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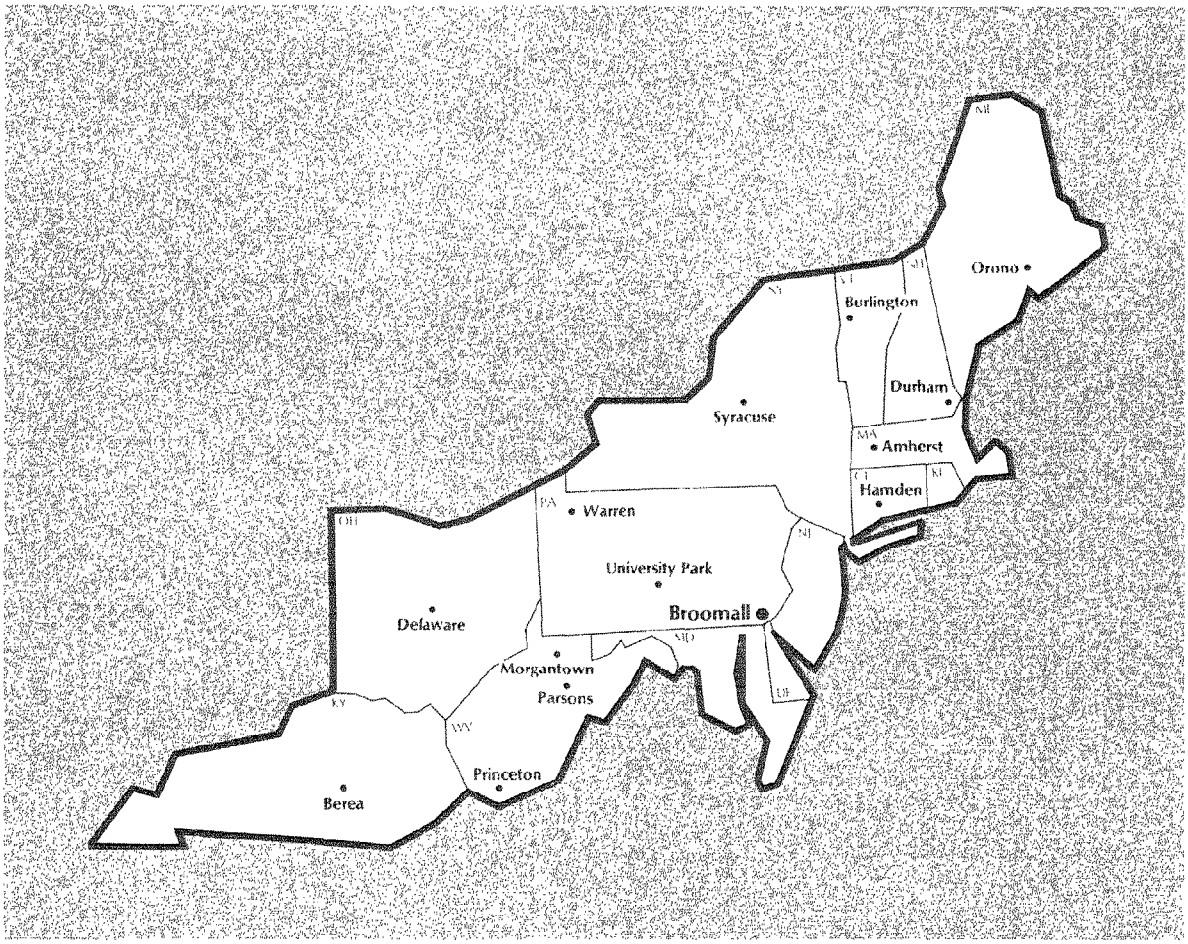
Progress in Forest Research in the Northeast, 1982



Progress in Forest Research in the Northeast, 1982

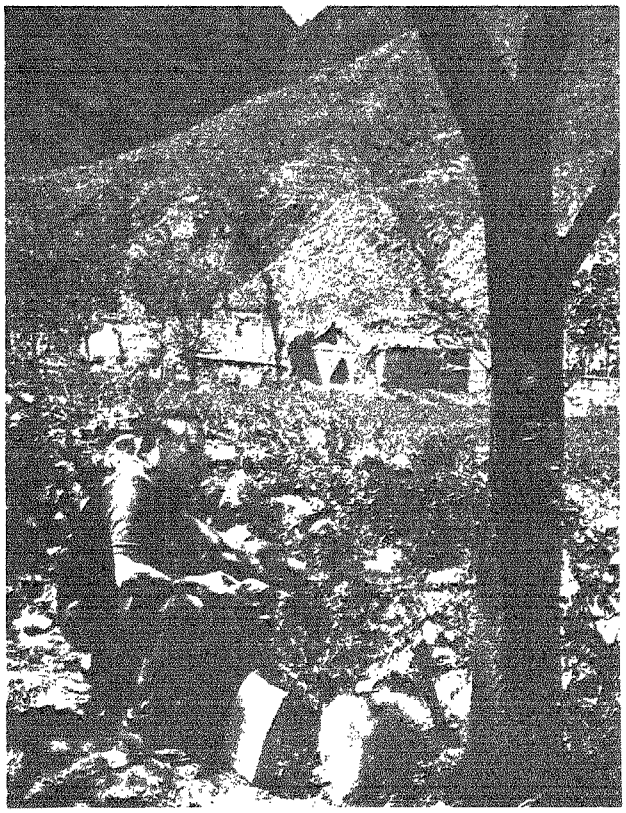
Highlights

The following brief highlights represent a portion of the wide range of research activities engaged in by scientists with the Northeastern Forest Experiment Station in 1982.

Biologicals Key to Gypsy Moth Control

The use of biological control agents--parasites, predators, and microbials--is considered the most desirable method for limiting populations of the gypsy moth, the most destructive forest and urban insect pest in the Eastern United States. Last year, research on biologicals at the Station's Laboratory at Hamden, Connecticut, was accelerated when the Chief of the USDA Forest Service designated the lab and its field station at nearby Ansonia as the Center for Biological Control of Northeastern Forest Insects and Diseases.

Last summer, a team of U.S. scientists, including a researcher with the Center, spent 2 months in the People's Republic of China studying the gypsy moth and its natural enemies. Gypsy moths were collected at each of 52 locations, and some 9,000 gypsy moth eggs, larvae, and pupae were reared. Researchers also identified 13 parasites, 14 predators, and 2 diseases. Diseased gypsy moth caterpillars containing the NPV virus and bacteria that were collected in the People's Republic are now being evaluated at the Hamden facility.



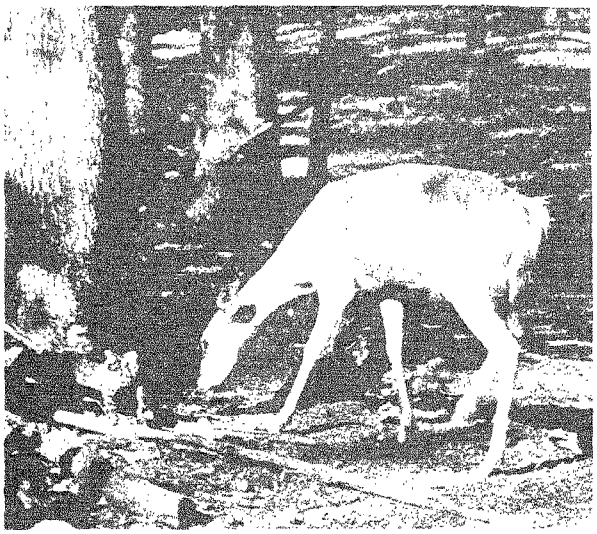
Station scientist William Wallner collects gypsy moth larvae beneath stones in a persimmon orchard northwest of Beijing in the People's Republic of China. More than 9,000 gypsy moth larvae were collected and reared to determine potential biological controls for use in the United States.

How Do You Handle a Hungry Deer?

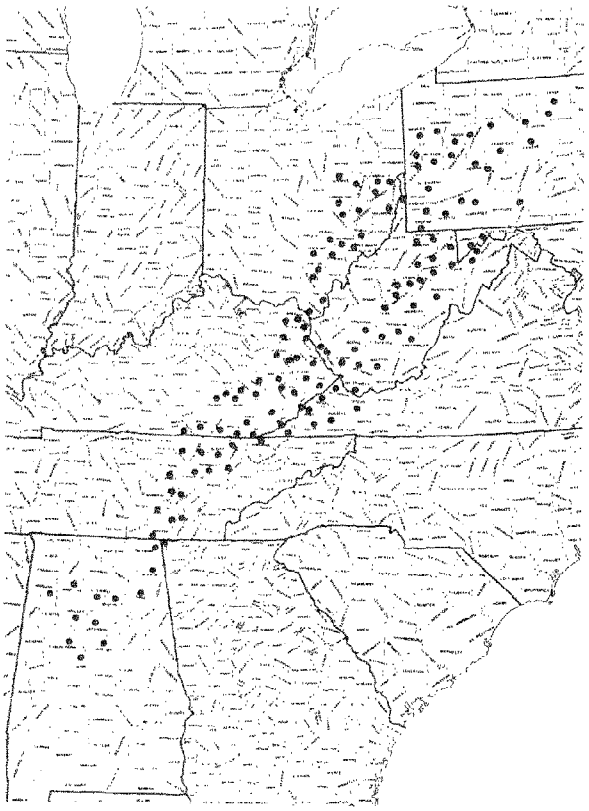
Timber and deer are the major resources of the Allegheny forests, but the relationship between the forests and their primary inhabitant has been far from harmonious. Estimates of future timber production show that current levels of browsing by deer could reduce annual timber income over the entire Allegheny Plateau by an average of $32 per hectare. This represents a 50-percent loss in total timber value.

Station scientists at Warren, Pennsylvania, have developed several management strategies designed to sustain both high deer populations and the forest. The key is providing such a dense regrowth of seedlings that the deer cannot eat all of them before some grow out of reach. This is done by selecting areas for harvest cutting with abundant advance regeneration; stimulating advance reproduction through thinning and shelterwood cutting; and using herbicides to control plants that interfere with seedling development. Other options include fertilization and direct protection in the form of enclosures.

These techniques are being used on the Allegheny National Forest, and by the Pennsylvania Bureau of Forestry, Pennsylvania Game Commission, and forest industries throughout Pennsylvania (Marquis 1982, Res. Pap. NE-498).



Browsing by white-tailed deer has eliminated most understory vegetation in many heavily forested sections of Pennsylvania, making it difficult to establish new seedlings when the overstory timber is harvested.



The study area. Each dot marks one of the 136 Appalachian counties included in this study.

Assessing the Impact of Surface Mining on Water Quality

In 1940, surface mining accounted for little more than 10 percent of domestic coal production. Today, about half of our coal is produced by this method. Throughout Appalachia, surface mining is known to cause changes in the quality of water downstream from mined areas. Since 1950, numerous water-quality sampling sites have been established on Appalachian streams, but most are on streams that drain watersheds so large that it is impossible to isolate the effects of surface mining from other human activities.

To better assess the influence of surface mining and reclamation on stream water quality, scientists at Berea, Kentucky, have established a network of sampling sites for the coal fields of Alabama, Georgia, eastern Kentucky, Ohio, Tennessee, Virginia, West Virginia, Maryland, and Pennsylvania. In 136 counties, samples from streams have been analyzed for the common ions, alkalinity, acidity, pH, 16 trace elements, nitrogen, phosphorus, specific conductance, suspended solids, turbidity, settleable matter, water temperature, and estimated discharge.

This data base from throughout Appalachia should help determine the methods of surface mining that are the most effective in reducing the quantity of pollution reaching streams, and provide a more reliable means of determining the probable hydrologic consequences of future mining operations. The data will be used by regulatory agencies, mine operators, reclamation associations, consultants, land-use planners, landowners, and environmental groups (Dyer, Kenneth 1982, Gen. Tech. Rep. NE-70 and 73 through 78).

New Hope for the Village Smithy?

At the beginning of the 20th century, the American chestnut was one of the Nation's most valuable trees, accounting for more than 25 percent of the eastern hardwood forest. Its lofty trunk and durable, decay-resistant wood made this species ideal for telephone poles, fence posts, mine and construction timbers, furniture, and paneling. The American chestnut furnished more than half of our domestic supply of tannin used in the manufacture of leather, and its edible fruit was a food source not only for man and his domesticated animals but also for a variety of wildlife.

When forester Herman W. Merkel first reported the chestnut blight attacking trees in the New York Zoological Garden in 1904, he had little idea that this deadly canker disease would rapidly reduce the American chestnut from an important timber species to an understory shrub. During the next half century, the chestnut blight—the only known plant pathogen to have nearly eliminated its host—struck virtually every American chestnut tree over its entire range—from Maine to Michigan south to Mississippi and east to Georgia. By 1950, the blight had destroyed the equivalent of 9 million acres of chestnut forest.

Since that time, research efforts to control or at least reduce the devastating effects of the chestnut blight have been unsuccessful. But recent research results have created renewed optimism among scientists and stimulated new studies of the disease. Researchers in Europe have reported that certain less pathogenic (hypovirulent) strains of the chestnut blight inhibit the growth of virulent strains of the blight. In certain situations, hypovirulent-treated cankers have developed callus tissue. When hypovirulent isolates or slurry solutions converted a virulent isolate in the lab, the same isolate was converted in the field. These phenomena have been demonstrated both naturally in surviving American chestnut trees in Appalachia and in Michigan, and in artificially inoculated cankers in Connecticut and Appalachia.

In January 1982, a USDA Forest Service cooperators' meeting was held at Morgantown, West Virginia, to discuss the status of the cooperative research program, report study results on hypovirulence as related to vegetative compatibility, cultural research, host-parasite interactions, and molecular aspects (Smith and MacDonald 1982).

Living American chestnut sprouts like this one persist throughout the Appalachian Region.

Eastern Hardwoods: A Maturing Resource

The eastern hardwood forest is still maturing, according to recently completed forest resource inventories of New York, Pennsylvania, and Ohio. Conducted by researchers at Broomall, Pennsylvania, for more than 40 million acres of hardwood forest land, the surveys indicate that the volume of growing stock and sawtimber for these three states has increased by more than 40 percent during the last decade. Diameter classes in which most of the volume occurs have shifted upward from pole-size (8 to 10 inches) to sawtimber classes (12 to 15 inches). This increase in average size has resulted in slight increases in the volume of sawtimber material of higher quality.

One-half of the forest-land area of New York, Pennsylvania, and Ohio is now classified as sawtimber stands, a dramatic increase in the past 10 years. The area of stands containing 5,000 or more board feet per acre represents a substantial portion of the area in sawtimber stands.

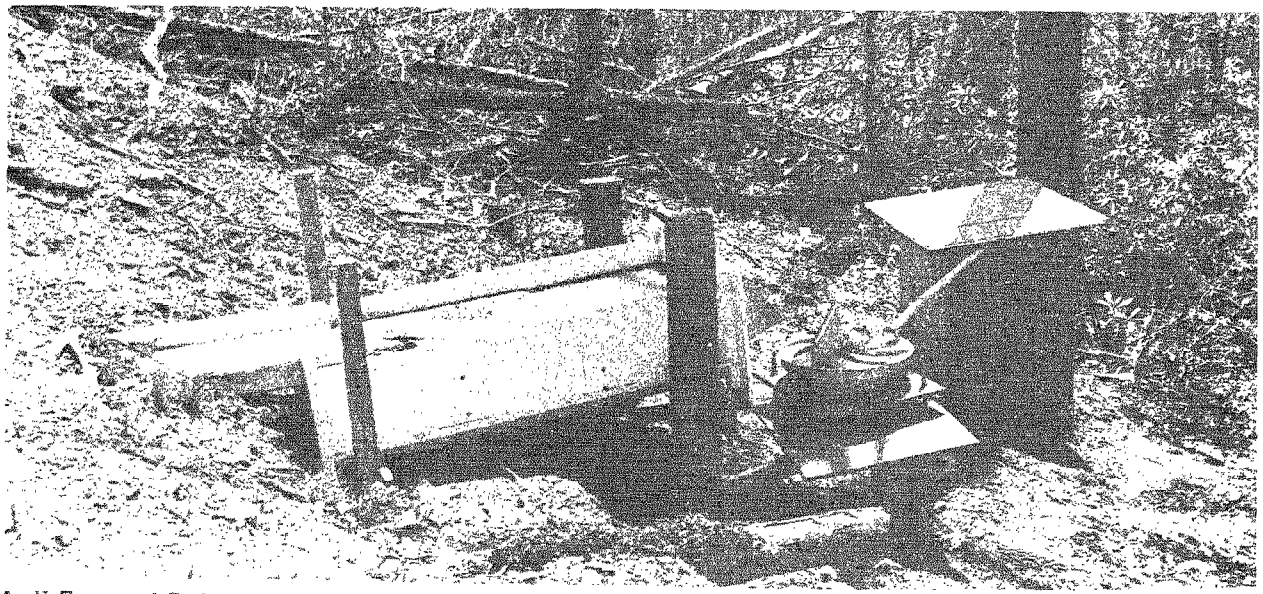
This maturation process has important implications not only for increased opportunities to expand the market for hardwood forest products but also for recreation and wildlife values. Observed changes in stand structure and composition most likely will result in changes in wildlife populations during the next decade (Birch and Wharton 1982, Resour. Bull. NE-70; Considine and Frieswyk 1982, Resour. Bull. NE-71; Powell and Considine 1982, Resour. Bull. NE-69).

Sawtimber trees are becoming more dominant in our eastern hardwood stands.

Economize, but Watch That Sediment

In the Central Appalachians, where both timber volume and stumpage values are low, landowners must economize on road costs to realize a profit on timber sales. But forest access roads in this region are major sources of sediment in streams, so they must be carefully located and drained.

Researchers at Parsons, West Virginia, are studying forest road designs that are economical yet effective in protecting the quality of stream water. As a part of a study of the erosion characteristics of logging roads built to different specifications, data were obtained on soil type, road steepness, type of drainage, and size of gravel. The study showed that gravel, although a major cost consideration, greatly reduces erosion losses and improves the quality of surface runoff.



