

## BIRDS AS ENEMIES OF INJURIOUS INSECTS.

Extracted from "The Practical Value of Birds," HENDERSON.

In a preceding chapter the work of birds in checking great plagues of insects and rodents has been discussed, but their services in keeping such pests in check at all ordinary times and thus preventing destructive outbreaks are even more important. To fully appreciate such services, especially in connection with injurious insects, three things should be kept clearly in mind: (1) The large amount of food required by birds, in proportion to their size, a matter more fully discussed in another chapter. (2) The large ratio of waste material in insects, which requires a great quantity of them to provide a comparatively small amount of nutriment. (3) The astonishing rate of reproduction among insects, which would soon overpopulate the whole surface of the earth, were it not for the numerous checks upon their increase, none of which can well be spared and among which birds occupy a very prominent position.

The rate of increase of some insects is almost incomprehensible. Murray has estimated that the offspring from a house fly, allowing only 1 out of every 12 eggs to develop, would reach the almost incredible number of 7,600,000,000 during the five months from April 10 to September 10. According to Collinge, if all the eggs of a hop aphid should hatch and all the individuals survive, each female producing its complement, the 12th generation (13 generations per annum) would number 10,000,000,000-000,000,000,000 individuals. Obviously a large proportion of them must be destroyed in one way or another, and some species of birds are known to be destroying large numbers of aphids. No agency engaged in keeping these insects in check can be spared. Buckland says that a single pair of potato beetles would produce 60,000,000 offspring in a single season, if unchecked. Certain species of birds feed upon these beetles, and cannot be spared, but the fecundity of the insects and the great increase in the supply of their favourite food render all their natural enemies inadequate, so that artificial means of combating them are necessary. This is true of many other insects. The rate of increase of all destructive insects is so high that, if unchecked by adverse weather and enemies of all kinds, parasitic and predatory, the insects would soon destroy practically all vegetation, unless their very numbers should act as an efficient check upon further increase.

With the fecundity of insects in mind and their consequent potential capacity for destruction, we may now for a moment consider the actual damage they do even with all the checks upon their increase in full operation. Buckland says that the daily ration of a caterpillar is twice its own weight of leaves,