300 years ago, and they built and ruled an empire. We of the twentieth century also need to understand the nature of these watersheds.

Why has it taken us so long to see the need for integrated multi-purpose programs in the river valleys of these hilly hinterlands of our cities? Why only now are we beginning to design dams and reservoirs to serve as recreational sites, water supply and stream stabilization, as well as flood control structures? Why have we been so slow to respond to the changing role of agriculture especially to the plight of our low-income farmers on submarginal lands?

I believe that the crux of the trouble lies in the lack of co-ordination between the two major forms of areal planning in this country, that is, between urban and regional planning. There should be no dichotomy. Both are concerned with the same fundamental problem—to bring our ways of living into harmony with the natural environment.

In practice, however, urban and regional planning have gone along separate paths. The gap between them has grown wider through the years until now it is a gulf of ignorance, broad and deep. City and regional-resource planners use two different vocabularies. Communication has become extremely difficult.

Traditionally, the city planner has focused attention upon the immediate pressing demands of the city itself. He has given but cursory attention to the city's space relations with surrounding

regions; witness the haphazard sprawl of our suburbs.

By contrast, and due largely to the manner in which regional planning emerged in the 1930's, with federal assistance to river valleys where social and economic stagnation were widespread, the resource planner's "region" became identified with the river basin or watershed. Such examples as the TVA, the Missouri or the Arkansas-White-Red River basins come to mind immediately. Just as the city planner failed to make clear what he meant by a region, the regional planner went all out in the opposite direction. To him, the region was the watershed, and to develop the river valley would lead inevitably to the panacea.

Unfortunately, and in the South especially, this concept was nurtured by men who were clinging to agrarian tradition, trying in a last dying breath to maintain the "folk culture" of a rural South. The urban-industrial giant, pressing upon them from the North, was somehow to be repelled by dynamic planning in the framework of "the natural region," the river valley.

Whether we like it or not, metropolitan areas are here, growing bigger, more complex, more demanding, every day. We are living through the growing pains of a new planning concept thrust upon us by this wave of urbanism. Only if watershed planning is integrated with city-region planning, with metropolitan planning a fundamental part, will it make sense and continue to make sense.—*ELEANOR E. HANLON, in a paper given at the annual convention of the New York State Conservation Council at Glens Falls, October 1960.*

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