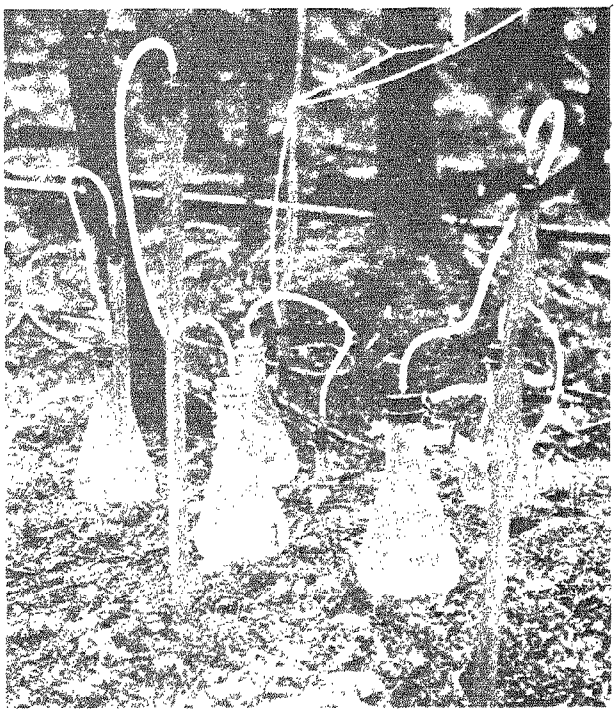
An H-flume and Coshocton wheel used for measuring sediment losses from a logging road.

How Cutting Affects the Nutrient Cycle

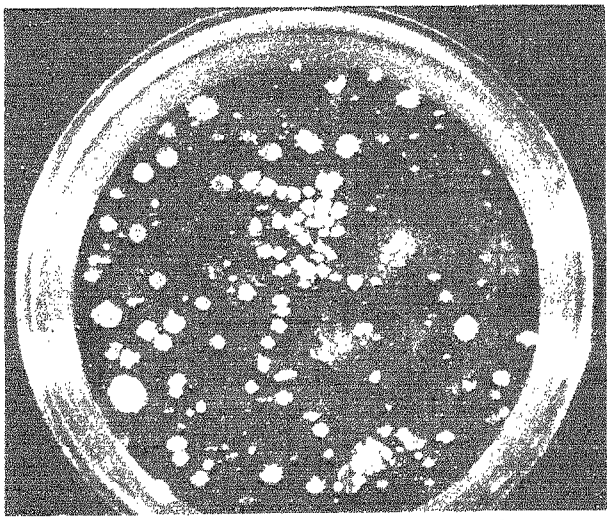
Forest managers have given little attention to the impact of whole-tree harvesting on the processes, mechanisms, and rates by which nutrients are made available for future stands. Station scientists at Durham, New Hampshire, are evaluating the effect of whole-tree harvesting and other cutting practices on nutrient cycling and forest productivity.

In south-central Connecticut, a whole-tree harvest and a selection cut of central hardwoods were completed in early 1982. Although it is too early to determine the effects of these harvests, by midsummer of 1982 there were no noticeable changes in the chemical content of streams or soil solution. In central Maine, a study of whole-tree harvesting of spruce-fir is being conducted on a watershed that was harvested in the summer of 1981. Nitrogen and calcium have increased substantially in soil solution, but not in streams. The effects of both whole-tree and stem-only harvesting also are being assessed in northern hardwood stands in New Hampshire. In the 10 years since the stem-only harvests were initiated, leaching of nitrogen increased by 19 kilograms per hectare in a progressive strip cutting, and by 58 kilograms per hectare in a block clearcut. Nitrogen losses to leaching from whole-tree harvesting were less than 40 kilograms per hectare for the first 2 years after cutting.

In these studies, researchers also are evaluating the removal of nutrients from biomass, nutrient mineralization, nitrification, and stand regeneration.



Soil solution is evaluated to determine effects of whole-tree harvesting on nutrient cycling.



Colonies of Bacillus thuringiensis soon develop from spray droplets when petri dishes exposed to spray deposit are cultured in the lab.

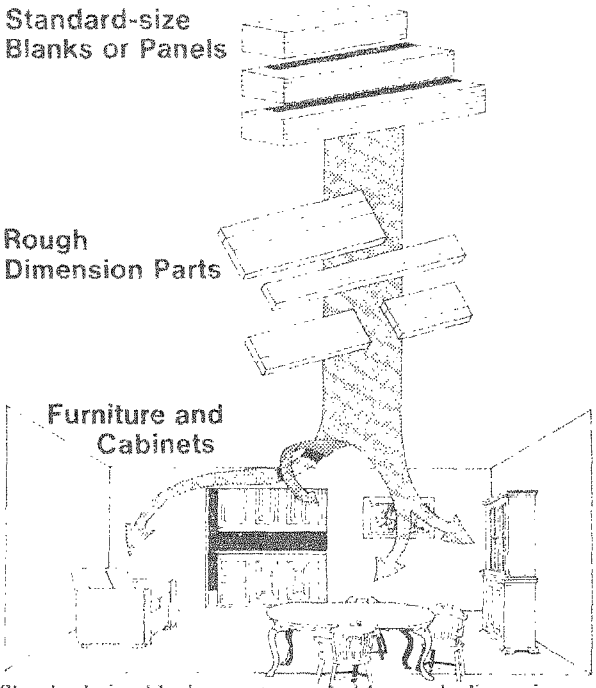
CANUSA Gaining Ground in Budworm Battle

During the last decade, prolonged, massive outbreaks of the spruce budworm have plagued both eastern and western conifer stands. Particularly hard hit have been the boreal forests of Maine and the Canadian Maritime Provinces. The Canada/United States Spruce Budworms Program (CANUSA), the largest international research and development effort ever attempted, was organized to develop technology to minimize the destructive effects of the budworm.

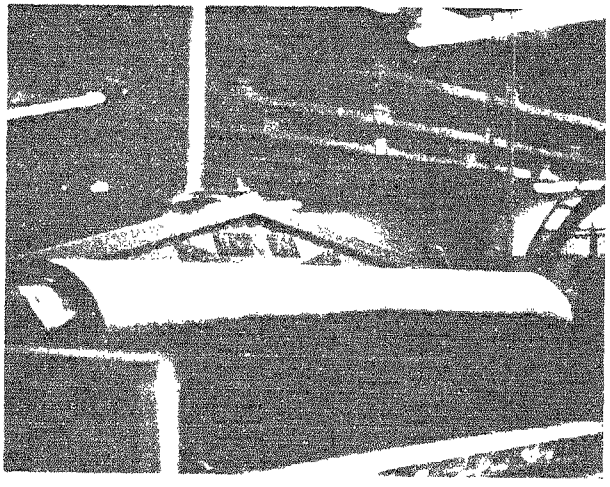
CANUSA cooperators currently are applying new methods for monitoring and evaluating spruce budworm populations, and are testing a system that rates the susceptibility of spruce-fir stands to budworm attack. Cooperators also have developed guidelines on the use and marketing of budworm-damaged trees, and techniques for spraying Bacillus thuringiensis to prevent severe defoliation. A series of 17 USDA Agriculture Handbooks, including a comprehensive budworm management handbook, is being prepared for use by forest managers and forest pest control officials (Crawford and Jennings 1982, Bibliogr. Lit. Agric. 23; Seegrist and Arner 1982, Res. Pap. NE-491; Walton and Lewis 1982. Res. Pap. NE-506).

System 6 Blankets Furniture, Cabinet Markets

In their search for more efficient ways to use the abundant low-grade hardwood resource, researchers at Princeton, West Virginia, have developed System 6, a new process that converts low-grade hardwood logs to high-value specific end products. Furniture and kitchen cabinet makers will make use of the new technology by substituting standard-size blanks produced by System 6 for high-cost, high-grade lumber. When the blanks are converted to the actual sizes needed, material losses are minimal. To date, 10 furniture companies and 1 kitchen cabinet firm have used System-6 produced blanks and found them to be fully satisfactory (Araman 1982, Res. Pap. NE-503; Araman et al. 1982, Res. Pap. NE-494; Reynolds and Gatchell 1982, Res. Pap. NE-504).



Standard-size blanks are converted to rough-dimension parts for furniture and cabinets.



Slicing of northern red oak flitch on a half-round lathe at a veneer plant in southeastern Pennsylvania.

Picture This: Defect Indicators in Red Oak

Hardwood tree- and log-grading systems are used to predict the volume and value of specified end products. To use these systems properly, one must first be able to correctly identify external defect indicators and assess the effects of the underlying defects on possible end products. Scientists at Delaware, Ohio, have developed a photographic guide that describes eight types of external defect indicators for northern red oak. The first in a series on selected species and species groups, the photo guide also shows the progressive stages of the defect throughout its development. This guide should help in the training of foresters, technicians, log buyers and processors, and landowners, and aid in the development of grading systems (Rast 1982, Res. Pap. NE-511).

Publications

Availability of Publications

Most Station publications (Research Papers, Notes, General Technical Reports, and Resource Bulletins) are available from Station headquarters in Broomall, Pa. If Station publications are not in stock, availability from the National Technical Information Service (NTIS) is listed below the citation. Write to: National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.

For copies of articles, contact a university library or the Northeastern Forest Experiment Station author or co-author. A list of Station authors by location follows the citations. Full mailing addresses for field locations are located on the inside back cover.

Adams, Edward L. **Using a recording watt/varmeter to measure power consumption of sawmill equipment.** Gen. Tech. Rep. NE-71. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 8 p.
Describes a recording meter system for measuring both watts and vars on sawmill systems and components. Presents sections on (1) equipment needed for the system (2) using the system, (3) testing the system, and (4) possible uses of the output. The system is easy to use and provides output for a wide range of applications.

Alekseyev, V. A.; Doehinger, L. S. **Goals and tasks of the Project 02.03-21 "Interaction between forest ecosystems and pollutants."** In: Alekseyev, V. A.; Martin, J.; Martin, L. N.; Nilson, E.; Piin, T., eds. Interaction between forest ecosystems and pollutants. Part I. Tallinn: Academy of Sciences of the Estonian S.S.R.; 1982: 16-26.
Discusses individual plant and community air pollution damage diagnoses; variations of composition, structure, and productivity of communities; precipitation chemism and its transformation by forest ecosystems and soils; structural and functional mechanisms and variations of tolerance/sensitivity of plants. Reports on the perspectives of Soviet-American collaboration in this field.

Araman, Philip A. **Rough-part sizes needed from lumber for manufacturing furniture and kitchen cabinets.** Res. Pap. NE-503. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 8 p.
Summarizes results from a recent survey of rough-part sizes needed from lumber for manufacturing furniture and kitchen cabinets. Twenty furniture and twelve cabinet companies participated in the survey. Presents lumber thicknesses needed and rough-part qualities desired along with distributions describing the required rough-part dimensions.

Araman, Philip A. **Standard-size hardwood blanks (edge-glued panels)—an opportunity for hardwood producers.** Natl. Hardwood Mag. 56(8): 36-37, 41, 45-46; 1982.
Standard-size, kiln-dried hardwood blanks of specific length, width, thickness, and quality can be used instead of random-width and random-length lumber to produce furniture and kitchen cabinet parts. Standard sizes for panel blanks (edge glued) have been developed by analyzing rough-dimension part requirements from 20 furniture companies and 12 kitchen cabinet companies. Blanks provide a means for upgrading low- and medium-quality lumber or for making high-valued products from low-grade roundwood. Blanks can be used to complement high-grade lumber or to replace regular dimension stock. Steps for developing a blank market are included.

Araman, Philip A. **Standard-size hardwood blanks for furniture and cabinets—a potential for tropical hardwood producers.** Import/Export Wood Purch. News, August/September, 1982. 3 p.
Standard-size, kiln-dried hardwood blanks of specific length, width, thickness, and quality can be used instead of random-width and random-length lumber to produce furniture and kitchen cabinet parts. Standard sizes for panel blanks (edge glued) have been developed by analyzing rough-dimension part requirements from 20 furniture companies and 12 kitchen cabinet companies. Blanks provide a means for upgrading low- and medium-quality lumber. Blanks for the U.S. furniture and kitchen cabinet markets can be produced in tropical hardwood producing countries to complement our present needs for raw materials. One result will be increased revenues for these countries.

Araman, Philip A.; Gatchell, Charles J.; Reynolds, Hugh W. **Meeting the solid wood needs of the furniture and cabinet industries: standard-size hardwood blanks.** Res. Pap. NE-494. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 27 p.
Standard-size, kiln-dried hardwood blanks (panels) of specified lengths, widths, thicknesses, and qualities can be used instead of lumber to produce rough-dimension furniture parts. Standard sizes were determined by analyzing thousands of part requirements from 20 furniture and 12 kitchen cabinet companies. The International Woodworking Machinery and Furniture Supply Fair-USA collected the data and supported the analysis. Recommended blank sizes and examples of rough-dimension parts for furniture and cabinets made from blanks are included.

Armstrong, J. E.; Shigo, A. L.; Funk, D. T.; McGinnes, E. A.; Smith, D. E. **A macroscopic and microscopic study of compartmentalization and wound closure after mechanical wounding of black walnut trees.** Wood and Fiber 13: 275-291; 1981.
Compartmentalization is a concept developed to explain tree response to injury. To study this concept, uniform mechanical wounds were made in 50 black walnut trees. Each tree was wounded at two heights, 0.5 and 1.4 m, and at two times, fall (November 1975) and spring (March 1976). The amount of wound closure was noted after one complete growing season, as were several macroscopic and microscopic characteristics of compartmentalization. Wound closure and compartmentalization were separate responses. Most of the wounds were closed after a single season's growth. Results of this study suggest that the relative ability to compartmentalize is under genetic control.

Auchmoody, L. R. **Response of young black cherry stands to fertilization.** Can. J. For. Res. 12(2): 319; 1982.

Twenty fertilizer treatments of different rates and combinations of N, P, and K were applied to young black cherry stands that originated after clearcutting in northwestern Pennsylvania. Height, diameter, basal-area growth, and foliar nutrient composition were evaluated annually for 5 years thereafter.

Barger, Jack H. **Evaluation of methoxychlor-sprayed utility poles baited with multilure for suppression of elm bark beetles in Minneapolis.** (Abstr. 97) In: Hall, Franklin R., compiler. Proceedings, 37th annual meeting, North Central Branch of Entomological Society of America; 1982 March 23-25; Sioux Falls, SD. Wooster, OH: North Central Branch of Entomological Society of America; 1982.
Discusses a control strategy which included spraying insecticide on utility poles near elm populations and then luring beetles to these larger surfaces. In 1977, the rate of Dutch elm disease (DED) was 22.7 percent for treated plots and 18.8 percent for control plots; DED rates fluctuated among all plots each year but declined more rapidly in treated plots than controls. By 1980, DED rates were 4.1 percent for treated plots and 3.7 percent for controls.

Barger, Jack H.; Cannon, William N., Jr.; DeMaggio, S. Robert. **Dutch elm disease control: sanitation improved by girdling infected elms.** J. Arboric. 8(5): 124-127; 1982.
For 5 years, three alternative treatments to improve the efficacy of municipal sanitation for controlling Dutch elm disease (DED) were compared to the sanitation practice in which one disease survey was made each year and diseased elms were removed in late fall and winter. Significant reductions in DED were obtained in treatments where tree disease surveys were conducted each year and diseased elms were removed promptly. In the treatment in which diseased elms were girdled, fewer elms became diseased in subsequent years. Spraying the trunks and major branches of diseased elms with hydraulic applications of methoxychlor did not significantly improve DED control.

Barnard, Joseph E. **Resources in the northern part of the United States.** In: Proceedings, Forest Products Research Society conference on "Harvesting small timber: waste not, want not;" 1981 April 28-30; Syracuse, NY. Madison, WI: Forest Products Research Society; 1982: 24-27.
The wood resource on the forest lands of the north is principally hardwood species. It is maturing and has continually increased in volume during the past quarter century. Much of the harvested volume is used for products in which quality is not a factor. To plan for the increased utilization of this resource, the following must be considered: (1) size of the trees; (2) quality and cull in these trees; (3) harvesting constraints related to location, for example, steep slopes, streams, and roads; (4) availability.

Benoit, L. F.; Skelly, J. M.; Moore, L. D.; Dochinger, L. S. **Radial growth reductions of Pinus strobus L. correlated with foliar ozone sensitivity as an indicator of ozone-induced losses in eastern forests.** Can. J. For. Res. 12(3): 673-678; 1982.
A study of the radial increment growth of native eastern white pine evaluated the possible effects of oxidant air pollution (primarily ozone) in long-term growth of forest species in the Blue Ridge Mountains of Virginia. Ten plots of three white pines of reproducing age were sampled. Mean annual radial increment growth of the ozone-sensitive trees was significantly smaller than that of tolerant trees for the period 1955-78. Mean increment growth of all trees, regardless of sensitivity to ozone, decreased during the period. Precipitation was positively correlated with radial growth in all sensitivity classes prior to 1964.

Berry, Frederick H. **Walnut anthracnose.** For. Insect and Dis. Leafl. 85. Washington, DC: U.S. Department of Agriculture, Forest Service; 1981. 4 p.
Walnut anthracnose is a widespread and destructive disease of walnut species, particularly the eastern black walnut. Caused by a fungus, the disease can quickly become epidemic during wet weather in the growing season and cause premature defoliation. No practical control is known for walnut trees growing under forest conditions. Fungicidal sprays have been used to effectively control anthracnose in nurseries, seed orchards, and plantations.

Berry, Frederick H. **Reducing decay losses in high-value hardwoods—a guide for woodland owners and managers.** Agric. Handb. 595. Washington, DC: U.S. Department of Agriculture; 1982. 23 p.
Prepared for use by forest owners and managers in reducing decay in hardwoods. Among the topics discussed are: (1) how decay gets started, (2) how to recognize trees that may be decayed, and (3) what to do to prevent decay or reduce losses to acceptable levels through prevention of wounds, proper handling of sprout stands, reduction of inoculum, and timber stand improvement.

