

Natural Areas

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Not so long ago, the rural and small-town landscape, and even the fringes of cities, were characterized by many small natural areas that had escaped cultivation or other use. Such places might be a wooded ravine, a pond or marsh, a creek, a dry brushy hillside, or vacant lot. They existed because nobody thought it worthwhile to do anything better with them than to leave them alone.

Whether one explored them for inspiration, to study or collect something, or just to roam, these accidentally preserved natural areas had a way of being more satisfying than public parks or other dedicated places. Perhaps it was because they allowed nature to remain here and there in undisturbed harmony with human life, and gave a sense of freedom as one wandered in search of certain values, ignoring property lines. From a scientific point of view, these areas were sometimes of extreme interest because in them were preserved rare species, or remnants of vanishing ones that once had been widespread. Often they were the only places that could still tell the story of the native vegetation and soils and wildlife of a community. It would be hard to exaggerate the number of biologists who laid the foundations of their careers through youthful curiosity while roaming in the natural areas of their neighborhoods.

What has been happening to the natural areas in our landscape in recent years? And what are the consequences for biological science?

A quick look at almost any growing community will answer our first question; the city is simply moving out upon the countryside and covering both farmlands and natural areas with homes and lawns, shopping centers and asphalt paving. Besides this, urbanization requires still more acres for highways, airports, schools, factories, utilities, military installations, reservoirs, and artificial parks and playgrounds. Not only are there more of them, but they require more space than they used to: the 20-foot road has widened into a 166-foot freeway, taking about 20 acres of

land for every mile. The Department of Agriculture estimates that we have been turning land over to these uses at the rate of a million acres a year for more than forty years.

Besides occupying more land, urbanization has affected the quality of surrounding lands over much greater areas. This is most noticeable along roads and streams, which we will select as examples.

It is not feasible to enlarge every country road into a superhighway. However, to accommodate the demand for speed on every road, the engineers and maintenance men have shaved back banks and shoulders and applied chemical herbicides to unruly vegetation, destroying countless miles of bird and small animal habitat. Here and there, too, were rights-of-way which had not been mowed or grazed for years and which harbored many native grasses and wildflowers that had not been able to survive over the fence in pastures. Many thousands of miles of roadways have been degraded into barren channels for speeding traffic.

Even if the roadsides were still allowed to be natural, it would not be safe to walk along them to study and enjoy them. The speeding automobile has virtually eliminated walking and bicycling and left nothing to replace them. Where automobiles can stop near accessible natural places, we find litter strewn about and other shabby signs of wear and tear. More and more land owners post their land against trespassing in an effort to hold back floods of automobile roamers from the city who have time and curiosity on their hands but no particular destinations. The invention of the jeep and bulldozer have permitted easy access to almost any kind of land and hence have had very widespread impact on previously undisturbed areas.

And what of streams? I know a botanist who struggled vainly against her county flood control engineers who wanted to cement the stream bed at her back yard so the winter rains would run off faster. Her old-fashioned argument was that the dense vegetation would help hold the water back. But it was no use, the winter rains now rush down a concrete

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trench with a chain fence on both sides to keep children from falling in who once played safely on its banks. Natural streams virtually disappear from the urbanized landscape while larger rivers become polluted thoroughfares for industry. Just as roads become mere channels for moving traffic along, streams become mere channels for moving water along. In both cases, as a result of urbanization we have lost one of our richest opportunities for preserving natural conditions where we might have access to them easily and regularly. There is no estimate of the amount of land that has been so affected by urbanization that its natural values have been lost. Much of the loss would appear to be unnecessary, the result of indifference, or of ignorance of the ecological principles underlying proper land use.

Now let us project this picture on a bigger scale. All of the urbanized land I have described, even including all parks and preserves, takes up about 6 per cent of the land in America, or 105 million acres. This is more than double what it was in 1910, and they are the acres closest to home where we need to retain natural areas most badly. But what of the staggering remainder of nearly 1 billion, 800 million acres? Surely our opportunities for natural areas are inexhaustible.

