

721.41
F67

DEPARTMENT OF
ARCHITECTURE

1960



We must recognize that America's forest wealth is not confined to rural areas. Trees in the city are being increasingly recognized as a vital asset in soil and water conservation and in upgrading the quality of an urban environment. Open spaces, greenbelts, buffer strips, roadsides, community parks, wooded residential and industrial zones, expanding urban areas, and new communities—these are new target areas of forestry concern. The potential benefits are many—cooling shade, better air to breathe, less street noise, protection from winds, more birds and wildlife, a pleasant and serene environment, and increased natural beauty.

A handwritten signature in black ink that reads "Edward P. Cliff". The signature is written in a cursive, flowing style.

EDWARD P. CLIFF
Chief, Forest Service
U.S. Department of Agriculture

October 1970

PEOPLE, CITIES AND TREES

CONTENTS

Urban Planning

Air Pollution

Protecting City Trees

Noise Abatement

Boosting Pure Water Supplies

Recreation Development

Housing Research

Improving Wood Products

Natural Healers

Making Christmas Green

Forestry Assistance for the City

PA 658

FOREST SERVICE
U.S. DEPARTMENT
OF AGRICULTURE

People! Millions of People!

In New York, Los Angeles, Detroit, or Dallas, the problem is the same:

People jammed together, closed in by cement sidewalks, streets, and freeways, and surrounded by steel and glass walls. People blasted by the sound of screeching brakes and the high whine of jet aircraft—breathing factory and auto exhaust, dust, dirt, and nauseous odors.

This is the face of modern, urban America. Fortunately, however, islands of trees brighten the landscape between flaking billboards, flashing neon signs, cluttered trash piles, and crowded tenements.

Much like giant air-conditioners, trees help to cool the city. They provide shade and protection from the elements, and they soften harsh contours of new buildings. They clean the air. They deaden sound. And perhaps

most important of all, they provide each city with a much needed measure of beauty and serenity. In fact, a single tree in the city can be appreciated more than whole clusters of its country cousins.

Trees grown in rural areas also contribute to urban living as they become a part of everyday life in the city. They become products such as tables, chairs, newspapers, milk cartons, writing paper, envelopes—even toothpicks, window casements, and Christmas trees—all a vital part of the urbanite's lively routine. The forests in which they grow provide watersheds for city reservoirs and offer solitude and recreation to rest the strained nerves of the city dweller.

Research scientists employed by the Forest Service, U.S. Department of Agriculture, at eight Forest Experiment Stations around the country and

at the Forest Products Laboratory in Madison, Wisconsin, serve both rural and urban America. They improve the productivity of forest land, develop trees more resistant to destruction by pests, diseases, and atmospheric conditions, find ways to provide more clean water—all this and more to make the Planet Earth a more liveable place.

Forest Service researchers survey woodlands to keep producers and consumers informed of the state of our Nation's forest resources. They improve tree culturing and harvesting methods, so that the wood supply will remain sufficient to meet the population's ever-increasing demands. They seek new and improved wood products and new approaches to wood housing. And they study wood quality to insure top-grade manufactured goods.

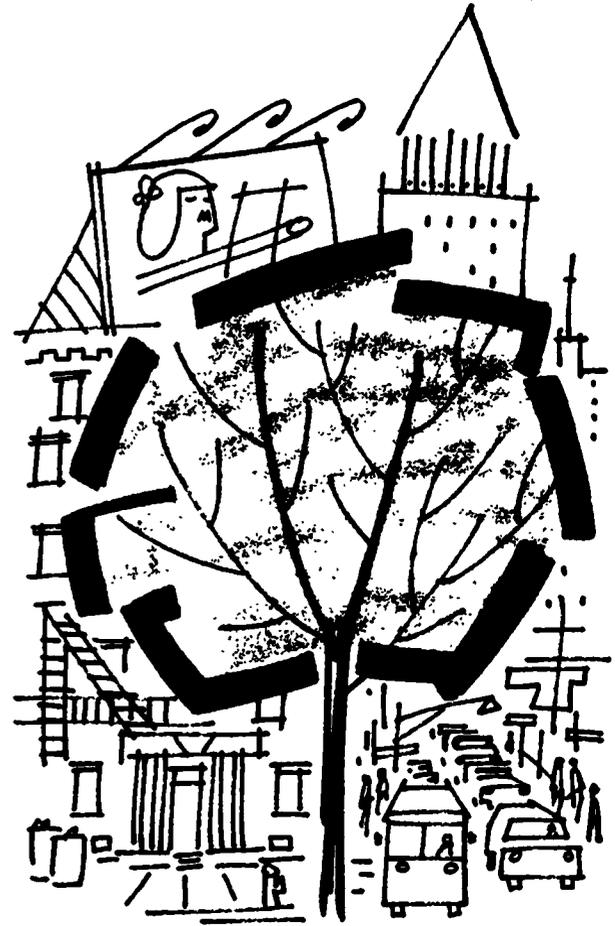
Forest Service scientists study individual tree species and their rela-