Biller, Cleveland J. **Fabrication of the Appalachian Thinner.** Res. Pap. NE-495. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 7 p.
The Appalachian Thinner, a prototype cable yarder, has proven capable of harvesting timber on steep slopes. Presents details of the fabrication of the prototype yarder. An Appalachian Thinner can be built economically in a logger's repair shop.

Biller, Cleveland J.; Peters, Penn A. **Testing a prototype cable yarder for tree thinning.** Trans. Am. Soc. Agric. Eng. 25(4): 901-905; 1982.
Field tests with the Appalachian Thinner were conducted in a clearcut, sanitation thinning, and diameter-limit thinning. Average cycle times excluding delays were 9.17, 12.70, and 7.51 minutes, respectively. The average move time, including rigging, from one setting to the next was only 5.4 minutes because the Appalachian Thinner does not require guylines. Regression analysis yielded equations that can be used to predict cycle time as a function of slope yarding distance and number of logs per turn. Because of the low initial investment and its excellent mobility, the Appalachian Thinner is particularly effective in small woodland ownerships.

Biltonen, Frank E.; Peters, Penn A. **A review of the Forest Engineering Research projects.** In: Proceedings, 5th annual council of forest engineer's meeting; 1982 August 16-20; Corvallis, OR. Corvallis, OR: Forest Engineering, Inc.; 1982: 5 p.

Birch, Thomas W. **The forest-land owners of Ohio—1979.** Resour. Bull. NE-74. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 84 p.
Reports on the statistical analysis of a mail canvass of private commercial forest-land owners in Ohio. The study was conducted in conjunction with the third forest survey of Ohio by the USDA Forest Service. Discusses landowner characteristics, attitudes, and intentions of owners regarding reasons for owning, recreational use, timber management, and harvesting.

Birch, Thomas W.; Lewis, Douglas G.; Kaiser, H. Fred. **The private forest-land owners of the United States.** Resour. Bull. WO-1. Washington, DC: U.S. Department of Agriculture, Forest Service; 1982. 64 p.
A report on a 1978 survey of private forest-land owners, based on 11,076 questionnaires. About 7.8 million ownership units hold 333 million acres of privately owned forest land in the United States. Regional and subregional breakdowns are included for variables such as form of ownership; owner's occupation, age, sex, race, residence, and education; and size class of ownership.

Birch, Thomas W.; Wharton, Eric H. **Land use change in Ohio, 1952 to 1979.** Resour. Bull. NE-70. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 24 p.
Analyzes trends of major land uses in Ohio from 1952 to 1979. The relationship between the decline in farm area and increase in forest land is emphasized. Losses of wood fiber attributable to clearing forest land between 1968 and 1979 are estimated.

Blum, Barton M.; Klaiber, Harold M.; Randall, Arthur G. **Northeastern spruce-fir.** In: Choices in silviculture for Eastern Canadian forests. Fredericton, NB: Forest Extension Branch, New Brunswick Department of Natural Resources; 1982: 11-15.
This chapter on northeastern spruce-fir was adapted from "Choices in Silviculture for American Forests," and was specifically revised for use in Eastern Canada. It is intended to help landowners understand how the northeastern spruce-fir type can be managed for such benefits as recreation, watershed protection, wildlife, and timber.

Boyce, Stephen G. **Predicting multiple benefits from silviculture.** In: Proceedings, IUFRO/MAB conference: research on multiple use of forest resources; 1980 May 18-23; Flagstaff, AZ. Gen. Tech. Rep. WO-25. Washington, DC: U.S. Department of Agriculture, Forest Service; 1980: 46-50.
Describes an orderly way to plan, control, and direct the transformation of forests from one state to another. This ordered transformation provides time-varying variables; namely, the temporal and spatial dispersion of habitats that can be used to predict the potential for any and all forest benefits singly and in combination.

Boyce, Stephen G. **Regeneration on the southern scene.** In: Proceedings, site preparation and regeneration management; 1980 November 18-20; Clemson, SC. Clemson, SC: Forestry and Harvesting Training Center and Clemson University, Department of Forestry; 1980: 1-15.
The regeneration of pine after the harvest of pine is probably the most difficult forestry operation to carry out on nonindustrial private forests (NIPF). An increasing number of NIPF owners are interested in living in harmony with nature. Social and economic forces influence NIPF owners' perceptions of their best interests. Forestry professionals should help NIPF owners achieve their personal goals by using silviculture for the conservation of natural resources.

Boyce, Stephen G. **Stimulate the use of silviculture in hardwood forests.** In: Proceedings, 3rd central hardwood forest conference III; 1980 September 16-17; Columbia, MO. Columbia, MO: University of Missouri; 1980: 1-9.
The most effective way to use knowledge, technological innovations, and research findings in hardwood forests is to stimulate the systematic culture of forests to enhance the benefits perceived by landowners to be in their best interest.

Boyce, Stephen G. **Biological diversity and its use in silviculture.** In: Proceedings, national silviculture workshop; 1981 June 1-5; Roanoke, VA. Washington, DC: U.S. Department of Agriculture, Forest Service; 1981: 163-181.
Operational techniques are an effective and an efficient way to use biological diversity to meet multiple-use objectives as described by the National Forest Management Act of 1976.

Boyce, Stephen G. **Multiple-use of renewable resources is enhanced with system dynamics methods.** In: Proceedings, 1981 system dynamics research conference; 1981 October 14-17; Rensselaerville, NY. Albany, NY: State University of New York; 1981: 1-10.
A study of the multiple-use task produces a method for integrating quantitative and subjective information to enhance decisionmaking about the multiple use of renewable resources. Methods of resolving conflicts and applying system dynamics are given.

Boyce, Stephen G. **Translation of biological information into forest management plans.** In: Proceedings, IUFRO symposium on forest management planning: present practice and future decisions; 1980 August 18-20; Blacksburg, VA. FWS-1-81. Blacksburg, VA: Virginia Polytechnic Institute and State University, the School of Forestry and Wildlife Resources; 1981: 118-128.
Describes a technique for translating biological information into forest management plans. The technique integrates the translations with the conventional functions of forest management and limits the complexity for using the biological information. The technique is important because many special interest groups are pressuring forest managers to include biological information in forest plans. The technique is used to make biological information compatible with the conventional functions used in designing forest management systems.

Brewer, Mike S.; Lee, Richard; Helvey, J. David. **Predicting peak stream flow from an undisturbed watershed in the central Appalachians.** Water Resour. Bull. 18(5): 755-759; 1982.

Data from a small forested catchment were used to model peak stream flow as a function of basic hydrologic variables associated with 112 rain storms. Rainfall depth and initial stream flow rate accounted for 87.1 percent of peak flow variability. Forty expressions of rainfall intensity were used in an attempt to improve the predictability of basic models. None of the intensity parameters improved predictability by as much as 2 percent, apparently because the most intense rainfall bursts generally occurred near the beginning of storm periods.

Cannon, William N., Jr. **Sterilizing effects of tepa, hempa, and N,N'-hexamethylenebis (1-aziridinecarboxamide) on the smaller European elm bark beetle.** J. Econ. Entomol. 75(3): 535-537; 1982.

Tepa, hempa, and N,N'-hexamethylenebis (1-aziridinecarboxamide) (HMAC) were evaluated for sterilizing activity by topical application to Scolytus multistriatus (Marsham) adults of both sexes. Tepa at 0.8 µg per beetle, the maximum tolerated dose (LD_{10}), was effective in sterilizing males but not females. Hempa at 1.2 µg (LD_{10}) or less per beetle had marginal sterilizing activity in males and very little in females. HMAC was the most effective of the three compounds. When applied at 0.6 µg per beetle to females only, it reduced the number of larvae produced per female by 48 percent; to males only, 82 percent; and to both sexes, 91 percent. Adult 48-hour mortality at this dosage was 2 percent.

Cannon, William N., Jr.; Barger, Jack H.; Worley, David P. **Dutch elm disease control: economies of girdling diseased elms to improve sanitation performance.** J. Arboric. 8(5): 129-135; 1982.

Early detection and immediate girdling plus prompt removal (within 20 work days) of diseased elms saved more elms at a lower cost than sanitation practices in which diseased elms were just removed promptly or allowed to remain standing into the dormant season. A 5-year case history demonstrated savings of 25 percent in total cost and an additional 163 elms per thousand.

Carey, Andrew B. **The ecology of red foxes, gray foxes, and rabies in the Eastern United States.** Wildl. Soc. Bull. 10(1): 18-26; 1982.

In the Eastern United States, rabies occurs more commonly in foxes than in other animals. Rabid foxes are most frequently encountered in localized areas in the Appalachian mountains, valleys, and highlands in Kentucky, Tennessee, Virginia, and West Virginia. The localization of rabies is due, at least in part, to the effects of physiography on the density and contiguity of fox populations. Reported rabies cases are not suitable for quantifying the relationship between virus distribution and elements of the landscape. Attempts to solve rabies-associated problems will be ineffectual until rabies ecology is understood.

Carey, Andrew B.; Healy, William M. **Data base management workshop at West Virginia University—new ideas, new opportunities.** Morgantown, WV: West Virginia University, Agricultural and Forestry Experiment Station; 1982; W. Va. For. Notes Circ. 121(9): 7-8.

Discusses the three major problems that land managers have in the planning process: (1) acquiring complete, accurate, and precise data; (2) manipulating these data to produce useful information; and (3) using this information to evaluate alternative actions.

Carey, Andrew B.; Main, Andrew J., Jr.; Carey, Marion G. **Sampling populations of small mammals in Connecticut forests.** In: Proceedings, 1981 Northeast fish and wildlife conference; 1981 April 19-22; Virginia Beach, VA. Northeast Section, Wildlife Society; 1981: 90-104.

Discusses a 1978 study on three stages of forest development in each of eight areas. From April 1979 to August 1980, trap clusters were used 60 m and 20 m apart in four forest types. A total of 3,645 mammals of 23 species were caught. Species differed in the range of environments they occupied, the feature of the environment to which they responded, and the distances they moved between subsequent captures.

Considine, Thomas J., Jr. **Forest timber resources.** In: Forest resources of New York, a summary assessment. Albany, NY: New York State Department of Environmental Conservation; 1981: 134-140.

Three forest inventories have been conducted in New York. The most recent was completed in 1980 and revealed a maturing resource with increasing timber volumes. Volume breakdowns by geographic unit and species are presented.

Considine, Thomas J., Jr. **New York's third forest survey.** North. Logger 31(4): 6-7, 26-27; 1982.

New York's third forest survey was conducted by the USDA Forest Service in cooperation with the New York State Department of Environmental Conservation. Trends that emerged from the information collected generally showed that the state's forests are in good shape. The positive trends include a million-acre increase in commercial forest land since 1968, and increases in growing-stock and sawtimber volumes of 38 and 53 percent, respectively.

Considine, Thomas J., Jr.; and Frieswyk, Thomas S. **Forest statistics for New York—1980.** Resour. Bull. NE-71. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 118 p.

A statistical report on the third forest survey of New York conducted in 1978 and 1979. Statistical findings are based on data from remeasured and new 10-point, variable-radius plots. The current status of forest-land area, timber volume, and annual growth and removals is presented. Timber products output by timber industries, based on a 1979 updated canvass of manufacturers, is presented.

Corbett, E. S.; Sopper, W. E.; Lynch, J. A. **Hydrologic evaluation of the stormflow generation process on a forested watershed.** University Park, PA: The Pennsylvania State University, College of Agriculture; 1981; Res. Briefs 14(1): 20-23.

An irrigation system was used to simulate rainfall over a 19.6-acre forested experimental watershed. Under dry antecedent soil-moisture conditions, the rising limb and hydrograph peak were produced by stormflow contributions from the channel and base slope zones, primarily in the front 30 percent of the watershed. The lower and middle slopes provided the major portion of the storm hydrograph recession. The front half of the watershed was the major stormflow generating area for the rising limb and the initial hydrograph peak under wet antecedent soil-moisture conditions. Flow from the back half was a major contributor to the delayed but maximum peak, and to the recession portion of the storm hydrograph.

Corner, Sandra L., compiler. **Christmas trees: a bibliography (1981 supplement).** Am. Christmas Tree J. 25(1): 36-38; 1981.
Supplements and updates the annual Christmas tree production and marketing bibliographies published since 1967 by the National Christmas Tree Growers' Association.

Corner, Sandra L., compiler. **Christmas trees: a bibliography (1982 supplement).** Am. Christmas Tree J. 26(5): 21-23; 1982.
See previous entry.

Craft, E. Paul. **The effect of sawbolt length on the yield of pallet materials from small-diameter hardwood trees.** Res. Pap. NE-499. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 6 p.
From overstocked poletimber thinnings, 52 sample trees were bucked into 8-foot lengths, and 49 trees were bucked into 10-foot lengths. These lengths were sawed into pallet parts and pallet cants. The sawed yield from 8-and 10-foot lengths is compared to the predicted yield from sawing 4- and 6-foot bolts from the same trees.

Crawford, Hewlette S. **Seasonal food selection and digestibility by tame white-tailed deer in central Maine.** J. Wildl. Manage. 46(4): 974-982; 1982.
Seasonal food selection and digestibility by tame white-tailed deer were studied in the white pine—Canada hemlock and lowland conifer types, areas representative of important deer habitat in the Northeastern United States. Deer selected highly digestible late spring, summer, and autumn diets. Winter and early spring food were less digestible.

Crawford, H. S.; Jennings, D. T. **Relationships of birds and spruce budworms—literature review and annotated bibliography.** Bibliogr. Lit. Agric. 23. Washington, DC: U.S. Department of Agriculture; 1982. 38 p.
The relationships between birds and spruce budworms are reviewed. Literature summaries and annotated bibliographies are presented under four topic areas: (1) predation and bird populations, (2) determining consumption of budworms by birds, (3) life histories of important predaceous birds, and (4) predator-prey models.

Crow, Garrett E.; Graber, Raymond E. **Robbins' cinquefoil: can it survive?** Wild Flowers Notes, Spring: 4-5; 1982.
All who enjoy the alpine environment for its views, its flora and fauna, its geological features, and its physical challenges represent a significant threat to the survival of Robbins' cinquefoil. Because of a serious decline of the colony, the population must be monitored closely and trespassing must be minimized.

Cuppett, Donald G. **Power consumption and lumber yields for reduced-kerf circular saws cutting hardwoods.** Res. Pap. NE-505. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 6 p.
A 9 by 10 gage, 1/4-inch kerf saw and a 7 by 8 gage, 9/32-inch kerf saw were used for cutting matched samples of hardwood cants and bolts into pallet parts. The 1/4-inch kerf saw consumed about 15 percent less power than the 9/32-inch kerf saw. Product yield for the 1/4-inch kerf saw averaged 8 percent more than yield for the 9/32-inch kerf saw.

Cuppett, Donald G. **Uses and markets for hardwoods, 1980's and 1990's.** Consultant 27(3): 53-54; 1982.
During the 1980's and 1990's, uses and markets for hardwoods will increase steadily. The size and character of the market will largely depend on softwood supplies and availability, and on the rate of U.S. economic growth. Hardwood sawtimber supplies are sufficient to sustain a substantial increase in volume cut and some increase in log quality. Very large increases in demand would require increased utilization of intermediate cuttings from the poletimber and small sawtimber resource. Current utilization research and technological developments will enable greater use of small-diameter hardwoods, and thus increase opportunities for more intensive hardwood management.

Cuppett, Donald G.; Craft, E. Paul. **Low-grade log sawing rates for a mobile sawmill.** South. Lumberman 243(3025): 6-9; 1982.
A conventional mobile circular sawmill was evaluated for processing small hardwood logs and bolts. Net production rates (four-man crew) for Grade 3 logs averaged 2,329 board feet per day for 8- and 9-inch logs, and 2,710 board feet per day for 10- through 18-inch logs. Net production rates for bolts ranged from 2,361 to 3,007 board feet per day. Production rate per man-day for the mobile sawmill was 84 percent of the rate for a permanent circular mill, and 55 percent of the rate for a permanent band mill.

Curtis, Willie R. **Reclamation research needs in relation to Public Law 95-87.** In: Land-use allocation: processes, people, politics, professionals. Proceedings, 1980 convention of the Society of American Foresters; 1980 October 6-8; Spokane, WA. Washington, DC: Society of American Foresters; 1982: 70-76.
The increasing demand for coal as an energy source has led to a dramatic increase in surface mining. In response to the enactment of Public Law 95-87, the Surface Mining Control and Reclamation Act of 1977, surface mining and reclamation performance standards were developed. Mine operators need information to comply. Research is needed in geology, soil science, engineering, hydrology, microbiology, range science, forestry, and landscape architecture.

Czapowskyj, Miroslaw M. **Biomass response of hybrid poplar planted on a chipharvested clearcut as affected by cultural levels and fertilization.** In: Agronomy abstracts, 1981 annual meetings; 1981 November 29-December 3; Atlanta, GA. Madison, WI: American Society of Agronomy, Crop Sciences Society of America, Soil Science Society of America; 1981: 224.
To study biomass response of hybrid poplar to cultural levels and fertilization, unrooted cuttings of hybrid poplar clones NE-388 and NE-41 were planted on strongly acid spodosols. Five years after planting, sample trees were excavated and dry weights of tree components determined. For each component, least square regression equations defining the relationship between diameter at 15 cm aboveground and oven-dry biomass were developed. Biomass of all tree components and leaf surface area increased significantly on intensively cultured plots, compared

with extensively cultured plots. The effects of lime and fertilizer were much smaller.

