

windows, so to speak, through which I want to reveal the great scene that occupied them all—nature itself. The real hero of the book is man's mind as it is concerned with nature." Furthermore we at once realize that this book is literature, and literature of a high order, for Mr. Peattie's gifted pen has the ability to tell us just what he has in mind in a style that holds our interest to the very end. There have been masters of literature who have written of nature and naturalists but all too often their own natural history has been at fault, but Mr. Peattie has been a naturalist before he became an author while one of his earliest works was a technical one: 'Flora of the Indiana Sand Dunes.' He possesses also a good knowledge of American ornithology. The fifteen chapters of 'Green Laurels' treat of the "Schoolmen" and "Herbalists"; of Buffon and Reaumur; of Linnaeus; Cuvier and Lamarck; Bartram and Michaux, Wilson and Audubon; Say and Rafinesque; Goethe, Darwin and Wallace, and Fabre.

We have space to consider but one chapter, the "Wilderness Birdsmen: Wilson and Audubon." This to our mind is the best estimate of the relative standing and personal characteristics of the two men that we have ever read. Our author admits that he once gave himself license to admire and love Audubon boundlessly "but I am come this time," he writes, "to give the older man, the less lucky pioneer of American ornithology, his due." He shows us that when we look upon bird life through Wilson's eyes we look with the eyes of the poet while through Audubon's we look with the eyes of the artist. It is ridiculous to consider the two as rivals and, in many ways, impossible to compare them, as the work of one was finished ere that of the other had really begun. As we have always contended there is no question as to which was the pioneer and, as Mr. Peattie truly says, Wilson "left very few birds in all of eastern North America for any newcomer to discover" and furthermore as he tells us the European scientists had the skins and bones from which to draw up descriptions but they knew nothing of the glory of New World bird life which Wilson's "gift of the fresh eye, the poet's quickness of ear" were destined to furnish. "The early European naturalists were necessarily deprived of the very spirit of the whole subject and what we lacked before Wilson's day was some Gilbert White, some patient adoring amateur who would think nothing too small to set down. Indeed ornithology cannot for a moment dispense with a whole chain of Gilbert Whites." As our author puts it, "ornithology is an amateur's science" and he lets "museum men roll their eyes and groan" the while! We do not groan, however, and we agree that "bird study in the field" is largely an amateur study and that ornithology in many of its branches is dependent upon just such study but there would seem to be another side to ornithology which is just as much professional science as others that are mentioned in 'Green Laurels.' Mr. Peattie very properly eliminates poor Wilson from the controversy between Ord, Waterton and Audubon, which occurred long after his death, and also very properly characterizes it as disgraceful.

"The Wilderness Birdsmen" is but one chapter in this fascinating Book and there is much side light upon ornithology in several of the others while ornithologists, and others as well, will wish to read the whole work through and will then appreciate the author's idea in writing it. There are many excellent photogravure illustrations and a good bibliography of "sources and reference material."—W. S.

**Clarke on 'Fluctuations in Numbers of Ruffed Grouse.'**<sup>1</sup>—In an excellently written and handsomely printed brochure<sup>1</sup> Mr. Clarke has presented the results of

<sup>1</sup> *Fluctuations in Numbers of Ruffed Grouse, Bonasa umbellus (Linne), with special reference to Ontario.* By C. H. Douglas Clarke. University of Toronto Studies. Biological Series, No. 41, 1936. Pp. 1-118, Price \$1.00.

an investigation carried on by him in the Department of Biology of the University of Toronto of the fluctuation in numbers of the Ruffed Grouse (*Bonasa umbellus*) with special reference to Ontario. We have read the report through and seldom have we found a more or less technical report presented in such a clear, readable, style.

Mr. Clarke has searched the literature for data on possible fluctuations in the past and has issued a number of questionnaires through which to gather present day data. He finds that notable diminutions in the numbers of the Grouse have occurred approximately every ten years, from 1874 to 1934, and doubtless earlier; that these diminutions, preceded by comparative abundance and followed by comparative scarcity, are not simultaneous throughout the country and that they differ as much as three years at different localities; and finally that the diminution is due mainly to the failure of the young birds to reach maturity. As an example he takes ten "territories" each with its pair of birds; the normal number of young should theoretically be ten per pair but is actually less, so that the number of young and adults at hatching is 108 while in the fall it is 72 and the number of adults next spring will be 30, the decrease in the year's crop being due to shooting, and other causes. In years when the diminution takes place the number of young and adults at hatching is the same i. e. 108 but by autumn there are but 36 left and only 15 adults the next spring. These are actual counts and show clearly the nature of the decrease. As to the cause of the diminution Mr. Clarke found a number of parasites and disease germs affecting the Grouse but only one "significantly associated with the cyclic diminution and compatible with its characteristics was a blood protozoon, *Leucocytozoon bonasae*," belonging to a genus which moreover has been found to be peculiarly pathogenic to young birds. The secondary host of related species of this protozoon has been found to be a fly of the "Black Fly" group and it is possible that this is the carrier in the case of the Grouse. There is much more of interest in this carefully prepared report which is of the greatest importance in connection with investigations in North America and also in Europe with other species of Grouse. As regards the claim advanced by certain game protective publications that predators are responsible for the diminution in Grouse, Mr. Clarke finds that no such claim has any basis from a scientific standpoint for any resident or regularly migrating predators, but suggests the possibility of irregular migratory species such as the Goshawk or Snowy Owl being a factor. Investigation, however, showed that the diminution preceded the arrival of these species! It should be read by all officials of State Game Commissions where Grouse occur.—W. S.

**Are Arsenicals Dangerous to Game?**—An interesting investigation<sup>1</sup> of this subject in France should be brought to the attention of ornithologists as definite data in this vexed field are scarce. In laboratory tests, the minimum lethal dose of three arsenicals for the Common Partridge was determined: lead arsenate 60.6 mg. of arsenic per kilogram of live weight; calcium arsenate 13.8 mg.; and Paris green 10.6 mg. It was found that a smaller quantity of arsenic sufficed to kill when divided into several daily doses than was required for a single fatal dose. The Partridge is rather susceptible to arsenical poisoning compared to the Domestic Fowl which has extraordinary resistance. However, an adult Partridge can scarcely devour enough poisoned potato beetles or their larvae to obtain a lethal quantity of arsenic. The young are somewhat more in danger but it would require an improbable combination of circumstances to result in poisoning even them. The risk of Partridges being killed by the usual insecticidal treatment for potato beetles is regarded as slight. Analysis

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<sup>1</sup> Chappellier, A. et M. Raucourt, Les traitements insecticides arsenicaux sont-ils dangereux pour le gibier et pour les animaux de la ferme? Ann. Ephyphytes etc., Ministry Agr. France, N. S., 2(2) 1936, pp. 191-239, 27 tables.