tion to landscapes. They find ways to produce superior trees through genetics, and better ways to plant, protect, and grow them. They study trees planted in rows, groups, and vast plant communities. They study the ecosystems of our environment in order to improve and maintain its life-sustaining capabilities. From such studies, they resolve principles to plan and manage park and forest playgrounds for urbanites, to use trees to improve municipal air, water, and sound conditions, and to protect trees that add to the quality of city life.

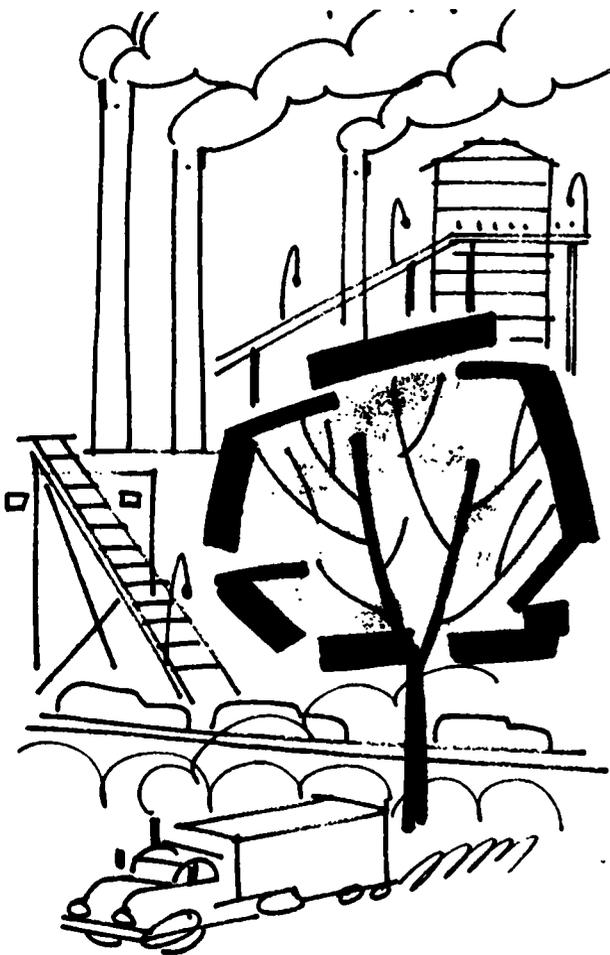
Cities are people. Forest Service research is people—helping man to live in harmony with his urban environment.

Urban Planning

As planners design the cities of the future, they realize the need to include



721. 41
F67



trees. The city tree, standing alone, presents special problems. With roots boxed in by concrete, it often lacks growing space. Winds, whipping around busy corners, blow through its branches with excessive force. Sufficient moisture often is lacking, and the air it needs is tainted sometimes by poisonous elements.

Under such conditions, only the most vigorous tree survives. So, city planners are turning more and more to Forest Service research for guidance in overcoming tree planting problems.

Forest Service scientists are testing trees from around the world to discover hardier varieties. They are also working to improve native and imported trees through tree breeding research. Experimental plantings of these different species help scientists determine those varieties best suited to the city environment.

As a further guide to land use planning, Forest Service and university scientists, working in Nicassio Valley, California, have shown planners how to survey vegetation, geology, soils, climate, and scenic resources. With foresight, they may be able to save present rural landscapes from the blight that has so often in the past accompanied urban sprawl.