Czapowskyj, Miroslaw M. **Response of a young black spruce stand to soil drainage, control of competition and fertilization.** In: Agronomy abstracts, 1982 annual meetings; 1982 November 28-December 3; Anaheim, CA. Madison, WI: American Society of Agronomy, Crop Science Society of America, Soil Science Society of America; 1982: 263.
The responses of a black spruce forest stand thinning, soil drainage, and fertilization were assessed. The experiment was established in 1963 and the responses measured after 15 years. Between 1957 and 1960, the mature forest was clearcut and the area regenerated to a thick stand of black spruce. Soils were sampled and stand responses measured. The response to thinning was dramatic. Thinning and soil drainage significantly affected the biomass, height growth, bole volume, and crown surface area. Fertilization did not affect stand performance.

Dale, Martin E. **Hardwood growth and yield projections—state of the art.** In: Proceedings, national silviculture workshop; 1981 June 1-5; Roanoke, VA. Washington, DC: U.S. Department of Agriculture, Forest Service; 1981: 87-88.
Explains how various growth and yield models are classified, the types of use, and some of the factors that should be considered in choosing a particular model for a specific objective.

Davidson, Walter H.; Sowa, Edward A. **Conifers growing on anthracite minesoils respond to fertilization.** In: Proceedings, 1982 symposium on surface mining hydrology, sedimentology and reclamation; 1982 December 5-10; Lexington, KY. Lexington, KY: University of Kentucky; 1982: 115-118.
Studies were conducted in Pennsylvania on anthracite minesoils and breaker refuse to examine the growth response of some planted conifers to (1) slow-release fertilizer and (2) granular fertilizer. Annual height growth was used to measure response. Species evaluated were Japanese larch, white spruce, and red, white, Scotch, and Austrian pines. All except the white spruce showed significant response to the treatments. However, the actual height differences were relatively small.

DeBald, Paul S. **Estimating timber stand values: A guide to treatment.** In: Proceedings, national silviculture workshop; 1981 June 1-5; Roanoke, VA. Washington, DC: U.S. Department of Agriculture, Forest Service; 1981: 237-247.
Timber management planning must meet a number of important tests: feasibility, productivity, acceptability, flexibility, and effectiveness. The test of effectiveness usually requires the estimation of timber stand values to compare economic benefits to economic cost. Because eastern hardwoods are so diverse, hardwood stand evaluations should consider differences in species, timber size, timber quality, and product potential. Stumpage values by species and log grade should be the minimum consideration.

DeBald, Paul S. **Small-farm woodlands: Other forest interests for small-scale agriculture.** In: Proceedings, special symposium, research for small farms; 1981 November 15-18; Beltsville, MD. Misc. Publ. 1422. Washington, DC: U.S. Department of Agriculture; 1982: 245-251.
Small-farm woodlands amount to more than 13 million acres, mostly in the East. Although most are not the best farming sites, many are good for growing timber. Most farmers probably own their forest land because it came with the farm. Although many hold their woodlands for their own use, few seem interested in growing timber; most seem more interested in nontimber outputs. Most have a consumer orientation to both the timber and nontimber outputs of their woodlands.

DeGraaf, R. M.; Rudis, D. D. **Forest habitat for reptiles and amphibians of the Northeast.** Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station and Milwaukee, WI: U.S. Department of Agriculture, Forest Service, Eastern Region; 1981. 239 p.
Twenty-five species and subspecies of amphibians and reptiles occur in the eight-state New England Planning Area of the Eastern Region, USDA Forest Service. This publication presents narratives of the life histories of these amphibian and reptile species and presents their habitats in the classification scheme used by the Eastern Region. Timbered and nontimbered habitats used for feeding and reproduction are presented in tabular form.

DeGraaf, R. M.; Wentworth, J. M. **Urban bird communities and habitats in New England.** In: Transactions, 46th North American wildlife and natural resources conference; 1981 March 21-25; Washington, DC. Washington, DC: Wildlife Management Institute; 1981: 396-413.
Avian communities differ in urban and suburban habitats, both in the breeding season and in winter. In the breeding season, bird density is more than 2.5 times greater than that in the suburbs, and 1.7 times greater in winter. The suburban bird community contains more species in both seasons--50 versus 19 in the breeding season and 28 versus 20 in winter.

DeGraaf, R. M.; Witman, G. M.; Rudis, D. D. **Forest habitat for mammals of the Northeast.** Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station and Milwaukee, WI: U.S. Department of Agriculture, Forest Service, Eastern Region; 1981. 182 p.
Sixty-five species of mammals inhabit the eight-state New England Planning Area of the Eastern Region, USDA Forest Service. This publication summarizes the natural history of each species in a narrative, including its special habitat requirements, and key literature references. Extensive tables present each species association with 11 forest types under even-age management, as well as with a wide range of nonforest habitats. Habitat uses for feeding and reproduction are differentiated, and primary habitats indicated.

Demeritt, Maurice E., Jr., ed. **Abstracts of 1st Region VI technical session.** Orono, ME: Maine Agricultural Experiment Station, University of Maine; 1982; Misc. Rep. 270. 8 p.
Presents abstracts of the Society of American Foresters March 1982 meeting, "Continuing education--practical information from research."

Demeritt, M. E., Jr. **What is the potential for hybrid poplar and pitch x loblolly pine hybrids in New England?** (Abstr.) In: Abstracts of 1st Region VI technical session. Orono, ME: Maine Agricultural Experiment Station, University of Maine; 1982; Misc. Rep. 270: 2.
Reviews the history of the hybrid poplar and pitch x loblolly pine programs at the USDA Forest Service, Northeastern Forest Experiment Station.

Denig, Joseph; Wengert, Eugene M. **Estimating air-drying moisture content losses for red oak and yellow-poplar lumber.** For. Prod. J. 32(2): 26-31; 1982.
Air-drying below an optimum moisture content results in excessive costs as a result of both increased inventory expenses and loss of quality. Industry has found it impractical to obtain MC readings of air-drying lumber on a regular basis. Includes an accurate means of estimating daily loss of moisture content from which regional air-drying calendars can be developed.

Dennis, Donald F. **Who's minding the store? Penn's Woods ownership varies.** Pa. For. 72(1): 4, 5, & 11; 1982.
Almost one-quarter of Pennsylvania's 15.9 million acres of commercial forest land is publicly owned and managed for a variety of uses. This is the largest proportion and acreage in public holdings in the Northeast. The remaining 12.5 million acres are privately owned by a myriad of individuals, corporations, and organizations. Characteristics and attitudes of these landowners are explored.

Dochinger, L. S. **Review of "Air pollution and forests" by William H. Smith.** J. For. 80(2): 112-113; 1982.
Smith has written a definitive book on the complex relationship between forest ecosystems and atmospheric deposition. It provides a comprehensive reference long needed by university and scientific communities and by forest managers.

Dochinger, L. S. **Air pollution impacts on forest trees: abiotic and biotic stress factors.** In: Alekseyev, V. A.; Martin, J.; Piin, T.; Nilson, E., eds. Interaction between forest ecosystems and pollutants. Proceedings of the first Soviet--American symposium on the Project 02.03-21. Tallinn: Academy of Sciences of the Estonian S.S.R.; 1982: 18-19.
World forests have evolved through the interaction of environmental stresses. Air pollution, a recent addition to these stresses, can be beneficial or injurious to forest ecosystems. It interacts with insects, diseases, and edaphic and climatic factors to bring about biological alterations in the forest. Little is known about these interactions, and research is urgently needed.

Dochinger, L. S. **Air pollution impact on forest trees: foliar responses.** In: Alekseyev, V. A.; Martin, J.; Martin, L. N.; Nilson, E.; Piin, T., eds. Interaction between forest ecosystems and pollutants. Part I. Tallinn: Academy of Sciences of the Estonian S.S.R.; 1982: 48-75.
Assaying foliar injury is a primary measure for determining the impact of air pollution on forest and tree plantings. Describes chronic and acute foliar symptoms and tolerance/sensitivity listings of coniferous and broad-leaved trees to the primary pollutants of sulfur dioxide, fluorides, and ozone. Research direction is proposed for further delineation of foliar symptomatology to facilitate estimations of economic losses, determining impacts on forest resources, and recommending control criteria for forest management.

Dyer, Kenneth L. **Stream water quality in the coal region of Alabama and Georgia.** Gen. Tech. Rep. NE-73. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 109 p.
Data collected in 1977-79 from 20 small streams that drain unmined watersheds and 38 that drain areas where coal has been surface mined include common ions, alkalinity, acidity, pH, 16 trace elements, 5 nitrogen and phosphorous species, specific conductance, suspended solids, turbidity, settleable matter, water temperature, and estimated discharge.
Available from: NTIS, Accession No. PB 83-124636, Cost $13.00.

Dyer, Kenneth L. **Stream water quality in the coal region of Eastern Kentucky.** Gen. Tech. Rep. NE-74. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 208 p.
Data collected in 1977-79 from 38 small streams that drain unmined watersheds and 86 that drain areas where coal has been surface mined include common ions, alkalinity, acidity, pH, 16 trace elements, 5 nitrogen and phosphorous species, specific conductance, suspended solids, turbidity, settleable matter, water temperature, and estimated discharge.
Available from: NTIS, Accession No. PB 83-112185, Cost $26.50.

Dyer, Kenneth L. **Stream water quality in the coal region of Ohio.** Gen. Tech. Rep. NE-75. Broomall, PA: U.S. Department of Agriculture. Forest Service, Northeastern Forest Experiment Station; 1982. 138 p.
Data collected in 1977-79 from 19 small streams that drain unmined watersheds and 50 that drain areas where coal has been surface mined include common ions, alkalinity, acidity, pH, 16 trace elements, 5 nitrogen and phosphorous species, specific conductance, suspended solids, turbidity, settleable matter, water temperature, and estimated discharge.
Available from: NTIS, Accession No. PB 83-119495, Cost $16.00.

Dyer, Kenneth L. **Stream water quality in the coal region of Pennsylvania.** Gen. Tech. Rep. NE-76. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 168 p.
Data collected in 1977-79 from 29 small streams that drain unmined watersheds and 57 that drain areas where coal has been surface mined include common ions, alkalinity, acidity, pH, 16 trace elements, 5 nitrogen and phosphorous species, specific conductance, suspended solids, turbidity, settleable matter, water temperature, and estimated discharge.
Available from: NTIS, Accession No. PB 83-124586, Cost $17.50.

Dyer, Kenneth L. **Stream water quality in the coal region of Tennessee.** Gen. Tech. Rep. NE-77. Broomall, PA: U.S. Department of Agriculture,

Gibson, Lester P. **Acorn floatation tests: are they effective.** (Abstr.) North Cent. Branch, Entomol. Soc. Am. Bull. March 1982.
Tests on northern red oak acorns showed conclusively that floatation is not a reliable method of separating viable northern red oak acorns from acorns that are infested with insects or otherwise damaged.

Gibson, Lester P. **Insects that damage northern red oak acorns.** Res. Pap. NE-492. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 6 p.
Insect damage to northern red oak acorns is extensive throughout the range of northern red oak, and greatly reduces the number of acorns available to produce seedlings and feed wildlife. Five species of Curculio weevils, three species of Conotrachelus weevils, two species of moths, and two species of gall wasps cause most of the damage.

Gibson, Lester P. **New species of Urosigalphus (Hymenoptera: Braconidae) from Mexico.** Proc. Entomol. Soc. Wash. 84(1): 97-101; 1982.
Describes two new species of the subgenus Neourosigalphus Gibson, and presents changes in the existing key to Mexican and Central American species.

Gibson, Lester P. **New species of Urosigalphus (Hymenoptera: Braconidae) from South America.** Proc. Entomol. Soc. Wash. 84(1): 167-176; 1982.
Describes five new species of Urosigalphus. One, diversus, is the first species of the subgenus Microurosigalphus to be collected in South America. One, alius, belongs to the subgenus Urosigalphus, and three, flexus, porteri, and surinamensis, belong to the subgenus Neourosigalphus. Presents changes in existing keys to South American species.

Godwin, Paul A.; Valentine, Harry T.; Odell, Thomas M. **Identification of Pissodes strobi, P. approximatus, and P. nemorensis (Coleoptera: Curculionidae), using discriminant analysis.** Ann. Entomol. Soc. Am. 75(6): 599-603; 1982.
Among the bark weevils of Eastern North America, Pissodes strobi (Peck), P. approximatus Hopkins, and P. nemorensis Germar have the greatest impact on the silviculture of conifers. They share a number of behavioral and morphological attributes that make their identification uncertain. Therefore, we made a discriminant analysis of eight morphological variables and one meristic variable on 97 insects of each species. We also developed linear discriminant functions to discriminate between P. strobi and P. approximatus, and between P. strobi and P. nemorensis.

Gottschalk, Kurt W. **Silvicultural alternatives for coping with the gypsy moth.** In: Proceedings of coping with the gypsy moth; 1982 February 17-18; University Park, PA. University Park, PA: The Pennsylvania State University; 1982: 137-156.
Discusses a number of possible silvicultural treatments and their ecological basis. The strategies of control are: (1) to alter habitat for the gypsy moth or its predators and parasites, and (2) to alter stand susceptibility and vulnerability. A decision tree chart for management recommendations is used to propose specific silvicultural treatments based on forest stand conditions and gypsy moth influences.

Gottschalk, Kurt W.; Marquis, David A. **Survival and growth of planted red and white ash as affected by residual overstory density, stock size, and deer browsing.** In: Muller, R. N., ed. Proceedings, 4th central hardwood forest conference; 1982 November 8-10; Lexington, KY. Lexington, KY: University of Kentucky; 1982: 125-140.
Underplanting seedlings can be used to regenerate areas that lack natural regeneration. In south-central Pennsylvania, large and small northern red oak and white ash seedlings that were protected or left unprotected from deer were planted under 100, 60, and 30 percent residual overstory density. After 7 years, survival was 58 percent for protected red oak seedlings and 85 percent for protected white ash. For unprotected seedlings, survival was 13 percent for red oak and 28 percent for white ash. The height of protected seedlings was 3.6 feet for red oak and 5.8 feet for white ash. The height of unprotected seedlings was 0.8 feet for red oak and 1.3 feet for white ash.

Graber, R. E.; Crow, G. E. **Hiker traffic on and near the habitat of Robbins' cinquefoil, an endangered plant species.** Durham, NH: New Hampshire Agricultural Experiment Station; 1982; Stn. Bull. 522. 10 p.
Outdoor recreationists have a negative impact on the last surviving colony of Potentilla robbinsiana Oakes. Hikers were observed to determine their numbers, characteristics, travel time, and motives. Ten percent disregarded warning signs, left the trail, and entered the endangered plant habitat. Trespass was most common during June when many of the alpine plants were in flower. Trespass usually occurred around noon and again in the evening.

Gregory, G. F. **Comparative Dutch elm disease therapy: pruning of symptomatic limbs following Arbotect 20-S and Lignasan BLP injection.** In: Proceedings, Dutch elm disease symposium and workshop; 1981 October 5-9; Winnipeg, MB. Sault Ste. Marie, ON: Canadian Forestry Service; 1981: 486-497.
Lignasan BLP and Arbotect 20-S were pressure injected into mature street-lawn American elms with 10 percent or less of the foliage symptomatic of Dutch elm disease. One to two weeks later, symptomatic limbs were removed and length, if any, of clearwood was measured. Up to 2 years after treatment, Lignasan BLP injection was slightly more effective than Arbotect 20-S.

Gregory, Garold F. **Dutch elm disease therapy of American elm by injection of Arbotect-20S and Lignasan-BLP.** (Abstr.) In: Proceedings, Dutch elm disease symposium and workshop; 1981 October 5-9; Winnipeg, MB. Sault Ste. Marie, ON: Canadian Forestry Service; 1981.
American elms lightly affected by Dutch elm disease were pruned of diseased limbs about 10 days after injection with either (1) high therapy dosage of Arbotect-20S, (2) same active ingredient dosage as (1) but of Lignasan-BLP, or (3) low dosage of Lignasan. Nearly 90 percent of the trees injected with either high dosage of Arbotect-20S or Lignasan-BLP were saved. About 75 percent of the elms injected with the low dosage of Lignasan-BLP were saved, but past studies suggest that most of this success is attributable to rapid, complete removal of diseased limbs.

Gunn, Cynthia M.; White, David E. **The trend of machinery prices and wages in the northeastern logging industry.** North. Logger 31(2): 22, 36, 38; 1982.

Presents the results of a study that developed the price trend of logging machinery and labor for the Northeast logging industry. The indexes developed are also compared with the Producer Price Index, prices of agricultural and construction machinery, and an all-manufacturing wage index.

Halverson, Howard G.; Cook, Robert N. **Long-term silviculture implications in urban forestry.** In: Craul, Phillip J., ed., Urban forest soils--a reference workbook; 1982 April 26-28; College Park, MD. Syracuse, NY: State University of New York College of Environmental Science and Forestry; 1982: 1-30.

Discusses benefits of long-term silvicultural management of urban trees. Considers the constraints, or stresses, that are placed on the trees, and presents one technique of management planning.

Halverson, Howard G.; DeWalle, David R.; Sharpe, William E.; Wirries, Dama L. **Runoff contaminants from natural and manmade surfaces in a nonindustrial urban area.** In: 1982 international symposium on urban hydrology, hydraulics and sediment control; 1982 July 27-29; Lexington, KY. Lexington, KY: University of Kentucky; 1982: 233-238.

Presents results of a study designed to determine the interactions of specific types of urban surfaces with acidic deposition from the atmosphere, and to quantify contributions from surfaces that are sources of given pollutants.

Halverson, Howard G.; Zisa, Robert P. **Measuring the response of conifer seedlings to soil compaction stress.** Res. Pap. NE-509. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 6 p.

Evaluation of several growth responses showed that root penetration depth was best related to soil compaction stress. Conventional measures such as seedling height were not well related to soil compaction level, but seedling height can be used to predict root penetration. Selecting the proper growth variable is an important step in any seedling study.

Heisler, Gordon M. **Reductions of solar radiation by tree crowns.** In: Proceedings, solar technologies conference and international exposition; 1982 June 1-5; Houston, TX. Killeen, TX: American Section of the International Solar Energy Society, Inc.; 1982: 133-138.

