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THE WHITE HOUSE  
WASHINGTON

October 12, 1989

MEMORANDUM FOR ED ROGERS

FROM: JIM PINKERTON *JP*  
SUBJECT: Planting the future

This week the Office of Policy Planting toured the Buckingham Forest Tree Nursery operated by the state of Maryland.

New facts for the layman: In addition to sequestering carbon dioxide, the roots of trees help maintain and improve water quality through the absorbtion of chemicals and nutrients from herbicides and fertilizers that run off or leach from farms, lawns and gardens.



Date: 9/29

TO: Ed Rogers

FROM: JAMES P. PINKERTON  
Deputy Assistant to the President  
for Policy Planning

# Do nature a favor: Plant a hardy tree

By H. Marc Cathey  
SPECIAL TO THE WASHINGTON TIMES

**R**ight now, in the early fall planting season, let's challenge the carbon dioxide (CO<sub>2</sub>) buildup we are told will overheat the planet.

We can do very little as individuals to affect the amount of CO<sub>2</sub> entering our atmosphere, but we can do a lot to guarantee our oxygen supply and lessen the CO<sub>2</sub> buildup. We can plant trees. In our area, this is the best season for it.

The simple fact is that the air we breathe is a byproduct of the life of plants. Plants absorb carbon dioxide, which comes from the breakdown of all biodegradable products, and from the burning of coal and oil.

In the presence of minerals, water and light, plants convert CO<sub>2</sub> into sugars and release into the air the oxygen we need. The sugars are transformed into products we depend on: wood, leaves, flowers, fruits and seeds.

While scientists haven't yet agreed on whether our climate is heating up, cooling down or drying out, there is a fair consensus that the level of CO<sub>2</sub> has increased measurably. The rate of CO<sub>2</sub> released into our air and the CO<sub>2</sub> taken up by plants is slowly going out of balance. And we cut down more trees every year.

For generations, CO<sub>2</sub> levels in the atmosphere remained at about 30 parts per million (ppm). Because of the increased burning of fuels for transportation, heating and industry, the CO<sub>2</sub> level is beginning to climb by about 2 ppm each year. As the CO<sub>2</sub> level increases, the earth loses its ability to release excess heat from the sun back into the outer atmosphere — the "greenhouse effect."

Some scientists predict that this effect will slowly warm the earth, melting its polar ice, raising sea levels along our shores, shifting air currents, reducing rainfall and permanently altering the climate.

Sponsors of programs such as the American Forestry Association's Global Re-Leaf believe that we can regain the CO<sub>2</sub> balance by planting trees, millions and millions of them — in home gardens, municipal parks and wild spaces. Young trees grow rapidly, processing CO<sub>2</sub> at faster rates than old trees.

Don't plant just any tree. Some trees have a great potential for failure. The new ethic I encourage in gardeners calls for planting only trees that have no chemical dependencies and will be beautiful for generations.

## Trees to avoid:

**Strangers:** Saplings of unknown origin can be damaging to the environment. They can grow so vigorously that they overwhelm desirable natives, and they can introduce harmful organisms.

**Exotic species:** Introduced into a delicately balanced ecosystem, they may overwhelm and kill out sturdy necessary indigenous species. Others, especially exotics set in climates foreign to them, can require so much water, fertilizer and chemical blitzing to survive that they encourage pollution.

**Trees that will go out of scale and have to be cut down:** Trees for garden design must be small enough to permit light into the site and allow space enough for their own and other roots.

**Trees used for lumber:** Some young evergreens will grow to massive size and should be planted only in vast open spaces where they can grow properly.

## Trees to seek out:

**Selected natives:** Seedlings of natives selected and deliberately replanted in their origination region have a greater potential for success than seedlings of unknown sources. They also are sounder than some of our lovely but overplanted ornamentals. The beautiful flowering cherries and crabs, for instance, must be planted only in pest- and disease-resistant form.

**Established cultivars:** Resistant clonal selections of widely planted ornamentals have greater potential for success than saplings of unknown origin. Now that flowering dogwood, for example, has anthracnose, a fungus disease, look for selections of *Cornus kousa* var. *chinensis*, Chinese dogwood.

Don't be tempted to overplant the site in your hurry to save the world. Crowding can greatly limit the full development of the trees.

Contaminants of the environment in the water, soil and atmosphere limit the successful performance of many plants in urban sites.

Excessive fertilization can be a pollutant. Choose benign pesticides such as dormant oils in late winter and early spring (but not on blue spruce!), insecticidal soap spray, Sevin, Diazinon and all-purpose fruit spray.

## Outstanding performers:

Among the hardiest trees for our city streets, parks and gardens are these established species and cultivars:

*Acer ginnala*, amur maple, and cultivars such as "Flame" are medium trees with good fall color.

*Acer plantanoides*, Norway maple, and cultivars such as "Cleveland," "Crimson King," "Crimson Sentry," "Drummondii," "Emerald Queen" and "Summer-shade" are big, long-lived, handsome shade trees.

*Acer rubrum*, red maple, swamp maple, particularly cultivars "October Glory" and "Red Sunset," are handsome, medium shade trees with spectacular fall color — hardy in warm regions as well as cool; for climates with real cold, choose "Autumn Flame" and "Northwood."

*Acer saccharum*, sugar maple, rock maple, hard maple and cultivars such as "Bonfire" are big shade trees with beautiful fall color.

*Chamaecyparis nootkatensis*, Nootka cypress is a beautiful, small-to-medium conifer with drooping branches.

*Crataegus x lavalleyi*, Lavalley hawthorn is a vigorous, upright little tree with glossy foliage that colors bronze or copper-red in fall.

*Crataegus phaenopyrum*, Washington thorn, has white flowers in late spring and persistent bright-red fruits in early fall.

*Elaeagnus angustifolia*, Russian olive, deciduous and sometimes evergreen small trees with gray-green willow-like leaves and fragrant cream-yellow flowers in spring followed by yellow or orange fruit.

*Fagus sylvatica*, European beech, very beautiful, big shade tree.

*Fraxinus pennsylvanica*, green ash, big, beautiful shade tree.

*Ginkgo biloba*, maidenhair tree, very tolerant of city conditions, with beautiful yellow color in fall. Plant only male trees because the female drops messy fruit in the fall.

*Gleditsia triacanthos* var. *inermis*, thornless honey locust, "Shademaster" and "Sunburst," slow-growing, medium-height

feathery trees for light shade.

*Gymnocladus dioica*, Kentucky coffee tree, tall, with bold, picturesque branching, handsome bark and light blue-green foliage. Specimen for larger parks and golf courses.

*Koeleruteria paniculata*, varnish tree, golden-rain tree, lovely, summer-flowering small shade tree.

*Liquidambar styraciflua*, American sweet gum, big shade tree with magnificent fall color in the right climate. "Moraine" tolerates below-zero climates.

*Liriodendron tulipifera*, tulip tree and colorful cultivars such as "Aurea-marginatum," gold-edged tulip tree. A big shade tree.

*Malus*, crab apple, a most beautiful spring-flowering tree, with bright fall fruit. Insist on pest- and disease-resistant cultivars. Among many are "Candied Apple," "Coralburst," "Dolgo," "Louisa," "Naragansett," "Parrisi," "Pink Princess Crab Apple," "Red Jade" and "White Cascade."

*Picea*, spruce. Big conifers with the aromatic, rigid needles, large cones and pyramidal form of Christmas trees.

*Platanus x acerifolia*, London plane, in particular cultivars "Columbia" and "Liberty." These are big, handsome shade trees popular for street planting.

*Populus alba* var. *nivea*, white poplar, silver-leaved poplar, is excellent for screening and rapid growth.

*Pyrus calleryana*, callery pear cultivars "Capital" and "Whitehouse," beautiful, rather large spring-flowering trees with good fall color.

*Taxodium distichum*, bald cypress, is a majestic deciduous conifer that thrives in swamps. It also is successful as a specimen for large parks and estates, but it will be smaller.

*Ulmus parvifolia*, "Dynasty," Chinese elm, a big, handsome shade tree that may be tried in place of the problem-plagued American elm.

*Zelkova serrata*, "Village Green." Japanese zelkova, is another big, handsome tree that has been planted to replace the American elm.

Dr. Cathey is the director of the National Arboretum.

WT  
9/28/89



THE WHITE HOUSE  
WASHINGTON

Date: 9/26/89

TO:

Ed Rogers

FROM:

JAMES P. PINKERTON  
Deputy Assistant to the President  
for Policy Planning

fyi

## ENVIRONMENT

### 'Killer' Trees to the Rescue

His predecessor's most notable environmental pronouncement was that trees cause air pollution, but President George Bush thinks otherwise. On a swing through the West last week, the First Arborist planted maples and elms in South Dakota, Montana and Washington—calling the tree “the oldest, cheapest and most efficient air purifier.” Trees breathe in carbon dioxide (CO<sub>2</sub>), responsible for the greenhouse effect; they also absorb particulates, a major component of urban air pollution, and provide shade that can reduce the need for air conditioners, which run on gases

that destroy the ozone layer. Can trees save the planet?

■ A single forest tree absorbs 26 pounds of CO<sub>2</sub> per year; an acre of trees can remove 2.4 to 5 tons of CO<sub>2</sub>. There are 728 million forested acres in the United States: they can remove more than 1.7 billion tons of CO<sub>2</sub> a year. The burning of fossil fuels releases 5.6 billion tons of CO<sub>2</sub> into the atmosphere annually.

■ Planting 100 million trees around homes and businesses in the United States would keep them cooler in summer. That would save \$4 billion in energy costs and reduce CO<sub>2</sub> emissions by 18 million tons per year, calcu-

lates the American Forestry Association.

■ Just three trees around a house can cut air-conditioning needs 10 to 50 percent.

■ Each year 2.3 billion seedlings are planted in the United States, covering 3.4 million acres. Even with that effort, the annual net loss of forest in the United States is about 900,000 acres.

■ In America's urban forests, about four trees die or are cut down for every one planted.

■ In St. Louis, 440,000 oaks, maples and lindens remove 340 tons of dust and smoke each year—1 percent of the city's particulate pollution.

■ In tropical forests, 27 million acres are cleared for farms and other uses every year—a loss of 500,000 trees every hour of every day.



# Poisoned Treaty Oak Still Hanging On

## Venerable Texas Tree's Fate May Not Be Known Till Spring

9/25/89

By Elizabeth Hudson  
Special to The Washington Post

AUSTIN—Treaty Oak, the venerable Texas landmark poisoned earlier this year, is keeping a fragile hold on life as it puts out a fifth set of leaves to rid itself of the poison soaked into its roots, but the fate of the 500-year-old tree may not be known until next spring.

Just how sick Treaty Oak is "depends on who you talk to," said Jerry Brand, professor of botany at the University of Texas and a member of the task force of tree experts attending Treaty Oak. "The people who make the herbicide that was used to poison the tree seem quite negative. But others working to save it are optimistic."

"No one has ever had any experience with this before," Brand said, "so there is no log of information for evaluation."

Treaty Oak was poisoned last March. In June Austin police arrested Paul Stedman Cullen, 45, and charged him with second-degree felony. Police allege Cullen poured the herbicide Velpar around the 60-foot tree, apparently as a

ritual to protect a woman from a man.

Thanks to a blank check from Dallas billionaire H. Ross Perot and other anonymous donors, the city has spent more than \$100,000 trying to save the dying tree. This month tree specialists injected it with 70 gallons of sucrose—table sugar—in one of several experimental treatments that have been used. It was injected earlier with salt water to try to flush out the herbicide, and a dozen 65-foot telephone poles have been placed to support plastic panels that block the sun and will add protection from winter winds.

The extraordinary efforts to save Treaty Oak have drawn some criticism, particularly from Texas Indian leaders who have said there are more important things in life than a tree. But the tree has also been inundated with visitors. Well-wishers from around the world have left cards and letters in Spanish, French, Latin and Chinese. A large yellow ribbon is tied around the trunk and flowers and candles decorate the area. The most popular get-well gifts of

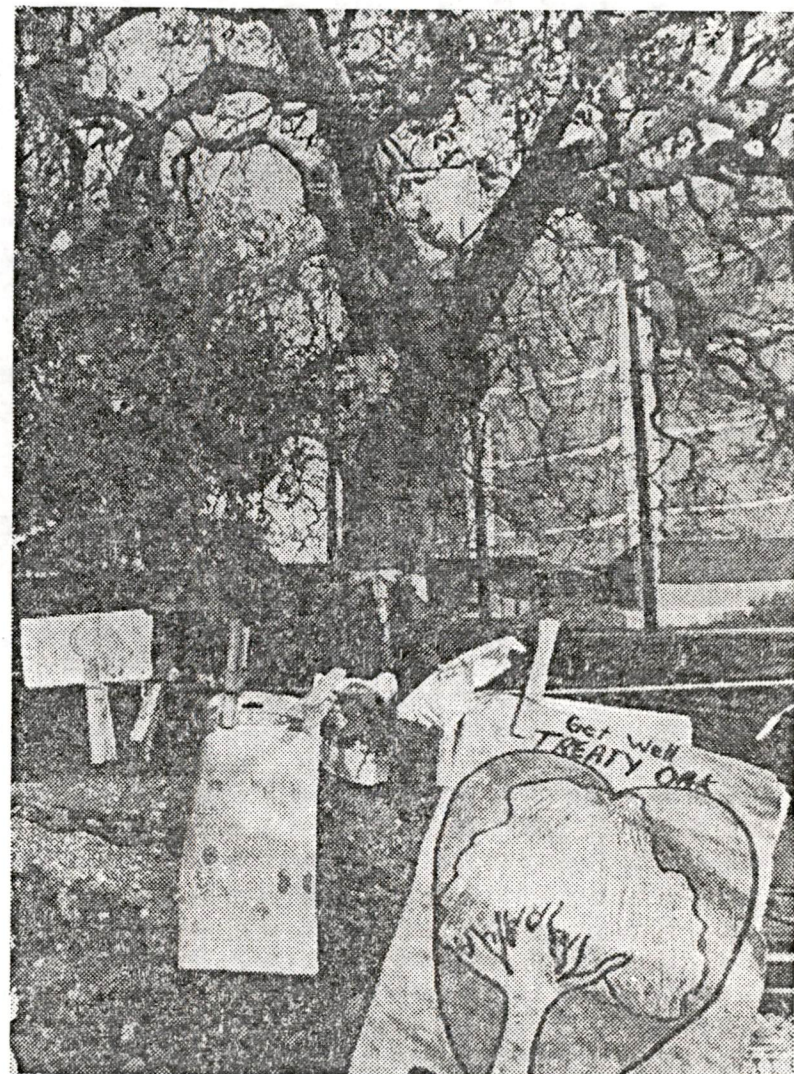
all—cans of chicken soup—are stacked up in front of the tree.

Treaty Oak legend says that Stephen F. Austin signed a peace treaty with the Indians in its shade in 1824. Although the legend's historical accuracy is questionable, Treaty Oak has become a significant part of local lore.

The tree has more than just historical significance, Brand said. "It's the cultural significance and what that means to Austin that makes it worth the work" to save it, he said.

Clippings have been taken from the tree to begin raising Treaty Oak offspring. City forester John Geidraitis said the clippings will be used to make genetically identical Treaty Oak clones.

Meanwhile, Cullen, a drifter with prior burglary convictions, has remained in Travis County Jail in lieu of \$20,000 bail. Prosecuting attorney Kent Anschutz dismissed criticism of the bail amount. "Considering his prior convictions, it's not unusually high at all," he said. Cullen was indicted in August by the Travis County Grand Jury. He faces a life sentence if convicted. No trial date has been set.



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Treaty Oak is receiving experimental treatments as well as get-well cards.

