

In Chapter VII an account is given of decays of felled timber and timber in service in the open ; of the fungi described *Lentinus lepideus*, *Polystictus versicolor*, *Polyporus adustus*, *Stereum hirsutum*, *Trametes gibbosa*, *Schizophyllum commune*, *Lenzites trabea*, *Pholiota adiposa* and *Polystictus hirsutus* are found also in New Zealand.

Chapter VIII deals with decays of timber in buildings and structures and includes *Poria xantha* which is one of the most destructive rots in the north of New Zealand.

Of the next four chapters, XI deals with the prevention of decay in felled and converted timber during storage and shipment, X with the decay of timber in various uses, XI with the deterioration of composite wood and manufactured products, and XII with the natural durability of timber.

Chapter XII gives an account of the preservation of wood by chemicals and XIV with the staining and discoloration of timber.

The Appendix describes the wood-block method of test for the toxicity of wood preservations to fungi.

There is a comprehensive index and each chapter is followed by a valuable list of references applicable to each section.

There are few printing errors of importance except for the unfortunate but obvious inversion of titles on plate 4.

There is nothing in this volume which any forester would not benefit by studying, in particular Chapters I, V, VI, VII, VIII and XIV deal with matters of vital importance in forestry work, while those engaged primarily on utilisation would be well advised, in addition, to make a careful study of the remaining chapters.

While the present volume consists mainly of reprints of previous publications which are no longer available, there is, in addition, much new information which brings the various subjects up to date, many controversial points are clarified and lines of future research are indicated.

In Great Britain the kinds of timber and species of fungi are far smaller numerically than in New Zealand, but nevertheless, we find many of the rots common to both countries and the underlying principles are the same, it is to be hoped that the forest pathology laboratory in New Zealand will produce a similar publication relating to this country.

G.B.R.

**The Use of Aerial Survey in Forestry and Agriculture.**—By J. W. B. Sisam. Imperial Agricultural Bureaux. Joint Publication No. 9 (Imperial Forestry Bureau and Imperial Bureau of Pastures and Field Crops). 1947. 7/6.

For the last twenty-five years aerial photography has been used to an ever-increasing extent for a variety of forestry and agricultural

purposes. Recent literature abounds with references to its possibilities for rapid and inexpensive planimetric and topographic mapping, for extensive surveys of vegetation, soil and forest conditions, for land-use planning and economic survey, and, in forestry alone, for such intensive work as forest-type mapping, timber cruising, insect damage surveys, fire control, and the lay-out of tracks, roads and logging areas. As far as the more technical aspects of aerial mapping are concerned the most up-to-date methods are admirably described in a manual published by the American Society of Photogrammetrists. There has hitherto been no comparable work dealing with the applications of aerial photography to forestry and agricultural problems and describing the many techniques which have been evolved. The long-awaited I.A.B. bulletin is designed to fill this gap and will be a welcome contribution to forestry literature.

Chapter I, Introduction, deals with the various applications of aerial photographs and their advantages over visual reconnaissance and ground survey. It is interesting to note that the visual method (sketching from an aircraft) has been preferred for such tropical areas as New Guinea and the French African colonies, although a combination of visual reconnaissance and photography is more generally recommended. New Zealand experience confirms that visual reconnaissance can be a valuable preliminary to the actual photography and that, by curtailing the area which must subsequently be flown, it can be responsible for much saving in time and money. The advantages of aerial photography over ground survey are concisely stated, although again the conclusion is drawn that a combination of both methods will give the best results. Three limitations of aerial photography are stressed—that the photographs are not themselves maps, that the photography demands a highly skilled pilot with specialised experience, and that the photographs can never completely supplant ground surveys. A fourth could perhaps be added—that interpretation is also a highly skilled work and demands special qualities in the operator.

The second chapter deals with the factors affecting the efficiency and cost of aerial photography. Efficiency is discussed under the two headings of operational factors and environmental factors. By operational factors are meant such considerations as type of photography (vertical, steep-oblique, low-oblique), type of camera, scale and other specifications of the photographs, and type of mapping or transferring device. Environmental factors are taken to include the shape and topography of the area to be flown, the time of day and season of year for flying, climate, and the incidence of smoke and haze. In discussing the effect of cumulative environmental factors the author concludes that "conditions which may handicap aerial survey to some extent in the tropical zones of relatively heavy rainfall include marked differences in elevation, uncertain weather conditions, luxuriant vegetation often with no clear definition of sub-type bound-

aries, and relatively poor correlation between vegetation and soil"; a statement which in every point will be endorsed only too readily by workers in New Zealand.

