

REVIEWS

Practical Forestry in the Hudson Highlands. By Henry H. Tryon. *Black Rock Forest Bul. 12.* 50 pp. Cornwall, N. Y., 1943. \$1.

This publication will have a tonic effect on many readers, not because of any new silvicultural techniques advanced or imposing array of evidence to support the conclusions reached, but because of the author's unusually thoughtful approach to developing a sound system of forestry practice for his locality. After seventeen years of intensive experimental treatments and close observation of results in the Black Rock Forest, a privately owned tract located in the Hudson River Highlands, Tryon has arrived at the conclusion that "By far the wisest, the most effective, and the least expensive management policy is to work to improve the natural timber stands." He has found that conifer plantations "... are almost invariably a venture of doubtful value," and attributes the oftentimes hasty and indiscriminate resort to planting by others to "... a curious lack of basic ecological knowledge. . ." He maintains that an understanding of local forest-cover types and their place in the successions is the key to successful forest management.

Having set his sights under the basic philosophy of working in harmony with natural tendencies, the author goes back over his years of observation and experience to piece together the ecological complex of the local forests and to outline, provisionally, "... what now appear to be the generally sound management practices. . ." In brief, his aim is the gradual establishment, through judicious cutting, of well-stocked stands of near-climax or climax composition. This requires, of course, a knowledge of how the present types differ from the original, for the various sites and exposures.

The four original cover types tentatively identified range from red and white oak, hemlock, sugar maple, and basswood mixtures in the coves and on lower slopes to dry-site oaks (scrub, scarlet, and chestnut), pitch pine, and red cedar on the exposed upper slopes and ridge tops. In

between, on the midslopes, red oak, sugar maple, white oak, and hickory predominated. White pine is believed to have occurred but scatteringly. A classification of the local tree species according to pioneer, secondary, near-climax, and climax status is presented, followed by a description of sixteen recognized present-day cover types. Incidentally, it is pleasing to read that chestnut shows some evidence of slowly winning its fight against the blight.

Present stands in the Black Rock Forest are characteristically evenaged, poorly stocked mixtures of sprout origin running strongly to the oaks, for the reason that "... nearly every single exploitable acre of the tract has been cut hard (and usually well burned as well) at some time during the past 80 years." Thus the change from the original to the present stands has been towards greater uniformity in form and age, lowered density of stocking and poorer tree quality and, apparently, a somewhat increased proportion of species, such as the oaks, that are favored by repeated clear cutting. Presumably, trees of the more exacting species, such as sugar maple, basswood, yellow poplar, and white ash, were originally more plentiful. But the differences in composition between the major past and present types are not yet sufficiently clear to justify any one course of conversion treatments, or sufficiently great to warrant any drastic changes in the present composition. Back of this lies the fact that much of area concerned has comparatively poor soils and slow growth; and changes in composition caused by heavy cutting are milder and slower than in areas of more fertile soil. In the case of the out-and-out temporary cover types on abandoned fields (which occupy relatively little area), differences in composition are, of course, more marked.

The general plan of management recommended is to remove the present poor stands by a series of shelterwood cuttings (called thinnings by the author) for the purpose of establishing a dense natural reproduction of the near-climax or climax species for the site. The author prop-

erly prefers the near-climax composition as the goal, since, with man-made rotations and frequent cuttings to improve the stand and to remove merchantable products, it is not believed practicable (or profitable) to establish the climax. Even so, Tryon wavers occasionally in adherence to his basic philosophy, being swayed by considerations of present relative commercial values of the different species.

Great stress is laid on making the reproduction cuttings light. Heavy cuttings, instead of encouraging the preferred species, almost invariably bring in the less desirable. It is in the discussion of the practical application of silviculture to the sixteen present cover types that the author is most at home. A wealth of useful information is given on the degree and timing of cuttings, supplementary seed spotting, and tending the new crop. An appendix contains hints on sowing forest-tree seed, including methods of seed storage over winter. A glossary of forestry terms is added for the benefit of the layman.