To: Ed Rogers  
Fr: Jim Pinlee  
fyi



THE WHITE HOUSE  
WASHINGTON

September 12, 1989

MEMORANDUM TO ED ROGERS

FROM: JIM PINKERTON 

SUBJECT: Trees

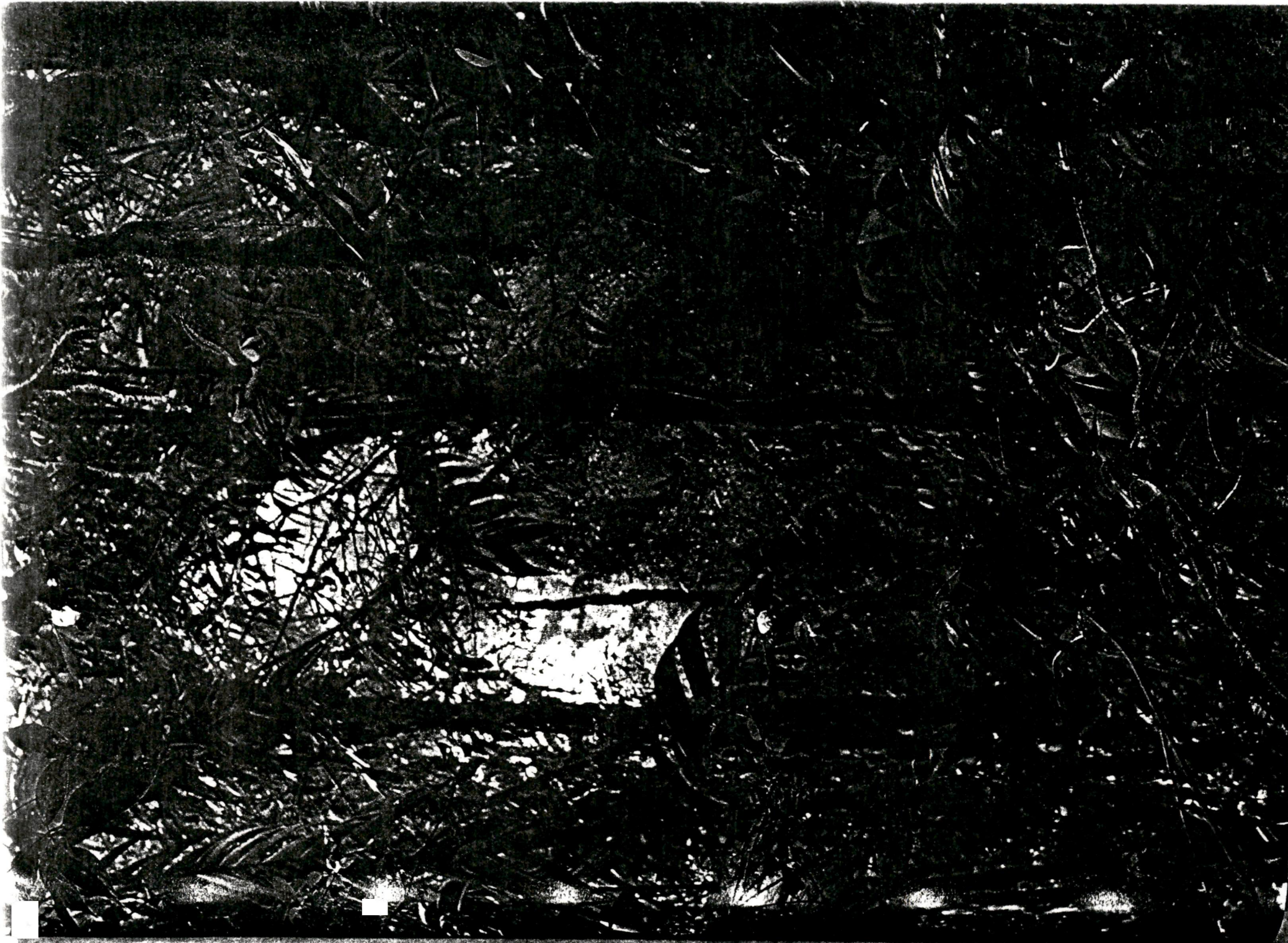
Deforestation has significant consequences beyond the greenhouse effect or (as noted in yesterday's article) the loss of shade in a quiet neighborhood.

The attached article from Scientific American (9/89), by famed Harvard biologist E. O. Wilson, discusses the extinction of thousands of species of plants and animals each year as a result of deforestation.

Dr. Wilson writes that "species diversity -- the world's available gene pool -- is one of our planet's most important and irreplaceable resources." By contributing to global deforestation and the "habitat destruction" it causes, the U.S. is contributing to "the death of birth."

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# Threats to Biodiversity

*Habitat destruction, mostly in the tropics, is driving thousands of species each year to extinction. The consequences will be dire—unless the trend is reversed*

by Edward O. Wilson

The human species came into being at the time of greatest biological diversity in the history of the earth. Today as human populations expand and alter the natural environment, they are reducing biological diversity to its lowest level since the end of the Mesozoic era, 65 million years ago. The ultimate consequences of this biological collision are beyond calculation and certain to be harmful. That, in essence, is the biodiversity crisis.

In one sense the loss of diversity is the most important process of environmental change. I say this because it is the only process that is wholly irreversible. Its consequences are also the least predictable, because the value of the earth's biota (the fauna and flora collectively) remains largely unstudied and unappreciated. Every country can be said to have three forms of wealth: material, cultural and biological. The first two we understand very well, because they are the substance of our everyday lives. Biological wealth is taken much less seriously. This is a serious strategic error, one that will be

increasingly regretted as time passes. The biota is on the one hand part of a country's heritage, the product of millions of years of evolution centered on that place and hence as much a reason for national concern as the particularities of language and culture. On the other hand, it is a potential source for immense untapped material wealth in the form of food, medicine and other commercially important substances.

It is a remarkable fact, given the interdependence of human beings and the other species that inhabit the planet, that the task of studying biodiversity is still in an early stage. Although systematics is one of the two oldest formal disciplines of biology (the other is anatomy), we do not even know to the nearest order of magnitude the number of species of organisms on the earth. With the help of other specialists, I have estimated the number of species that have been formally described (given a Latinized scientific name) to be about 1.4 million. Even conservative guesses place the actual number of species at four million or greater, more than twice the number described to date.

Terry L. Erwin of the Smithsonian's National Museum of Natural History believes the number of species to be even greater. With the help of co-workers, he applied an insecticidal fog to the forest canopy at localities in Brazil and Peru in order to obtain an estimate of the total number of insect and other arthropod species in this rich but still relatively unexplored habitat. By extrapolating his findings to moist tropical forests around the world and by including a rough estimate of the number of ground-dwelling species in his calculations, Erwin arrived at a global total of 30 million species. Even if this number proves to be a considerable overestimate, the amount of biodiversity in the world is certain to be projected sharply upward in other, compensatory ways.

Groups such as the mites and fungi, for example, are extremely rich and also very underexplored, and habitats such as the floors of the deep sea are thought to harbor hundreds of thousands of species, most of which remain undescribed. Even the number of bacterial species on the earth is expected to be many times greater than the 3,000 that have been characterized to date. To take one example, an entirely new flora of bacteria has recently been discovered living at depths of 350 meters or more beneath the ground near Hilton Head, South Carolina. Even new species of birds continue to turn up at an average rate of two per year.

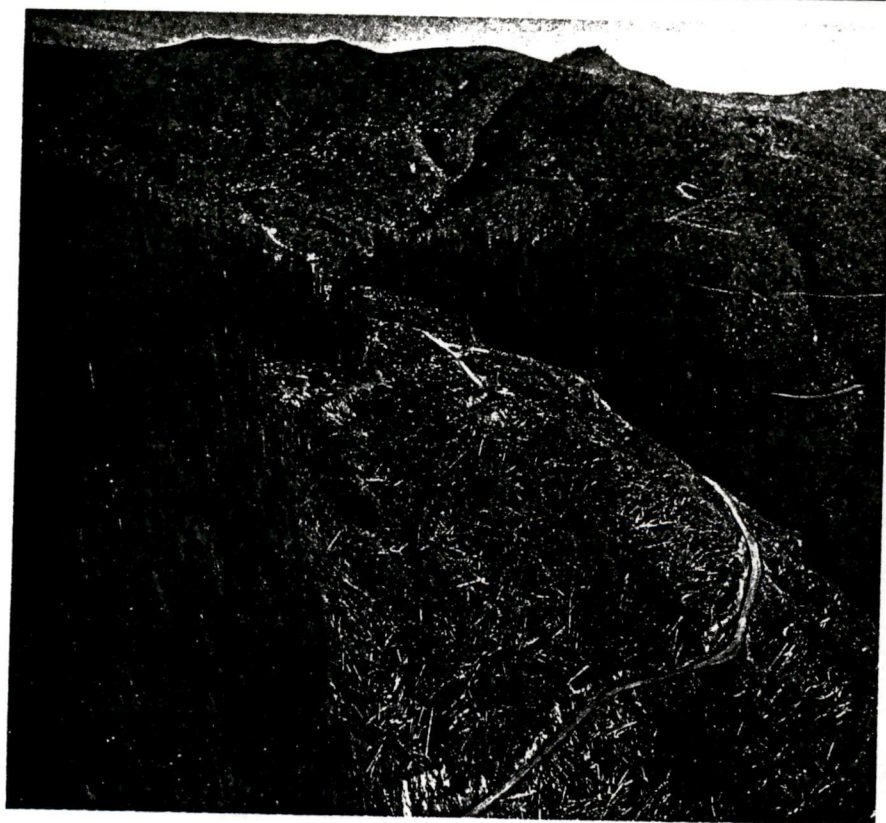
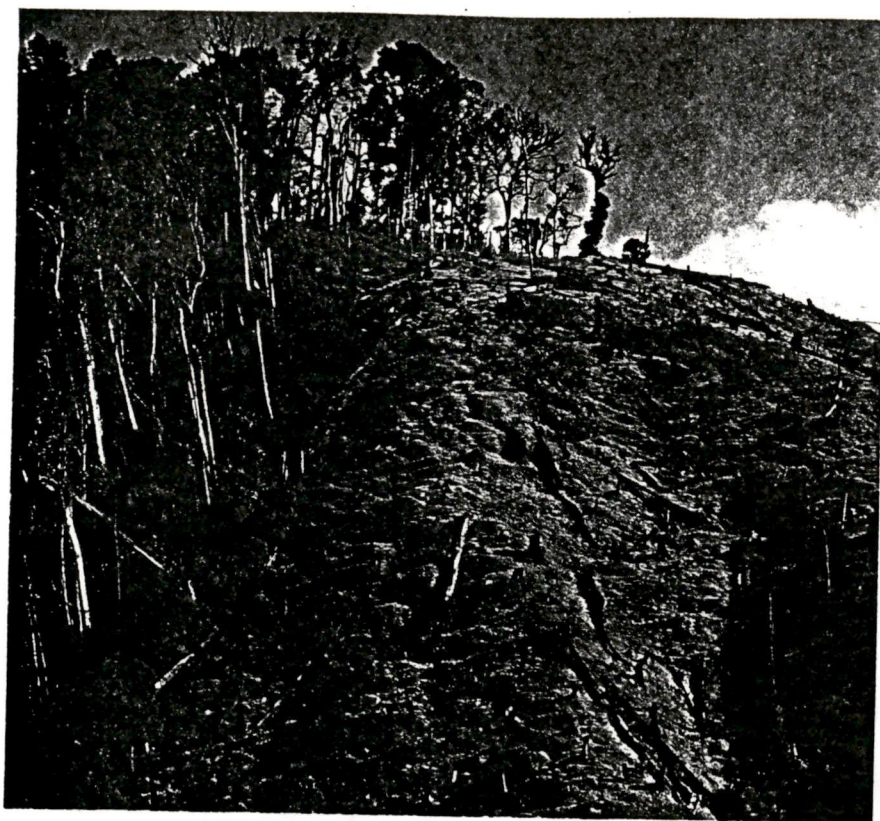
Systematists are in wide agreement that whatever the absolute numbers, more than half of the species on the earth live in moist tropical forests, popularly referred to as rain forests. Occupying only 6 percent of the land surface, these ecosystems are found in warm areas where the rainfall is 200 centimeters or more per year, which allows broad-leaved evergreen trees to flourish. The trees typically sort into three or more horizontal layers, the canopy of the tallest being 30 meters (about 100 feet) or more from the ground. Together the tree crowns of the several layers admit little sunlight to the forest floor, inhibiting the development of undergrowth and leaving large spaces through which it is relatively easy to walk.

The belief that a majority of the

EDWARD O. WILSON was one of the first to call attention to the global decline in biological diversity and to sound the alarm on the consequences of its loss. His interest in living organisms, especially ants, stems back to his childhood, which was devoted to the exploration and collection of living things, and to his undergraduate studies in evolutionary biology at the University of Alabama. He received his Ph.D. in biology from Harvard University, where he is now Frank B. Baird, Jr., Professor of Science and Curator in Entomology. Wilson has made major contributions to a number of fields, including the behavior and evolution of social insects, chemical communication and the evolution of social behavior. He has been awarded the National Medal of Science, the Pulitzer Prize in general nonfiction for his book *On Human Nature* and the Tyler Prize for environmental achievement.

TROPICAL RAIN FORESTS, such as this one in northern Costa Rica, are among the most species-rich habitats on the earth. The enormous biological diversity found in these forests can be explained by the fact that the most species-rich groups on the planet, the invertebrates and flowering plants, are concentrated there. The vegetation, much of it broad-leaved evergreens, is extremely lush; the tallest trees tower as much as 30 meters (100 feet) above the rain-forest floor.





DEFORESTATION IS OCCURRING at a rapid rate around the world. In Costa Rica (*top*), as well as in parts of South America, rain forest is often cut and the land fenced in and converted to pasture. Unlike temperate forests, where nutrients accumulate in the soil, tropical forests typically have poor-quality soil. Consequently, within two or three years after being cleared, soil that once supported dense vegetation becomes too nutrient-poor to provide much grass for grazing cattle. In the U.S. (*bottom*), the impact of large-scale logging operations can be clearly seen in this photograph of a mountain range in the state of Washington. The scattered logs in the foreground are trees that have been cut and stripped of their branches and are waiting to be collected.

planet's species live in tropical rain-forest habitats is not based on an exact and comprehensive census but on the fact that the two overwhelmingly species-rich groups, the arthropods (especially insects) and the flowering plants, are concentrated there. Other extremely species-rich environments exist, including the coral reefs and abyssal plains of the oceans and the heathlands of South Africa and southwestern Australia, but these appear to be outranked substantially by the rain forests.

Every tropical biologist has stories of the prodigious variety in this one habitat type. From a single leguminous tree in Peru, I once retrieved 43 ant species belonging to 26 genera, approximately equal to the ant diversity of all of the British Isles. In 10 selected one-hectare plots in Kalimantan in Indonesia, Peter S. Ashton of Harvard University found more than 700 tree species, about equal to the number of tree species native to all North America. The current world record at this writing (certain to be broken) was established in 1988 by Alwyn H. Gentry of the Missouri Botanical Garden, who identified approximately 300 tree species in each of two one-hectare plots near Iquitos, Peru.

Why has life multiplied so prodigiously in a few limited places such as tropical forests and coral reefs? It was once widely believed that when large numbers of species coexist, their life cycles and food webs lock together in a way that makes the ecosystem more robust. This diversity-stability hypothesis has given way during the past 20 years to a reversed cause-and-effect scenario that might be called the stability-diversity hypothesis: fragile superstructures of species build up when the environment remains stable enough to support their evolution during long periods of time. Biologists now know that biotas, like houses of cards, can be brought tumbling down by relatively small perturbations in the physical environment. They are not robust at all.

The history of global diversity is reflected in the standing diversity of marine animals, the group best represented in the fossil record. The trajectory can be summarized as follows: after the initial "experimental" flowering of multicellular animals, there was a swift rise in species number in early Paleozoic times (some 600 million years ago), then plateaulike stagnation for the remaining 200 million years of the Paleozoic era and finally a slow but steady climb through

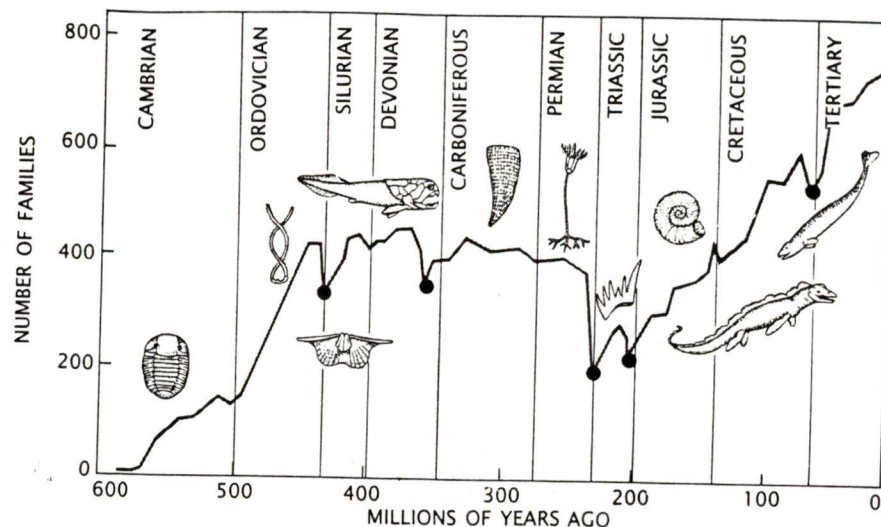


the Mesozoic and Cenozoic eras to diversity's present all-time high [see illustration at right].

