

chusetts Fish and Game Association and should be read by all who aspire to active participation in this field or who would know the problems that confront conservationists.—W. S.

Caum's 'Exotic Birds of Hawaii.'—Mr. Edward L. Caum, a former member of the Delaware Valley Ornithological Club, but a resident of Hawaii, has prepared an interesting list¹ of exotic birds which have at one time or another been introduced into the Hawaiian Islands. As is generally known the native birds have been driven back into the mountains by the cultivation of the lowlands and a number nearly or quite exterminated. While it is natural that the introduction of exotic species should aggravate this condition it is not generally known how many foreign species have actually been introduced. Fortunately most of these have so far failed to gain a permanent foothold but of those introduced in the last few years it is as yet impossible to say what their status may be.

According to Mr. Caum's list ninety-six species have been liberated in the islands of which twenty-eight were Passerine birds, twenty-seven upland game birds and eighteen Doves. Some sixteen or eighteen have become established more or less abundantly. They have come from all parts of the world and curiously enough some of them have been brought from countries where they had been previously introduced from elsewhere, as for instance the European Skylark which was imported from New Zealand!

Mr. Caum has done an excellent piece of work in recording these introductions before it was too late to get their history and even as it is he encountered no little trouble in running down the origin of some of the species.—W. S.

Mrs. Bailey on Birds of the Mammoth Cave Region.²—The September, 1933, issue of 'The American Midland Naturalist' is devoted entirely to Vernon Bailey's report on cave life in Kentucky, an interesting review of the forms of life to be found in and about the caves especially the famous Mammoth Cave. There is a brief account of the caves and a list of the forest trees of their vicinity, following which are full accounts of the vertebrates of the region—the mammals, reptiles and amphibians by Mr. Bailey and the birds by Mrs. Bailey, and finally an account of some of the invertebrates by Leonard Giovannoli.

Mrs. Bailey considers about ninety-five of the birds most likely to be found by tourists in the vicinity of Mammoth Cave and which were actually seen there during the season of 1929. While no formal descriptions of the species are given there are statements of the character and time of their

¹ *The Exotic Birds of Hawaii.* By Edward L. Caum. Bernice P. Bishop Museum, Occasional Papers, Vol. X, No. 9. 1933. Pp. 1-55.

² *Cave Life of Kentucky Mainly in the Mammoth Cave Region.* By Vernon Bailey with Chapters on the Birds by Florence Merriam Bailey and on the Invertebrates by Leonard Giovannoli. September 1933. The Amer. Midland Nat., Vol. XIV., No. 5, September, 1933. Pp. 395-635, text figs. 1-90. Price \$1.25. Apply Editor Amer. Midland Nat., Univ. of Notre Dame, Notre Dame, Indiana.

occurrence with interesting bits of life history gleaned from other publications or from the author's personal experiences, forming a very readable and instructive account which cannot but prove of value to visitors to what we trust may soon become another of our National Parks. The Baileys have prepared similar admirable guide books or reports on the natural history of parks that have been already established and the present publication should emphasize the importance of saving this region for the tourist and naturalist.—W. S.

Lowe on the Primitive Character of the Penguins.—In this important and interesting paper¹ Dr. Lowe presents the results of his studies of the pterylosis of the Penguins; of the character of their tarso-metatarsus; of the fore limb—both recent and fossil; together with embryological and myological data.

His conclusions with regard to the ancestry of these peculiar birds are that they are not degenerate flying birds but have sprung independently from a common generalized ancestor, probably some bipedal dinosaur, and from the very beginning have been specialized for an aquatic life. He would therefore divide recent birds into three subclasses "(1) a true aquatic [group], represented solely by the Penguin; (2) a cursorial [group], represented by such forms as the 'Ostriches'; (3) a flying [group], represented by the carinate division of birds."

He further points out that other swimming and diving birds, such as Auks, Grebes, Loons, etc., are merely flying birds, usually still able to fly, which have adapted themselves to an aquatic life. Their pterylosis is the same as in other carinate birds and their osteology even in the most modified forms is that of the true flying carinate type. "They swim and dive in spite of being flying birds." The Penguin on the other hand is the only true aquatic type having specialized directly from a primitive non-flying ancestor.

"The purely aquatic character of the Penguin" he writes, "has not, as far as I can gather, been noticed before. It seems to be one of those things which once said seems obvious enough; but it wanted saying." As Dr. Lowe points out it is hardly conceivable that the tremendous differences between the Penguins and carinate birds could have been brought about by adaptation of the latter to a purely aquatic life when we know from fossil evidence that such birds as the Loons have been swimming and diving since Eocene times with no striking modifications from the feathers or skeletal characters of the flying birds.

The detailed results of Dr. Lowe's studies form most interesting reading for anyone concerned with the phylogeny of birds.—W. S.

Ball's 'Jungle Fowls from Pacific Islands.'—This paper² of Dr.

¹ On the Primitive Characters of the Penguins, and their Bearing on the Phylogeny of Birds. By Percy Poycroft Lowe. Proc. Zool. Soc. London, 1933. Pp. 483-588, pl. I-VI., June 30, 1933.

² Jungle Fowls from the Pacific Islands. By Stanley C. Ball. Bernice P. Bishop Museum Bulletin 108. Pp. 1-121, pl. I-VII. Honolulu, Hawaii, 1933.