

research workers will find a wealth of problems yet to be solved, parameters to be quantified, and theories to be tested.

The frequently dominant effect of man, past and present, on the extent and structure of forest ecosystems is examined in the last chapter, although, to quote from the Introductory Remarks, "this subject matter might be more logically dealt with in a separate book." It will be of particular interest to those unfamiliar with forestry literature, and lends support to another quotation from the Introductory Remarks that "... foresters and forest biologists have always recognized the need for conservation, i.e., a sustained effort for the protection of the part of the human environment designated as the 'landscape.' Only recently has the general public become aware of this problem." Foresters, in common with many others, are less aware of the great need, referred to in the concluding paragraphs, to protect and conserve a wide diversity of genetic resources represented in natural forest ecosystems, especially those subject to management and utilization.

Technically the book is attractively bound, the print is clear and the reproduction of drawings and photographs is excellent. Editing was in-

adequate to correct a number of omissions and errors in the literature cited and some typographic errors, including the omission of the first three rows of numbers from Tables 17 and 18. Indexes for Species and Family and for Subject are comprehensive and valuable reference tools. A debt of gratitude must be given Dr. Kris Morgenstern, Canadian Forestry Service, for his outstanding translation from the German.

This important addition to the literature of population genetics and ecology will remain a major reference and deserves to be widely known and appreciated. As Professor Roche writes in concluding the Preface, "The tragic death of Klaus Stern, just as the book was ready for press, and when he was at the height of his powers, has impoverished the lives of all who knew him, and left a gap in scientific forestry which will not easily be filled."

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Vegetation of the Earth—In relation to Climate and the Eco-physiological Conditions

By Heinrich Walter, translated from the second German edition by Joy Wieser. 1973. English Universities Press, London, and Springer-Verlag, New York, Heidelberg, Berlin. 237 pp. \$5.90.

This small book was abridged by the author from his two-volume (1964, 1968) treatise of the same title. It includes only a few additional new notes arising from field work subsequent to the publication of the larger work. The original of this abridged format was published in German in 1970 and this reviewer has used it in that form before the translation appeared. Joy Weiser has performed a valuable service to English-speaking ecologists in translating this book.

Walter justifies his book in an unusual way by use of a map showing his own extensive travels and visits to research institutes around the world. It is a frank and impressive justification. It does, however, expose Walter to a minor criticism in that, although he has examined much of Europe, Africa, Australia, the United States, and parts of South America, he apparently did not take a corresponding look at Canada, Alaska, or the tropical parts of South America such as Brazil,

Colombia, Ecuador, and Peru. The Russian literature was consulted concerning the inaccessible regions of Asia. His arctic and alpine conclusions are based on experience in European and American mountains and in the arctic part of Norway and Finland, augmented strongly by the published literature. In general I am impressed by Walter's masterful grasp of ecological conditions in all parts of the world.

The special strength of this volume is summed up in his sentence "This book is intended as an eco-physiological study rather than as a description of the vegetation." Clear thinking and strict definition of concepts mark his discussions and arguments. An example is the discussion of poikilohydric organisms (bacteria, algae, fungi, and lichens) whose water content varies with that of the surroundings, versus homiohydric plants whose cell water content is more independent of the surroundings. An anglicized spelling, homeohydric, would have been more acceptable in translation. Another example is that he would redefine halophytes as 'plants that store large quantities of salt in their organs without thereby undergoing any damage' instead of 'plants grow-

ing on saline soil.' They must balance the osmotic effect of the salt in the soil by a similar salt concentration in the cell sap. True halophytes will greedily take up salt from normal soil. The chloride ions cause a swelling of the particular proteins of these plants and result in succulence. Other halophytic relationships are mentioned including sulphate-halophytes, alkali-halophytes with organic anions, and salt-excreting plants like *Tamarisk*.

On competition and limits of distribution he has this to say: "The natural limit of distribution of a particular species is reached when, as a result of changing physical environmental factors, its ability to compete, or its competitive power, is so much reduced that it can be ousted by other species." Further: "Only at the absolute distribution limit, in arid or icy desert, or where the forest shade is at its deepest, are the physical environmental factors (usually one particular extreme factor) of direct importance."

Walter's treatment is concrete and replete with examples. It is a rare page that does not contain exact quoted figures of evidence and example. His style is succinct, clear, and readable. Possibly because this book is an abridgment of a much larger work the examples and evidence adduced

so consistently to make the point under discussion usually lack references to their sources or authors.

The admirable emphasis on eco-physiology extends throughout the accounts of the major ecosystems of the world. This analysis of the vegetation of the world is the best and most understandable treatment I have encountered. It is well illustrated with black-and-white halftones, climatic diagrams, distributional maps, and many physiological charts. Minor faults include a very few typographical spelling errors, and the lack of a glossary. I made an incomplete list of 142 technical terms freely and well used but often without explanation. A final summary presents estimates of phytomass and yearly primary production of plant material in the whole biosphere and its component major parts.

I recommend Walter's book highly to both ecologists and the interested general reader, providing he is willing to decipher some terminology.

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Forestry in Newfoundland

By Graham Page, W. C. Wilton, and Tony Thomas. 1974. Canada Department of the Environment, Forestry Service. 118 pp. Free on request from the Newfoundland Forest Research Centre, P.O. Box 6028, St. John's, Newfoundland.

This colorful booklet, primarily designed to entice Newfoundland high-school students into forestry, does so quite successfully by the ingenious approach that forestry is not just another industry but is in fact a complex biological system which can be manipulated, through careful management, into serving the economic and recreational needs of the province. The nine chapters touch all bases: from a short history of the Newfoundland forest industry to a life history of a forest; from a review of legislation germane to forestry, including timber rights, to a consideration of the future of forestry in Newfoundland. Some chapters are curiously ambivalent. On the one hand, the authors recognize that forest fires are an integral part of the boreal-forest ecosystem while on the other they exhort all good Newfoundlanders to prevent forest fires. "Smokey the Bear" is not dead, he has been banned to Newfoundland.

All in all this is a very useful book which, according to Information Canada, will be reprinted and distributed throughout Canada in their bookstores. Before this reprinting occurs, however, I would call on the authors to correct a few errors and omissions: mature trees do not become decadent—societies perhaps, but not trees. The omission of black ash, the only ash which occurs in Newfoundland, from their list of trees found in Newfoundland is difficult to understand. I know it is not commercially important but then neither is red pine, which is discussed. And finally, measurements should be given in SI units, especially since today's high-school student thinks metric. Moreover, since the federal government is pushing ahead with its plans for metrication it might be useful for government departments and their agencies to provide an example.

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MacLulich, Duncan Alexander. 1975. "Vegetation of the earth - in relation to climate and the eco-physiological conditions, by Heinrich Walter [Review]." *The Canadian field-naturalist* 89(4), 481–482. <https://doi.org/10.5962/p.344968>.

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DOI: <https://doi.org/10.5962/p.344968>

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