The overall impression gained from examining these and comparable sets of data for other groups of organisms is that biological diversity was hard won and a long time in coming. Furthermore, the procession of life was set back by five massive extinction episodes during the Ordovician, Devonian, Permian, Triassic and Cretaceous periods. The last of these is by far the most famous, because it ended the age of dinosaurs, conferred hegemony on the mammals and ultimately, for better or worse, made possible the origin of our own species. But the Cretaceous crisis was minor compared with the great Permian crash some 240 million years ago, which extinguished between 77 and 96 percent of all marine animal species. As David M. Raup of the University of Chicago has observed, "If these estimates are even reasonably accurate, global biology (for higher organisms, at least) had an extremely close call." It took five million years, well into Mesozoic times, for species diversity to begin a significant recovery.

What lessons can be drawn from these extinction episodes of the past? It is clear that recovery, given sufficient time, is sometimes possible. It is also true that in some cases new species can be created rapidly. A large minority of flowering-plant species have originated in a single generation by polyploidy—a multiplication of chromosome sets, either within a single individual or following the hybridization of two previously distinct species. Even geographic speciation, in which populations diverge genetically after being separated by a barrier such as a strait or desert, can in extreme cases lead to the evolution of new species in as few as from 10 to 100 generations. Hence, it might be argued that when a mass extinction occurs the deficit can be made up in a relatively short time. But under such circumstances pure numbers of species mean little. What matters more, in terms of the spread of genetic codes and the multiple ways of life they prescribe, is diversity at the higher taxonomic levels: the number of genera, families and so on.

A species is most interesting when its traits are sufficiently unique to warrant its placement in a distinct genus or even a higher-level taxon, such as a family. A concrete example helps to illustrate my point. In western China a new species of muntjac deer was recently discovered, which



BIOLOGICAL DIVERSITY has increased slowly over time, set back occasionally by mass extinctions. There have been five mass-extinction events so far: at the close of the Ordovician, Devonian, Permian, Triassic and Cretaceous periods, when the number of families of marine organisms declined by 12, 14, 52, 12 and 11 percent, respectively. The extinction event at the end of the Permian was by far the most severe; since then diversity has slowly increased to its present all-time high. It is now declining at an unprecedented rate, however, as a result of human activity.

appears to differ from the typical muntjac of Asia only in chromosome number and in a few relatively minor anatomical traits. Human beings intuitively value this slightly differentiated species, of course, but not nearly so much as they value the giant panda, which is so distinctive as to be placed in its own genus (*Ailuropoda*) and family (*Ailuropodidae*).

Within the past 10,000 years biological diversity has entered a wholly new era in the turbulent history of life on the earth. Human activity has had a devastating effect on species diversity, and the rate of human-induced extinctions is accelerating. The heaviest pressure has hitherto been exerted on islands, lakes and other isolated and strongly circumscribed environments. Fully one half of the bird species of Polynesia have been eliminated through hunting and the destruction of native forests. In the 1800's most of the unique flora of trees and shrubs on St. Helena, a tiny island in the South Atlantic, was lost forever when the island was completely deforested. Hundreds of fish species that are endemic to Lake Victoria, formerly of great commercial value as food and aquarium fish, are now threatened with extinction as the result of the careless introduction of one species of fish, the Nile perch. The list of such biogeographic disasters is extensive.

Serious as the episodes of pin-

point destruction are, they are minor compared with the species hecatomb caused by the clearing and burning of tropical rain forests. Already the forest has been reduced to approximately 55 percent of its original cover (as inferred from soil and climate profiles of the land surface), and it is being further reduced at a rate in excess of 100,000 square kilometers a year. This amount is 1 percent of the total cover, or more than the area of Switzerland and the Netherlands combined.

What is the effect of such habitat reduction on species diversity? In archipelago systems such as the West Indies and Polynesia, the number of species found on an individual island corresponds roughly to the island's area: the number of species usually increases with the size of the island, by somewhere between the fifth and the third root of the area. Many fall close to the central value of the fourth root. The same relation holds for "habitat islands," such as patches of forest surrounded by a sea of grassland. As a rough rule of thumb, a tenfold increase in area results in a doubling of the number of species. Put the other way, if the island area is diminished tenfold, the number of species will be cut in half.

The theory of island biogeography, which has been substantiated at least in broad outline by experimental alterations of island biotas and other field studies, holds that species number usually fluctuates around an equilibri-



um. The number remains more or less constant over time because the rate of immigration of new species to the island balances the extinction rate of species already there, and so diversity remains fairly constant. The relation between the theory of island biogeography and global diversity is an important one: if the area of a particular habitat, such as a patch of rain forest, is reduced by a given amount, the number of species living in it will subside to a new, lower equilibrium. The rich forest along the Atlantic coast of Brazil, for example, has been cleared to less than 1 percent of its original cover; even in the unlikely event that no more trees are cut, the forest biota can be expected to decline by perhaps 75 percent, or to one quarter of its original number of species.

I have conservatively estimated that on a worldwide basis the ultimate loss attributable to rain-forest clearing alone (at the present 1 percent rate) is from .2 to .3 percent of all species in

the forests per year. Taking a very conservative figure of two million species confined to the forests, the global loss that results from deforestation could be as much as from 4,000 to 6,000 species a year. That in turn is on the order of 10,000 times greater than the naturally occurring background extinction rate that existed prior to the appearance of human beings.

Although the impact of habitat destruction is most severely felt in tropical rain forests, where species diversity is so high, it is also felt in other regions of the planet, particularly where extensive forest clearing is taking place. In the U.S. alone, some 60,000 acres of ancient forests are being cut per year, mostly for lumber that is then exported to Japan and other countries in the Pacific rim. Most severely affected are the national forests of the Pacific Northwest, from which some 5.5 billion boardfeet of timber were harvested in 1987, and Alaska's Tongass National Forest,

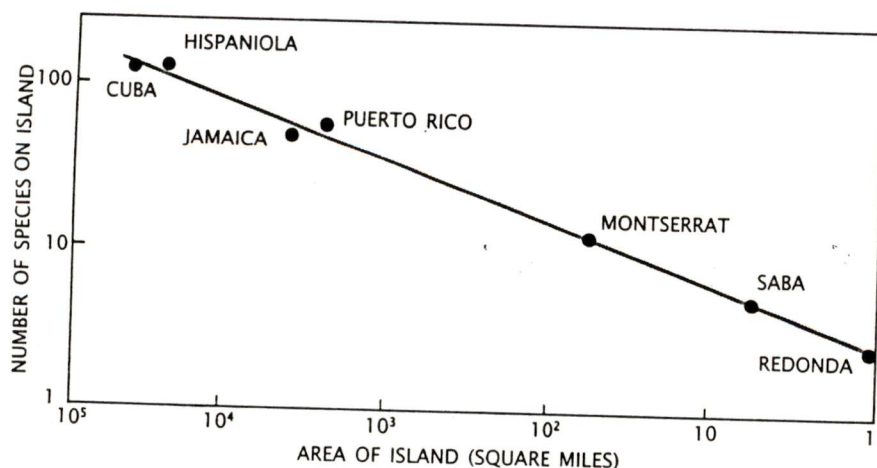
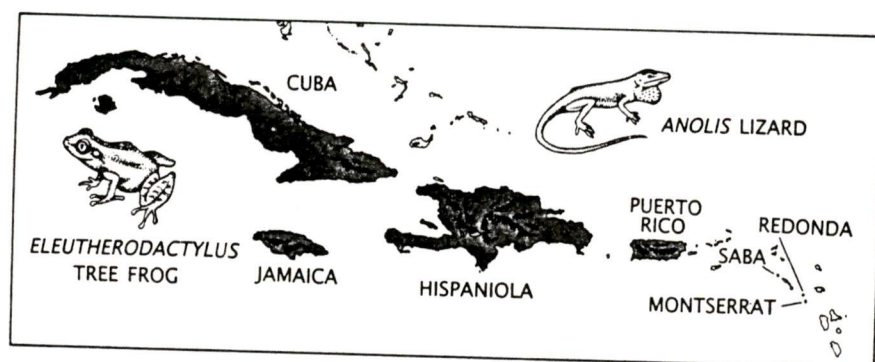
where as much as 50 percent of the most productive forestland has been logged since 1950. Although reforestation in these areas is possible, the process of regrowth may last 100 years or more.

How long does it take, once a habitat is reduced or destroyed, for the species that live in it to actually become extinct? The rate of extinction depends on the size of the habitat patch left undisturbed and the group of organisms concerned. In one ingenious study, Jared M. Diamond of the University of California at Los Angeles and John W. Terborgh of Duke University counted the number of bird species on several continental-shelf islands, which until about 10,000 years ago had been part of the mainland but then became isolated when the sea level rose. By comparing the number of species per island with the number of species on the adjacent mainland, Diamond and Terborgh were able to estimate the number of species each island had lost and to correlate the rate of species loss with island size.

Their model has been reasonably well confirmed by empirical studies of local bird faunas, and the results are sobering: in patches of between one and 20 square kilometers, a common size for reserves and parks in the tropics and elsewhere, 20 percent or more of the species disappear within 50 years. Some of the birds vanish quickly. Others linger for a while as the "living dead." In regions where the natural habitat is highly fragmented, the rate of species loss is even greater.

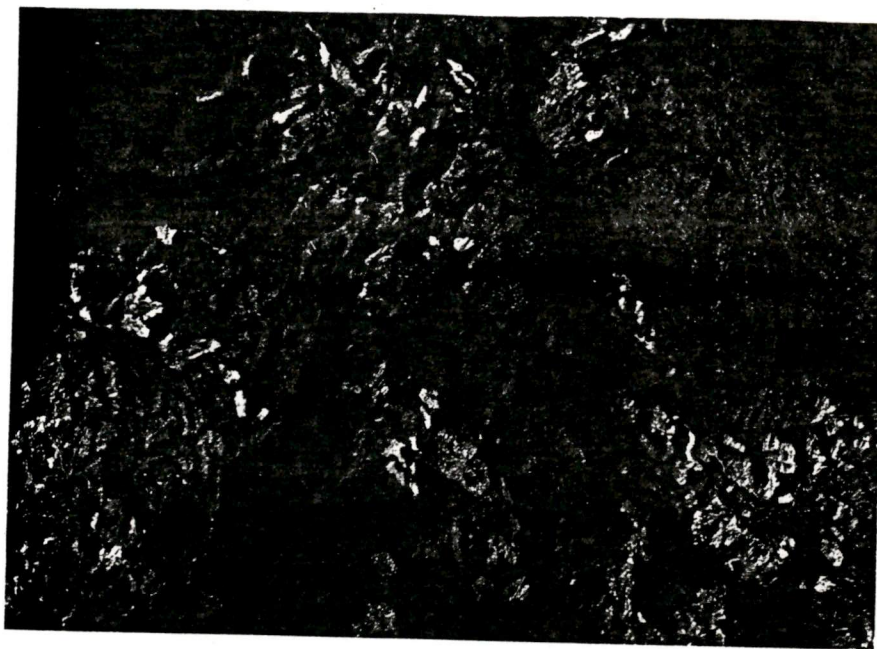
These extinction rates are probably underestimates, because they are based on the assumption that the species are distributed more or less evenly throughout the forests being cut. But biological surveys indicate that large numbers of species are confined to very limited ranges; if the small fraction of the forest habitat occupied by a species is destroyed, the species is eliminated immediately. When a single ridge top in Peru was cleared recently, more than 90 plant species known only from that locality were lost forever.

Ecologists have begun to identify "hot spots" around the world—habitats that are rich in species and also in imminent danger of destruction. Norman Myers, an environmental consultant with wide experience in the tropics, has compiled a list of threatened rain-forest habitats from 10 places: the Chocó of western Colombia, the uplands of western Amazonia, the



NUMBER OF SPECIES on an island corresponds to its size. As a general rule, when the area of an island increases tenfold, the number of species on it doubles. This is easily demonstrated for an island archipelago, such as the West Indies (top), where there are numerous islands of different sizes. The numbers of species of reptiles and amphibians on five islands, including *Anolis* lizards and *Eleutherodactylus* tree frogs, were counted and the combined total plotted against the area of each island. As the curve shows (bottom), a large island, such as Cuba, has more than twice as many species as, say, the smaller island of Saba. These findings have important implications for conservation biology because the data can be used to predict species loss from habitat destruction and to determine the optimal size of wildlife preserves.





SATELLITE IMAGE of the northern tip of Prince of Wales Island in Tongass National Forest, Alaska, shows the extent to which the region has been clear cut. Areas that have recently been cleared and are barren of tree cover are indicated in pink; those that have been cut but have started to recover are light green; areas where the forest has not yet been disturbed are dark green. The image covers about 400 square miles.

Atlantic coast of Brazil, Madagascar, the eastern Himalayas, the Philippines, Malaysia, northwestern Borneo, Queensland and New Caledonia. Other biologists have similarly classified certain temperate forest patches, heathlands, coral reefs, drainage systems and ancient lakes. One of the more surprising examples is Lake Baikal in Siberia, where large numbers of endemic crustaceans and other invertebrates are endangered by rising levels of pollution.

The world biota is trapped as though in a vise. On one side it is being swiftly reduced by deforestation. On the other it is threatened by climatic warming brought on by the greenhouse effect. Whereas habitat loss is most destructive to tropical biotas, climatic warming is expected to have a greater impact on the biotas of the cold temperate regions and polar regions. A poleward shift of climate at the rate of 100 kilometers or more per century, which is considered at least a possibility, would leave wildlife preserves and entire species ranges behind, and many kinds of plants and animals could not migrate fast enough to keep up.

The problem would be particularly acute for plants, which are relatively immobile and do not disperse as readily as animals. The Engelmann spruce, for example, has an estimated natural dispersal capacity of from one to 20 kilometers per century, so that mas-

sive new plantings would be required to sustain the size of the range it currently occupies. Margaret Davis and Catherine Zabinski of the University of Minnesota predict that in response to global warming four North American trees—yellow birch, sugar maple, beech and hemlock—will be displaced northward by from 500 to 1,000 kilometers. Hundreds of thousands of species are likely to be similarly displaced; how many will adapt to the changing climate, not having migrated, and how many will become extinct is, of course, unknown.

Virtually all ecologists, and I include myself among them, would argue that every species extinction diminishes humanity. Every microorganism, animal and plant contains on the order of from one million to 10 billion bits of information in its genetic code, hammered into existence by an astronomical number of mutations and episodes of natural selection over the course of thousands or millions of years of evolution. Biologists may eventually come to read the entire genetic codes of some individual strains of a few of the vanishing species, but I doubt that they can hope to measure, let alone replace, the natural species and the great array of genetic strains composing them. The power of evolution by natural selection may be too great even to conceive, let alone duplicate. Without diversity there can be no selection (either natu-

ral or artificial) for organisms adapted to a particular habitat that then undergoes change. Species diversity—the world's available gene pool—is one of our planet's most important and irreplaceable resources. No artificially selected genetic strain has, to my knowledge, ever outcompeted wild variants of the same species in the natural environment.

It would be naive to think that humanity need only wait while natural speciation refills the diversity void created by mass extinctions. Following the great Cretaceous extinction (the latest such episode), from five to 10 million years passed before diversity was restored to its original levels. As species are exterminated, largely as a result of habitat destruction, the capacity for natural genetic regeneration is greatly reduced. In Norman Myers's phrase, we are causing the death of birth.

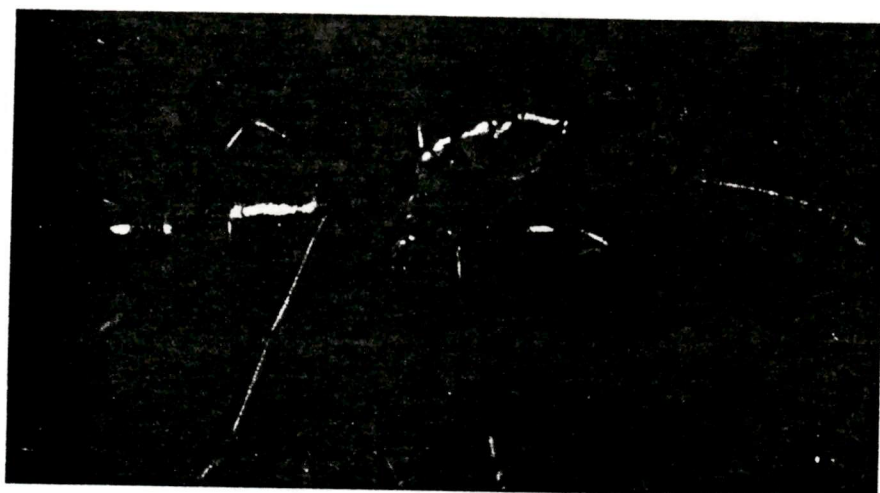
**W**ild species in tropical forests and other natural habitats are among the most important resources available to humankind, and so far they are the least utilized. At present, less than one tenth of 1 percent of naturally occurring species are exploited by human beings, while the rest remain untested and fallow. In the course of history people have utilized about 7,000 plant species for food, but today they rely heavily on about 20 species, such as wheat, rye, millet and rice—plants for the most part that Neolithic man encountered haphazardly at the dawn of agriculture. Yet at least 75,000 plant species have edible parts, and at least some of them are demonstrably superior to crop species in prevalent use. For example, the winged bean, *Psophocarpus tetragonolobus*, which grows in New Guinea, has been called a one-species supermarket: the entire plant—roots, seeds, leaves, stems and flowers—is edible, and a coffeelike beverage can be made from its juice. It grows rapidly, reaching a height of 15 feet in a few weeks, and has a nutritional value equal to that of soybeans.