Of that 1800 million acres, only 84 million acres of it, or 4½% of our total land area, is classified as completely unusable; that is, land too rough or barren to yield any agricultural products. All the rest of it is either being used already for crops, grazing, or timber production, or can be made to do so. Indeed, economists unhesitatingly foresee the ultimate use of nearly all of it. It is apparent that whatever natural areas we have, large or small, exist by the grace of history; we simply haven't gotten around to using them yet. The only large areas still being accidentally preserved are in remote, rough country where it does not pay us now to make a harvest; the smaller areas nearer our towns and cities are rapidly decreasing in both quality and extent. It is clear that a process is consistently at work and has not yet reached its peak; nearly all of our land is undergoing more intensive use, and is being altered, sometimes drastically, sometimes indirectly, from the natural state in which we found it. After centuries of celebrating the virgin American continent with

its rich and inexhaustible resources, it is somewhat of a shock to realize that within two or three more generations our supply of unused, unspoiled land could be reduced to scattered bits.

Let us take one closer look at this social process which, in its voracious appetite for resources and its rapid expansion, has come to be the keynote of modern life. Samuel Ordway, Jr., in his book, *Resources and the American Dream*, points out that our consumption of materials is accelerating at a rate much faster than population itself is growing. "While the number of persons in the U.S. doubled in fifty years," he writes, "the production of all minerals increased 8 times; the consumption of power increased 11 times; the consumption of paper and pasteboard increased 14 times over the same period." In other words, it is our drive for a higher level of living which is largely responsible for the impact on the land we have been describing. Coupled with it is an almost complete indifference to the possible outcome when this terrific consumption begins to run short of high-grade materials as in time it must. We call it progress; and, as Mr. Ordway observes, it is "the basic philosophy, indeed religion, of modern man"; namely, to earn, spend, possess, and eat more and more, to banish work and insecurity, and enjoy more leisure. It is a rare man who does not believe that the chief end of life is an ever higher standard of living, or who knows what this may mean for our resources.

If our goal is to maintain and even continue to raise our standard of living as our population grows, we will need to put many more millions of acres of farmland into production within the next 20 years. Note that we are losing a million acres a year to urbanization—that we must not only make up for it, but must achieve a net increase. Many marginal lands are being retired which should never have been farmed. In spite of probable increased production on present lands, much of the increase will have to come from the drainage, clearing or irrigation of heretofore unused lands—of which around 40 million acres are available and suitable.

But before we develop these unused lands, which is an expensive process, the pinch will begin to be felt elsewhere; existing farms will be expanded and utilized more intensively. Those strips and corners and unused pieces

that we admired because they were remnants of nature will have to be put into production. Both statistics and experience show that this is no idle expectation; it is happening now. Drainage, clearing and irrigation, mostly on existing farms, have been proceeding at the rate of a million and a half acres a year. Gone are many irreplaceable natural areas, some known to be of exceptional scientific interest.

What are the consequences for biological science?

The almost complete destruction of virgin conditions over widespread areas of the country means that we have lost priceless materials for research and cannot reconstruct them. It does not help the student of Iowa soils that there are 50,000 acres of virgin redwood forest preserved in California when he would give his eyeteeth for five acres of virgin prairie grassland. Our most acute needs for natural areas are in those urbanized and cultivated regions where they are being lost most rapidly.

The British ecologist, F. Fraser Darling, observes, "man advances materially and ultimately in his civilization by breaking into the stored wealth of the world's natural ecological climaxes. The process gives him leisure for the much needed art of civilizing. The ecological climax, as opposed to earlier stages of succession, is a conservation of energy, wasting very little; rather it builds up a store of wealth. . . ." America's present high standard of living represents, to a great degree, her success in tapping the wealth stored up by nature on this continent. As we have seen, we are removing energy and materials at a very rapid rate and are putting little back. Therefore, it is not just sentiment that moves us to preserve these natural areas that represent the remnants of virgin conditions. Such areas are needed to show what the land does when left alone to build up wealth and life and, therefore, to teach us better how we can use the same kind of land for a permanent agriculture. The goal of the conservation movement is simply to create a permanently favorable balance between what we have and what we expend so we will not, in the long run, face the fate that overtook some ancient civilizations when their land was worn out. The knowledge to accomplish this must come from biological science. And some of that knowledge can come only from natural areas.

The primary scientific need, then, is for a carefully selected system of areas to represent typical natural conditions in all parts of the country.

However, this does not begin to satisfy our need for more casual areas in every community which would have aesthetic and educational values for a larger part of the public. When natural conditions disappear from roadsides, farms, and miscellaneous public lands, it has the unfortunate result that public parks come to be the only accessible natural places in the community. Not only do they represent a limited diversity of landscape types, but they are subjected to all the impact from people who can find no other place to go. More parks are not the only, or the best, answer. There are many other ways to broaden the variety of natural places in a community if a community desires to do it. We shall focus our attention here on only one, the natural area for the school.