Air Pollution

Industries, cars, aircraft, busses and trucks, and home and office heating systems spewed some 200 million tons of pollutants into the air over the United States in 1969. The amount is increasing every year. As these toxic agents in our smog-shrouded skies increase, trees, like people, suffer. In fact, damage to green plants is usually one of the first signs that air pollution has reached a critical stage.

In California, an estimated 1.3 million ponderosa pines have been killed or injured by smog. In the Midwest, Northeast, and Southeast, certain white pines are showing themselves highly susceptible to air pollutants that burn their needles and dwarf or kill the trees.

Air pollution problems are not quickly or easily cured. While the Nation is cleansing the air above its cities, suburbs, and rural industrial centers, forestry scientists are searching for trees with less susceptibility to pollution-caused injury. Such trees will be used in selective-breeding research to develop pollution-resistant tree strains.

Meanwhile susceptible trees, especially those that have shown particular sensitivity to specific toxicants—such as the sulfur dioxide emitted by a coal-burning power plant or the fluor-

ides from a fertilizer plant—will be propagated for use in air pollution abatement programs. They can serve as living indicators of the intensity of a specific pollutant in a given area.

Protecting City Trees

There are already millions of trees, worth billions of dollars, beautifying city parks and shading city streets. Each year scores of thousands are lost, because of repeated attacks by insects and diseases.

Certain insects, like bark beetles, feed on living wood. Some insects, like oak leaf-tier, mimosa webworm, and elm leaf beetles, strip leaves from trees. Others, like acorn weevils, infest seeds. Still others stunt, deform, and kill young nursery stock.

To protect man and his environment, forestry researchers are designing control programs with natural

control measures. Insect sterilization is one possibility for future controls, since it promises to interrupt the reproductive cycles of some very specific insect populations. Other future programs include biotic control, whereby the diseases that naturally attack pest insect populations are harnessed and applied by scientists to limit insect numbers. Forest Service scientists have been successful in sterilizing the locust borer under test conditions. They also have succeeded in obtaining one biotic agent, a purified virus, to control the European pine sawfly.

Viruses, bacteria, fungi, and mycoplasmas cause tree diseases. Forest Service researchers are attempting to determine which of these agents cause specific diseases and how they spread, so that effective control measures can eventually be applied.

Dutch elm disease, accidentally brought to this country about 40 years ago, threatens to kill all our native American elms. Forestry scientists discovered that the disease fungus is carried by the European elm bark beetle. The beetle is attracted to elm bark by substances produced by the tree, so scientists are hoping to combat Dutch elm disease by controlling the disease-carrying beetle. Several methods are under study. One involves extracting the attractant from the elm bark for use as a lure to divert beetles away from the elm tree. Another uses a chemical to neutralize the beetle-attracting substances in the tree.

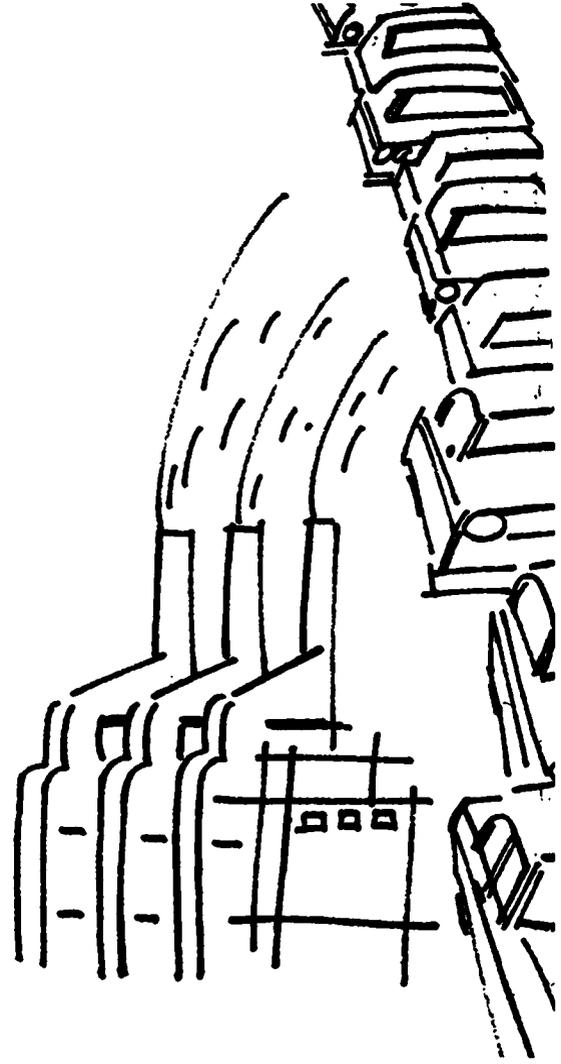
Other natural disease control measures may also someday be feasible. Certain fungi that appear on the surface as toadstools or mushrooms are known to help trees survive on poor soil. Forest Service scientists have