Wild plant and animal species also represent vast reservoirs of such potentially valuable products as fibers and petroleum substitutes. One example is the babassú palm, *Orbignya phalerata*, from the Amazon basin; a stand of 500 trees produces about 125 barrels of oil a year. Another striking example is the rosy periwinkle, *Catharanthus roseus*, an inconspicuous little plant that originated in Madagascar. It yields two alkaloids, vinblastine and vincristine, that are extremely





PLANTS FROM TROPICAL RAIN FORESTS are the source of food, medicine and other commercially valuable products. The rosy periwinkle, *Catharanthus roseus* (left), contains substances that are effective against some cancers, and the babassú palm, *Orbignya phalerata* (right), produces bunches of fruit (each one weighing about 200 pounds), from which oil (for cooking and other purposes) can be extracted.



INSECT DIVERSITY is extraordinarily high in tropical rain forests, where millions of species, including this ant from the island of Sulawesi in Indonesia, have yet to be inventoried. The ant, which is unusual for its large eyes and robotlike movements, belongs to the genus *Opisthopsis* but has not yet been given a species name.

effective against Hodgkin's disease and acute lymphocytic leukemia. The income from these two substances alone exceeds \$100 million a year. Five other species of *Catharanthus* occur on Madagascar, none of which have been carefully studied. At this moment one of the five is close to extinction due to habitat destruction.

**B**iological diversity is eroding at a swift pace, and massive losses can be expected if present rates continue. Can steps be taken to slow the extinction process and eventually bring it to a halt? The answer is a guarded "yes." Both developed and developing (mostly tropical) countries need to expand their taxonomic inventories and reference libraries in order

to map the world's species and identify hot spots for priority in conservation. At the same time, conservation must be closely coupled with economic development, especially in countries where poverty and high population densities threaten the last of the retreating wildlands. Biologists and economic planners now understand that merely setting aside reserves, without regard for the needs of the local population, is but a short-term solution to the biodiversity crisis.

Recent studies indicate that even with a limited knowledge of wild species and only a modest effort, more income can often be extracted from sustained harvesting of natural forest products than from clear-cutting for timber and agriculture. The irony of

cutting down tropical forests in order to grow crops or graze cattle is that after two or three years the nutrient-poor topsoil can no longer support the agricultural activity for which it was cleared in the first place.

Thomas Eisner of Cornell University has suggested that in addition to the compilation of biological inventories, programs should be established to promote chemical prospecting around the world as part of the search for new products. The U.S. National Cancer Institute has begun to do just that: their natural products branch is currently screening some 10,000 substances a year for activity against cancer cells and the AIDS virus.

It has become equally clear that biological research must be tied to zoning and regional land-use planning designed not only to conserve and promote the use of wild species but also to make more efficient use of land previously converted to agriculture and monoculture timber. More efficient land use includes choosing commercial species well suited to local climatic and soil conditions, planting mixtures of species with yields higher than those of monocultures and rotating crops on a regular basis. These methods relieve pressure on natural lands without reducing their overall productivity. No less important are social studies and educational programs that focus directly on the needs of the people who live on the land.

I have enough faith in human nature to believe that when people are both economically secure and aware of the value of biological wealth they will take the necessary measures to protect their environment. Out of that commitment will grow new knowledge and an enrichment of the human spirit beyond our present imagination.

#### FURTHER READING

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THE WHITE HOUSE  
WASHINGTON

September 11, 1989

MEMORANDUM TO ED ROGERS

FROM: JIM PINKERTON 

SUBJECT: Trees

Communities everywhere are concerned about trees.

This article from Sunday's Washington Post describes a suburban housing development where families are concerned with preserving the sense of neighborhood that trees help create. They even have a tree committee to ensure that their community is not "deforested."

#



# Va. Settlers Closer to Home In Distant Developments

9-10-89 p. B1

By Cornelius F. Foote Jr.  
Washington Post Staff Writer

The one thing Jaclyn Silway misses from her old home in Chantilly is the weeping willow tree in her back yard. Otherwise, she, husband Robert, Joker the dog and Trouble the cat have settled into their new life in one of the many new developments springing up in Washington's outer suburbs.

As the first family to move into Loudoun County's Ashburn Farm a year ago, the Silvays are the modern-day version of the American pioneers. They and many of their neighbors have packed up their homes in the traditional suburbs of Fairfax, Reston and Herndon and moved west for a bigger house and a better life, willing to put up with the inconveniences that come with a little less civilization.

Developers and real estate officials said that more than 60 percent of Ashburn Farm's new residents are moving up to bigger houses from smaller homes in closer-in Washington communities.

Most are families that have two wage-earners, professionals that include federal and local government executives, computer specialists and small-business owners.

Unlike the older, more established developments in the Washington area, the new neighborhood has revived their sense of community, say the Silvays and several of the more than 450 families who have bought houses in Ashburn Farm in the last year.

Many have jumped into work on the community association's 12 committees. They also find themselves spending more time relaxing at home, playing with the children, driving through the country or simply enjoying the quieter life.

"In Fairfax, we knew people on the block, but that was it," said Jaclyn, 33, who along with her husband lives on Tiger Lily Place.

They both work at American Telephone & Telegraph Co. about

See ASHBURN, B11, Col. 1

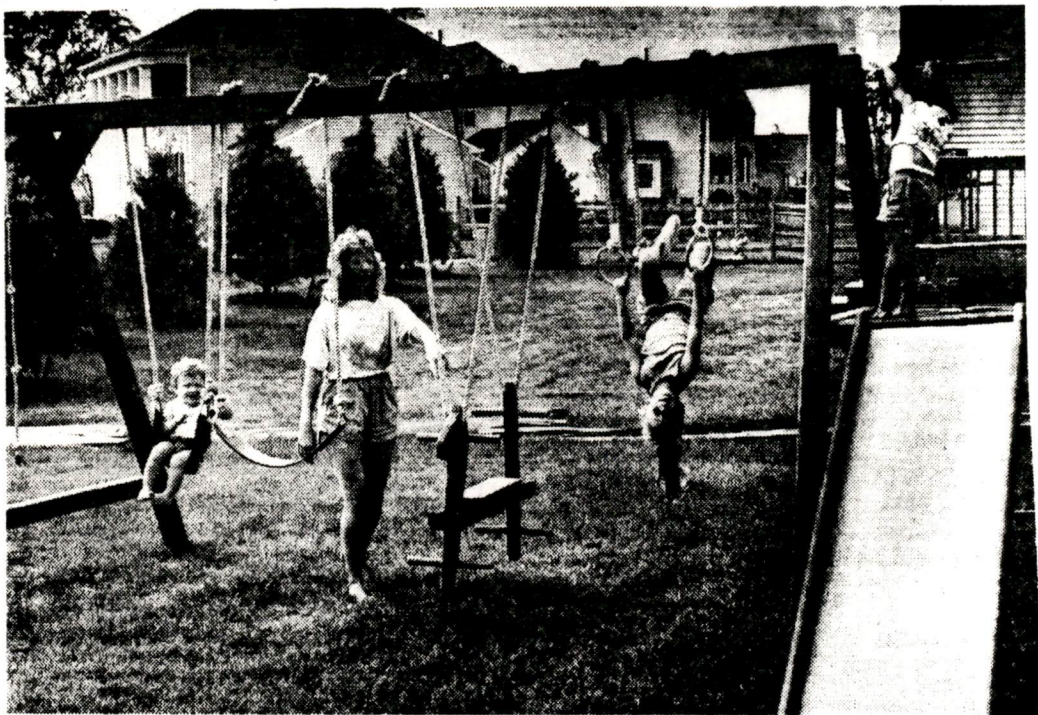
## ASHBURN, From B1

15 minutes away. She heads the community's newsletter committee and he serves on the open space committee. "We didn't get involved like we are now."

"In most communities, everything is already established," said Paul Zdunek, 44, an examiner for the Internal Revenue Service in Arlington, who lives with his wife, Jane, 39, a tax consultant, and three cats, Sadie, Misha and Ollie, on Great Harvest Court. "Here, everything is evolving and people see it changing and want to get involved."

The Zduneks lived in a Reston town house for six years before moving into Ashburn last September. When they first moved to Reston, he said, it was "nice and quiet." But one of the reasons they left was that the developers "tried to fill every place that was open. It wasn't the quiet place we came to."

Moving beyond the traditional suburbs can have its drawbacks. Some residents have longer commutes on roads that badly need improvement. Construction trucks rumble past their new homes all day.



BY LARRY MORRIS—THE WASHINGTON POST

From left, Ryan, Ann, Ashley and Kristen Alves take a play break in their back yard in the Ashburn Farm subdivision.

And there is the ever-present worry that the developers will change the design of the community, such as removing a row of trees that serves as a buffer between homes, roads or other buildings, without telling the residents.

Since the Silvays moved from Fairfax County's Franklin Farm development a year ago July, Ashburn Farm's 1,274 acres, along Route 641 about five miles east of Leesburg, has been transformed from wheat fields and rolling pasture to a suburb of paved roads, newly planted trees and ponds.

When the project is completed by 1997, it will have 3,820 homes and more than 8,000 residents. It will include 1,724 single-family homes, which cost about \$220,000, 1,340 town houses, which cost about \$150,000, and 766 rental apartments. There are now two ponds stocked with fish, a 25-meter outdoor swimming pool, two tot lots, two tennis courts and a basketball court.

During the next eight years, the developers plan to put in two more pools, 10 more tennis courts, 13 more tot lots, two schools, four churches, a library, a fire/rescue station, a supermarket, a bank and a gas station.

Zdunek, a Baltimore native, said he hopes that Ashburn doesn't develop the same way Reston did. That is one of the reasons he has gotten involved in the community's tree and airplane noise committees.

In recent months, tree committee members have been meeting with the developer, Cavalier Land Development Corp., to make sure that many of the area's trees remain, particularly in the area where a small shopping plaza is planned.

Committee members also have met with Board Supervisor Ann B. Kavanagh (D-Dulles) on correcting the flight path of planes taking off from nearby Dulles International Airport. No planes are supposed to fly directly over the development but they occasionally do.

For Ann and Wally Alves, the move to Ashburn was a logical step up from their Reston condominium.

Ann, 30, a graphic artist who now devotes her time to caring for Ashley, 6, Kristen, 3, and Ryan, 1, said she and Wally, 34, "just fell in love with the area" when they first drove out.

The move to the four-bedroom, 2½-bath house on Golden Meadow Circle has extended by about 20 minutes her husband's commute to his Arlington office at American

Management Systems Inc., where he is a systems analyst.

The Alveses and other area residents discovered that in the short time they have lived there, the area's roads, many of which are narrow and bumpy, are quickly getting congested with commuters and trucks.

A stretch of Route 641 that passes along the front of the project is expected to be widened by Cavalier Land Development within the next year.

But the remainder of the road from Route 7 to the Washington and Old Dominion Bike Path is a state and county transportation project that won't be completed for at least another year, officials said.

Last month, Cavalier completed widening and realigning Route 640 to four lanes from two. This road now joins Route 625 and runs directly into the Ashburn Farm development. That has helped, commuters said, but commercial and industrial development will be built along the road within the next five years.

The area's roads haven't caused too many problems for Sharen Settles, her husband, Clark, and their three children. During the first few months in their home on Tiger Lily Place, they spent many weekends going to the District to visit the national monuments and museums.

"Now that we got that out of our system, my husband and I just get in the car and drive out onto one of the country roads," she said.

The Settleses came from Somerville, S.C., where her husband worked with the U.S. Customs Service. The move here meant that Sharen had to get a job after nearly 20 years out of the labor force.

She said the family needed the extra income to buy the new house and pay for the college education of their children, Wendy, 19, and Clark Jr., 18.

Sharen Settles is a hostess in one of the homebuilder's model homes at Ashburn Farm. Another daughter, Betsy, 14, is a sophomore at Broad Run High School, across the street from their new home.

"It didn't take long for it to feel like a community and not like a new subdivision," Settles said. "They got the pool and the tennis courts in during the first year and that gave the kids and us something to do."

Developers have used various techniques to bring its new homeowners together. Ashburn Farm's developers sponsored a mini-country fair last October with hayrides, bands, pony rides and a pet farm.

They also hired a community manager, Nancy Harris, who helps organize the residents' community association and resolve any problems they have with their homes.

Many of the residents are working with local C&P Telephone Co. officials to widen the local calling area. Many residents were surprised when they were charged for a long-distance call to sections of Sterling that were less than 10 miles away.

Living in a developing rural area also means not everything is at one's fingertips.

The closest grocery store is Partlow's, an old-fashioned country store that sells everything from fresh eggs to fishing tackle.

The larger supermarkets are in Sterling or Leesburg, both about 15 minutes away. A shopping center isn't in the development for another two years.

"We started calling Partlow's 'Ashburn Mall,'" Settles said. "I usually have to split up the shopping in Countryside or Leesburg, depending on what I need . . . It just means that everything has to be planned out more."

Robert and Jaclyn Silway, who are natives of northern New Jersey,

said they are still in search of the perfect New York style pizza and a decent deli. But that search hasn't dampened their enthusiasm about their neighborhood.

"Franklin Farm felt like a place to stay a little while," Robert Silway said. "But this place is more like home to us."



THE WHITE HOUSE  
WASHINGTON

"Jesse"

Date: 9/7

TO:

Ed Rogers

FROM:

**JAMES P. PINKERTON**

**Deputy Assistant to the President  
for Policy Planning**

The best argument yet  
for a pre-emptive  
strategy!



# Cleaning up the West's dirtiest nation

**ENVIRONMENT** ■ Green power has arrived in the land of the tulip

**O**ff the port of Rotterdam, there is a half-mile-wide chasm in the North Sea, sealed off from the waves by dikes. The Dutch are clever with water. They have contrived this latest wonder as the final destination for what none of Europe wants. Into it goes the poisoned sediment of waste dumped by the industries and cities that crowd the banks of the Rhine. Peering into the hole from atop a breezy dike, a marine engineer says, "It'll take 20 years to fill it. Then what?"

You could ask the same question of Holland. The land of tulips, windmills, scrubbed doorsteps and creamy cows is in reality the dirtiest nation in the West, and its poisoned air and water have put the Dutch in the vanguard of a broad political change sweeping across Europe. Last May, Holland's government was the first to be upended by environmental concerns, and the nation goes to the polls this week to elect new leaders because the old ones failed to find a way to pay for a massive cleanup. As West European economies prosper, the old worries about East-West conflict and unemployment are fast giving way to concern over the environment, and governments are under pressure as never before to think and act green.

**Pigs, cows and cars.** Being the sump of Europe makes Holland particularly sensitive. Three of the continent's industry-choked rivers—the Rhine, the Meuse and the Schelde—all converge on the tiny country. But the 14.7 million Dutch are also their own worst ecological enemies. They are crowded into the most densely populated country in Europe—14 times more tightly packed than are Americans—but they drive the most cars per square kilometer, they burn the most fossil fuel per person in Europe, and their busy farmers are among the most intensive users of chemical fertilizers. On top of that, Holland's human population is outnumbered by its pigs and cows, whose manure is too fulsome for their fragile land to bear. And heavily concentrated Dutch industry is no less prolific a producer of toxic waste and noxious fumes than are its neighbors.

Not surprisingly, the environment is the No. 1 issue in the Netherlands' September 6 election. With "Green Queen" Beatrix declaiming about "the unimaginable, the end of life itself, becoming imaginable," her subjects are increasingly fearful. Most would forfeit increases in living standards for a cleaner country, opinion polls show. Holland's big Christian National Federation of Trade

Unions would accept a wage freeze. Still, the consensus-minded Dutch don't rock the dikes at election time, and Ruud Lubbers, head of the center-right Christian Democratic Appeal may win the right to form a new government coalition in place of the one that he led until May.