Information on the reduction of solar radiation in tree shadows is useful in designing landscapes for optimum passive cooling and heating, and is important for solar collector placement. Measurements of insolation in the open and in the shade of several medium-sized deciduous trees show that insolation reductions may vary with solar altitude and diffuse fraction of total radiation in the open. The effect of these variables on the ratio of irradiance on a horizontal surface in shade to irradiance in the open can be modeled by regression equations. Deciduous trees that reduced irradiance by up to 86 percent in summer reduced irradiance by up to 54 percent without leaves.

Heisler, Gordon M.; Schutzki, Robert E.; Zisa, Robert P.; Halverson, Howard G.; Hamilton, Bruce A. **Effect of planting procedures on initial growth of Acer rubrum L. and Fraxinus pennsylvanicum L. in a parking lot.** Res. Pap. NE-513. U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 7 p.

Survival of thirty-two 5-year-old red maple and green ash trees planted in holes in the asphalt cover of a large parking lot was 100 percent after 2 years. Fertilizer reduced growth of green ash planted bare root, but had little effect on bare-rooted red maples or trees of either species planted balled and burlapped. Bare-rooted red maples and unfertilized bare-rooted green ash generally grew better than corresponding balled and burlapped trees.

Helvey, J. D.; Kunkle, Samuel H.; DeWalle, David. **Acid precipitation: a review.** J. Soil and Water Conserv. 37(3): 143-148; 1982.

Topics addressed include time trends of precipitation and streamflow pH; effects of rapid snowmelt on stream pH and fish populations; effects of acid precipitation on terrestrial ecosystems; effects of natural hydrologic, topographic, and soil factors on stream pH; and some economic implications of reducing atmospheric pollutants.

Herrick, Owen W. **Hazard rating forest trees threatened with gypsy moth invasion.** In: Proceedings of coping with the gypsy moth; 1982 February 17-18; University Park, PA. University Park, PA: The Pennsylvania State University; 1982: 38-42.

Analyzes forest tree mortality in the gypsy moth outbreak of the early 1970's in northeastern Pennsylvania, and provides a structure for assigning mortality risks to individual trees based on species, crown condition, and site aspect.

Herrick, Owen W. **Production indexes for cooperative forestry's timber sales assistance.** North. Logger 30(10): 16, 17, 32; 1982.

Measures of timber product output per hour of timber sales assistance provide a vehicle for evaluating the range of change that might accompany policy changes or new approaches to assisting landowners. A "best case" scenario suggests that Cooperative Forestry's timber sales assistance can be important as a catalyst to mobilize others in the chain of events needed to increase future timber harvests.

Hilt, Donald E.; Dale, Martin E. **Effects of repeated precommercial thinnings in central hardwood sapling stands.** South. J. Appl. For. 6(1): 53-58; 1982.

Precommercial thinnings were repeated four times in a central hardwood sapling stand beginning at age 8 and ending at age 22. Treated plots were thinned on an area-wide basis to specified density levels of 30-, 50-, and 70-percent stocking. Results indicate that repeated areawide precommercial thinning to specified density levels is not an effective timber management alternative for hardwood sapling stands.

Hilt, Donald E.; Dale, Martin E. **Height prediction equations for even-aged upland oak stands.** Res. Pap. NE-493. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 9 p.

Presents a total tree height prediction equation for even-aged upland oak stands. Predicted tree heights follow a logical and consistent progression with increasing dbh, age, and site index.

Hornbeck, James W.; Kropelin, William. **Nutrient removal and leaching from a whole-tree harvest of northern hardwoods.** J. Environ. Qual. 11(2): 309-316; 1982.
Whole-tree harvesting of a northern hardwood stand in New Hampshire removed an average of 111 dry metric tons/ha of biomass, representing 96 percent of the aboveground total. Nutrient removal in harvested trees averaged 344 kg/ha for Ca, 242 kg/ha for N, 128 kg/ha for K, and 19 kg/ha for P. The harvest was carried out on the lower 40 percent of a 16-ha watershed. Concentrations of NO_3, Ca, and K in soil solution and streamflow of the harvested watershed increased for 1-1/2 to 2 years.

Hornbeck, J. W.; Martin, C. W.; Pierce, Robert S.; Likens, Gene E.; Eaton, John S.; Bormann, F. Herbert. **Impacts of even-age management on nutrients and hydrologic cycles of northern hardwood forests.** (Abstr.) Bull. Ecol. Soc. Am. 63(2): 158; 1982.
Summarizes two even-age management systems, progressive strip cutting and block clearcutting, that have been studied since 1970 on small watersheds at the Hubbard Brook Experimental Forest, New Hampshire.

Horsley, Stephen B. **Control of herbaceous weeds in Allegheny hardwood forests with herbicides.** Weed Sci. 29: 655-662; 1981.
Evaluates bromacil, glyphosate, picloram, simazine, and hexazinone at four application rates and five application dates for their ability to control seven herbaceous, forest ground covers without residual effects on black cherry seed stored in the forest floor, or on survival and growth of natural or planted black cherry seedlings.

Horsley, Stephen B. **Development of reproduction in Allegheny hardwood stands after herbicide-clearcuts and herbicide-shelterwood cuts.** Res. Note NE-308. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 4 p.
Presents preliminary results of an experiment comparing regeneration 3 years after herbicide-clearcuts and herbicide-shelterwood seed cuts. The amount of desirable hardwood reproduction was substantially greater in the shelterwood treatment than in the clearcuts. Clearcuts were dominated by black cherry, whereas shelterwood cuts contained nearly equal mixture of black cherry and red maple. The herbicide-shelterwood sequence appears to be more reliable than the herbicide-clearcut treatment in obtaining adequate reproduction of desirable species.

Houston, David R. **Some dieback and decline diseases of northeastern forest trees: forest management considerations.** In: Proceedings, national silviculture workshop; 1981 June 1-5; Roanoke, VA. Washington, DC: U.S. Department of Agriculture, Forest Service; 1981: 248-265.
Discusses several important dieback and decline diseases of northeastern forest trees with respect to their forest management relationships of cause, effect, and possible amelioration.

Houston, David R. **Chestnut blight—priorities for research.** In: Smith, H. Clay; MacDonald, William L., ed. Proceedings, USDA Forest Service American chestnut cooperators' meeting; 1982 January 5-7; Morgantown, WV. Morgantown, WV: West Virginia University; 1982: 218-225.
Outlines original objectives and assigns priorities for American chestnut research programs. Identifies gaps in existing knowledge inhibiting American chestnut research progress, and identifies areas where research progress would indicate a high probability of success and where future research efforts should be directed.

Houston, David R. **A technique to artificially infest beech bark with the beech scale, Cryptococcus fagisuga (Lindinger).** Res. Pap. NE-507. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 8 p.
Describes a technique using covers of polyurethane foam to initiate or enhance the development of local infestations of the beech scale on both seedlings and large trees.

Hoyle, Merrill C. **Economical and simple production of containerized hardwood seedlings.** Res. Pap. NE-500. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 12 p.
An automatic mat-watering system for growing hardwood seedlings in containers was designed and tested. Results were excellent with mat watering combined with simple, peat-vermiculite mixes, and pelleted, slow-release fertilizers. The system is economical, simple, and physiologically ideal. Mat watering was effective in growth rooms, controlled environment chambers, and greenhouses.

Huyler, Neil K. **The cost of thinning with a whole-tree chip harvesting system.** North. Logger 31(1): 8-9, 14, 28-29; 1982.
Presents the cost of thinning with a whole-tree chip harvesting system consisting of a feller-buncher, two grapple skidders, and a 22-inch chipper.

Jennings, Daniel T. **Observations on Olios fasciculatus Simon; a giant crab spider (Araneae:Sparassidae).** Southwest. Nat. 26: 437-439; 1981.

Jensen, Keith F. **Growth analysis of hybrid poplar cuttings fumigated with ozone and sulfur dioxide.** Environ. Pollut. 26: 243-250; 1981.
To measure the influence of air pollutants on the partitioning of photosynthate into leaves or stems and roots, softwood cuttings of a hybrid poplar clone were fumigated with either zero pollutants, 0.15 ppm ozone (O_3), 0.25 ppm sulfur dioxide (SO_2), or 0.15 ppm O_3 plus 0.25 ppm SO_2 for 12 hours a day for 7 weeks. Relative growth rate (K_W), relative leaf area expansion rates (K_A), and relative leaf weight growth rates (K_L) were calculated. Results indicated that even though total biomass was reduced by air pollutants, the proportion of total available photosynthate used in leaf growth remained nearly constant.

Jensen, Keith F. **Ozone fumigation decreased the root carbohydrate content and dry weight of green ash seedlings.** Environ. Pollut. 26: 147-152; 1981.
Thirty 1-year-old green ash seedlings were divided into two groups. The first group served as the control while

the second group was fumigated with 0.5 ppm O_3 8 hours a day for 5 days a week. The seedlings in the O_3 fumigation had reduced stem and leaf dry weight and there was significantly less starch, sucrose, and reducing sugar in the roots. The reduced root carbohydrate content may have resulted from the leaves of the fumigated seedlings not being able to meet the demands of the seedlings for carbohydrates.

Jensen, K. F. **Air pollution and vegetative growth of forest trees.** In: Alekseyev, V. A.; Martin, J.; Martin, L. N.; Nilson, E.; Piin, T., eds. Interaction between ecosystems and pollutants. Part I. Tallinn: Academy of Sciences of the Estonian S.S.R.; 1982: 116-131.
Discusses the techniques for determining the effects of pollutants on forest trees and the problems associated with such measurements. Results of studies on the effects of SO_2, oxidants, fluorides, and oxides of nitrogen on tree growth are presented. Also considered are the effects of pollutant mixtures on tree growth and development.

Jensen, K. F. **An analysis of the growth of silver maple and eastern cottonwood seedlings exposed to ozone.** Can. J. For. Res. 12(2): 420; 1982.
Silver maple and eastern cottonwood seedlings were treated with either 0.0, 0.1, 0.2, or 0.3 ppm O_3 for 12 hours a day for up to 60 consecutive days. Relative growth rate, relative leaf-area expansion rate, and relative leaf-weight growth rate declined with an increase in time and O_3 concentration. Net assimilation rate declined with time and with increase in O_3 concentration; specific leaf area and leaf-area ratio had no consistent trends.

Kaiser, Fred; Birch, Thomas; Lewis, Douglas. **New findings on private forest landowners.** Am. For. 88(7): 28-44; 1982.
A 1978 survey estimates that there are 7.8 million private forest-land ownerships. A majority of these ownerships are small parcels of 10 acres or less. About one-third of all private forest land is in corporate ownerships and most of this area is held by forest-based industries. The implications of this new information on the planning of forestry assistance programs are discussed.

Kendall, David M.; Jennings, Daniel T.; Houseweart, Mark W. **A large-capacity pheromone trap for spruce budworm moths (Lepidoptera:Tortricidae).** Can. Entomol. 114: 461-463; 1982.
Two types of large-capacity pheromone traps were designed and field tested for capturing male spruce budworm moths. In 1979, a bucket trap was designed and field tested; in 1980, the bucket trap was compared to a newly designed Kendall trap. Both traps use 70 percent ethanol and ethylene glycol to kill and preserve the captured moths. The Kendall trap is smaller, less costly, and easier to construct and transport than the bucket trap. The Kendall trap captured significantly more male moths than the bucket trap.

Kingsley, Neal P.; Powell, Douglas S. **Using resources evaluation data: the potential pitfalls.** In: In-place resource inventories: Principles & practices, proceedings of a national workshop; 1981 August 9-14; Orono, ME. Washington, DC: Society of American Foresters; 1982: 994-996.
Discusses pitfalls for the unwary user of present day resources evaluation inventories.

Kingsley, Neal P.; Spencer, John S., Jr. **Resources evaluation inventories in the North: what they are and what they can do.** North. Logger 31(5): 16-17, 31; 1982.
Explains why there is a Resources Evaluation program, what kinds of information Resources Evaluation can provide, the intended use of this information, and some uses for which the information was not intended.

LaPage, W. F. **Research problems in monitoring recreation trends.** In: Shaw, Joan, ed. Dispersed recreation and natural resource management: A focus on issues, opportunities and priorities; 1979 April 26-27; Logan, UT. Logan, UT: Utah State University; 1979: 13-20.
Discusses the research problems involved in monitoring outdoor recreation participation trends--problems of methods, meaning, measurement, and maintenance. The solution to such problems is to assess our deficiencies in these four areas and begin to correct them.

LaPage, Wilbur F. **$200 million in camper subsidies?** NCOA News February/March 1, 3; 1981.
Discusses results of the National Campground Owners Association's National Economic Survey, which reveals a basically healthy campground industry.

Leak, William B. **Review of "Overshoot: the ecological basis of revolutionary change" by William R. Catton, Jr.** J. For. 79(11): 756; 1981.
Reviews the main conclusions: (1) world population is well beyond the permanent carrying capacity; (2) there will be an inevitable crash in population and standards of living; (3) the crash will come about through conflict between factions competing for limited natural resources. Applications to forestry and conservation are suggested.

Leak, William B. **Habitat mapping and interpretation in New England.** Res. Pap. NE-496. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 28 p.
Recommendations are given on the classification of forest land in New England on the basis of physiographic region, climate (elevation, latitude), mineralogy, and habitat. Includes a habitat map for the Bartlett Experimental Forest in New Hampshire based on landform, vegetation, and soil materials. For each habitat or group of habitats, data are presented on stand composition, understory vegetation, biomass, volume, and diameter development by species.

Leben, C.; Shigo, A.; Hall, T. J. **A method for evaluating tree wound treatment.** Can. J. For. Res. 12: 115-117; 1982.
Wound closure and discoloration and decay are evaluated in one stem wound, which is separated into equal parts by a metal divider that provides treatment and control portions.

Leonard, R. E.; McBride, J. C. **Continuous line intercept system for measuring groundcover changes.** Recreation and Resour. Use Manage. Bull. 1(4): 4; 1981.
A modified point-intercept transect system was used on backcountry campsites and trails to measure baseline conditions and low-use impacts on groundcover. Based on a continuous sample intercept rather than discrete

points, this method provides more information (in addition to reducing field time) than the conventional sample-point system. Vegetation is recorded along the transect according to broad categories of ground cover such as moss matt, duff layer, and exposed organic soil; specific herbs that make up part of the ground cover are labeled.

Luppold, William G. **An econometric model of the hardwood lumber market.** Res. Pap. NE-512. U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 15 p.

A recursive econometric model is used to analyze the effects of wage rates, interest rates, stumpage price, lumber exports, and output prices on the production, demand, and price of hardwood lumber.

Lynch, James A.; Corbett, Edward S. **Increasing summer storm peakflows following progressive forest clearcutting.** In: Canadian hydrology symposium 82; 1982 June 14-15; Fredericton, NB. National Research Council of Canada; 1982: 561-574.

A 106-acre watershed was clearcut in three progressive stages: lower, middle, and upper slopes. Herbicides were applied to eliminate revegetation following the second and third cuttings to make comparisons between phases possible. Average summer storm peakflow increases over precutting levels ranged from 344 percent following the lower slope cut to 882 percent after the entire watershed was clearcut. Peakflows were consistently higher for all peakflow classes; the most pronounced changes occurred for the small to medium storms. Changes in peakflows were most evident the first summer following each cut.

McManus, Michael L. **The gypsy moth in the Northeast--an historical review.** In: Proceedings of coping with the gypsy moth; 1982 February 17-18; University Park, PA. University Park, PA: The Pennsylvania State University; 1982: 14-21.

Discusses significant changes in New England forests that have occurred in the past 150 years and how the gypsy moth was introduced at a time and in a situation that proved to be ideal for its establishment and multiplication.

McManus, Michael. **What is the state of the art on gypsy moth in New England?** (Abstr.) In: Abstracts of 1st Region VI technical session. Orono, ME: Maine Agricultural Experiment Station, University of Maine; 1982; Misc. Rep. 270: 3 p.

The gypsy moth defoliated over 12.8 million acres of woodland in 1981. Nine states requested Forest Service funds to spray over 1 million acres in 1982. Emphasis is being directed towards preventive measures such as integrated pest management, silvicultural prescriptions, and increased public education.

McManus, Michael L.; Riddle, Jane R. **The beast that ate the Northeast (and is still hungry).** Am. For. 88(6): 22-27, 60-63; 1982.

Presents an overview of the moth's damaging progress, and an assessment of the sometimes conflicting choice of control measures available to homeowners and communities.

Marquis, David A. **Even-age development and management of mixed hardwood stands: Allegheny hardwoods.** In: Proceedings, national silviculture workshop; 1981 June 1-5; Roanoke, VA. Washington, DC: U.S. Department of Agriculture, Forest Service; 1981: 213-216.

Most Allegheny hardwood stands contain at least two age classes as a result of the sequence of cuttings that led to their formation. The mixture of species with widely different growth rates and tolerance levels adds to the complexity of present stand structure. Some modifications of traditional even-age silvicultural techniques seem desirable to provide for more efficient management of these mixed hardwood stands.

Marquis, David A. **Hardwood silviculture and management systems: Modification for special objectives.** In: Proceedings, national silviculture workshop; 1981 June 1-5; Roanoke, VA. Washington, DC: U.S. Department of Agriculture, Forest Service; 1981: 77-87.

Numerous modifications to traditional silvicultural techniques can be used to improve their suitability for nontimber resources. Rotation length and stand structure goals can be set to provide more large trees and alter the distribution of size classes for wildlife or esthetics. Esthetic shelterwood, retention of residuals, and two-age management cutting can be used to reduce the visual impact of regeneration openings. Opening size, shape, and distribution can be altered to favor water yield, esthetics, or certain wildlife species.

Marquis, David A. **Management of Allegheny hardwoods for timber and wildlife.** In: Proceedings XVII IUFRO world congress, div. 1, forest environment and silviculture; 1981 September 6-17; Kyoto, Japan. International Union of Forestry Research Organizations; 1981: 369-380.

