

relationship to other forms of life, past and present. As a matter of sentiment, all lovers of nature are interested in birds; their beauties of form and colour, their intelligence, sociability and musical powers excite both wonder and admiration in the minds of all who give them even casual attention. It is, however, from the economic standpoint, chiefly, that I propose to deal with the subject in this work, and the economic value of our familiar birds will, to some extent, be pointed out in the succeeding pages.

The economic value of birds to man lies in the service the birds render by keeping within proper limits the various forms of insects which are injurious to our crops or animals, in preying upon rats, mice, and other destroyers of our grain and fruit trees, in devouring weed seeds, in acting as scavengers, and in the case of game birds and wildfowl furnishing sport and food.

No reliable estimate has ever been made of the annual loss to the farmers of Ontario by the depredations of insects. In the United States much careful attention has been given to the subject, and in a report of the Department of Agriculture at Washington, issued in 1912, Dr. Henshaw estimates the loss to the agricultural interests of that country at upwards of \$700,000,000. Our losses will certainly be as large proportionately. This loss is caused chiefly by reason of an insufficiency of bird life on our cultivated lands; experience the world over has shown that as bird life decreases insects increase; also, that birds are more efficient in keeping down insect pests than are all other agencies, natural and artificial, combined.

Under ordinary conditions the number of birds required to keep plant-eating insects in proper check need not be extraordinarily great, for in order to maintain their active bodies adult birds require an enormous amount of food in proportion to their size and weight, while the quantity consumed by the young in the nest is far greater yet. In the case of nestlings their food supply must necessarily be great, for their growth is very rapid; birds like the Sparrows, Warblers, Thrushes, &c., attaining nearly full-size and becoming sufficiently well-fledged to leave the nest in about eleven days from the time they were hatched.

The power of flight possessed by birds enables them to act more efficiently as a check upon any abnormal increase of insects, or small animals, than any other force in nature. Should an unusual abundance of any insect, or of field mice, occur in any locality, birds which feed upon them will soon be attracted to the spot, and there they will remain until usual conditions are restored and the plague abated. In other lands this habit of the birds which act as scavengers renders good service in disposing of animal matter which would otherwise decompose and poison both air and water.

MIGRATION OF BIRDS.

Ever since men first began to make records of natural phenomena the arrival and departure of migratory birds have arrested attention. The Greek and Roman philosophers remarked it, and the writers of the Old Testament commented upon it. As yet, however, no satisfactory explanation of the origin of the habit of migration has been given. Some modern naturalists think that change of climate such as that which took place during the glacial period affords a rational and certain explanation of the phenomenon. When examined closely, however, under the light of recent research this theory is open to many objections. At any rate, if the general habit of migration originated by reason of the violent climatic changes which occurred during the glacial period, it has been and is still being so greatly

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