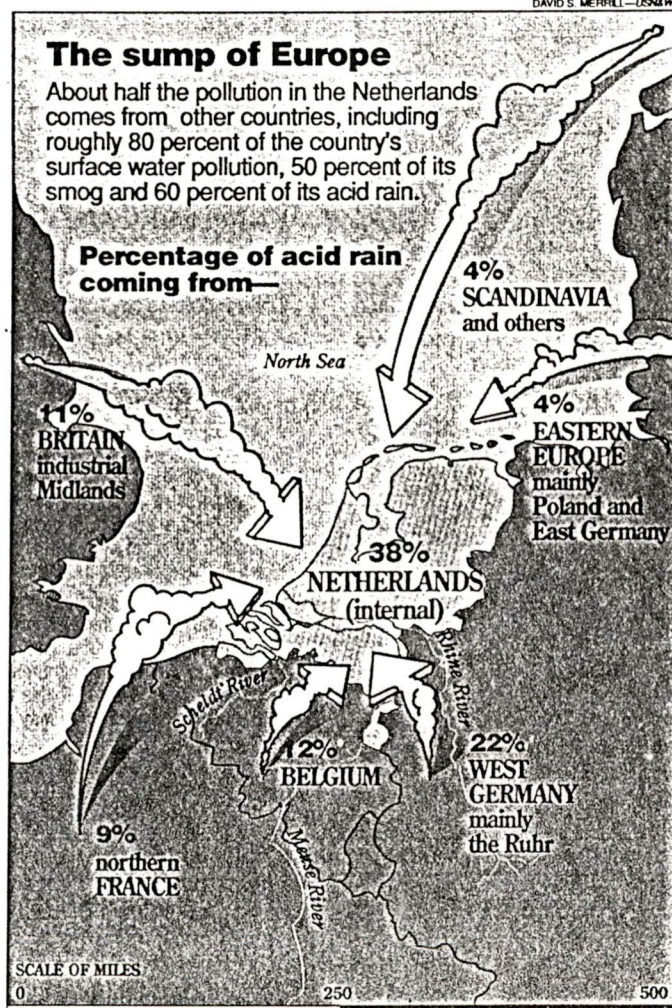
But ecological anxiety is forcing both Lubbers's Christian Democrats and the rival Socialists to bid against the radical Greens in promising the most massive national cleanup yet tried in the industrial world. The broad aim is to cut all forms of pollution by at least 70 percent in the next

20 years. The election battle is not about what to do but how to pay for it. The bill will swell to \$6.5 billion a year by 1994, and by the turn of the century Holland aims to spend more protecting itself against pollution than the 3 percent of national wealth it now spends on defense. Greenness is contagious. A voting breakthrough (15 percent) by Britain's Greens in elections to the European Parliament in June startled Prime Minister Margaret Thatcher, who has just installed an able favorite, Chris Patten, at the Environment Ministry. Green parties have made strong advances in France and also in Italy, where a summer crisis over algae blooming along the Adriatic coast hurt tourism and prompted Rome to assign a top admiral to fight algae.

In West Germany, *Angst* over dying forests and a poisoned Rhine, both symbols of soulful significance for Germans, has helped give the Greens 42 seats in parliament. This year, environmental issues propelled the antinuclear Greens into state government for the first time in alliances with Social Democrats in West Berlin and Frankfurt. If those experiments work, West Germany could find itself ruled after legislative elections next year by a leftist Social Democrat-Green coalition. No wonder that conservative Chancellor Helmut Kohl is courting German voters by proposing a specially trained national "environment police."

Other nations, however, still balk at controls that inconvenience them. France, fretting over new costs for its large auto industry, backs away from the U.S.-style automobile emission standards its neighbors want to impose throughout Europe. In Holland's view, the industrial British won't do enough to reduce their acid rain because their island winds blow the stuff to the Continent. For the Dutch, however, downwind and downstream from everybody else, ignoring the mess they have both made and inherited may be even more expensive than getting on with their 20-year cleanup. ■

by David Lawday in Rotterdam



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THE WHITE HOUSE  
WASHINGTON

September 6, 1989

MEMORANDUM TO ED ROGERS

FROM: JIM PINKERTON

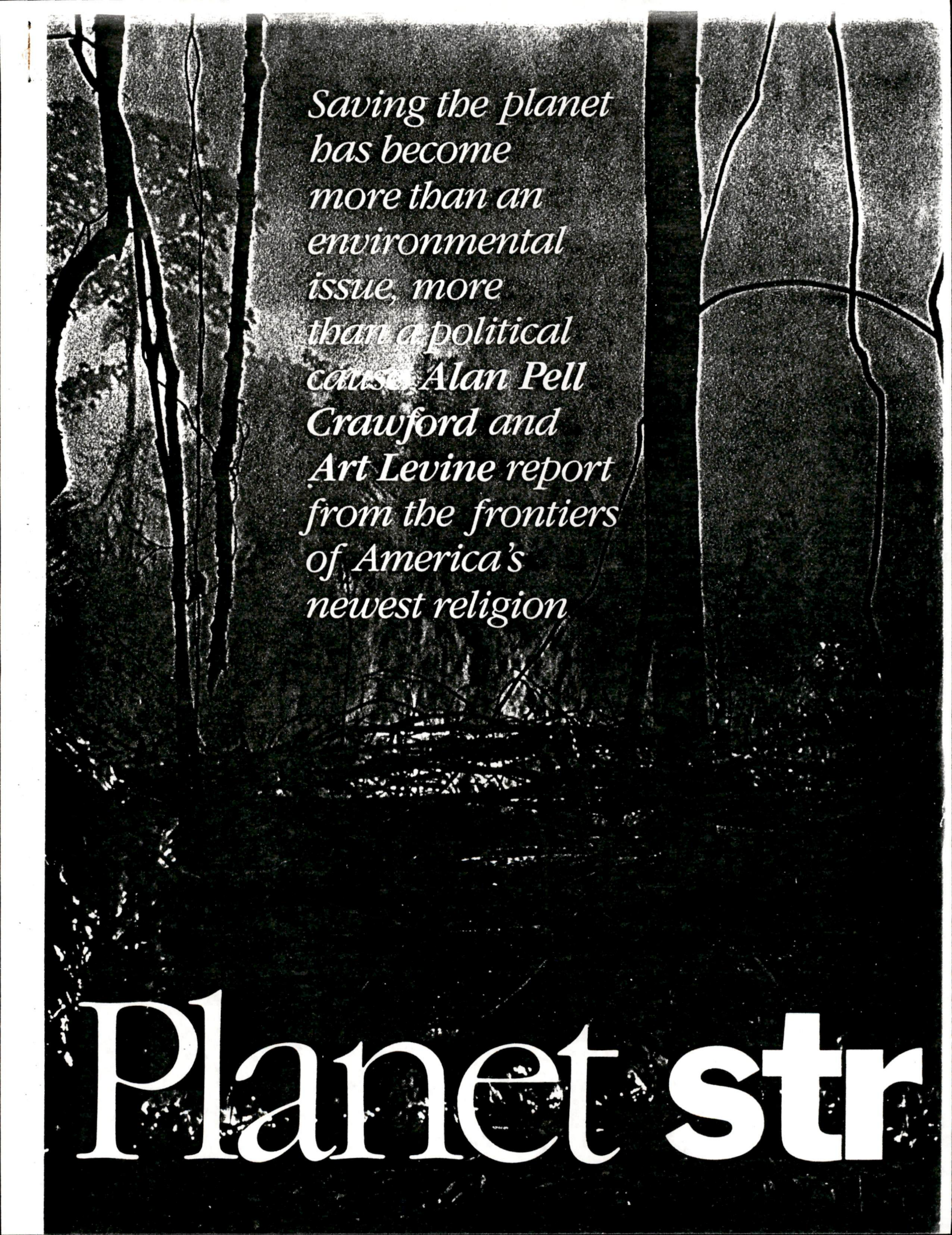
SUBJECT: Cultural Update on Trees

The attached article from the September issue of Vogue magazine reminds us of the cultural impact of trees and the reforestation issue. The environmental movement has drawn a huge number of luminaries across the spectrum -- from Madonna and Barbara Streisand to Margaret Thatcher to Robert Redford to "environmental priests" such as Reverend Daniel Martin.

As the article observes, "Contemporary environmentalism, no longer merely a cause, has quite effortlessly assumed the characteristics of a religious faith. Right now it is probably the fastest-growing faith in America, with its own rituals and converts..."

#





*Saving the planet  
has become  
more than an  
environmental  
issue, more  
than a political  
cause. Alan Pell  
Crawford and  
Art Levine report  
from the frontiers  
of America's  
newest religion*

# Planet str





# icken

A view from Rondônia, Brazil.  
LEFT, illustrates the destruction  
of the Amazon basin, permanently  
deforested by fire. Madonna  
cheerleading for the trees, ABOVE,  
at the star-studded "Don't Bungle  
the Jungle" benefit at the Brooklyn  
Academy of Music in May.



# *To some New Age ecologists, man is no more deserving of reverence than any other species—including plankton*



**T**he crowd at the Brooklyn Academy of Music tonight didn't plunk down \$500 a shot to hear Dr. Russell A. Mittermeier. They paid to hear, to see, to *experience* Madonna, and they are not to be denied. As Dr. Mittermeier, president of Conservation International, chairman of the International Union for Conservation of Nature and Natural Resources, and adjunct professor of Anatomical Sciences at the State University of New York, holds forth on the destruction of tropical rain forests, a shriek is heard.

"Madonna!"

This rude interruption Dr. Mittermeier manages to overlook. He pushes on, explaining the consequences of Brazilian deforestation for the delicate ecosystems there when, from a different part of the hall, comes another scream.

"Madonna!"

This happens over and over, but the good doctor manages to deliver his message anyhow, before stepping behind the curtain and relinquishing the stage to a rock group. His exit comes as a relief to this audience of fashion models, film stars, East Village artistes, and rock and rollers, whose attention span, at least when it comes to abstruse matters like ethnobotanical rescue, is not long.

They'll get their chance to experience Madonna. She came out earlier, at the beginning of the program, and read about the rain forest from four-by-six-inch cards, and when she returns, she'll sing, "I Got You Babe" arm-in-arm with Sandra Bernhard. Together, they're hot enough to make their own contribution to global warming, and certainly hot enough to make the crowd forget the real reason for this evening's entertainment, which is: saving the world.

"Don't Bungle the Jungle," as tonight's event is called, is a benefit. Madonna, artist Kenny Scharf, and the other performers want to raise \$500,000 to create a southeast Brazil nature preserve and stave off global catastrophe in the bargain. Madonna says she has "a lot of things she wants to do" during her lifetime and fears that the end of those rain forests will obliterate not only the tiny tamarin monkeys that live there, but the rest of us too by the end of the century. Tropical forests produce oxygen, and the loss of these forests, environ-

mentalists say, will be devastating to the world's mounting human population, with its increased oxygen needs. Mittermeier, while concerned, is a bit more circumspect about it all: he says nothing at all about our facing extinction within the decade, so perhaps we won't.

That doesn't mean there's nothing to worry about. There is, as scholars, responsible citizens, even mainstream politicians now acknowledge. What with global warming, a hole in the ozone layer, and mounting population pressures, the environment is on everybody's lips these days. Margaret Thatcher's. Gorbachev's. Even George Bush's. Even, by God, Lisa Bonet's. . . .

Ten days after Madonna's bash, Lisa is at Lincoln Center for New York City's contribution to the "Our Common Future" global television broadcast, where she takes the stage to talk about her own commitment to the cause. Lisa is, like, really concerned about the environment because when she was a little girl she, like, used to swim in the ocean, and now that she and her husband, rocker Lenny Kravitz, have, like, a baby, Zoe, Lisa wants to make sure Zoe gets to, like, swim in the ocean, too. Lisa's serious. She makes sure Zoe wears only cloth diapers. Millions of the disposable ones, as all environmentally aware parents now know, end up in United States landfills each year.

Lisa, who's written a song about "living in fear" of ecological catastrophe, isn't alone, obviously. More and more celebrities—actors and rock stars, mostly—have discovered the environment and are rallying behind its preservation with unprecedented fervor. Robert Redford, Barbra Streisand, and Jane Fonda are grizzled veterans when it comes to the cause, but the Brat Pack generation is active, too. Belinda Carlisle, not hitherto notorious for social activism, will enclose fliers in her next album with the message: "We have only ten years to save our planet. It starts with you and it's easy." Melissa Manchester has written a song about man's sorry stewardship of the earth, called "Sometimes I Feel So Sorry for God." She performed it at the Lincoln Center telethon, and the lyrics hint that the stars themselves may question the sincerity of their own commitment. "Could we be part of some trendy idea?" Melissa wails.

She isn't the only one who'd like to know. Saving the plan-



et is trendy; in this year of eco-euphoria, overflowing with charity galas, nature rallies, and crisis conventions, it would be hard to name anything trendier. But as the atmosphere at many of these events makes plain, it is also much, much more. The air positively crackles with a certain, well, *righteousness*—a righteousness that falls somewhere between old-timey tent-show revivalism and New Age, explore-your-feelings spirituality.

There's a good reason for this. Contemporary environmentalism, no longer merely a cause, has quite effortlessly assumed the characteristics of a religious faith. Right now it is probably the fastest-growing faith in America, with its own rituals and mysteries and converts—hundreds of thousands of converts, in Rocky Mountain ski lodges, folky Appalachian log cabins, and Lower East Side lofts. For some, environmentalism constitutes an all-consuming political commitment—a secular faith, like thirties communism. For others, it is a religion, just like Christianity or Judaism, with the earth itself as the object of worship.

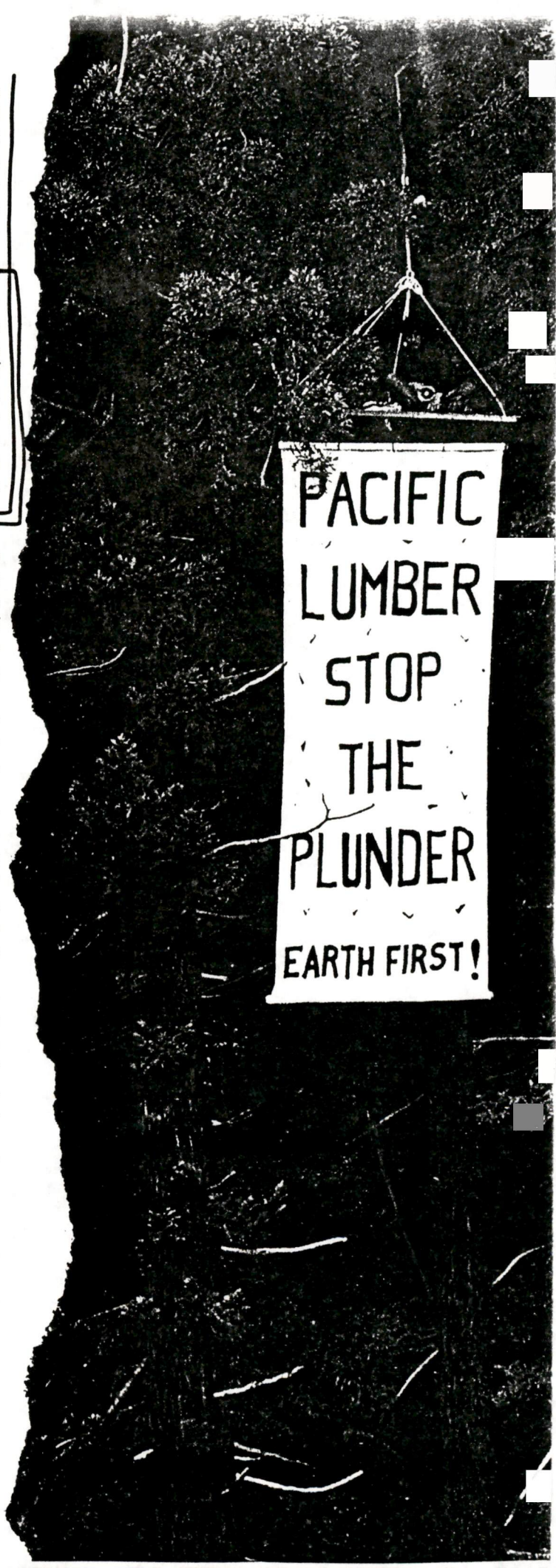
Quiet, please. Worship is starting. You can tell because the tom-toms have begun to solemnly pound out the "earth's heartbeat." The worshipers have assembled behind three Mohawk Indians and a banner emblazoned with a likeness of the planet, forming a procession that will wind its way through the cool of the trees toward the brilliant, blinding sunshine at the water's edge.

This is not a reservation in Arizona, mind you, and the ritual being enacted isn't some authentic Hopi powwow. The setting is the stately Wainwright House on Long Island Sound, in Rye, New York, and the congregation, dressed in L.L. Bean skirts and Land's End sweaters, is genteel, even matronly. They're here to take part in an "environmental Sabbath" led by the Reverend Daniel Martin, a hip Roman Catholic priest who wears a porkpie hat and a T-shirt. Father Martin talks a good bit about "spirit" but doesn't mention Christ—in deference, perhaps, to the Hindu he shares the mike with and the guy in the crowd sporting a "Witches Heal" button. There are prayers of praise to Earth, Wind, Fire, and Water, during the last of which worshipers are exhorted to "feel the water refresh you," then to "rain on the person next to you, so he or she may grow." To close the service, the faithful form a circle and lend their voices to a folky hymn about how life is like a circle, having been reminded that the circle they've formed represents the earth, which is like a circle, too.