Describes management practices and techniques originally developed to ensure adequate seedling regeneration in the presence of a large deer herd. The key is providing so much deer food within the home range of the local herd that the deer cannot consume all of it, and some seedlings will escape to form the next stand. Control over the deer population is essential, but once it is achieved, these techniques will become an integral part of a coordinated management system for Allegheny hardwoods that should allow sustained high yields of both timber and deer.

Marquis, David A. **Effect of advance seedling size and vigor on survival after clearcutting.** Res. Pap. NE-498. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 6 p.

Survival of advance seedlings after clearcutting in Allegheny hardwood stands is a function of initial seedling size--larger seedlings survive best. Age, number of leaves, and leaf size were important determinants of survival. Advance seedlings that originated under a shelterwood canopy survived overstory removal much better than seedlings from an uncut stand. Therefore, the final removal cut of a shelterwood sequence can be made as soon as there are an adequate number of seedlings.

Marquis, David a. **Guidelines for evaluating regeneration before and after clearcutting Allegheny hardwoods.** Res. Note NE-307. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 4 p.

Use of the guidelines will enable selection of Allegheny hardwood stands most likely to regenerate successfully after clearcutting. The guides are based on how well before-logging criteria predicted success in a number of stands 5 years after cutting. Compared with earlier information, these guidelines recommend more small reproduction and higher quality, though fewer, stems of large reproduction. Guides to evaluate regeneration after cutting, based on both number and height of stems, are included.

Martin, C. W.; Hornbeck, J. W. **Revegetation of the northern hardwood forest following a block clearcutting and a progressive strip cutting.** (Abstr.) Bull. Ecol. Soc. Am. 63(2): 174; 1982.
In 1970, a 12-ha watershed in the northern hardwood forest of central New Hampshire was clearcut in a single block. At the same time, a progressive strip cutting was initiated on a neighboring 36-ha watershed. Revegetation and biomass were sampled on both watersheds either annually or biannually through 1980. Both stem counts and species composition changed dynamically during the first 10 years of revegetation.

Martin, C. Wayne; Noel, Diane S.; Federer, C. Anthony. **The effect of forest clearcutting in New England on stream-water chemistry and biology.** Durham, NH: University of New Hampshire, Water Resource Research Center; 1981; Res. Rep. No. 34.
Changes in stream chemistry following clearcutting were sought in 56 streams at 15 locations throughout New England. Streams draining clearcut areas were compared with nearby streams in uncut watersheds over periods of up to 2 years.

Maurer, Brian A.; McArthur, Laurence B.; Whitemore, Robert C. **Effects of logging on guild structure of a forest bird community in West Virginia.** Am. Birds 35(1): 11-13; 1982.

Mazzone, H. M.; Dubois, N. R.; Kluck, J. **Studies on the control of Dutch elm disease with biological agents or their metabolites.** In: Proceedings, Dutch elm disease symposium and workshop; 1981 October 5-9; Winnipeg, MB. Sault Ste. Marie, ON: Canadian Forestry Service; 1981: 36-45.
Strains of Bacillus thuringiensis induced for chitinase produced inhibition zones when reacted with the Dutch elm disease fungus. The fungus also was screened against a number of antibiotics. In appropriate concentration, Polymyxin B totally inhibited the fungus.

Merrill, Amanda, A., ed. **Volunteers in the backcountry (Proceedings);** 1982 May 26-28; Durham, NH. Durham, NH: University of New Hampshire; 1982. 219 p.

Montgomery, Daniel A.; Keown, Sarah L.; Heisler, Gordon M. **Solar blocking by common trees.** In: Proceedings, 7th national passive solar conference American solar energy society; 1982 August 29 to September 1; Knoxville, TN. 1982: 6 p.
Some passive solar design manuals suggest that radiation reduction by leafless trees is insignificant. While recent studies have shown this to be untrue, there is a need to discover how these trees would reduce solar radiation on surfaces (particularly south-facing walls) which receive reflected radiation from the ground. Results from pyranometer readings show significant solar radiation reduction by leafless trees. Snow cover had little effect on reduction percentages. Design conclusions: no trees should be planted within a "solar window" collection area for passive solar buildings, and the understory of mature trees should be pruned to allow solar penetration to the south wall in winter.

Montgomery, Michael E. **Life-cycle nitrogen budget for the gypsy moth, Lymantria dispar, reared on artificial diet.** J. Insect Physiol. 28(5): 437-442; 1982.
Lymantria dispar larvae were reared on a wheat-germ-based artificial diet from egg eclosion until pupation. Results suggest that need for N decreases relative to other diet constituents as the larva matures. While L. dispar is comparatively inefficient at assimilating dietary N, over one-half of the N assimilated by the female larva is transferred to egg production by the adult.

More, Thomas A. **What are the factors affecting the production and marketing of scientific information?** (Abstr.) In: Abstracts of 1st Region VI technical session. Orono, ME: Maine Agricultural Experiment Station, University of Maine; 1982; Misc. Rep. 270: 6.
A number of factors operate against the production of research with immediate applicability. These include a combination of institutional factors such as reward systems, promotion and tenure, and personal considerations. Understanding how these factors operate on scientists can help us encourage the production of useful research.

Nevel, Robert L., Jr.; Blyth, James E. **Pulpwood production in the Northeastern and North Central States in 1980.** North. Logger 30(11): 52, 96; 1982.
Twenty of the twenty-one Northeastern and North Central States produced a total of 14.6 million cords of pulpwood in 1980, up 3 percent from 1979. Seventy-eight percent of the pulpwood came from roundwood. Four-fifths of the pulpwood total came from Maine, New York, Pennsylvania, Michigan, Minnesota, and Wisconsin. Production from residue declined by nearly 4 percent, while the roundwood harvest rose by nearly 5 percent.

Nevel, Robert L., Jr.; Sochia, Everett L.; Wahl, Thomas H. **New York timber industries—a periodic assessment of timber output.** Resour. Bull. NE-73. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 30 p.
Reports the results of a survey of the timber industries of New York; contains statistics on industrial timber production and receipts, and production and disposition of the manufacturing residues. Comparisons are made with the most recent survey, and trends in industrial wood output are noted. Includes 18 statistical tables.

Nevel, Robert L., Jr.; Widmann, Richard H. **Pulpwood production and receipts in the Northeast, 1980: a statistical report.** Resour. Bull. NE-72. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 23 p.
A canvass of the pulpmills in the 14 Northeastern States reveals that from 1979 to 1980, total pulpwood production rose to nearly 8½ million cords and roundwood production to over 6 million cords; chipped residue production fell below 2½ million cords. Mill

receipts were 9.1 million cords—6.4 million in roundwood and 2.7 million in chips.

Northeastern Forest Experiment Station. **Sugar maple research: sap production, processing, and marketing of maple syrup.** Gen. Tech. Rep. NE-72. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 109 p.

Summarizes sugar maple research at the Northeastern Forest Experiment Station's George D. Aiken Sugar Maple Laboratory in Burlington, Vermont: (1) sap extraction and collection and management of the sugarbush; (2) genetic improvement of the sugar maple tree for sap-sugar production; (3) propagation and planting, including the rooting of sugar maple cuttings; (4) economics of maple sap and syrup production; and (5) the marketing structure of the maple syrup industry.

ODell, T. M.; Shields, K. S.; Mastro, V. C.; Kring, T. J. **The epiphysis of the gypsy moth, Lymantria dispar (Lepidoptera: Lymantriidae): structure and function.** Can. Entomol. 114: 751-761; 1982.

Describes the external structure, cellular structure, and function of the tibial epiphysis of the gypsy moth. Scanning electron micrographs and histological preparations indicate that the epiphysis of the male gypsy moth is an efficient antennal comb, but behavioral studies indicate it is not required for either precopulatory stimulation or for orientation to sex pheromones. The acanthae covering the inner surface of the epiphysis appear to have only a mechanical function.

Owe, Manfred; Craul, Phillip J.; Halverson, Howard G. **Contaminant levels in precipitation and urban surface runoff.** Water Resour. Bull. 18(5): 863-868; 1982.

Precipitation and resultant runoff were sampled for a series of storm events over 1 year. The test site was the parking lot of a large suburban shopping mall near Syracuse, New York. Both precipitation and runoff were tested for lead, zinc, copper, cadmium, and petroleum hydrocarbons. Substantial amounts were detected in each.

Patric, J. H.; Kidd, W. E., Jr. **Erosion caused by low-cost roads in the eastern forest.** In: Forest regeneration: Proceedings, 1981 symposium on engineering systems for forest regeneration; 1981 March 2-6; Raleigh, NC. ASAE Publ. 10-81. St. Joseph, MI: American Society of Agricultural Engineers; 1981: 22-28.

Patric, J. H.; Kidd, W. E., Jr. **Erosion on very stony forest soil during phenomenal rain in Webster County, West Virginia.** Res. Pap. NE-501. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982 13 p.

On July 15 and 16, 1979, at least 6 inches of rain fell in central West Virginia during 3 hours, a storm of return period longer than 1,000 years. More than 6 miles of logging roads were examined for evidence of soil erosion and sediment delivery to streams.

Patton, Roy L.; Garraway, Michael O. **Ozone injury and peroxidase activity in hybrid poplar leaves of different ages.** (Abstr.) Phytopathology 71(8): 899; 1981.

Leaves from 12-week-old rooted cuttings of hybrid poplar clone NE-50 were examined for necrotic injury and peroxidase activity following fumigation with ozone. Results showed that ozone-induced necrosis in young leaves of hybrid poplar is preceded by an increase in peroxidase activity.

Peacock, J. W. **Citywide mass trapping of Scolytus multistriatus with multilure.** In: Proceedings, Dutch elm disease symposium and workshop; 1981 October 5-9; Winnipeg, MB. Sault Ste. Marie, ON: Canadian Forestry Service; 1981: 406-426.

Mass trapping for the suppression of populations of the smaller European elm bark beetle, and the reduction of Dutch elm disease incidence has been evaluated in citywide programs in Colorado, Illinois, and South Dakota that include relatively large areas and large numbers of elms. Despite the trapping of millions of beetles and the probable alteration of their distribution within the test areas, there was no evidence that mass trapping affected Dutch elm disease rates. There was no indication that eliminating potential parent beetles affected the size of the next generation.

Peacock, John W.; Cuthbert, Roy A.; Lanier, Gerald N. **Deployment of traps in a barrier strategy to reduce populations of the European elm bark beetle, and the incidence of Dutch elm disease.** In: Mitchell, Everett R., ed. Management of insect pests with semiochemicals. New York: Plenum Press; 1981: 155-174.

Describes the research program on the pheromone of the European elm bark beetle. Emphasizes current status of studies to determine the efficacy of applying the pheromone-trapping system to manipulate elm bark beetle populations and reduce Dutch elm disease in an integrated disease control program.

Peters, Penn A. **Cable logging problems and approaches in the Eastern United States.** In: Proceedings, seminar of planning and technique of transport and its relation to operational activity in forestry, IUFRO; 1982 June 17-22; Sandefjord, Norway. International Union of Forestry Research Organizations; 1982: 157-175.

Cable yarders currently in use in the Eastern United States range from large to small. Cable yarders are a potential replacement for skidders, forwarders, and crawler tractors, which had combined sales of 1,724 units in the North Region in 1980. In the Eastern United States, the greatest potential market for the small yarder is in areas with steep terrain.

Phillips, Ross A.; Peters, Penn A.; Falk, Gary D. **The weak link HP-41C hand-held calculator program.** Res. Pap. NE-510. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 12 p.

Describes a hand-held calculator program that quickly analyzes a system for logging production and costs. The program models conventional chain saw, skidder, loader, and tandem-axle truck operations in eastern mountain areas. The program calculates production of each function of the logging system from user-supplied input. System production equals the lowest production of any function--the weak link. Costs of each function are calculated to obtain logging costs in dollars per thousand board feet.

Plass, William T. **Organic and inorganic amendments affect vegetation growth on an acidic minesoil.** Res. Pap. NE-502. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 7 p.
Shredded hardwood bark, composted municipal waste, and a tannery waste were applied to an acidic minesoil. Supplemental inorganic amendments including fertilizer, agricultural lime, and an alkaline waste from an SO_2 scrubber system were applied alone and in combination with the organic amendments. Treatment comparisons were based on vegetation response and chemical and physical characteristics of the minesoil after treatment. Organic amendments are not required for establishing vegetation, though some reduced the time required to produce an acceptable cover.

Plumley, Harriet J., moderator. **The spectrum of volunteer activities II: research and environmental monitoring.** (Summary). In: Merrill, Amanda A., ed. Proceedings, volunteers in the backcountry; 1982 May 26-28; Durham, NH. Durham, NH: University of New Hampshire; 1982: 156-157.
A summary of panel discussions on the use of volunteers to collect hiker information in the backcountry, volunteer success in natural resource management at an Appalachian Mountain club camp in New Hampshire, a volunteer operated hiker self-registration system, and volunteers' contributions to field research.

Potts, Donald F.; Herrington, Lee P. **Drought resistance adaptations in urban honeylocust.** J. Arboric. 8(3): 75-80; 1982.
Morphologic and physiologic drought stress-resistance adaptations of honeylocust were evaluated. Small boundary layer resistances, leaf folding, wilting, small stomata, low stomatal densities, and even premature senescence provide the species with more xeric ecological amplitude. However, the species exhibits extremely poor stomatal control over excess water use. Advected sensible heat drives excess evapotranspiration, resulting in long periods of low plant-water potentials. This, in turn, probably results in metabolic imbalance, loss of carbohydrate reserves, reduced vigor, and early mortality.

Powell, Douglas S. **Resource evaluation I.** Pa. For. Resour. 86: 1-4; 1982.
Forest surveys in Pennsylvania were conducted in 1955, 1965, and 1978. Each survey used a two-stage sampling design that included thousands of points on statewide aerial photograph coverage and a subsample of hundreds of ground plots. A brief description of the sampling scheme and objectives is given for each of the three surveys.

Powell, Douglas S. **Resource evaluation II.** Pa. For. Resour. 87: 1-4; 1982.
Highlights are given for some of the important results of the most recent (1978) forest resource inventory of Pennsylvania conducted by Resources Evaluation, USDA Forest Service. Values and benefits of nontimber forest resources are discussed. The survey also identified many opportunities for forest management.

Powell, Douglas S. **A solution for resolving conflicts between land use and land cover inventories.** In: In-place resource inventories: principles & practices, proceedings of a national workshop; 1981 August 9-14; Orono, ME. Washington, DC: Society of American Foresters; 1982: 665-668.
Land use inventories for resources such as forest land, rangeland, and wetland often contain areas of overlap that prevent useful comparison or aggregation. A solution to this problem is presented whereby the same land cover classification is applied to each land use inventory by a flexible matrix approach.

Powell, Douglas S.; Barnard, Joseph E. **Gypsy moth's impact on the timber resource.** In: Proceedings of coping with the gypsy moth; 1982 February 17-18; University Park, PA. University Park, PA: The Pennsylvania State University; 1982: 72-83.
Describes the impact on timber supplies from gypsy moth outbreaks. Concludes that there is no need to panic and that the impact on future timber supplies is not yet of major consequence.

Powell, Douglas S.; Considine, Thomas J., Jr. **An analysis of Pennsylvania's forest resources.** Resour. Bull. NE-69. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 97 p.
A comprehensive analysis of the current status and trends of the forest resources of Pennsylvania. Topics include forest area, timber volume, biomass, timber products, timber's role in the state's economy, growth, and removals. Forest area, volume, growth and removals are projected through 2008. A detailed treatment is given to water, soil, minerals, fish, wildlife, and recreation as they relate to forest resources. Also identified are forest management opportunities for increasing the production of major forest resources and enhancing the benefits derived from Pennsylvania's forests.

Rast, E. **Where has all the volume gone?** Plywood and Panel World 23(10): 16-18; 1982.
Volume is lost during the process of converting veneer logs into usable or salable products. To be economically competitive, this loss must be minimized, and we must know where in the conversion process the loss occurs. Traces the logs path through the veneering process and identifies the areas and volume of loss.

Rast, Everette D. **Photographic guide of selected external defect indicators and associated internal defects in northern red oak.** Res. Pap. NE-511. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 20 p.
To properly classify or grade logs or trees, one must be able to correctly identify defect indicators and assess the effect of the underlying defect on possible end products. This guide aids the individual in identifying the surface defect indicator and shows the progressive stages of the defect throughout its development. It describes and illustrates eight types of external defect indicators and associated defects that are particularly difficult to evaluate.

Rea, James; Barnard, Joseph; Brann, Thomas. **Digitizing photo interpretation points for future sample unit determination in decennial forest re-evaluation.** In: In-place resource inventories: principles & practices, proceedings of a national workshop; 1981 August 9-14; Orono, ME. Washington, DC: Society of American Foresters; 1982: 817-820.
Digitizing photo interpretation points makes forest survey data more useful to a variety of users. The

photo interpretation points were located to ± 100 meters with a Talos digitizer. About one-third of the land area in the state was digitized at a cost of $0.002 per acre.

Rees, F. M. **Dehydrated maple syrup.** J. Food Sci. 47(3): 1023-1024, 1026; 1982.
Selected grades of maple syrup (34 percent moisture) were dehydrated by two dissimilar methods. Differences in color and flavor of reconstituted dried products and the maple syrups from which they were derived were minimal. This study indicates that either of the dehydrated products would provide the maple industry with a new and useful product. The lower moisture content, greater weight per unit volume, and method of continuous manufacture make the patent product preferable.

Reid, C. P. P.; Haeskaylo, E. **Evaluation of plant response to inoculation.** In: Schenck, N. C., ed. Methods and principles of mycorrhizal research. St. Paul, MN: American Phytopathological Society; 1982: 175-187.

