is left to enjoy his prize in peace. Occasionally one sees a solitary Swamp Sparrow as he patters over the mud and trash caused by the overflow of lake or river. His discordant metallic *chink* does not impress one as a feathered friend at all. The first time I visited the Nova Scotia wilderness in quest of big game, when a boy of sixteen, I remarked upon the absence of crows to an old guide. "No sir," said he, "you will never see or hear one back here, but I should like to bring a live one out here and let him go; he wouldn't live long." "Why?" I queried. "Oh," the guide replied, "he would fly up to one of these big granite rocks and caw himself to death trying to locate a friend." This fall I was surprised to hear a Song Sparrow burst forth into song. He was at least twenty-five miles from civilization. I waved my hat in his direction and wished him a safe journey south and an early return next spring. He was the exception to the rule.

We may sum up the perching birds that may be seen in the wilderness here as follows: Great-Horned Owl; Raven; Jay; Chickadee; Crossbill; Flicker; Robin; Hawk; Swamp Sparrow. The first five mentioned are residents.

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BOOK NOTICES AND REVIEWS.

LEAD POISONING IN WATERFOWL, by Alexander Wetmore, Bulletin No. 793, U.S. Dept. Agr., Professional Paper, Washington, D.C., July 31, 1919. This is a twelve-page pamphlet of considerable interest to sportsmen, conservationists and ornithologists. Many of our ducking marshes have been shot over for a good many years. Each shot so fired scatters in the neighborhood of an ounce of shot over the bottom. Mr. Wetmore estimates that on one large marsh examined by him an average of 75,000 shells are fired annually. This amounts to over two tons a year. As lead shot resists corrosion and is practically everlasting, the effect is cumulative and amounts to over eighty tons in the past twenty years. The shot gradually sinks in the mud, of course, but as tipping ducks, such as Mallard, Pintail and others, dig down into it from 12 to 16 inches, it is evident that their opportunity for picking up shot is considerable. On examination the author found in the mud from the bottom in the neighborhood of favorite shooting stands from 20 to 22 No. 6 shot in each sample dredged up and examined. The ducks in sifting through the mud for food retain any small hard particle like gravel and the presence of real gravel does not seem to prevent them from taking the shot as well. Experiments on captive specimens of wild species proved that six pellets, often less, are fatal to ducks.

In this manner large numbers of ducks have been poisoned in certain marshes every year though it is only lately (see Bowles, *Auk*, XXV, 1908, pp. 312-313) that the cause of the deaths was recognized. By a process of experiment and elimination it was proved that it is the lead content and not the additions to the metal such as arsenic that causes the trouble, though chilled shot is less rapid in its effects than soft.

The paper deals at length with the symptoms and pathology of the poisoned conditions. The first effect is a weakening of the wing muscles until the power of flight is lost, difficulty is experienced in walking and partial or complete paralysis of the legs ensues. The wings drag and the tail droops. The bird's appetite remains good and even increases, but the food does not seem to pass the stomach and the proventriculus and lower esophagus become distended with food. The fecal matter is green and watery. The heart is finally affected and death comes in from a few days to five weeks.

Though magnesic sulphate in water, 60 grams to 10 quarts, seems to give relief and sometimes cure in individual treatments no suggestions as to treatment or prevention on a large scale is proposed. It is suggested that by its nature the trouble is more likely to increase than decrease but the author seems more anxious over the effect the lead poisoning will have, even in the cases of birds showing considerable resistance to or even recovery from it, on reproductive fertility, than over the number it actually kills.

So far only Mallards, Pintails, Canvas-backs, Whistling Swans and Marbled Godwits have been known to be affected, and as shot is common in stomachs of wild ducks examined by the Biological Survey, it seems that some individuals or species have more or less tolerance for, or resistance to, lead poisoning, or its effects would be more widespread and serious. It would be well for the sportsmen to look out for sickly ducks and examine them for lead poisoning, in order that fuller details may be known.

P. A. TAVERNER.

ANNOTATED CHECK LIST OF THE MACROLEPIDOPTERA OF ALBERTA. By Kenneth Bowman. Published by the Alberta Natural History Society, Red Deer, Alta., 16 pp., February, 1919.

For a number of years the late F. H. Wolley-