

concise accounts, with information on the original references. In the chapter on lichen chemistry, the presence in the thallus of lichen acids (substances unique to lichens) is considered, and the methods of extracting and recrystallizing these substances, as an aid to taxonomy are considered. However, the photographs illustrating the various acid crystals are not completely satisfactory, as they do not show clearly the characteristics of the crystals.

The final chapter deals with the economic uses and applications of lichens, including such topics as lichens as food; their use as antibiotics; as dye-stuffs and in perfumes; their damaging effect on old stained-glass windows; and even their use as stuffing for Egyptian Mummies. This provides a very interesting chapter to end a most useful basic account of the biology of lichens.

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Forest Gene Resources: Their Conservation and Utilization with Special Reference to the Canadian Spruces

By Laurence Roche. Forest Research Laboratory, Can. Forestry Service, Quebec Region. Quebec. Information Report Q-X-16. 27 p.

Public interest in preserving representative samples of the earth's surface, the biosphere, is steadily increasing world-wide. In Canada many groups are pressing provincial and federal governments to set aside ecological reserves, justified by their cultural-historical and aesthetic values plus their educational and research uses. In support of the same ideas, Dr. Roche has put forward a persuasive argument for the reservation of many forest stands across the country to guard against genetic impoverishment of important trees, such as the spruces and pines, as the technology of logging becomes more and more efficient. He points out that plant breeding relies on variability of populations, so future production of improved forest trees requires protection of geographically-evolved races. Also given is a good review of how gene resources should be utilized; by defining ecological seed zones, establishing superior seed production areas, maintaining a seed registry and

siting nurseries in favorable environments. The report can be obtained without cost from the Canadian Forestry Service, and it is recommended to those who are interested in natural areas and their potential uses for tree breeding.

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The Life History and Ecology of the Gray Whale (*Eschrichtius robustus*)

By Dale W. Rice and Allen A. Wolman. American Society of Mammalogists. Special Publication No. 3. 1971 142 p. 38 figs. 18 tables. \$5.00.

Of the three publications in this series to date, "The Life History and Ecology of the Gray Whale (*Eschrichtius robustus*)" is the second dealing with a marine mammal. This is perhaps a fair indication of the burgeoning interest in these fascinating creatures which has occurred in recent years. It is also a sign of the times, however, when the biology of many species of marine (and other) mammals is only beginning to be fully documented in the face of dwindling populations and threats of extinction. Happily the gray whale and other species of marine mammals are again increasing in numbers from levels which at the turn of the century appeared to have reached the point of no return. The authors in the present instance even cautiously suggest that commercial harvesting of gray whales might again be considered on a strictly limited, sustained yield basis.

This monograph is the culmination of twelve years of observation of gray whales both in Californian and Arctic waters and extensive material collected from 316 whales. It has an introductory chapter, a brief review of the nomenclature and an outline of field and laboratory procedures. These are followed by sections on the seasonal migratory cycle; food and feeding; age and growth; the female and male reproductive cycles; predators; parasites and epizoots; population; exploitation; and a summary. There is also an extensive bibliography and a short but useful index.

Each section consists of a detailed account and analysis of the assembled data and is crisply rounded off with discussion and conclusions. The publication is at once of use to the specialist, who

would wish to read it in its entirety, and the non-specialist who could gain a good general knowledge of gray whale biology by simply reading the first and last sections and the discussion and conclusions in between.

The gray whale undergoes the longest migration known for any mammal — a round trip of more than 11,000 miles between the waters of Baja California and the Chukchi Sea. Breeding takes place in winter at the southern end of the range and the feeding grounds are located at the northern extremity. The complete reproductive cycle of females occupies two years and, as it involves feeding, fasting, migrating, mating, calving and lactation, it is an example of a wonderfully adapted sequence of events resulting ultimately in the birth of the young in the most favourable conditions. A completely reliable method of age determination has not yet been established, which is perhaps a little surprising in view of the clearly defined seasonal cycle. The pattern of growth differs from that of other baleen whales in becoming constant after only one year with relatively shorter flippers and a longer tail than at birth. This would seem to be an adaptation to the swimming needs even of the gray whale calf during the long migrations.

One outstanding feature in the biology of the gray whale is the annual passage of large numbers of these spectacular animals within a few miles of easily accessible vantage points along the California coast. Increasing interest of biologists, however, is said to be having deleterious effects through harassment, particularly at calving grounds, by small boats and aircraft carrying over-zealous investigators. These observations focus attention on a broad spectrum of ecological and human factors affecting the survival of one of the world's most attractive mammals and give much food for thought to conservationists at all levels.

The book attains the same very high standard of scholarship and production established by its two predecessors in the series. Both the authors and the American Society of Mammalogists are to be congratulated on a very welcome contribution to marine mammal literature and the presentation of the kind of information which is essential for rational management of the species for their scientific interest and enjoyment to all.

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Birds of Guatemala

By Hugh C. Land. Livingston Publishing Company, Wynnwood, Pennsylvania. 1970. Numerous range maps, 44 col. pls. by the author and Wayne Trimm, xvi + 381 p. \$10.00.

Here at last is a really comprehensive, well-illustrated field guide covering a complete Central American country. "Birds of Guatemala" by the late Hugh Land, is more than just a field guide, containing as it does, a surprising amount of information on Guatemala's rich and colorful avifauna.

Although Guatemala's area is smaller than that of England, no less than 667 bird species have been recorded from within its boundaries. Just recently, species no. 668 was added with the discovery that the plebeian House Sparrow, *Passer domesticus*, has arrived in the country (See *Thurber* 1972, *Auk* 89 (1): 200).

Introductory material includes information on the geography, climate, life zones (Holdridge's system) and their characteristic resident birds, comments on migratory birds, and an ornithological history of the country. Terms used in the text are lucidly explained.

The greater part of the book (322 pp.) is devoted to the species accounts. For each species there is well-chosen and succinctly-presented information organized in such categories as Range, Subspecies, Status in the country, Elevation, Habitat, Description (includes total length and wing chord), and Remarks (a catchall of informative odds and ends). There is a distribution map for each species and on this the numerical status, varying from abundant to rare, is indicated by five degrees of shading. This system has obvious advantages for those parts of the range where the numerical status of the species is known. For areas where the status of the species is unknown, however, the method creates the problem of either having to guess at the appropriate shading to use or the alternative of leaving the unknown area blank even though there may be good reason to assume that the species is found there.

Forty-four color plates depict 294 species, almost all of which are resident Guatemalan birds that do not occur north of Mexico. Half of the plates are by the author, half by Wayne Trimm. Although the latter are aesthetically more pleasing than those done by Land, all serve well their purpose of showing the field appearance of the birds they depict.



Ling, John K. 1972. "The Life History and Ecology of the Gray Whale, by Dale W. Rice and Allen A. Wolman [Review]." *The Canadian field-naturalist* 86(2), 200–201. <https://doi.org/10.5962/p.343591>.

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