shown that some of these fungi produce potent antibiotics that repel other destructive fungi. It may one day be possible to inoculate the soil with beneficial mushrooms and thus let nature protect our valuable trees.

Tree products also need protection against insects and disease attacks. Forestry researchers are studying the characteristics of attack by organisms and are developing various wood treatments to make forest products serve better and longer.

Tree breeders are producing strains of important species that are resistant to serious diseases and insect attack. These will reduce the need for control measures in the future.

Forest Service pest control research is emphasizing natural biological controls. Success in these methods will eliminate the need for the use of chemical control methods.





Noise Abatement

Noise is unwanted sound. Year by year it increases in intensity. In fact, during the last 30 years, the noise level in the average community increased eightfold. Since 1954, city noise has doubled.

Noise causes fatigue and hinders concentration. It disturbs rest and sleep, and aggravates certain nervous and mental disorders. Continued exposure to high noise levels can result in damaged hearing.

Here again, the forester can help his city brother. It has been found that tree and shrub barriers that screen out light and slow the flow of wind are also effective in muffling sound. Scientists at the University of Nebraska are investigating how effective these barriers are for noise control, especially in recreation areas. Preliminary studies along highways with

belts of trees and shrubs indicate that these living barriers can reduce the sound level as much as 50 percent.

The results of the study will be used in the design of plantings adjacent to parks, playgrounds, and other recreational, as well as residential, areas where intrusive noises are objectionable. Plantings can be included in the landscaping of new highways to reduce noise. Ground noise can be reduced at airports, industrial plants, and along rail lines by properly located trees and shrubs.

Boosting Pure Water Supplies

More than 50 billion gallons of water are used each day for human and industrial consumption, hydroelectric power, farm irrigation, and waste disposal. Most of the water tapped by city faucets originates on forest land.

Forest Service scientists are therefore carefully assessing the effects of forest vegetation, soils, atmospheric factors, and stream hydraulics on water behavior, quality, and quantity. They are developing techniques for managing municipal watersheds, for sustaining streamflow and water quality during low-flow periods, and for alleviating flood hazards.

In late summer, for instance, when the demand for water is greatest, streamflow usually dwindles. Most of the summer rain is evaporated from ground or water surfaces and a great deal of it is transpired from leaf surfaces. Flows can be boosted, Forest Service researchers in the East have found, by manipulating vegetation—by reducing the number of trees about a reservoir, by introducing species that have lower water requirements, and by temporarily defoliating

trees or closing off their leaf pores with harmless chemicals.