Rexrode, Charles O. **Bionomics of the peach bark beetle Phloeotribus liminaris (Coleoptera: Scolytidae) in black cherry.** J. Georgia Entomol. Soc. 17(3): 388-398; 1982.
The seasonal history and habits of the peach bark beetle were studied in 76 black cherry trees in northern Ohio during 1978-80. Female beetles made the initial entry into the trees and only one female and male occupied each egg gallery. The period of attack per tree ranged from 5 to 17 days, and the density of attack ranged from 2 to 41 galleries per 1,000 cm^2 of surface area. Over 50 percent of the parent adults reemerged after egg gallery construction and oviposition. The egg stage was from 7 to 110 days, the larval stage from 25 to 332 days, the pupal stage from 17 to 181 days, and the adult stage from 7 to 215 days. The beetles overwintered in the adult and larval stages. Spring emergence began about May 11, 1979, and about May 6, 1980. Two generations occurred each year.

Rexrode, C. O.; Auchmoody, L. R. **Glaze-damaged black cherry.** Pa. For. 72(3): 8-9; 1982.
In 1936, a severe glaze storm damaged trees on 6 million acres on the Allegheny Plateau. Black cherry was damaged more than any other species because of its dominant position and coarse branchy crown. Nearly 60 percent of the 2,180 black cherry trees in the 21- to 40-year age class that were examined had top breakage; 41 percent had severe damage. In 1982, the extent of top rot in the damaged black cherry was determined. Results showed that major top rot has not developed since 1936. Decay from severe upper stem damage during the storm has progressed slowly during the past 46 years.

Reynolds, Hugh W.; Gatchell, Charles J. **New technology for low-grade hardwood utilization: System 6.** Res. Pap. NE-504. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 8 p.
Small-diameter (7.6 to 12.5 inches) low-grade hardwoods can be converted to high-valued end products with System 6. Among its concepts are: (1) a new, nonlumber product called standard-size blanks; (2) highly automated methods of converting the logs to blanks; (3) total processing of every board that contains a minimum-size cutting; and (4) minimized machine operator decisions and limited choices. Presents details of System 6 technology.

Rishel, Gregg B.; Lynch, James A.; Corbett, Edward S. **Seasonal stream temperature changes following forest harvesting.** J. Environ. Qual. 11(1): 112-116; 1982.
Exposing headwater streams to direct solar radiation by removing forest cover could cause drastic changes in streamwater temperature regimes. This study evaluated the maximum potential impacts and the effectiveness of management practices used to control these detrimental effects.

Rothwell, Frederick M.; Vogel, Willis G. **Mycorrhizae of planted and volunteer vegetation on surface-mined sites.** Gen. Tech. Rep. NE-66. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 12 p.
Records the mycorrhizal status of a number of plant species collected on orphan surface-mined sites and adjacent unmined sites, and on artificially planted surface-mined sites in eastern Kentucky and Tennessee.

Rowntree, Rowan A. **Mapping vegetation in highly urbanized areas.** In: In-place resource inventories: principles & practices, proceedings of a national workshop; 1981 August 9-14; Orono, ME. Washington, DC: Society of American Foresters; 1982: 758-765.
The urban forest system comprises three levels of intensity and density of interaction between vegetation and urban processes: city, suburban, and exurban. For mapping the highly urbanized city subsystem, a homogeneous area approach is satisfactory for a preliminary overview of structure. This can be accomplished by organizing the information into cells for analysis or management manipulations, or both. Procedures for realizing the capabilities of multispectral remote sensing are now being investigated and tested. The state-of-the-art of urban forest inventory and mapping is still immature.

Rowntree, Rowan A. **Review of "The self-managing environment" by Alan Roberts.** Ann. Assoc. Am. Geogr. 72(2): 290-292; 1982.

Rowntree, Rowan, A. **Evolutionary and cyclical change as fundamental attributes of the estuary.** In: Smardon, R.C., ed. The future of wetlands: assessing visual-cultural values. Totowa, NJ: Allanheld, Osmun; 1983: 119-145.
A dynamic interpretation of wetlands provides a richer and more valid picture of the landscape than visual analysis of static qualities. Estuaries are excellent candidates for this approach because they are visually dynamic at both short-term cyclical and long-term evolutionary scales.

Rowntree, Rowan A.; Sanders, Ralph A. **The urban forest resource.** Albany, NY: New York State Department of Environmental Conservation; 1982; N.Y. State For. Resour. Assess. Rep. No. 13. 99 p.
Discusses the structure and function of the urban forest in relation to land uses in the city, suburbs, and the exurban agricultural forest-island zone. Reports the current status of the urban forest resource, the current status of stewardship, and the future of the urban forest.

Safford, L. O. **Correlation of greenhouse bioassay with field response to fertilizer by paper birch.** Plant and Soil 64: 167-176; 1982.

Describes a bioassay technique that, with further refinements and observations on a larger number of sites, should be a valuable tool for estimating potential response to fertilizer by young paper birch in the field, and for ranking the relative productivity of different soils.

Safford, L. O. **Intensive management of paper birch—how to do it.** (Abstr.) In: Abstracts of 1st Region VI technical session. Orono, ME: Maine Agricultural Experiment Station, University of Maine; 1982; Misc. Rep. 270: 3.

The supply of paper birch lags behind demand driving up prices. Because of its fast growth and high value in small sizes, paper birch can be intensively cultured more profitably than any other hardwood in the region. Intensive culture starts at a young age and continues throughout the rotation. Frequent observations of stand conditions are used to prescribe applications of silvicultural treatments.

Sanders, Ralph A. **Geographical themes in urban forestry research.** In: Smith, Christopher J., ed. Proceedings, Middle States division Association of American Geographers; 1981 October 16-17; Rochester, NY. Albany, NY: State University of New York; 1981: 75-79.

Urban forestry, viewed both as a research concept and as an on-the-ground practice, is an increasingly important theme in federal, state and local public policy. Its significance stems from the impacts of urban vegetation on property values and local tax bases, environmental quality, energy savings, and urban esthetic qualities. Little is known of the configurations of urban vegetation beyond their association with land use patterns, and needs for urban geographical description and explanatory theory are evident. Interest in urban forestry persists because it offers achievable environmental goals for the urban locality, a theme also of relevance to applied geography.

(Sanders, Ralph A.) **Urban forestry research.** AAG Newsletter 16(8): 19; 1981.

Briefly describes research of the Northeastern Forest Experiment Station in cooperation with the SUNY College of Environmental Science and Forestry at Syracuse.

Sanders, Ralph A. **Managing for species diversity in city-owned trees.** Syracuse, NY: SUNY College of Environmental Science and Forestry; 1982; Urban Forester's Notebook, Suppl. No. 5. 13 p.

Maintaining high levels of species diversity in tree populations that are managed by city governments helps guard against catastrophic losses. Present conditions tend to promote biological simplification in these populations. A method for measuring diversity levels and changes in diversity which result from management actions is outlined and applied to the street trees of Syracuse, New York.

Sarles, Raymond L.; Rutherfoord, J. Penn. **Converting small industrial boilers to burn wood fuels.** Res. Pap. NE-508. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 10 p.

Investigates the engineering and economic feasibility of retrofitting two small industrial boilers for firing green wood fuels. Subjects covered include: fuel requirements and costs; availability, storage, and handling of wood fuels; designs; specifications; stack emissions; cost estimates; and economic feasibility. The economics of boiler conversion projects are heavily dependent on annual savings in fuel costs. Analyses of variables affecting annual fuel savings determined that the boiler utilization rate and the price of fuel oil had the greatest impact on the economic feasibility of this project.

Scott, Charles T. **Plot configurations in the East for multiresource purposes.** In: In-place resource inventories: principles & practices, proceedings of a national workshop; 1981 August 9-14; Orono, ME. Washington, DC: Society of American Foresters; 1982: 379-382.

Presents seven characteristics of plot configurations. Includes examples of plot designs from several public and private organizations which conduct multiresource surveys in the Eastern United States. Discusses general guidelines for designing cost-effective plot configurations for multiresource surveys.

Scott, Charles T.; Alerich, David J. **How will the New England States benefit from the new and improved USFS statewide inventories scheduled for the '80's?** (Abstr.) In: Abstracts of 1st Region VI technical session. Orono, ME: Maine Agricultural Experiment Station, University of Maine; 1982; Misc. Rep. 270: 6.

An extensive data base will be available in 1985 for resource planners in the New England States who need information on soils, land area, land management, timber, wildlife habitat, socioeconomic, and ecologic factors. These data supplement the resource bulletins published for each state.

Seegrist, Donald W.; Arner, Stanford L. **Mortality of spruce and fir in Maine in 1976-78 due to the spruce budworm outbreak.** Res. Pap. NE-491. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 3 p.

The spruce budworm population in Maine's spruce-fir forests has been at epidemic levels since the early 1970's. Spruce-fir mortality in 1976-78 is compared with predictions of what mortality would have been had the natural mortality rates remained at the levels experienced before the budworm outbreak. It seems that mortality of spruce and fir has increased 2½-fold since the 1960's; that is, 60 percent of the mortality can be attributed to the budworm outbreak.

Seliskar, Carl E.; Wilson, C. L. **Yellows diseases of trees.** In: Maramorosch, K., Raychaudhuri, S. P., eds. Mycoplasma diseases of trees and shrubs. New York: Academic Press; 1981: 35-96.

Summarizes many of the yellows diseases of trees reported as having been caused by mycoplasmas and fastidious bacteria. Excluded from consideration are sandal spike, lethal yellowing of palm, citrus stubborn and greening diseases, paulownia witches'-broom, and mulberry dwarf, which are reviewed in other chapters of the volume.

Sendak, Paul E.; Huyler, Neil K.; Garrett, Lawrence D. **Lumber value loss associated with tapping sugar**

maples for sap production. Res. Note NE-306. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 4 p.
Tapping sugar maples for sap production yields an annual income, but there is a loss in timber quality if the tree is cut for factory lumber products. The average loss per tree is $2.87 based on a sample of 90 trees in Vermont that were formerly tapped.

Shigo, Alex L. **Dutch elm disease: a CODIT perspective.** In: Proceedings, Dutch elm disease symposium and workshop; 1981 October 5-9; Winnipeg, MB. Sault Ste. Marie, ON: Canadian Forestry Service; 1981: 151-167.
A CODIT perspective of Dutch elm disease focuses on the elm tree and its defense system—compartmentalization. Insects and Ceratocystis ulmi interact until energy reserves of the tree are so reduced that compartmentalization no longer functions. Then the insects and fungus spread rapidly into living, but defenseless tissue, and reproduce.

Shigo, Alex L. **Injections and injury.** In: Proceedings, Dutch elm disease symposium and workshop; 1981 October 5-9; Winnipeg, MB. Sault Ste. Marie, ON: Canadian Forestry Service; 1981: 483-485.
Discusses proper injection techniques for trees. Proper injections cause little injury to the tree; improper injections cause serious injury to the tree.

Shigo, Alex L. **Cabling & bracing: how to minimize internal injury.** Arbor Age 2(1): 16-19; 1982.
Offers suggestions for proper cabling and bracing. Focus is on the internal problems rather than on the actual placement of cables and other hardware.

Shigo, Alex L. **A pictorial primer for proper pruning.** For. Notes 148: 18-21; 1982.
Proper pruning is the best thing you can do for your tree; improper pruning is the worst thing you can do to your tree. Much of what is done to some trees cannot be dignified by calling it pruning. Trees are equipped with a full set of "instructions;" the task of researchers is to learn how to "read" these instructions.

Shigo, Alex L. **Tree decay in our urban forests: what can be done about it?** Plant Dis. 66(9): 763-768; 1982.
Describes how a tree responds to injury and infection. Maintenance programs must be developed to make certain that trees receive proper care long after they are planted.

Shigo, Alex L. **Tree health.** J. Arboric. 8(12): 311-316; 1982.
A nontechnical discussion for the arborist on what a tree is and how it responds after injury and infection. The more we know about trees, the more we can help them help themselves after injury and infection.

Shigo, Alex L. **Trees: How they build up & break down.** In: Trees, sixty years toward the future. Crawley, Sussex, UK: The Men of the Trees; 1982: 57-69.
A general discussion for the arborist on how trees are constructed, how they respond to injury and infection, and how they eventually break down. Information is given on how to prevent and treat injuries in trees.

Shigo, Alex L. **Trees resistant to spread of decay associated with wounds.** In: Proceedings, 3rd international workshop on genetics of the host parasite interactions in forestry; 1980 September; Wageningen, The Netherlands. Wageningen, The Netherlands: Centre for Agricultural Publishing and Documentation; 1982: 103-109.
Discusses results of several experiments that show that individual trees of a species can wall off injured and infected wood more effectively than others. Wounding experiments on several tree species indicate that compartmentalization is under moderate to strong genetic control.

Shigo, Alex L. **Wood decay.** In: Encyclopedia of science and technology. 5th ed. New York: McGraw-Hill; 1982: 680-683.
Describes a complex series of orderly events involving the living tree, chemical reactions, bacteria, yeasts, nondecay-causing fungi, and decay-causing fungi. A tree responds to infection in an orderly way by compartmentalizing the infected wood. Many microorganisms are involved in the infection process. Survival of a tree after wounding depends on rapid and effective compartmentalization of the infection. Survival of wood-inhabiting microorganisms after a tree responds to the injury depends on successions.

Shigo, Alex L.; Dudzik, Kenneth. **Chestnut blight: defense reactions.** In: Smith, H. Clay; MacDonald, William L., ed. Proceedings, USDA Forest Service American chestnut cooperators' meeting; 1982 January 5-7; Morgantown, WV. Morgantown, WV: West Virginia University; 1982: 65-67.
Anatomical studies showed that chestnut trees can set boundaries to resist the spread of infected bark and wood. Where portions of cambium remained alive after infection, xylem rays expanded into the bark and wood formed.

Shigo, A. L.; Wilson, C. L. **Wounds in peach trees.** Plant Dis. 66(10): 895-897; 1982.
Fifty-six disks cut at random from the stumps of 880 Elberta peach showed evidence of 131 wounds. The trees had been pulled because of poor production. Discolored and decayed wood associated with the wounds was compartmentalized according to the CODIT (Compartmentalization Of Decay In Trees) model for tree decay. There was a significant correlation between percentage of noninfected area of disk and width of sapwood. Data suggest that the multiple wounds played a role in reducing tree vitality.

Shortle, Walter C. **Decaying Douglas-fir wood: Ionization associated with resistance to a pulsed electric current.** Wood Sci. 15(1): 29-32; 1982.
Examines the relationship among changes in electrical resistance, moisture content, and concentration of soluble positive ions during developmental stages of a white rot and a brown rot of Douglas-fir sapwood and heartwood.

Shortle, Walter C. **Using space-age technology to determine tree quality.** In: Proceedings, 10th annual hardwood symposium of the Hardwood Research Council; 1982 May 12-15; Cashiers, NC. Asheville, NC: Hardwood Research Council; 1982: 92-94.
During the past decade, our ability to evaluate tree quality has been improved by a simple model that

explains how decay columns form in living trees, and an electronic tool that detects wood altered by the decay process. The model, called CODIT, helps the tree manager develop a "mind's eye view" of what is happening inside a living tree. The tool, called the Shigometer®, helps confirm or modify that view.

Smith, H. Clay. **Managing central Appalachian hardwood stands.** In: Proceedings, national silvicultural workshop; 1981 June 1-5; Roanoke, VA. Washington, DC: U.S. Department of Agriculture, Forest Service; 1981: 185-195.
Central Appalachian hardwood stands are extremely variable and complex. Stands contain a variety of tree age classes and species with different growth rates and silvical characteristics. Management practices for immature and sawlog-size stands are discussed.

Smith, H. Clay. **Normal hardwood silvicultural and management systems—eastern hardwoods.** In: Proceedings, national silvicultural workshop; 1981 June 1-5; Roanoke, VA. Washington, DC: U.S. Department of Agriculture, Forest Service; 1981: 66-76.
Discusses silvicultural cutting methods used in the eastern hardwoods for even-age and uneven-age management. These methods include clearcutting, shelterwood, and seed tree for even-age management and individual-tree selection for uneven-age management.

Smith, H. Clay. **USDA Forest Service cooperative research chestnut program 1978 to 1982.** In: Smith, H. Clay; MacDonald, William L., ed. Proceedings, USDA Forest Service American chestnut cooperators' meeting; 1982 January 5-7; Morgantown, WV. Morgantown, WV: West Virginia University; 1982: 14-17.
Cooperators in the USDA Forest Service American chestnut hypovirulent research program are identified. From 1978 to 1982 there have been eight cooperators engaged in 15 studies. Approximately $400,000 have been obligated for this Federal cooperative research effort.

Smith, H. Clay; Lamson, Neil I. **Number of residual trees: a guide for selection cutting.** Gen. Tech. Rep. NE-80. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 33 p.
Describes marking trees for removal by an individual-tree selection cutting. The number of desirable residual trees is computed for given ranges of residual basal areas, largest diameter trees to grow, and q-values. Included are guidelines for applying this selection cutting practice.

Smith, H. Clay; MacDonald, William L., eds. Proceedings, USDA Forest Service American chestnut cooperators' meeting; 1982 January 5-7; Morgantown, WV. Morgantown, WV: West Virginia University; 1982. 229 p.
Summarizes research programs on the American chestnut. Discusses current status of five selected research topics relating to hypovirulence: vegetative compatibility, cultural studies, host-parasite interactions, molecular aspects, and dissemination of hypovirulence.

Solomon, Dale S. **Identification of hybridization in Betula.** In: Proceedings, 7th North American forest biology workshop "Physiology and genetics of intensive culture;" 1982 July 26-28; Lexington, KY. Lexington, KY: University of Kentucky; 1982: 197-202.
Three species of birch and their hybrids were classified by using leaf, seed, and bract variables in a discriminant analysis. Leaf variables classified intraspecific crosses correctly and placed hybrids near the mean of the female parent. Seed and bract variables classified intraspecific crosses correctly and placed hybrids between the means of the intraspecific crosses. The application of the discriminant equations on individual crosses with known chromosome numbers provides one method of progeny comparison.

