Baldwin is a welcome contribution to the somewhat neglected astronomy of the solar system.

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Island life: a study of the land vertebrates of the islands of eastern Lake Michigan. (Cranbrook Institute of Science, Bull. No. 27.) Robert T. Hatt *et al.* Bloomfield Hills, Mich.: Cranbrook Institute, 1948. Pp. xi + 179. (Illustrated.) $4.00.

Insular plant and animal populations have always held a peculiar fascination for the student of natural history, partly because they provide opportunity to observe, record, and deduce without the harassment of the almost innumerable impinging factors that must be reckoned with in a comparable mainland study. Here there is land, there, water; the boundary line is sharply drawn, confining the terrestrial fauna, for the most part, within the area it circumscribes.

Island life is a progress report presenting the results of seven years' study of such an insular fauna. The study, jointly sponsored by the Cranbrook Institute of Science and the University of Michigan, covers 17 islands lying off the Lower Peninsula of Michigan. Mammals, birds, reptiles, and amphibians are considered, both as to distribution and as to habits that have effected the presence or absence of certain forms.

The study is well conceived, particularly in that it includes research into the geological and cultural history of the islands. The geological history, specifically the postglacial history, indicates that, following the recession of the glacial sheet, the water level dropped to around 200 feet below its present level. This provided land bridges between the islands and the mainland, but there seems little evidence from the faunal lists that these land bridges contributed materially to the distribution of the various vertebrates considered. In part, this may be due to the fact that the lake level subsequently rose around 300 feet, covering all the smaller islands, and the bulk of the larger ones. In any case, the authors hesitate to ascribe the present distribution of any form primarily to land bridge invasion.

The cultural history is interesting to the extent that man has superimposed certain introduced species (gray and fox squirrels, raccoon, and deer) extirpated others (elk, cougar, wolf, bear) and provided temporary haven for certain of man's common commensals (house mice, wharf rats, and English sparrows). The greatest single human influence seems to have resulted from the cutting of the original forest, opening the islands to many edge-dwellers that would not otherwise be there at all.

Just how the majority of terrestrial vertebrates reached the islands is open to speculation. Some undoubtedly came of their own volition—over the ice, through the water, or through the air. Some may have come via the land bridges. It is probable that some came in by drift, and evident that others were brought in by man.

The authors have been thorough in their consideration of the material at their disposal. However, one cannot help but feel that the summation may have been somewhat premature. Nearly every page poses questions that must go unanswered pending further investigation. It might be wished that one of the participating institutions would set up a permanent biological station on some one of the islands, and embark upon a 10- or 20-year program of study. Only thus could such phenomena as the relative paucity of species on the islands, as compared to the mainland, be explained. Even the largest island, Beaver, 58.4 square miles in area, and with nearly the same number of plant communities as the mainland, sustains less than one third the number of animal species.

As a progress report, *Island life* is excellent. It is well illustrated, the faunal lists are well annotated, and the analyses of the results to date are intriguing. As a stimulant to speculation and to further research, it is outstanding. The serious ecologist and vertebrate zoologist might ask for a more detailed record of specimens, localities of collection, and habitats, perhaps with maps. Such an expansion of the work would have made it more valuable to future field workers.

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Studies on bats and bat parasites. Olof Ryberg. Stockholm, Sweden: Univ. Lund and Zool. Lab. Agr., Dairy, and Hort. Inst. of Alnarp. Pp. xvi + 330. (Illustrated.)

This voluminous publication is taken from a greater study of many years' duration. It is largely a biological account or natural history of Scandinavian bats, but the information is equally relevant to the study of North American or other bats. Thirteen pages and eight plates deal with bat parasites and these chiefly the ectoparasitic *Diptera* of the family Nycteribidae.

The geographical distribution of bats of the world is dealt with by families in the text and in individual maps. Detailed maps are given for north European species. It appears that there are very few records of bats' approaching the Arctic Circle. Few, if any, occur in strictly polar regions, and none apparently in the treeless tundra, where these predominately cave and arboreal mammals could hardly be expected to be found. Ryberg remarks on the difficulty of establishing the northern limit of bat distribution in Siberia because of the "inaccessibility of the Russian literature." In Iceland bats occur only as stragglers, two North American species having been taken during the second world war. Few species occur at the