While schools are one of the land uses that are wiping out agricultural and natural areas, it is possible to turn this apparent loss into an advantage. When a new school is being built, a portion of the school grounds can be kept aside in its natural condition and used as an outdoor study area—a genuine extension of the classroom facilities. Such an area rescued from the bulldozers may at first seem poor and small when compared with the richness of a large nature preserve, or even a city park one is accustomed to go to on occasional field trips. Chances are it will not even resemble virgin conditions. It may look weedy and unattractive—anything but the picture of wildflowers, songbirds, and running brooks that the public associates with nature study. So strong are prejudices about what a "natural" area ought to look like that some parents and other teachers may insist on seeing it tidied up, like a little park, taking sides against some forms of life and in favor of others. It may be necessary even to give in a little and bide one's time in order to get the area preserved at all. But once it is there, it can become the source of many exciting experiences for both students and teacher—as Miss Enid Larson and her young people at Carmel High School, California, have shown.

Three things strike me as essential for the greatest success of such a project, no matter what grade level it is used on. One: at least

a part of the area, if not all of it, should be fenced by the students themselves, and left completely untouched except for the observations to be made in it. Two: the students should be allowed to think up their own projects, insofar as possible. And three: The area should be observed continuously by the students throughout the year.

Why a fence? It need only be a token fence—a single wire strung on small posts. But it expresses the fact that this is *their* area—a sanctuary, to be protected, preserved, cherished, and examined out of pure curiosity. It is not a multiple-use area; it is not a play area; it is not to be manipulated to see if the plants can't be made to grow better.

And why projects that require continuous observation? The area is not just a place to go occasionally for illustrations of what's in the textbook. It is a textbook itself. It teaches what no other kind of experience can do so well: that life is an ongoing process, full of constant change and adjustment of living creatures to each other and their environment.

This lesson may well be lost, however, if the students do not pursue projects they are genuinely curious about, having thought up their own questions about what might be going on in their natural area.

For those of you who are wondering how to go about setting up such an area, there is practical information available. The NABT Conservation Committee has a project on "Outdoor Laboratories," under the lively chairmanship of John Brainerd. A series of articles on "Outdoor Laboratories," published in ABT, have been issued in booklet form by the Interstate Press, ABT publishers. His address is Biology Department, Springfield College, Springfield, Massachusetts. The Nature Conservancy also has a committee on natural areas for schools, of which Dr. Brainerd is also chairman. Several useful publications are available from either their main office at 2039 K St., N. W., Washington, D. C., or their Western Regional Office, Berkeley, California. State committees of the Nature Conservancy are being formed to draw together teachers interested in the idea. More publications describing progress are in the offering.

Besides a new dimension in teaching, what does this movement promise?

I think it is the nearest thing to a solution of that problem with which we began: the

need for a widespread educational experience in protecting and understanding biological values. Most of our scientific research and much of our teaching goes toward the furtherance of industrial technology; that is, toward the increased production and consumption of products. Perhaps our school natural areas can teach the virtue of conserving biological life, rather than the view that it is all so much raw material for human consumption. While the burden of responsibility for the future rests on all citizens alike, it seems to me that the biology teacher has a unique opportunity to carry more than his share and enjoy doing it.

Travel Grants

The Inter-University Committee on Travel Grants, representing American colleges and universities, wishes to announce that it is soliciting inquiries and applications from graduate students and scholars who wish to spend all or part of the academic year 1962-1963 engaged in study and research in the Soviet Union as participant in the academic exchange between the U. S. and the U. S. S. R. American citizens under forty years of age are eligible if they are graduate students, post-doctoral researchers, or faculty members at the time of application. Teachers of the Russian language in secondary schools are also eligible.

For further information and applications write to: Stephen Viederman, Deputy Chairman, Inter-University Committee on Travel Grants, 719 Ballantine Hall, Indiana University, Bloomington, Indiana. Applications must be received no later than December 15, 1961.

Career Pamphlet

"Should You Be a Biologist?" an article by Bentley Glass, is available in pamphlet form from the Career Information Service, New York Life Insurance Company, Box 51, Madison Square Station, New York 10, New York.