Foresters and ecologists will miss the tables and illustrations which usually lend support to such studies; they may question the status assigned to certain species with respect to successional stages (e.g., yellow poplar and black birch); some may even question the basic premise that the present major cover types differ substantially in composition from the original ones. However, this bulletin was written primarily for the use of the layman woodlot owner in the Hudson Highlands region, and it fulfills its mission of giving him a sound basis on which to start forestry on his own land—a guide to building up a productive growing stock. Great good will come through promoting the idea that forestry begins with the forest, that in the improvement of existing wild growing stocks—in composition, density, and quality—lies the greatest promise of profit for the owner.

A. C. CLINE,
War Production Board.



Reproductive Habits of Douglas Fir. By Leo A. Isaac. 107 pp. Illus. *The Charles Lathrop Pack Forestry Foundation, Washington, D. C.* 1943.

For a quarter of a century Leo Isaac has believed that silvicultural research consists of reading the record of the forest itself. *Reproductive Habits of Douglas Fir* is a handsome documenta-

tion of that belief. Here are few personal theories, but instead a lucid, objective record of what has happened on the ground.

The major divisions of the publication indicate its scope: seed supply; seedling establishment; Douglas fir regeneration as affected by climate, soil, cover, and grazing; effect of slash burning on restocking; seed-tree mortality; and silvicultural treatment to obtain Douglas fir regeneration. Most of the information presented on each of these topics is a compilation of results read from sample plots well scattered over western Washington and Oregon. Additional intensive studies were made at the Wind River and Cascade Head Experimental Forests, and in the Tillamook burn. The basic data of these plots and studies are presented in many tables and charts, and are illustrated by a number of appropriate, significant pictures.

The following facts were established: Douglas fir produces seed abundantly, with complete seed-crop failures only every fourth or fifth year. Mature trees produce on the average about a pound of seed in a good year, but much of the seed is destroyed by various agents, such as high surface-soil temperatures, spring frosts, summer droughts, winter frost heaving, diseases, insects, and animal predators. Shade offsets some of these inimical factors.

"Dead shade" (from slash and debris) is more favorable than shade from living vegetation because it does not compete with the seedling for plant food and moisture. Seedlings grow very little the first three or four years, which is a vital factor in their inability to overtop the competing vegetation. Seedlings in light weed shade grew much faster than seedlings in heavy brush cover. The competition of mature timber is such that Douglas fir reproduction will not thrive in less than half of full overhead light.

Decrease in precipitation and increase in isolation occur from north to south in the fir region, making reforestation more uncertain in the southerly portions of the territory.

Fire adversely affects regeneration, particularly by decreasing the moisture-holding capacity of surface soil. Unburned cutover areas in general show more Douglas fir reproduction than burned areas; but occasionally burned areas restock as quickly as unburned. Reburning often results in barren areas. Mortality of individual seed trees left after logging is variable, and high,

especially after slash burning. Burning tends to favor Douglas fir regeneration over that of its associates, but can prove to be a limiting factor for all. Where exigencies of protection or excessively heavy cover or debris dictate, the slash should be burned; otherwise not.

Recommendations for provision of a seed source closely parallel those suggested in the *Forest Practice Handbook* of the West Coast Lumbermen's and Pacific Northwest Loggers Associations. To obtain medium stocking in 6 to 8 years after logging it is thought that, on the average, 8 pounds of seed to the acre are necessary. The average annual production per tree is considerably less than one pound.

In partial-cutting operations where more than half of the overhead light or growing space is available, or with complete opening of an acre or more, Douglas fir should dominate its more tolerant competitors, but less than this is likely to eliminate Douglas fir in favor of hemlock, cedars, and the balsam firs.

The book is a foundation for silviculture in the Douglas fir region. It provides the needed information for management under the various phases of clear cutting. If the studies appear to be inadequate in the selective-cutting field, it is only because selective cutting is still in its infancy. This forest practice will expand, and as it does so, selective-cutting research must be continued and expanded. If the Douglas fir forests of tomorrow are to have well-stocked stands of the most desirable species for each particular site, forest practices must be based on the facts. Isaac has made a good beginning in getting at the silvicultural facts of selective cutting. A casual, uninformed approach to selective cutting can convert magnificent fir forests into low-grade forests of less desirable species.

To sum up, conditions within the Douglas fir region are so varied that simple, specific rules cannot be set forth for securing regeneration over large areas; but careful study of the local factors will produce more satisfactory reproduction than has been obtained in the past.