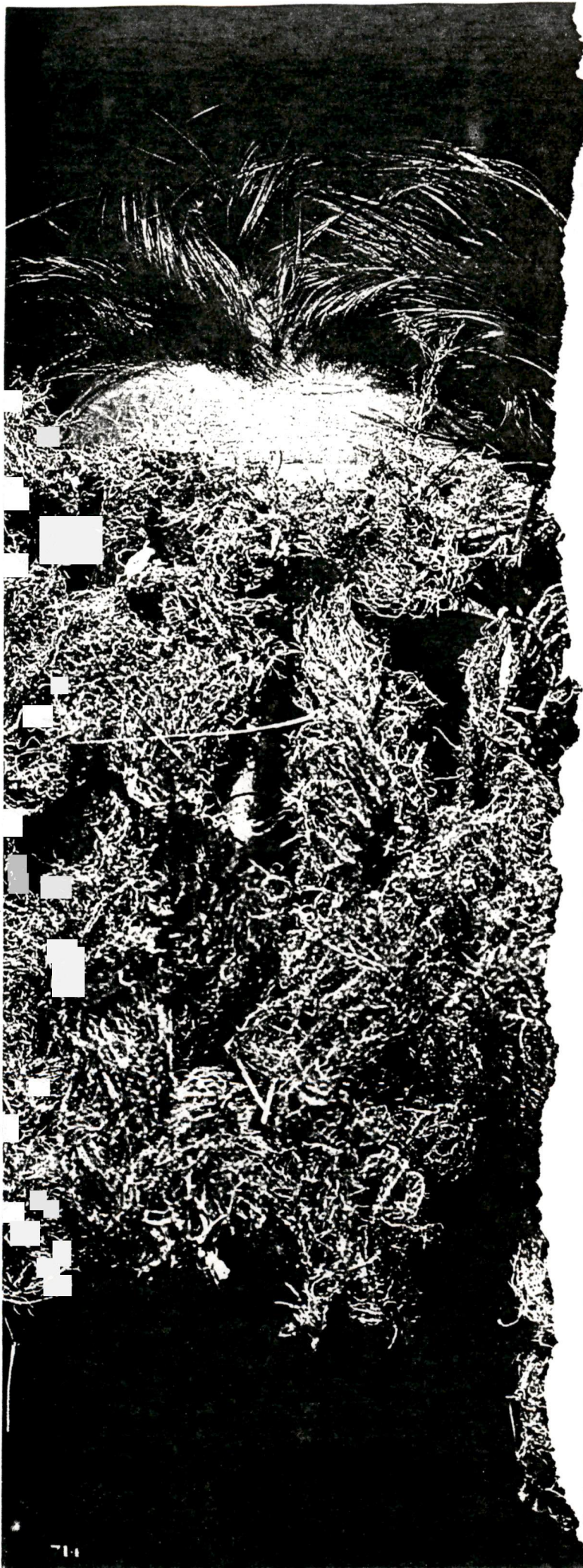
Although he has no church of his own, Father Martin is the religious adviser to the United Nations' Environment Programme, and today's festivities are being conducted, in part, under the auspices of the U.N. The overall purpose, he says, is to emphasize "that the earth is as sacred as we are, and that we have a special responsibility for its ongoing health."

Father Martin, who wants "care for the earth to become a fundamental dimension of religious faith and practice, and to create a bridge between environmental groups and mainline religious groups," is not alone in these efforts. He's got a

LEFT TO RIGHT: Cleared rain forest is used briefly for cattle pasture before the top soil is washed away; deforester with chainsaw, Brazil; Greenpeace protestors overlooking a nuclear test site in Frenchman Flat, Nevada. RIGHT: An Earth First! objector seventy feet up a tree in Scotia, northern California.







counterpart in Oakland, California, a Dominican priest named Matthew Fox, who heads the Institute in Culture and Creation Spirituality at Holy Names College. Silenced by the Vatican last December, Fox got in trouble for, among other infractions, adding a self-styled witch named Starhawk to his institute's faculty. His theology, like Father Martin's, is somewhat unorthodox. Fox preaches that the Second Coming doesn't mean the return of Christ, but a widespread recognition that the earth itself is divine, as are all its critters.

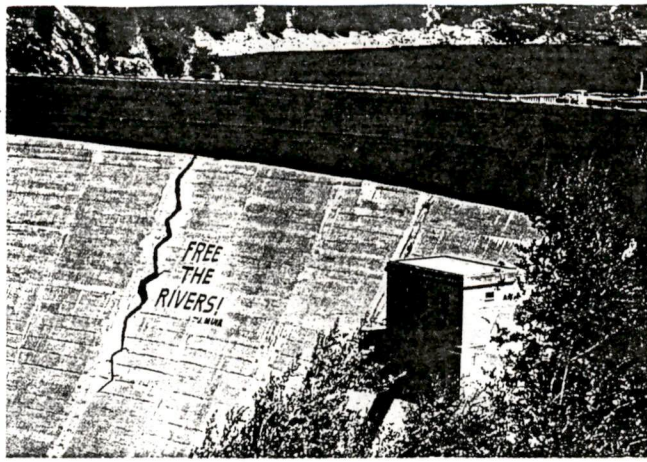
Even ostensibly mainstream religious thinkers, such as the Reverend Thomas Berry, formerly of Fordham University, are trying to prod traditional Christian theology in this direction by dressing up pre-Christian worship of the earth with enough monotheism to attract a broad following. A World Council of Churches conference this spring encouraged participants to apply the injunction "Love Thy Neighbor" to plants and animals. Another WCC conference pondered a paper on the "Theological Significance of Manure," presented by a Dutch Calvinist with a keen insight into how Mother Nature herself recycles waste.

Where these notions come from isn't clear. By almost any reckoning, they are as old as mankind itself, predating both Christianity and Judaism. They currently flourish not among mainstream activists of the Sierra Club variety, but at the environmental movement's fringes. And it is here that one glimpses contemporary environmentalism in its purest form: a radical spiritual impulse challenging the most entrenched assumptions about our relationship with planet earth.

**P**rotesting at a logging site at Terania Creek in New South Wales a few years back, the Australian activist John Seed underwent what must certainly qualify as a born-again experience. Fleeing from police during the protest, he ended up in the rain forest, *and the rain forest ended up in him*. In a "heightened state of awareness," Seed says, he became aware that the rain forest "was able to become integrated with my puny intelligence and use me for its own protection. The experience was the warmest connection that I believe we human beings are able to have in this world."

So that others may experience such ecstasy, Seed now conducts workshops around the globe. His tours of America, in 1987 and 1989, have made him a bona fide eco-star. The workshops encourage participants to see that man, far from being the crowning glory of evolution, is in fact no better than any other species—including plants and pebbles. Seedlings are urged to "go back to the beginning of time, [to remember] our childhood as minerals, as lava, as rocks, [and to become] the rocks dancing." To trigger such evolutionary memories, participants first roll around on the ground, feeling in their own bodies what it is to *be* a stick, a weed, or a tadpole. Toward the end of the ceremony, a "Council of All Beings" is staged, in which participants wear masks depicting the species they have chosen to portray. Once in costume, they form a circle and begin to speak. "I am lichen. I turn rock into soil," one participant intones. "I've worked as the glaciers retreated, as the other life-forms came and went. I thought nothing could stop me...until now. Now I am being poisoned by acid rain."





Man as lichen: **LEFT**, a participant in a "Council of All Beings" wears a mask to personify the fungus. O'Shaughnessy Dam in Yosemite National Park, **ABOVE**, bears a mark of eco-protest.

"We hear you, lichen," the others respond. When all of them—dead leaf, wompoo pigeon, cow, slug, weed—have had their say, the leader, who plays the Phil Donahue role, takes off his mask and concludes: "We hear you, fellow beings. It has been painful to hear, but we thank you for your honesty. We see what we're destroying, we're in trouble, and we're scared. What we've let loose upon the world has much momentum, we feel overwhelmed. Don't leave us alone—we need your help. . . ."

Every time Dan Becker walks up Maryland Avenue to the United States Capitol to testify before yet another congressional committee, he knows he will be outnumbered. For five years Becker worked for Environmental Action. Today he's a lobbyist for the Sierra Club, as savvy, when it comes to environmental issues, as anybody working the corridors of Congress. Right now, the battle lines are forming on the new Clean Air Act, and—as Becker is only too aware—the other guys have the big guns. "At every markup, there are maybe ten environmentalists going up against, literally, two hundred or three hundred corporate lawyers, hired guns of the oil industry and the timber industry and the steel industry, all of them sitting there with their \$500 briefcases. Unless everyday Americans get involved and demand that their air and water get cleaned up, it's not gonna get done."

Becker is a lawyer himself, a pragmatist who tends not to think in cosmic terms. He has little truck with what he calls eco-freaks, thinks movie stars are great for fund-raising purposes, and, when asked what he makes of those whose involvement is rooted in ersatz paganism, simply shrugs, "Different strokes for different folks." Becker welcomes one and all to environmentalism's ranks because there is so much to be done. "If some people get involved because it's a religious thing with them, that's OK with me," he says. "But as a lawyer, I tend to think in terms of appeals to rationality. And I don't really agree with some of the new wave environmentalists who think you've got to have some sort of worldwide awakening to solve these problems. I think you have to change people's minds, but I don't necessarily think you have to change their souls."

Step inside GAIA, a shop near the University of California-Berkeley campus, and once you've gotten used to the aboriginal music, you notice the shamanic drums and statues of the earth goddess for whom this emporium is named. So

many of these items are selling that the store and mail order sales are projected to reach \$750,000 for 1989—an indication of the growth in goddess worship, an ancient, earth-centered religion that is currently enjoying a revival among the broader "eco-feminist" movement. These goddess worshipers believe that Gaia exists in all things, and that all things ultimately constitute one living organism. Celebration of the goddess, expressed through prayers and rituals, signifies a sacred relationship to the earth itself—and vehement opposition to all those who would destroy it. Like other modern environmentalist religions, this one has a peculiarly Western twist: it demands that its followers, having seen the light, do not retreat to a mountaintop to seek nirvana. They act, if only to save the mountain itself.

Under cover of darkness, working in twos and threes, self-described monkeywrenchers creep stealthily from the underbrush here on the north rim of the Grand Canyon, decked out, like the terrorists their critics call them, in ski caps and forest-colored jackets, taking pains to strike at the most vulnerable points of "wilderness-destroying" activities—bulldozers, road graders, power shovels, backhoes. With the skill of master mechanics, these "earth warriors" cut hoses, smash fuel injectors, and slash conveyor belts. They're especially partial to "spiking": hammering metal spikes into trees so that when lumbermen attempt to fell them, their power saws will be ripped to pieces, a practice so dangerous to loggers that monkeywrenchers post signs announcing the trees have been spiked; the purpose, after all, is to keep the forests from being cut down in the first place, not to maim loggers.

Mission accomplished, they slip back into the forest, and—if they do their work correctly—they will leave no clues as to their identity, exhilarated by the success (even nobility) of their deeds. Such activities, while risky, can also be great fun, according to *Ecodefense: A Field Guide to Monkeywrenching*, and guarantee perpetrators "a rush of excitement, a sense of accomplishment, and unparalleled camaraderie."

Monkeywrenchers are the shock troops of the broader "Deep Ecology" philosophy, and they share with other Deep Ecologists a scorn for traditional environmentalists as "shallow" captives of industrialism. The central dogma of Deep Ecology, first formulated in 1972 by a Norwegian college professor named Arne Naess, is the equality of all living things, so that man is no more deserving of reverence than, say, plankton. And for some Deep Ecologists, probably less so. *Earth First! The Radical Environmental Journal* suggests that from an ecological perspective AIDS itself might not be such a bad thing, since it could destroy countless polluting humans, thereby easing population pressures. AIDS ultimately could mean the end of industrialism, "the main force behind the environmental crisis." That being the case, "as radical environmentalists, we can see AIDS not as a problem but a necessary solution." Fanatics who believe that, as well as the more benign idealists in Arne's army, are also convinced that passing the right laws on Capitol Hill, while well-meaning, simply isn't enough: since many environmental problems are global in nature, governments must work together as never before, reorder their priorities, restructure their economies, and reconsider notions of their own sovereignty. And because pollution isn't simply the fault of big corporations, but of consumer choices as well, ▶ 801



## PLANET STRICKEN

(Continued from page 715)

structuring space. It's the dynamite that blows open the picture box. And then you're able to put it back together again.

**John Baldessari, Artist**

*I think Cubism in the twentieth century is like gesso. It's so absorbed that it's under everybody's painting. The Picasso-Braque relationship was a little like Rauschenberg and Johns, except, as Calvin Tomkins reports in his book *Off the Wall*, Johns and Rauschenberg were not working on the same thing; they were working against the same thing. Picasso and Braque brought the external world into painting with all those *trompe l'oeil* elements. That's really very much what Johns and especially Rauschenberg did with their collages. They started bringing in the mass media. Obviously there are massive differences, but I think the analogies are still valid.*

**Collins & Milazzo, Independent curators and art critics**

I saw a lot of both men when I lived in France in the fifties and early sixties. Picasso was always avid for news of Braque. "How is he? Why doesn't he come and stay? I'll put a studio at his disposal, like in the old days. Why doesn't he acknowledge the ceramic fish plate I sent him?" "I thought it was a joke," Braque said.

When Picasso came to visit the house where I lived, he would spend a long time glaring at the great late Braque that hung there, devouring it with his eyes. There were also a lot of marvelous Picassos in the house, but Braque did not return the compliment on his visits. He only had eyes for his own paintings. He would narrow his great eyes and look at them speculatively, as if he were still at work on them.

Both artists talked nostalgically about Sorgues, a village just north of Avignon, our local town. They had lived there together for much of the culminating period of Cubism. The first papier collé had been done there in September 1912; and now (forty-five years later) it hung on our living room wall. Braque remembered buying the grained wallpaper that signified the wooden surfaces at a shop in Avignon. And then, Marcelle Braque told us, Braque had waited for Picasso to leave for a week in Paris so that he could perfect this crucial innovation on his own. Braque was cannier than he seemed.

As for Picasso: apropos one of his Cubist watercolors on the wall, inscribed "Avignon 1914," he suggested I go to a certain stable just inside the ramparts of Avignon. He even remembered the address and the name of the *cocher* (the cabdriver) who worked there. "I painted a wonderful pointillistic sign for him to hang outside the stable. *Fumier à Vendre* (manure for sale), it said. Maybe it's still there." I searched and searched, but couldn't find it. Maybe MoMA will.

**John Richardson, Picasso's biographer**

*Braque was a very gentle person, very soft and attentive to others. For example, he actually worried a lot about the fact that my brother and I were not recognized by my father. I mean, he cared about us even though we were not his children. He had a very sweet character, whereas my father—I wouldn't exchange him for any other—was much more self-centered and obsessed by his work, and yet a lot more fun to be with. There was nothing flamboyant about Braque, whereas my father was very flamboyant. I think Braque had a lot of affection for my father, which actually showed in the fact that he would be concerned with me.*

*Obviously Cubism has changed the way we look at things. I mean totally. Nothing will ever be the same, as they say. I don't know how many centuries you have to go backward and still not find anything as momentous as Cubism. I suppose the invention of perspective was the most important thing that happened before Cubism. Cubism made it possible for almost anything else to follow.*

**Paloma Picasso** ♥

every one of us must change the way we live. Until we do, Deep Ecologists say, government-imposed emissions standards will be nothing more than licenses to pollute, and logging limits will only conserve timberlands for future plunder.

Historically, that's understandable. Environmentalism—or conservationism, as it was called in the old days—began in this country as an effort by farsighted capitalists like Teddy Roosevelt not to prevent commercial exploitation of natural resources, but to guarantee that in decades to come there would still be natural resources to exploit. The movement was in large part an effort to perpetuate industrialism, led by a big-game hunter whose pals, on one safari alone, bagged nine lions, thirteen rhinos, seven hippos, and five elephants.

These conservationists—bird-watchers and deer hunters and trout fishermen and the like—dominated the movement until the late 1960s. Everything changed when the New Left, with its opposition to capitalism, militarism, sexism, and nuclear power, added Ecology Now! to its agenda. That swelled environmentalism's ranks, giving it a decidedly antiestablishment spin in the process. The traditionalists—the National Wildlife Federation alone has 5.8 million members—still have the numbers, but the radicals get the headlines. They also serve as the movement's conscience, and the bigger the movement, the more important that job becomes.

In Western Europe, the increasingly powerful Green party provides a political vehicle for the new environmentalism, with dramatic results. In this country, however, the two hundred or so grass-roots "green" organizations have had little national impact. Where they have been successful is in helping to change people's perceptions. A critical mass of ecological awareness is already developing, and entire communities are well ahead of their representatives in Washington in generating sweeping environmental programs. A southern California smog-control package, recently proposed by a regional planning board, stands a good chance of dramatically changing the lifestyles of thirteen million local residents. The significance of this, and of other initiatives across the country, is that they incorporate the central insight of the Deep Ecologists. Namely, that the enemy, once viewed as big, bad corporate America, is in fact ourselves.