Chapter III deals with the interpretation and application of aerial photographs and is perhaps the most valuable part of the publication. The preparation of maps and mosaics is discussed briefly, as is the question, more important to the forester, of the most suitable method for transferring data from photographs to base maps. A surprising omission in a list of the disadvantages of mosaics is the fact that they do not permit stereoscopic interpretation. This surely is their major disadvantage, and leads one to wonder whether an attempt has ever been made to construct a vectograph mosaic. A bird's-eye view in three dimensions would be the ideal arrangement for most general forestry purposes.

In a paragraph on interpretation proper the author attempts the difficult task of defining the principles used in differentiating vegetation types. Differentiation is said to be based on "(1) variation in tone and texture of the photograph, with respect to the vegetation itself and to related soil and topographic conditions, (2) characteristic espacements and patterns (outline and shadow) of associations and individual tree crowns, (3) position with respect to features in the landscape and to other vegetation." Here is the whole art of ecological interpretation reduced to a few words. It is vague, but inevitably so. Implicit is the most important fact in qualitative interpretation—that it can rarely be absolute. It is a relative process, relying on comparisons, projections and deductions. The successful interpreter must be primarily a detective. This aspect of interpretation is nowhere explicitly stated in the bulletin. In the reviewer's opinion, it should be stressed.

Of most interest to the general forester will be the paragraphs dealing with the application of aerial photographs to forest mensuration. In particular, cruising officers who struggle through the dense undergrowth of sub-tropical forests will read with envy of the methods whereby direct volume estimates can be made from the air. The different techniques for the measurement of area, stand-density, diameter and height are described, but generally without sufficient critical comment. It would perhaps have been advisable to stress the very definite limitations of each of these techniques. Thus the shadow/height method is ideal only for flat snow-covered ground, the image and parallax methods for height measurement are difficult to apply in the dense forests typical of high rainfall areas, the height/volume and crown diameter/diameter relationships will work well for some forest types, but by no means for all, and tree counts, even if all crowns are visible and distinguishable, will never tell anything about quality. If one has a criticism of this otherwise excellent bulletin, it is the tendency to describe processes which have proved

successful under certain restricted conditions, without at the same time stressing their limitations for general application or even attempting to evaluate their relative merits.

The last chapter gives examples of the use of air photographs for land-use and vegetation surveys in a number of countries. Emphasis is largely on forest survey and descriptions are given of the methods used in Canada, U.S.A. and U.S.S.R. In addition the general position with regard to aerial survey in the British Colonies is discussed and notes given of any type of aerial survey undertaken in these countries. Most of the surveys described are the large ones undertaken by Government agencies. There are many others, particularly in Canada and U.S.A., which have been made by private concerns. Thus in U.S.A. the highly successful volumetric survey of 44,000 acres of redwood made by Mason and Bruce in 1942, was not only the first forest survey undertaken by private enterprise in that country but it used an entirely new combination of techniques.

There is a comprehensive but well-selected reference list and a series of excellently reproduced photographs.

The bulletin deals with a complex and technical subject in a lucid manner and will be read with interest by all foresters. It will be of particular value to those who work with aerial photographs and who are still seeking new ideas for their uses.—A.P.T.

**The Commercial Timbers of Australia.**—By I. H. Boas. Published by the Council for Scientific and Industrial Research. pp. 344, 20 plates. Government Printer, Melbourne. Price 12/-.

This book fills a long-felt need for general reference to Australian woods as a whole. Individual timbers are described under standard headings and the data presented is sufficiently full for most practical purposes. The lists of timbers suitable for specific uses and the very full bibliography of Australian forest products are also of particular practical significance.

Part I of the book discusses trends in utilization, the more important aspects of timber technology, insofar as they affect the Australian timbers, and minor forest products. The expansion of the Division of Forest Products during the twenty years of its existence and its achievement under the guidance of Mr. Boas are too well known to require comment; this book, written when Mr. Boas was about to sever his connection with the Division is a fitting tribute to his work.—J.S.R.

**Unasylva.**—Vol. I, No. 1, July-August, 1947. Prepared by the Division of Forestry and Forest Products, and published bi-monthly by the Information Service of FAO, Washington, D.C., U.S.A. Annual subscription 3.50 dollars; single copy 65 cents.

The establishment of a Division of Forestry and Forest Products in the Food and Agricultural Organization of the United Nations has