Solomon, Dale S. **Spruce budworm impact on the spruce-fir forest of Maine: an integration of spatial information systems.** In: In-place resource inventories: principles & practices, proceedings of a national workshop; 1981 August 9-14; Orono, ME. Washington, DC: Society of American Foresters; 1982: 1046-1050.
Forest managers have developed information systems for monitoring both budworm population levels and the resulting damage to the forest resource. Permanent plots have been measured by timber type to provide data on the growth response of spruce-fir and spruce-fir-hardwood stands in both sprayed and nonsprayed areas. Merging spray histories from topographic grid maps, defoliation and egg-mass samples located on fire control grids, and random permanent plots distributed on ownership maps result in different classification systems and mapped locations. Although significant relations were not found, the integration of this data-base information by the Universal Transverse Mercator System provided a common point location for a continuous means of comparing insect damage, growth, and mortality in Maine's spruce-fir forest.

Solomon, D. S.; Kenlan, K. W. **Discriminant analysis of interspecific hybridization in Betula.** Silvae Genet. 31(4): 136-145; 1982.
Three species of birch and their hybrids, were classified with the use of leaf, seed, and bract variables in a discriminant analysis. Intraspecific crosses were classified correctly using leaf variables, and hybrids were placed close to the mean of the female parent. Seed and bract measures correctly classified intraspecific crosses and placed hybrids between the means of the intraspecific crosses. The application of our equations to data from other studies indicated that intraspecific crosses and hybrids from those studies will be classified correctly with our discriminant equations.

Sonderman, David L. **A remote camera system to observe the growth and quality changes of a developing stand.** Res. Note NE-309. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 3 p.
Describes the use of a remote 35-mm data-recording camera to observe daily the growth and quality development of a 27-acre clearcut.

Stringer, Jeffrey W.; Powell, Douglas S. **Kentucky's hardwood resource.** J. For. 80(8): 485; 1982.
Today, forests occupy about half of the land area of Kentucky, the distribution being concentrated in the mountainous eastern portion. Hardwoods dominate

overwhelmingly among many species growing on a diversity of sites. Oaks and hickories are the most important timber species. They are discriminated against by partial cutting--essentially high-grading--that favors shade-tolerant species such as American beech and sugar maple. Volume growth is good, with growing stock accruing 2.5 times as fast as it is being removed. Improved management and utilization would markedly increase the hardwood resource and the volume and quality of timber that could be drawn from it.

Talerico, R. L. **Reviewers comments.** In: Hedden, R. L.; Barras, S. J.; Coster, J. E., tech. coord. Hazard-rating systems in forest insect pest management: symposium proceedings; 1980 July 31-August 1; Athens, GA. Gen. Tech. Rep. WO-27. Washington, DC: U.S. Department of Agriculture, Forest Service; 1981: 169.
An examination of the various hazard-rating systems reveals many common elements. A great number of systems are still being developed for major pests and only a few have been validated. When possible, hazard-rating schemes for several pests should be combined so that savings in time and manpower can be achieved. Output information should be in terms that are meaningful to the forest manager.

Talerico, Robert L. **Introduction to an entomology-pathology working group technical session on: progress toward development of an integrated pest management system for southern forestry.** In: Increasing forest productivity: proceedings, 1981 SAF convention; 1981 September 27-30; Orlando, FL. Washington, DC: Society of American Foresters; 1982: 174.
Opening address defines integrated pest management.

Thorud, David B. **Interior west watershed management symposium - a wrap-up and future research needs.** In: David M. Baumgartner, ed. Proceedings, Interior west watershed management symposium; 1980 April 8-10; Spokane, WA. Pullman, WA: Washington State University; 1981: 283-288.
Research needs in watershed management include hydrologic modeling and prediction, management for water yield and quality, nonpoint-source pollution, nutrient status and site productivity, management of riparian zones, restoration of disturbed land, municipal and industrial waste disposal, and other topics. Research planning processes and the potential applications of computer technology to natural resources management and research are briefly discussed.

Tilghman, Nancy G.; Rusch, D. H. **Comparison of line-transect methods for estimating breeding bird densities in deciduous woodlots.** In: Studies in avian biology No. 6. Santa Barbara, CA: Cooper Ornithological Society; 1981: 202-208.
Compares the relative bias, sample variance, and cost of 12 line-transect methods used to estimate the density of 10 breeding bird species in woodlots of south-central Wisconsin. Estimates provided by all transect methods were fairly precise; estimates from only three methods gave coefficients of variation of more than 40 percent. These coefficients varied more among species than among methods.

Tippett, J. T.; Shigo, A. L. **Barrier zone formation: a mechanism of tree defense against vascular pathogens.** IAWA Bull. 2(4): 163-168; 1981.
Barrier zones of axial parenchyma were common in sapwood of trees that had recovered from vascular infections. They were a consistent feature in a representative sample of vascular wilt diseases caused by Ceratocystis ulmi, C. coerulescens, Verticillium albo-atrum, and Fusarium oxysporum.

Townsend, A. M.; Dochinger, L. S. **Relative sensitivity of pine species to ozone.** J. Arboric. 8(7): 186-188; 1982.
Seedlings of Pinus banksiana, P. parviflora, P. ponderosa, and P. sylvestris showed the most foliar injury to ozone fumigation at 20 and 30 parts per hundred million (pphm) during an 8-hour day, 70-day period. Pinus aristata and P. strobus showed the least injury, and were most tolerant. P. nigra, P. strobiformis, and P. thunbergii were moderately tolerant but sustained some injury. P. sylvestris was the only species that showed more than 10 percent injury at 10 pphm. P. sylvestris and P. banksiana fumigated with 30 pphm showed a significant reduction in survival in the year following fumigation.

Tritton, Louise M.; Hornbeck, James W. **Biomass equations for major tree species of the Northeast.** Gen. Tech. Rep. NE-69. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 46 p.
Reviews literature on biomass, and lists 178 sets of published equations for 25 species common to the Northeastern United States. On the basis of these equations, estimates of aboveground oven-dry weight of trees from 2.5 to 50.0 cm dbh for each species are presented.

Tsomides, Leonidas; Gibbs, K. Elizabeth; Jennings, Daniel T. **Species of Odonata feeding on Lepidoptera in spruce-fir forests of Maine.** Orono, ME: University of Maine, Life Sciences and Agricultural Experiment Station; 1982; Res. Life Sci. 30(1): 12 p.
The objectives of this study were to determine the species of Odonata associated with spruce-fir forests of Maine and to determine by gut-content analysis the prey of adult Odonata, with special emphasis on identifying remains of the spruce budworm.

Valentine, Harry T. Comment on "**Stand and site conditions related to southern pine beetle susceptibility**" by Ronald J. Kushmaul, Michael D. Cain, Charles E. Rowell, and Richard L. Porterfield. For. Sci. 27(3): 504; 1981.
Kushmaul and others (For. Sci. 25: 656-664; 1979) exceeded the usual limits of discriminant analysis with an ad hoc ranking procedure which used discriminant scores to define a susceptibility continuum. This procedure does not seem appropriate, especially in view of the uncertain susceptibilities of the stands in the original sample.

Valentine, H. T.; Podgwaite, J. D. **Modeling the role of NPV in gypsy moth population dynamics.** In: Proceedings, 3rd international colloquim on invertebrate pathology; 1982 September 5-10; Brighton, England. New York: Academic Press; 1982: 353-356.

A model of gypsy moth abundance consisting of eight coupled differential equations was developed to evaluate the effects of a nucleopolyhedrosis virus on gypsy moth population dynamics. The assumptions and rationale of the model are discussed. Particular emphasis is given to the viral transmission process.

Vogelmann, H. W.; Leonard, R. E. **Effects of fertilizer on alpine vegetation in the Green Mountains of Vermont**. Recreation Resour. Manage. Bull. 2(2): 21-22. 1982.
Applications of N-P-K fertilizer were made over a 3-year period on areas subjected to hiker damage in selected alpine communities in the Green Mountains of Vermont. Fertilization noticeably improved plant vigor. Vegetative cover over bare ground increased at the same rate on both fertilized and unfertilized plots throughout each growing season. The increases in percent vegetation coverage on heavily fertilized plots were not significant after seasonal growth was taken into account. Expensive and difficult applications of fertilizer to repair extensively damaged alpine vegetation may not be necessary when protection alone achieves significant results.

Wallin, Walter B.; Whitenack, Kenneth R. **Joint separation resistance—the first step in estimating pallet durability**. Pallet Enterp. 1(2): 22-25; 1982.
The first step in designing durable pallets is to use fasteners that contribute to longer life and lower cost of use. Fastener quality is measured in holding power based on the physical characteristics of the fastener. Joint quality is measured in deckboard-stringer separation resistance based on fastener quality in conjunction with specific gravity and moisture content of the wood materials, and on the depth of penetration of the fastener into the stringer or block.

Wallin, Walter B.; Whitenack, Kenneth, R. **Pallet joint shear resistance—the F(2) factor**. Pallet Enterp. 1(4): 20-21; 1982.
The ability of pallets to absorb stresses imposed in the course of handling and shipping operations can be measured in terms of the total joint shear resistance for all joints in the pallet. This is influenced by the wire diameter and the stiffness, or MIBANT angle, of the fasteners, by the specific gravity, thickness, and moisture content of the deck materials, and by the number of fastener couples.

Wallin, Walter B.; Whitenack, Kenneth R. **Pallet performance ratings as measured by joint separation resistance**. Pallet Enterp. 1(3): 21-25; 1982.
Pallet quality is measured by the efficiency of the fastening system and by the quality of the wood materials. Discusses joint separation resistance, which is used to measure the efficiency of the joints between the stringers or blocks and the deckboards.

Wallner, William E. **Forest Service research--Recent results and future plans**. In: Proceedings, 1981 national gypsy moth review; 1981 December 8-10; Cherry Hill, NJ. Trenton, NJ: New Jersey Department of Agriculture; 1982: 46-48.
Presents results of microbial insecticides, parasites, predators, larval behavior and sampling, gypsy moth nutrition and stand susceptibility, sterile and partially sterilized male technique, and future plans.

Wallner, William E. **Gypsy moth population dynamics**. In: Proceedings of coping with the gypsy moth; 1982 February 17-18; University Park, PA. University Park, PA: The Pennsylvania State University; 1982: 4-10.
Discusses the puzzling situation of the population dynamics of the gypsy moth in North America, and the complexity and variability of the gypsy moth life system.

Wallner, William E.; Weseloh, Ronald M.; Grinberg, Phyllis S. **Intrinsic competition between Apanteles melanoscelus (Hym.: Braconidae) and Rogas lymantriae (Hym.: Braconidae) reared on Lymantria dispar (Lep.: Lymantriidae)**. Entomophaga 27(1): 99-103; 1982.
In the laboratory, competition was determined between Apanteles melanoscelus Ratzeburg and Rogas lymantriae Watanabe by rearing both in the same gypsy moth hosts. Each parasite attacked larvae previously parasitized by its competitor. Neither parasite was excluded by the action of the other, but those that attacked first were more successful. Of 600 competitive interactions tested, only one gypsy moth larva yielded both parasite species. Percentage of parasitism was not significantly reduced, which suggests that A. melanoscelus and R. lymantriae are intrinsically compatible and that establishment of R. lymantriae in the United States could provide an additional benefit for gypsy moth control.

Walters, Russell S. **Sugarbush management and sap production**. Maple Syrup J. 4: 23-24; 1981.
Managing a sugarbush improves sap production efficiency and profit potential by increasing sap volume and sweetness. Individual-tree sap yield increases as crown size and growth rate respond to additional growing space. Selected crop trees should be vigorous, well formed, free of defect, and have sap above average in sweetness. A procedure is provided for testing a sugarbush for sweetness and selecting for thinning.

Walters, Russell S. **Conifer understory removal benefits maple sugarbush**. Maple Syrup Dig. 22(2): 26-28; 1982.
Sap and maple syrup equivalent production increased after a coniferous understory was removed from a sugarbush in northwestern Vermont. These increases, which became apparent the sixth year after treatment, were 14 and 17 percent for sap and syrup, respectively. Open sugarbush yields were used as the control in the analysis to indicate the influence of weather conditions in each sapflow season. Understory removal also stimulated growth of the overstory maple trees.

Walters, Russell S. **Tapholes close slowly**. Maple Syrup Dig. 22(3): 17-21; 1982.
Two years after drilling, half of the warm-day tapholes were fully closed with callus tissue. By contrast, only 5 percent of those drilled on the cold day were closed. After 3 years, the number of closed warm-day tapholes had increased to 80 percent, and only about 25 percent of those made on the cold day had closed. These differences are statistically significant. In neither the second nor the third year was there a significant difference in closure between power- and hand-drilled tapholes.

Walters, Russell S.; Yawney, Harry W. **Installation of pipeline correctly.** Maple Syrup Dig. 22(3): 25-28; 1982.
Collecting maple sap with an improperly installed pipeline may result in dark, low-grade syrup. We compared the grades of syrup made from sap collected by several techniques: properly and improperly installed tubing, galvanized buckets with covers, and a special aseptic tree tapping and sap collecting procedure.

Walton, Gerald S.; Lewis, Franklin B. **Spruce budworm core B.t. test—1980, combined summary.** Res. Pap. NE-506. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 12 p.
Compares results and critiques the experimental design, spray operation, and data collection procedures for two commercial preparations of B.t. that were applied aerially under the auspices of CANUSA-East.

Wargo, Philip M. **Defoliation-induced changes in tree roots favor infection by Armillaria mellea.** In Proceedings, 30th annual Western international forest disease work conference; 1982 September; Fallen Leaf Lake, CA. Fort Collins, CO: Colorado State University; 1982: 29-33.
Defoliation induces chemical changes in root tissues. Describes the changes that occur and their influence on the growth of Armillaria mellea. A hypothesis on how roots are predisposed to infection by A. mellea is proposed.

Wartluft, Jeffrey. **Air drying Appalachian hardwoods.** Wood 'N Energy 2(1): 37-38; 1982.
Appalachian hardwoods were tested for effects of variables--two types of exposure, three cover types, splitting, two stacking methods, nine species, and three lengths--on firewood seasoning. Individually treated piles replicated 5 times were weighed monthly for 1½ years. To have acceptable moisture control (about 20 percent, wet basis) in October, firewood should be seasoned at least 4 months earlier. To completely season, cut wood to length, split, and stack off the ground and under cover with open sides. In this study, moisture control, wet basis, of seasoned firewood decreased from 38 to 20 percent. A solar firewood dryer can be used to double the rate of drying in the summer.

Wartluft, Jeffrey L.; Sarles, Raymond L. **Fuelwood thinning—a marginal operation in West Virginia study.** North. Logger 30(12): 16-17, 28-29; 1982.
Production rates and costs were determined for chain saw felling and for log skidding with two machines--a small crawler and a small, wheeled tractor--on a thinning job in mountainous terrain. Estimated harvesting costs ranged from $28 to $33 per cord at the woods landing. Current prices for fuelwood in the central Appalachians allow little, if any, margin above these costs for operator profit. However, more efficient operators with lower labor and machine costs might be able to break even or turn a profit on similar cuttings in mountain hardwoods.

Wendel, G. W.; Kochenderfer, J. N. **Glyphosate controls hardwoods in West Virginia.** Res. Pap. NE-497. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 7 p.
Applications of Roundup, a glyphosate, by mistblower were effective in controlling hay-scented fern, blackberries, and some tree, shrub, and herbaceous species on an experimental watershed in West Virginia. Damage to Norway spruce was slight at rates of 1, 2, and 3 quarts per acre (0.75, 1.50, and 2.25 pounds per acre of the acid glyphosate). A variety of hardwood species was killed following injections of 20 or 50 percent solution of Roundup at a rate of 1.5 ml per incision. The cuts were spaced at 1.5 inches, edge to edge, around the stem near groundline. Resprouting of the treated hardwoods was minimal after 2 years.

Wharton, Eric H. **Recovery of aboveground biomass in Ohio, 1978.** Res. Note NE-310. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station; 1982. 6 p.
Timber-use studies in Ohio show that multiproduct harvesting could be improved. The recovery rate from these operations, expressed as a ratio of the merchantable stem biomass estimate, is 103 percent. Although current methods of multiproduct harvesting have improved recovery of the merchantable stem, an estimated 1,539,000 fresh tons of total residual biomass were left unused in 1978. Modifications of present multiproduct harvesting systems could increase the recovery of aboveground biomass.

Wilkinson, Ronald C. **Will western white pine replace eastern white pine in New England?** (Abstr.) In: Abstracts of 1st Region VI technical session. Orono, ME: Maine Agricultural Experiment Station, University of Maine; 1982; Misc. Rep. 270: 2.
In the most recent comparison of western white pine and eastern white pine, weevils killed the leaders of western white pines only 13 percent as frequently as they killed the leaders of eastern white pines in the same 10-year-old test plantation. The outlook for successful plantations of western white pine in areas of the Northeast with high weevil populations is promising, but the adaptability of this species to growing conditions and susceptibility to other insects and diseases in the Northeast has not been widely tested.

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A summary report on highlights of research activities and accomplishments of the Northeastern Forest Experiment Station in 1982, including an annotated list of publications.

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Headquarters of the Northeastern Forest Experiment Station are in Broomall, Pa. Field laboratories are maintained at:

- Amherst, Massachusetts, in cooperation with the University of Massachusetts.
- Berea, Kentucky, in cooperation with Berea College.
- Burlington, Vermont, in cooperation with the University of Vermont.
- Delaware, Ohio.
- Durham, New Hampshire, in cooperation with the University of New Hampshire.
- Hamden, Connecticut, in cooperation with Yale University.
- Morgantown, West Virginia, in cooperation with West Virginia University, Morgantown.
- Orono, Maine, in cooperation with the University of Maine, Orono.
- Parsons, West Virginia.
- Princeton, West Virginia.
- Syracuse, New York, in cooperation with the State University of New York College of Environmental Sciences and Forestry at Syracuse University, Syracuse.
- University Park, Pennsylvania, in cooperation with the Pennsylvania State University.
- Warren, Pennsylvania.