Gearing up for the approaching Green Decade, smart corporations are already ballyhooing their environmental awareness. Many, such as Kellogg's and Betty Crocker, have taken to sporting recycling logos on their products; Procter & Gamble recently made front-page news with the announcement that it will introduce recycling projects that could turn disposable diapers into flowerpots, park benches, and compost.

Given this kind of success, many mainstream activists are only too happy that the eco-radicals and new religionists are doing their thing. At the very least, says David Nesmith of the Sierra Club, radicals serve to "make us look reasonable in the larger world." For the moment, however, a problem resides in the smaller world. No amount of consciousness-raising can remove the ugly fact that, under present circumstances, an environmentally pure existence is pretty much impossible.

Chellis Glendinning, a New Mexico psychologist and environmental activist, has given it her best shot. With the single-mindedness of any convert, she chose an adobe home with no air-conditioning (it would have depended on a controversial power plant built on Indian lands), threw out her bed sheets (which contain boric acid and formaldehyde), replaced her mattress (some types of foam release a dangerous synthetic chemical), and sealed her plywood bed board with natural lacquers (to keep formaldehyde from being emitted). She did buy a television recently, however, and still drives a car—though she confesses to feeling guilty about both. "I really feel the big change is not going to happen if one person throws out the TV," she says. "We have to change the way the whole civilization is working." ♥



THE WHITE HOUSE  
WASHINGTON

*pink*  
*see*  
Date: 9/1/89

TO:

*Ed Rogers*

FROM:

JAMES P. PINKERTON

Deputy Assistant to the President  
for Policy Planning

*True  
file*

*Here's the stuff from  
EPA. As you can see,  
science / policy-wise it's  
all legit.*

*But it takes the President,  
not an inter-agency working group, to  
put this "1000 hrs. of Green Light" at the top of the*

*agency  
national*





EXECUTIVE OFFICE OF THE PRESIDENT  
OFFICE OF MANAGEMENT AND BUDGET  
WASHINGTON, D.C. 20503

June 27, 1989

MEMORANDUM FOR: JOHN H. SUNUNU  
CHIEF OF STAFF TO THE PRESIDENT

FROM: ROBERT E. GRADY *RG*  
ASSOCIATE DIRECTOR FOR  
NATURAL RESOURCES, ENERGY AND SCIENCE

SUBJECT: Possible Environmental Initiatives for the G-7  
Economic Summit

As you requested, we have prepared short discussion papers on six possible new environmental initiatives for the G-7 summit. The papers are contained in the attached book. In addition, the book contains a copy of the papers that have been prepared to date under the NSC process.

I would be happy to discuss these items with you at your convenience.

Attachment

c: Mr. Richard G. Darman  
General Brent Scowcroft  
Mr. David Q. Bates, Jr.  
Mr. James W. Cicconi  
Mr. Roger B. Porter



## Reforestation America

Proposal: The President would announce the U. S. program "Reforestation America." Federal costs would be in the FY 1991 budget for USDA and EPA.

### Background:

Forests occupy 33% of U.S. land (738 million acres, including 360 million acres of private lands). Urban and suburban forests take about 63 million acres. EPA estimates that three billion trees could be planted on the 7% of Federal forested lands with the best opportunities and in interstate highway corridors. EPA believes 5 billion trees could be planted in hedgerows around croplands, around houses and towns, and in urban areas. Two billion trees could be planted on the most highly eroding and surplus croplands. These actions give a total of 10 billion trees, the equivalent of 50 million acres, and would take up 10 % of the U.S. annual CO<sub>2</sub> emissions (about 2.2% of the world total), or in tons of carbon dioxide about 120-150 million tons annually. The Forest Service, the Bureau of Land Management and other Federal agencies that would be affected by EPA's proposal have not been made aware of the proposal, have had no opportunity to review it, and can not tell whether EPA's cost and other estimates are reasonable.

### Proposal:

1. Increase the stocking rate and level of management of Federal lands. EPA's estimate is that the equivalent of 7.5 million acres of new planting could be achieved, taking up 21 million tons of CO<sub>2</sub> per year.
2. Carry out a cooperative tree planting program with state, local, and private interests. EPA estimates that 25 million acres of planting could be achieved, taking up 35 million tons of CO<sub>2</sub> per year.
3. Encourage private owners to improve productivity on their timberlands. EPA estimates that more intensive management of 37 million acres could be achieved, taking up 50 to 80 million tons of CO<sub>2</sub> annually.
4. Encourage corporations to voluntarily plant trees to offset 10% of their CO<sub>2</sub> emissions. The potential acreage and tonnage is not estimated.
5. Demonstrate bioenergy plantations as a fuel source for electricity.
6. Afforest surplus private croplands. EPA estimates that 10 million acres could be planted under the existing Conservation Reserve Program, to take up 14 million tons of CO<sub>2</sub> annually.



Budget effects:

EPA's estimate of 1991 Federal cost is \$100 million, budgeted to EPA and USDA. Total 10 year costs are as follows:

|                                                                | \$ in Millions |                    |
|----------------------------------------------------------------|----------------|--------------------|
|                                                                | <u>Federal</u> | <u>Non-Federal</u> |
| Federal lands stocking<br>and management<br>estimated receipts | 1,860<br>- 930 |                    |
| Cooperative planting                                           | 1,000          | 4,000              |
| Private timberlands<br>tax losses ?                            |                | 1,000              |
| Voluntary corporate<br>planting                                | ?              | ?                  |
| Bioenergy plantations<br>demonstration                         | 250-500        | ?                  |
| Afforest surplus<br>croplands                                  | *              | *                  |
| Total                                                          | 2,180-2,430 +  | 5,000 +            |

\* EPA assumes that planting costs would be offset by avoiding costs of planting annual grasses.

Pros:

- If successful in achieving the acres proposed, would produce a reduction in U. S. CO2 emissions of c. 10%.
- Would put the U.S. in a leadership role while proposing actions likely to be less expensive than direct reductions of fossil fuel emissions.
- Would encourage other countries to take similar actions.

Cons:

- Agencies most expert in reforestation have had no opportunity to validate whether or not EPA's estimates, particularly of costs, are valid.
- It is doubtful that \$5 billion in private funding would be available in a ten year period.
- Most surplus cropland participating in the Conservation Reserve Program is in the Great Plains, which has never been in trees since the last glaciation.



- A program of this size, in addition to current efforts, is probably not feasible within the 10-year period.
- How much CO2 would be tied up is difficult to evaluate before current research on that issue is completed.



Memorandum For: Governor John Sununu  
Chief of Staff

Subject: "Reforesting America"

"Reforesting America" is a proposed unique cooperative federal-state-private partnership across the United States to plant 10 billion trees on private, state, local, and federal lands. It will draw on Americans' conservation spirit. It will assure a bountiful supply of timber, wildlife habitat, water, and other benefits. And it will convert excess carbon dioxide in the atmosphere into forests, thus slowing the Greenhouse Effect.

Over the next decade, through the year 2000, this project will tap America's great tradition of volunteerism, which will be harnessed, in concert with private-sector corporate resources, to plant and manage 10 billion new trees in America. It will regrow the hedgerows around farmland fields (helping to reduce soil erosion from wind), the trees that once shaded homes along city streets, and the woodlots among houses, towns, and industrial facilities, to reforest America.

Reforesting America will call upon citizens in every state to participate by planting trees around their own homes. It will call upon businesses, by contributing time and corporate resources to grow, distribute, and plant the trees. Trees will cool houses, pull carbon out of the atmosphere to improve air quality, reduce energy demand in urban areas, and provide an initially small but alternative energy source, from tree plantations, to meet the energy demands of the years to come.

"Reforesting America" has five key components:

1. Intensify planting and natural resource management on 50 million acres (the 7% of federal forested lands most likely to provide the appropriate opportunities) and along interstate highway corridors, by planting 3 billion trees;

2. Launch a cooperative state-corporate-volunteer tree planting program to plant 5 billion trees over 10 years in all 50 states, in hedgerows around croplands, around houses and towns, and in urban areas;



3. Leverage the Department of Agriculture's Conservation Reserve Program to target 2 billion trees on 10 million acres of the nation's most highly eroding and surplus croplands for tree planting. Another half a million acres will be targeted for intensively managed bioenergy plantations of fast-growing trees, harvested for use as biomass fuel for state-of-the-art gas turbines, as a demonstration project of an alternative fuel to substitute for our consumption of carbon-producing fossil fuels;

4. Call upon America's business and private interests and landowners to embark upon voluntary programs to become more active and aggressive stewards of the land by developing programs to unleash their creative genius to stimulate tree planting and forest management;

5. Expand research on the types of trees and management practices most suitable and cost effective for different regions of the country.

Together, these initiatives will provide America over the next decade with:

\* 10 billion trees planted on private, federal, and state-owned lands

\* the equivalent of 50 million acres of new trees planted

\* 120 million tons of carbon per year--or 10% of the U.S. annual carbon dioxide emissions--stored in these forests, once they are mature,

\* new forest growth that will offset the annual emissions of carbon from fossil fuels of 24 million Americans--fully 10 percent of the U.S. population. When the 10 billion trees are mature, their growth would likely offset the anticipated increase in CO<sub>2</sub> emissions from new fossil-fuel generated electricity over 10 years.

To begin this program, an initial \$100 million in federal support is needed to be made available in FY91 to a joint USDA and EPA program, to seed the reforestation process. This program will build on expertise available in federal and state forestry agencies, private timber companies, and other sectors. Costs of the program over 10 years will be shared among private, local, state, and federal entities. Total costs to the government will depend on the cost of rural vs. urban plantings, the savings in agricultural support payments resulting from an expanded Conservation Reserve Program, and the extent of participation by the private sector and state and local governments.



A task force of distinguished leaders drawn from three sectors of U.S. society will oversee this effort:

- 1) A Corporate Advisory Panel, to consider the best ways to harness the wealth of talent in the business community in order to meet these objectives,
- 2) A National Volunteers Panel, to work with the nation's national and local conservation leaders and land managers, and
- 3) A Federal Land Management Panel, comprised of top leaders and experts of federal land management agencies to assess capabilities on national lands.

These advisory bodies will be convened immediately and will report their observations and recommendations within 90 days, in order to move this program from the vision of a reforested America into seedlings.

A program to replant and better manage America's dwindling rural and urban forests offers a cost-effective response to slow the accumulation of greenhouse gases in the atmosphere. This is especially true as U.S. forests are suffering from the combined effects over time of the byproducts of this industrialized age--ozone, acid rain, and heavy metals in water and air--and climatic events like the widespread drought and attendant wildfires of last summer that may presage broader changes in average temperatures and climate in the years to come. By improving the health of private and publicly owned forests, the U.S. will be investing in its ability to provide forest products, water, and recreational benefits into the future.

The U.S. can offset a portion of its own emissions of carbon dioxide through reforestation and improved forest management, and can provide world leadership by identifying techniques and funding mechanisms for other nations to reduce their forest loss and increase tree planting, both among Western allies and in the developing nations of the tropics.

William K. Reilly



**DRAFT**

**REFOREST AMERICA PROGRAM**

**SUMMARY AND APPENDIX**



## SUMMARY

### INTRODUCTION

- Forest occupy 33% of the U.S. land (738 million acres)
- Private sector lands account for approximately 360 million acres
- Urban/suburban forest occupy about 68 million acres

### KEY ELEMENTS OF PROJECT

- Proposed Program would plant 2 billion trees over 10 years
- Over 40 million acres planted on federal, state, and urban lands
- Benefits would include reduced soil erosion, decreased electricity demand in urban areas, improved wildlife habitat, and increased water resources
- Conservation Reserve Program is targeted for 10 million acres of trees or approximately 25% of currently targeted acres (An area approximately 1.5 times the size of Vermont)
- Approximately 120 million tons of CO<sub>2</sub>/year stored at maturity
- Initial federal cost is approximately \$100 million
- Stresses major role for private sector and state/local government and individual volunteerism

### CURRENT ACTIVITIES

- Los Angeles has a project to plant 5 million trees
- North Dakota is currently committed to planting 100 million trees over the next 10 years
- Weyerhaeuser plants 40-50 million trees per year
- U.S. nurseries produce approximately 400 million seedlings per year. We estimate they could meet a one billion seedling goal in 2-4 years.

### NEXT STEPS

- Requires implementation of Reforest America Task Force composed of corporate leaders, local volunteer organizations, and federal land managers.



## PROGRAM SUMMARY

| Program Components          | No. Trees (bil) <sup>1</sup> | Acres Planted (mil) | Acres Managed (mil) | Tons CO2 /Yr Fixed (mil) | Cost/Year (mil \$) | Primary Activity |
|-----------------------------|------------------------------|---------------------|---------------------|--------------------------|--------------------|------------------|
| A. Federal                  | 3.0                          | 7.5                 | 7.5                 | 21                       | 93                 |                  |
| 1. USFS                     | 2.0                          | 5.0                 | 5.0                 | 14                       | 62                 | Plant & Manage   |
| 2. BLM                      | 0.6                          | 1.5                 | 1.5                 | 4                        | 19                 | Plant & Manage   |
| 3. DoD                      | 0.4                          | 1.0                 | 1.0                 | 3                        | 12                 | Plant & Manage   |
| B. Non-Fed.                 | 5.0                          | 25.0                | 37.0                | 113                      | 600                |                  |
| 1. State/Urban <sup>4</sup> | 5.0                          | 25.0                | 0.0                 | 35                       | 500                | Plant            |
| 2. Private Timberlands      | 0.0                          | 0.0                 | 37.0                | 50-80                    | 100 <sup>2</sup>   | Manage           |
| C. CRP                      | 2.0                          | 10.0                | 0.0                 | 14                       | 0 <sup>3</sup>     | Plant            |
| TOTAL                       | 10.0                         | 43.0                | 45.0                | 120-150                  | 693                |                  |

<sup>1</sup> Number of trees (billions) equals trees planted plus carbon benefits from improved management of existing trees measured in terms of tree equivalents.

<sup>2</sup> Assumes a cost of approximately \$30/acre for timber stand improvement.

<sup>3</sup> Revenue neutral program; Projected increased costs above budgeted for full enrollment in CRP to 45 million acres; Assumes that modest increases in contract prices accepted for CRP lands would be necessary incentive for higher tree planting; Costs could be offset because of lower planting costs per acre of trees compared to annual grasses

<sup>4</sup> Includes activities by state and local governments and volunteer efforts by individuals

Note: Volunteer efforts by corporations, including utilities, have not been specifically included in these calculations



## REFORESTING AMERICA: APPENDIX

### I. FEDERAL LANDS COMPONENT:

**Goal: Increase Stocking Rates and Intensively Manage Federal Forested Lands**

This program would increase the productivity of existing forests and plant new trees on land owned by the Bureau of Land Management (BLM), Department of Defense (DoD), and U.S. Forest Service (USFS) lands. The program would plant or manage for the equivalent of 3 billion trees for a carbon sequestration benefit of 21 million tons per year, once the forests are mature. A rough cost estimate is \$93 million/year for 10 years, assuming that 50% of total costs are recovered through the sales of harvested timber products.

#### 1. USFS Lands: Improving Productivity on Federal Forest Lands

Improved management of approximately 6 percent of the 192 million acres of USFS forest lands could offset 14 million tons per year of atmospheric carbon over the ten-year life of the program. Cost estimates reflect assumptions of planting costs of \$175/acre and \$75/acre timber stand improvement (management).

Scout troops, church groups, and other volunteer organizations could assist the Government by providing additional manpower in a national effort to improve the management and productivity of our national forest lands through new planting and timber stand improvement to foster new growth.

#### 2. BLM lands

A goal of 3 million acres of BLM lands (less than 1% of the total 341 million acres) will be targeted for planting of new trees and improved management of existing forests over 10 years. This BLM component of the program would sequester 4 million tons of carbon per year once mature.

#### 3. Department of Defense Land Replanting

A two-fold strategy to plant trees strategically around military bases and to increase stocking of DoD forests could yield carbon sequestration benefits of about 3 million tons per year over the life of the program. Strategic planting could be an important strategy in view of number of military bases located in southern states. Potential energy savings on air conditioning costs would also result and would be available to help fund the replanting program, but have not been estimated. Ten percent of DoD's 23 million acres could be replanted or more fully stocked and would increase annual growth sufficiently to allow increased harvest and timber sales, to pay most of the costs of the currently self-sustaining program.