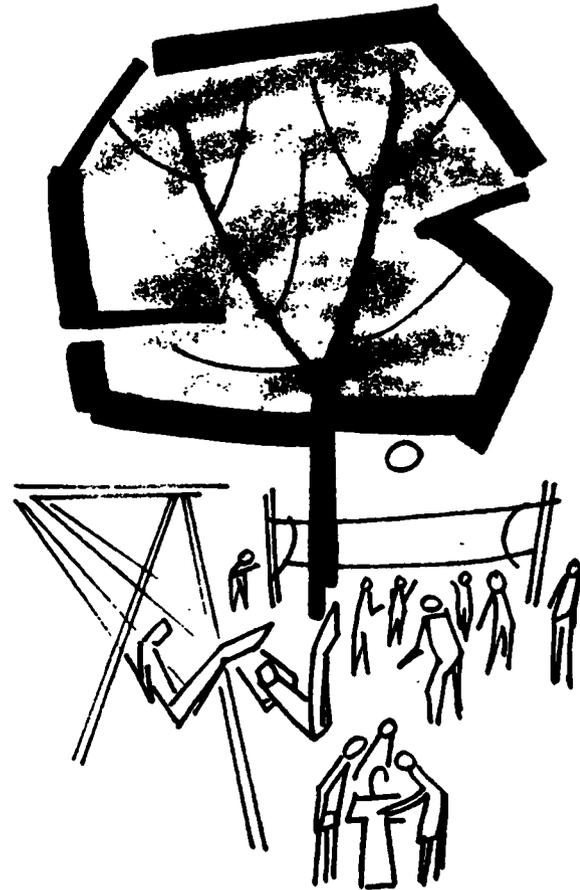
In the Rocky Mountains and the Sierra Nevada, Forest Service scientists have found that certain land management practices can influence the melting of winter snows. They can stretch water supplies during droughts and hold back flood waters. Fences can trap snow in cold alpine regions and so can forests with small openings cut in checkerboard fashion. These practices delay snowmelt and increase water yield. One watershed study on a 700-acre plot in Colorado showed a 30 percent streamflow increase using the checkerboard cutting pattern in the snow zone.

Such information is important to city reservoir managers, who will be able to manipulate watershed land so that the supply of water for city dwellers will be more reliable.

Recreation Development

As working hours become shorter and the standard of living rises, people are left with more and more free time. This increase of leisure time creates a demand for more and better recreation facilities—especially for those who wish to leave the big city for a day in the outdoors.

National Forests are located in 41 States and border on others, so one or more of these “outdoor playgrounds” are within easy driving distance of most American cities. These National Forests provide recreation for many millions of Americans. To take care of this demand, the Forest Service is building hundreds of new picnic, camping, boating, and winter sports areas each year. It is also increasing its purchase of desirable water recreation sites within reach of metropolitan areas. To assist in such developments





the Forest Service employs the Nation's largest single force of landscape architects to insure that all aspects of construction preserve the natural beauty of the areas.

Enterprising companies and private investors are moving into commercial recreation ventures. By studies to determine what the public wants, forest recreation researchers are helping to formulate guidelines for these ventures. The guidelines include the design of recreation facilities—campsites, picnic areas, swimming beaches, hiking trails, and ski slopes. These guidelines also provide information on the market potential and the investment required for a successful venture.

Housing Research

The housing crisis is critical among low-income families in the cities, where

about 10 million dwelling units are badly in need of repair. Wood-products scientists have developed techniques to aid the remodeling of rundown buildings and have designed new methods to cut construction costs.

In New York and other eastern cities, sagging floors in many tenements make it costly to use prefabricated walls, prehung doors, or complete kitchen and bathroom units. However, floor sag can be ended inexpensively. A newly designed Forest Service device holds 2 by 2 inch wooden strips in a level position over old floors, then quick-hardening plastic foam is sprayed under and around these wooden strips, bonding the strips to the old floors. The result is a level floor that can serve as a strong foundation for a completely remodeled room.

Forest Products Laboratory and Southeastern research engineers have

designed 11 low-cost wood homes in various styles and sizes, primarily for rural towns. They can be built for about half the normal construction costs and have all the essentials to provide comfortable living for families with as many as 12 children.

The fact that these homes are "low-cost" does not mean that they use second-rate materials or construction methods. Strength, safety, and durability are not sacrificed to obtain the cost reduction. It is achieved through simplicity of design, by use of economical but durable wood materials, and by employing unconventional materials and systems.

Forest Service researchers do not build or market these homes. But through their efforts, the designs are available for interested persons. The plans were developed at the Forest Products Laboratory, Madison, Wisconsin, and at the Southeastern Forest

Experiment Station, Athens, Georgia.

Improving Wood Products

Forest products are part of every American's life. The list is endless. Our civilization could hardly exist without them.