The patient, painstaking efforts that went into these investigations are evident in the thorough detail with which the pertinent factors are discussed. The conclusions are a summation of evidence, not opinion, and for this reason will weigh heavily with those whose business it is to reproduce Douglas fir. Except for the lack of an index, the presentation leaves nothing to be desired.

The ring of authenticity all the way through the book will appeal to foresters. This is no academic research, but a long step ahead in the practical management of Douglas fir forests. The surest guarantor of this fact has been the insistent demand of Northwest lumbermen that these findings be made available to them. As Colonel Greeley says in his foreword, "It should be in the hands of every forest owner in the Pacific Northwest." The reviewer heartily concurs.

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Forestry and Paper. 34 pp. Illus. P. H. Glatfelter Co., Paper Manufacturers, Spring Grove, Pa. 1943.

This is a primer on forest conservation carrying the forestry creed: "Timber is a crop. It grows—serves—and grows again. Grow trees to serve America today and tomorrow." This publication is the third in a series relating to the manufacture of paper. The other two are: *A Short Course in Paper Making* (1939) and *Paper and Its Performance* (1941). It complements the first two in presenting the forest as the source of the essential paper-making material—cellulose fiber. Within the last two years, woodusing industries have published a number of bulletins or pamphlets, nearly all of which have been arresting in their composition and have had public appeal in their narration.

Forestry and Paper is as appealing in its format as any that this reviewer has seen. The illustrations are well chosen and in themselves tell the story of silviculture, management, and utilization. Industry has an obvious motive in making such publications available. Foresters concede the worthwhileness of the effort and can assist in capitalizing it by individually seeing that publications such as this are placed in the hands of those who will read and preach.

Forestry and Paper will appeal to those young in mind, regardless of years. It should be in schools and on reading tables and will, as stated as one of its objectives, ". . . leave the reader with a keen appreciation of the great wealth that exists in our forests."

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Pathology in Forest Practice. By Dow V. Baxter. 618 pp. *Illus.* John Wiley and Sons, Inc., New York. 1943. \$4.75.

Dow Baxter has attempted to bring together the bulk of the information available on the influence of injuries and disease on silviculture and utilization, and also gives attention to the care of ornamental trees. He has done a good job. His book has several features that will appeal to foresters and other tree growers. A minimum of space is devoted to mycology, pathological anatomy, fungus physiology, and other of the less applied phases of pathology, so that broader coverage may be given to the use of pathological information in raising timber.

The book takes up the role of pathology in the nursery, plantation, and forest, in shade tree culture, and in the handling of forest products and the maintenance of wood structures. The author has tapped not only the more conventional avenues of publication, but also a large amount of source material not commonly reached by foresters, such as unpublished reports, mimeographed material, data from commercial organizations, and journals devoted to other fields. He not only cites the results of investigations, but freely interprets these results for the reader. His interpretations enhance the usefulness of the book for the practicing forester.

Since the science of forest pathology is just beginning to emerge from the era of describing diseases and determining their causes, into the era of weaving pathological knowledge into silviculture, much of the applied side of the field is embryonic. Because of this lack of experience, knowledge, and experiment in applied forest pathology, many pathologists and foresters may disagree with some of Baxter's recommendations and emphasis. To some, a book of this kind in the present state of our knowledge of the role of pathology in silviculture will seem premature. Others will welcome this attempt to bring together the scattered information on the subject.

To this critic, there is a certain looseness of writing about this book. Definitions are often sketchy and somewhat inaccurate, figure credit lines are very inconsistent, and some figures do not show what the text says they do (e.g., figs. 94 and 110, referred to respectively on pages 237 and 262). The choice of literature is in some cases subject to question, as in the section on the fungi of the southern pine and hardwoods region, where there is no indication that use was

made of the five pathological papers dealing specifically with decay in that region.

The overwhelming emphasis on the relation of site to disease all through the book seems overdrawn. Some might also criticize the detailed extent to which the author has gone into methods of cutting, effects of site factors on growth, competition in plantations, and many other silvicultural subjects. The unusual length to which he has discussed these subjects in a book on pathology has probably been influenced by his adoption of Meinecke's definition of forest pathology, which he gives on page 1, "Forest pathology embraces the study of those factors which cause damage or loss to the forest as an ecologic and economic unit." To this reviewer, this definition is much too broad, and, if accepted, would have to include under the science of forest pathology, the fields of fire, forest entomology, and a large share of the fields of silviculture, wildlife, and forest influences.