## II. NON-FEDERAL LANDS COMPONENT:

**GOAL: Increase Stocking and Management of Non-Federal Forest Lands**

### 1. Cooperative State, Local, and Private Tree Planting Initiative

States, municipalities, private corporations and individuals would together participate in a cooperative program to plant five billion trees over the next 10 years in the 50 states to capture 35 million tons of carbon. Costs of the program would be shared by government and private organizations; labor to plant trees would be donated by civic and youth groups such as the Scouts, YMCA, Lions Club, etc.

A major component of the program would be urban reforestation, which holds great potential for mitigating the urban heat island effect by shading and thereby cooling houses and commercial buildings. Cooler buildings require less air conditioning, and lower energy demands, thus reducing electricity demand from residential buildings by up to 20%. Urban tree planting around buildings is estimated to be about 15 times more efficient than rural tree planting in reducing atmospheric CO<sub>2</sub>.

Encouraging and fostering ties to urban development groups, businesses, and volunteer organizations will help provide the resources and labor to make this program self-sustaining. The City of Los Angeles effectively implemented such a program to plant 1 million trees for under \$1 million before the 1984 Olympics. In another example, the state of North Dakota has launched a tree planting program with a goal of planting 10 million trees per year for 10 years in the state, totalling 100 million trees by the year 2000. Based on the North Dakota program, a 5 billion tree goal could be obtained by the following approach:

- 30 states at 10 million trees/year for 10 years
- 10 states at 5 million trees/year for 10 years
- 10 states at 20 million trees/year for 10 years

The state and local program assumes cost-sharing of 40% from contributions from individuals and industry (about \$3 million per state per year), 40% from state and local government, and 20% Federal assistance.

### 2. Improving Productivity on U.S. Private Timberlands

Improving the management of 10 percent of the 373 million acres of private timberland in the U.S. could result in the sequestration of 78 million tons of atmospheric carbon per year, assuming the existing acres reach their full productivity potential. Tax law changes and fiscal incentives may be required to stimulate private sector investments.



### **3. Corporate Tree Planting to Offset Individual Company Carbon Dioxide Emissions:**

Corporations, especially electric utilities, and other institutions would be encouraged to voluntarily launch programs to plant trees to offset 10% of their total CO2 emissions. These activities could be modelled after the approach taken by the Applied Energy Systems utility offset. In this innovative example, the expected emissions of a new coal-fired electric plant being built in Connecticut are being offset by a tree planting program in Guatemala.

### **III. MARGINAL AGRICULTURAL LANDS COMPONENT:**

**GOAL:** Launch Large-Scale Tree Planting on Surplus Croplands and Degraded Lands

#### **1. Afforestation of surplus private croplands:**

USDA's Conservation Reserve Program (CRP) was established under the 1985 Food Security Act ("Farm Bill") to provide incentives for farmers to set aside the most highly erodible 10% of the nation's farm land. This cropland is currently producing surplus crops which require billions of dollars in annual commodity support payments from USDA.

CRP tree planting could be expanded 10 million acres, from the current low enrollment of 1.7 million acres up to 12 million acres, via modest additional fiscal incentives to farmers eligible to enroll erodible lands in the CRP. Costs of these incentives are already budgeted for full enrollment in the CRP, and are expected to be offset by reductions in Treasury payments for purchase of surplus commodity crops otherwise grown. Tree planting costs per acre are less than comparable costs for current vegetable cover (grass) establishment costs. This CRP expansion would encourage planting of 2 billion trees, yielding a carbon sequestration of 14 million tons of carbon per year.

#### **2. Demonstration of Planting of Bioenergy Plantations as Fuel for Electricity Production**

Tree planting under USDA's Conservation Reserve Program can be also be expanded with an additional program using fiscal incentives to enroll a small portion of CRP lands in short rotation, intensive culture (SRIC) tree plantations. The wood production ("biomass") from these bioenergy plantations will be fed into a new state-of-the-art gasification turbines to produce electricity, in a cooperative effort with the Department of Energy. Tens of thousands of acres will be planted over 10 years at a total project cost of \$25-50 million per year.





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# Planting the Future



## COMMON SPECIES AND USES

| Common name          | Mature Height<br>(Feet) | Possible<br>Uses |
|----------------------|-------------------------|------------------|
| Alder                | 15-25                   | ● ●              |
| Ash, green           | 30-50                   | ● ● ●            |
| Baldcypress          | 100-120                 | ● ● ●            |
| Crabapple            | 25-35                   | ●                |
| Dogwood, flowering   | 40                      | ● ● ●            |
| Dogwood, red-stemmed | 7                       | ● ● ●            |
| Honeysuckle, bush    | 12-15                   | ●                |
| Lespedeza, bicolor   | 12                      | ●                |
| Locust, black        | 40-60                   | ● ●              |
| Maple, sugar         | 60-80                   | ● ● ●            |
| Oak, northern red    | 60-80                   | ● ● ● ●          |
| Oak, pin             | 70-80                   | ● ● ● ●          |
| Oak, sawtooth        | 35-45                   | ● ● ● ●          |
| Oak, white           | 80-100                  | ● ● ● ●          |
| Olive, autumn        | 12-18                   | ● ●              |
| Pine, black          | 20-40                   | ● ● ●            |
| Pine, eastern white  | 80-100                  | ● ● ● ●          |
| Pine, loblolly       | 90-110                  | ● ● ●            |
| Spruce, blue         | 70-90                   | ● ● ●            |
| Spruce, Norway       | 60-80                   | ● ● ●            |
| Walnut, black        | 70-90                   | ● ● ●            |
| Willow, streamco     | 8-10                    | ● ● ●            |
| Yellow-poplar        | 120                     | ● ●              |

### USE CODES

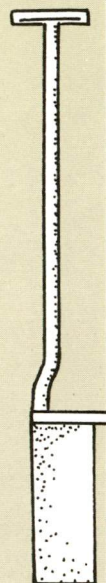
- **Wildlife:** food, cover, winter cover, breeding areas.
- **Forest Products:** lumber, veneer, pulp, firewood, posts.
- **Urban plantings:** ornamentals, windbreaks, sound barriers.
- **Conservation:** erosion control, reclamation, forest buffers.
- **Streambank stabilization.**

### Spacings for Tree and Shrub Seedlings

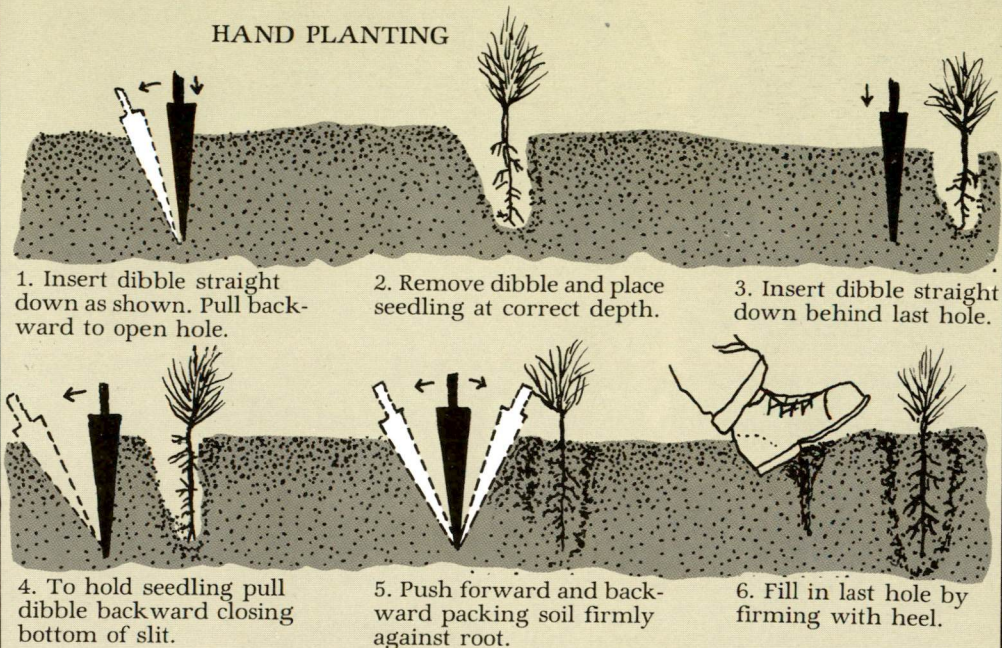
| FEET  | SEEDLINGS PER ACRE |
|-------|--------------------|
| 2×2   | 10,890             |
| 3×3   | 4,840              |
| 6×6   | 1,210              |
| 6×8   | 908                |
| 8×8   | 681                |
| 10×10 | 436                |
| 12×12 | 302                |

Consult your project forester for proper spacing of the species you select.

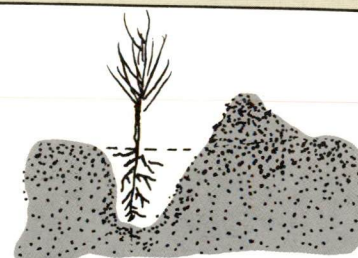
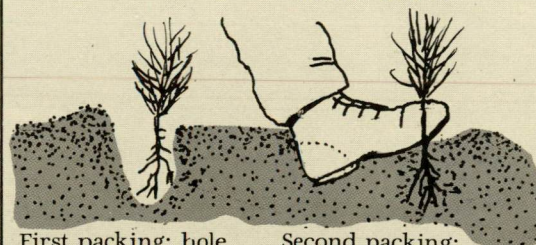
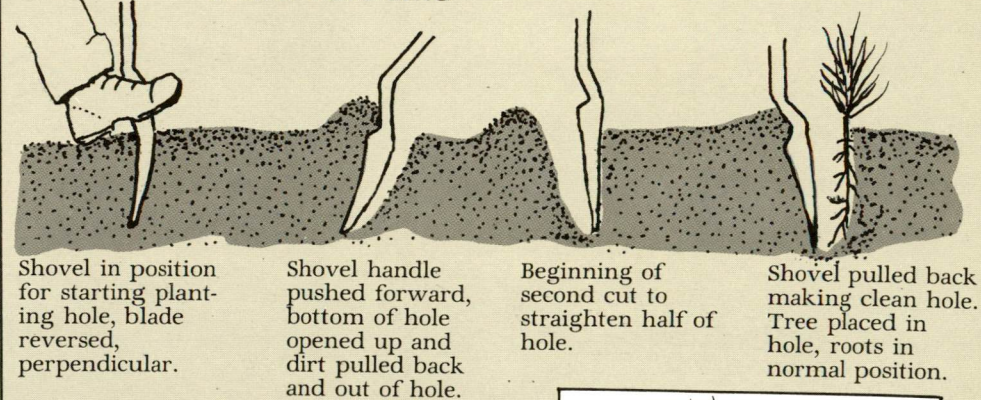
### DIBBLE or PLANTING BAR



### HAND PLANTING



### SPADE PLANTING



### CORRECT DEPTH

At same depth or 1/2" deeper than seedling grew in nursery.



## THE FUTURE OF OUR FOREST RESOURCES IS AT STAKE!

In the early 1600's the state of Maryland was nearly 95% forested. As the colonists settled in Maryland, forests were cleared for cropland and the wood was used for houses, lumber and firewood. As more people moved into Maryland, more homes were built, and more land was cleared for development and agricultural crops.

Today, Maryland is only about 40% forested. As forest land continues to disappear at an alarming rate, we must reflect on the precious resource that is being lost. By implementing a carefully planned reforestation program, you can help restore and conserve our natural resources. These programs can provide more benefits than you may imagine.

### Forest Buffer

*Sediments, nutrients and pesticides associated with agricultural fields are washing into our waterways. One way to help alleviate this problem is to plant forested buffer strips along our creeks and streams.*

Unlike grass filterstrips, which need continued maintenance, forested buffers require maintenance only until the seedlings become established. Trees become established in approximately 2 to 5 years, thus reducing costs incurred for labor, machinery and materials.

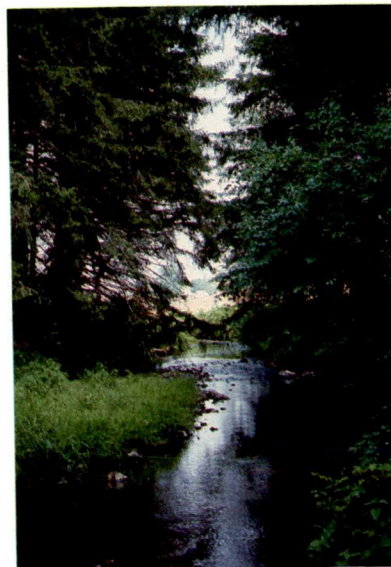
A forested buffer strip will slow run-off, trapping waterborne sediments, nutrients and pesticides in the organic layer of the forest.

Tree roots extending into shallow, perched and fluctuating water tables are able to absorb excess nitrates which have leached from croplands. In addition, forest buffers in wetlands provide an excellent environment for bacteria that convert nitrates to nitrogen gas. The nitrogen gas is then released into the atmosphere, thus preventing excess nitrogen from reaching our waterways and adversely affecting water quality.

Trees shade waterways, resulting in lower and more constant temperatures. This improves fish habitat and helps reduce the effects of nutrient pollution.

Forested buffers provide wildlife travel corridors between isolated woodlands.

Streambank stabilization plantings may be combined with buffer plantings. Planting small trees and shrubs is the most effective natural means of reducing the erosive action of water, ice, debris, and direct rainfall, along streambanks. These plantings also lessen the amount of damage to surrounding roads, fields, fences and structures.



### Conversion of Marginal Fields

*Some agricultural fields are located on marginally productive/highly erodible sites. These fields are tilled, planted, fertilized, and maintained at a higher cost per acre than more productive sites, yet return only a marginal level of profit. Tilling these sites increases erosion and the potential for sediment and nutrient pollution of our streams.*

Investing in timber on marginally productive/highly erodible cropland will produce annual equivalent returns greater than or equal to those of agricultural crops. When combined with conservation programs (as available), the investment in planting trees rivals that of a long term certificate of deposit.

Unlike row crops which are relatively perishable and must be sold at current market prices, forest "crops" can be left to grow, and sold when markets are favorable.

Growing desirable trees on marginally productive/highly erodible land significantly increases its resale value.

As in the case of forest buffers, cropland converted to forest land requires relatively low maintenance.

In many instances, soils that are marginally productive for crops, are highly productive for growing trees.

By converting marginal crop fields to forest land, the amount of sediment reaching streams can be reduced by 95%. Nutrient pollutants in the form of excess nitrogen and phosphorus can be reduced by 90% and 98% respectively.





## Wood Products

*Our increasing population is demanding an increasing amount of forest products from an ever decreasing acreage of forest land. Private landowners can help meet this demand by carefully managing their forest land, and planting additional forests for the future.*

On an average site, one acre of a 50-year-old mixed oak forest can produce 13,750 board feet. This is enough wood to build 1.37 average family homes, 825 Boston rocking chairs, 330 eight person dining room tables, or 33,000 copies of *National Geographic Magazine*.

Few people realize that the list of products derived from trees or tree by-products includes such items as: photographic film, baby food, toothpaste, tool handles, football helmets, textile products, sausage casings, paint, chewing gum, telephone housings, and more than 5000 other products that are a part of our everyday lives.



## Urban Reforestation

Development is causing a rapid loss of forest land and wildlife habitat. In addition, development and urbanization are adversely affecting water quality. This urbanization is accompanied by greater traffic flows, which result in increased noise levels. In many residential areas, the complete removal of trees before construction leaves new homes without protection from the weather. This results in an increased use of energy, and higher heating and cooling costs. By initiating an urban planting, you can beautify your community, improve water quality, restore wildlife habitat and save money through energy conservation.

In the summer, the shade of a single tree, which provides cool, moist air, can have the same cooling effect as 5 large air conditioners. Trees, strategically located around buildings, such as your home, can greatly reduce cooling requirements. Even shading your outside air-conditioning unit can increase its efficiency by as much as 10 percent.

In the winter, closely spaced, dense conifers planted next to the north and west walls of a home, may create a still air zone that will insulate the building, saving you up to 23 percent in fuel costs.

Trees and shrubs can help reduce noise. A row of dense shrubs with a row of closely spaced trees behind it, will form a good sound screen for residential areas. These plantings will be more effective close to the noise source rather than the area to be protected. Evergreens with dense foliage will block noise year-round. In addition, the trees and shrubs will provide the more pleasing sounds of leaves rustling in the wind as well as the sounds of songbirds and other animals.

The careful arrangement of a diversity of trees, shrubs, annuals and perennials will create and enhance food, cover and breeding areas for a wide variety of wildlife.

Trees planted around your yard and community will help maintain and improve water quality. The roots of trees will absorb chemicals and nutrients from herbicides and fertilizers that run off or leach from lawns and gardens.

Our forests and all the benefits derived from them are in jeopardy. Through the simple act of planting trees, you can help improve water quality, conserve soil, create wildlife habitat, supply forest products, conserve energy and beautify your community. The future is in our hands.

LET'S PLANT THE FUTURE TOGETHER!