In addition to seeking better wood-use methods to stretch the supply of wood for forest products, Forest Service researchers are seeking better technological processes to improve the actual products. They are promoting the safety, economy, durability, and attractiveness of the wood, as well as superior methods in using insulation, acoustics, and fire-retardant treatments for construction. They are checking out preservative treatments, finishes, drying techniques, and adhesives. Structures of "stressed skin" panels and "sandwiches" of plywood enclosed paper cores may soon be a reality

through their research efforts.

Forest Service utilization researchers are attempting to get more products from every tree, so there is less waste and less environmental pollution. They are improving technology for sawmills, papermills, and other processing plants. They are studying the best use for wood and fiber to produce packaging containers that are both economical and safe. And they are looking optimistically at the fibers in the solid wastes that make up a large part of city trash. In the future, even city dump material may be reclaimed and recycled as a valuable source of wood fiber products useful to people in the cities.

Nature's Healers

Colds, sniffles, backaches, and headaches are common ailments. A quick trip to the doctor and on to the neigh-



borhood pharmacy provides medicines offering some relief.

Of the \$2.5 billion spent for pharmaceuticals in the United States in 1967, \$300 million purchased derivatives from the roots, stems, bark, leaves, flowers, fruits, or seeds of forest plants. The modern doctor daily writes an average of eight prescriptions for drugs of natural origin. In addition, the ice cream dealer, textile and toilet goods manufacturer—literally, the butcher, baker, and candlestick maker—all find natural plants indispensable in their trades.

Some drugs formerly cultured from plants are now manufactured synthetically. However, many of the most valuable ones have such complex chemical structures that they may never be duplicated economically in a test tube.

Their continued propagation—both

in the forest and in artificial culture—is another major problem. Conservationists fear that entire species may be depleted if harvesting continues at the present rate and efforts at propagation remain unsuccessful.

Forest Service scientists in the Appalachians, where most medicinal plants are found, are checking into plant reproduction. In one instance, they were able to conserve *Lobelia inflata*, a flowering plant whose alkaloid lobeline sulfate is an ingredient in anti-smoking preparations, by discovering the key to its propagation under laboratory conditions.

These studies are evidence of the Forest Service's program for development of the total forest resource—attempting to expand the forest's potential for production of multiple products and benefits.

Making Christmas Green

Each year at holiday time, urbanites face the difficult task of finding the right Christmas tree. Christmas tree growers and vendors face the similarly difficult job of providing the 45 million trees to meet consumer demand.

Forest Service economists are studying Christmas tree market trends to establish kinds, quality, and size of trees that will be most popular, so that distributors can plan ahead. With this information, they expect to alleviate the yearly waste of flooded tree markets and over-stocked tree lots. Other researchers are working on tree growth and cultural techniques for the tree farms from which most Christmas trees are obtained. They also study new tree species that may be better suited for holiday use.

Forestry Assistance For the City

As metropolitan areas continue to expand and central cities face decline, there is growing interest in the role that trees can play in improving the quality of urban living.

Guidance and advice in developing and maintaining open spaces, greenbelts, roadsides, residential and industrial developments, as well as community parks and forests is increasingly being sought by urbanites. With cooperation and support from the Forest Service and other governmental agencies, environmental forestry assistance is becoming available in cities. In addition, several State forestry agencies are assigning forestry specialists to major cities to provide fulltime service to their communities, while other States are offering assistance

through their regular cooperative forestry programs.

This assistance will complement other urban planning, acquisition, and development programs. It will help arborists and municipal foresters to protect and enhance their environment through trees and woody plants. It will make available new information from forestry researchers on solving the problems of **people, cities, and trees.**

Forest Service research activities are conducted at ten centers—

Intermountain Forest and Range Experiment Station
Ogden, Utah

North Central Forest Experiment Station
St. Paul, Minn.

Northeastern Forest Experiment Station
Upper Darby, Pa.

Pacific Northwest Forest and Range Experiment Station
Portland, Oreg.

Pacific Southwest Forest and Range Experiment Station
Berkeley, Calif.

Rocky Mountain Forest and Range Experiment Station
Fort Collins, Colo.

Southeastern Forest Experiment Station
Asheville, N.C.

Southern Forest Experiment Station
New Orleans, La.

Institute of Tropical Forestry
Rio Piedras, Puerto Rico



DATE	ISSUED TO

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

LIBRARY BOOK CARD

DATE

ISSUED TO