The author's interest in the wood-destroying fungi is obvious from the fact that he has devoted 28 pages to a key to the species of wood-rot fungi, compared with two text pages to the entire group of ascomycetes, which include a large share of our most important tree-disease fungi, both epidemic and endemic.

The book as a whole is a new approach and a valuable contribution. The man who wants to know "what to do about it" will find Baxter's book a genuine help. Among its features are lists of tree and shrub species, arranged according to tolerance to shade, heat, wetness, acidity of soil, glaze, smelter fumes, fire, and other factors. There are also species lists arranged according to the amount of cull, length of life as crossties, and resistance to pests. There are some unique sections such as the one on the utility of many kinds of decayed wood.

The book is abundantly and beautifully illustrated, and is interestingly written. It fills a need for the forester, and provides a useful reference for the pathologist because of the wealth of information it contains and its new approach. *Pathology in Forest Practice* utilizes and refers to a large literature, but is truly by the author, being richly flavored with his own points of view. This, of course, will likely result in some disagreement of interpretations, on the part of other pathologists.

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How to Survive on Land and Sea. Individual Survival. Issued by the Aviation Training Division, Office of the Chief of Naval Operations, United States Navy. *xiii+264 pp. 322 illus., map. U. S. Naval Institute, Annapolis, Md. 1943. \$2.*

This manual on survival has been compiled as an official assignment by Lieuts. (jg) Frank and John Craighead, authors of *Hawks in the Hand* (reviewed in the JOURNAL for March, 1940), under direction of the Naval Aviation Physical Training Program of the U. S. Navy Department. It has been constructively reviewed by scientists of various other governmental agencies, notably those in the Department of Agriculture, the Department of the Interior, and the Smithsonian Institution.

It has been prepared to meet a specific need for definite, essential, comprehensive information on the technique of survival under unusual conditions, and is particularly designed for use by instructors and trainees in naval aviation. Its viewpoint is global, and it emphasizes principles that can be grasped quickly and easily and practiced to the benefit of any person subjected to the hazards of warfare. These general principles are supplemented where necessary with specific information.

Obviously, in a brief notice such as this, space limitations forbid more than merely an indication of the general range and scope of the work. Some idea of its value may be gained by enumeration of the more important subdivisions: Under "Orientation and Traveling," consideration is given to such matters as celestial guides (sun and stars); keeping a course (detours and base lines); water travel (including canoes, dugouts,

and rafts; swimming in aquatic vegetation, bogs, quagmires, quicksand, mangrove swamps, surf and currents, fringing coral reefs, and heavy seas; dealing with cramps; running a boat shoreward and working it seaward through surf); travel in mountainous or other rough terrain (descending cliffs, mountain snow fields, and glaciers, climbing trees, and dealing with mountain sickness). The chapter on "Water" covers such subjects as methods of finding water along seashores, in desert or arid lands, and on mountains; and of obtaining it from succulent plant tissues, from roots of desert plants, from vines, stems, and fruits, and from muddy, stagnant, and polluted pools. Consideration of the dangers of drinking impure water includes discussion of dysentery, cholera, typhoid, flukes, worms, and leeches. Similar detailed treatment is given to the chapters on "Wild Plant Food," "Wild Animal Food," "Fire-making and Cooking," "Survival in Special Areas" (ocean or seashore), "Tropical Plant Foods," and "Subsistence in the Far North." A chapter on "Environmental Hazards" deals with such subjects as sunlight, heat, snow blindness, cold, mosquitoes, malaria, fleas, lice, fungus infections, hookworms, poisonous snakes, sharks, barracudas, sting rays, crocodilians, harmful mammals, and poisonous plants.

It would be difficult indeed to overestimate the practical value of even single items of information or advice from this book to an unfortunate who might find himself in some of the situations that are considered. The book is a veritable compendium of useful information, likely to be of utmost helpfulness under a wide variety of conditions.

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