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THE OTTAWA NATURALIST

VOL. XXV. OTTAWA, DECEMBER, 1911 No. 9

POPULAR AND PRACTICAL ORNITHOLOGY.

(I).—The Snowflake.

By Norman Criddle.

Snowflakes are birds of the Northern Hemisphere, breeding in the far north from Newfoundland, Greenland and Hudson's Bay, west to Alaska, and north to about lat. 63°. They winter throughout the Canadian Provinces south to the middle United States.

As we know it, the Snowflake is a whitish bird with partly black wings and tail, and its back washed with brown. In its summer dress it is entirely black and white. Its home, as I have stated, is in the far north where the feet of white men seldom tread. Here among the mosses, or hidden by some over-hanging rock or boulder, it builds its nest and rears its young. Here too, it sings its song of love—a song that we in the south seldom or never learn to know. This song has been described by some as sweet and pleasing, by others as mere twittering or a short whistle. Personally, I have never had an opportunity of meeting the bird in its breeding grounds, but to judge from a captive that had lost the power of flight, its song is both loud and pleasing, being somewhat of the jovial type that distinguishes the Fox Sparrow, in fact there is just a faint resemblance between the two. I can bring it to mind by the following syllables: *When will-you meet me, when will-you meet me.* This is uttered in a clear, loud voice, and when once heard cannot be confused, so far as I know, with any other song. The song too is often followed by a number of very shrill notes resembling the first few in the air song of an Oven bird, which would lead one to suspect that our bird is a competitor to be reckoned with for a place among the songsters of the air.

To most of us, however, the Snowflake is a winter bird, not a summer one. We are apt to herald its return from the north as a harbinger of winter and to associate its presence, in numbers, as an indication of rough weather, or perchance a blizzard. As a rule it is a bird of the plains and probably reaches its greatest abundance in Manitoba and Saskatchewan. In these provinces it flocks over the prairies in search of food, gathering in all manner of seeds from plants protruding above the snow. On the approach of storms the prairies are abandoned for more sheltered situations and it is then that we have the visitations around the farm buildings; at times in such numbers as to almost rival the fast falling snowflakes from which the birds take their name. At such times they gather about the farm-yard and subsist upon the seeds of weeds sticking up above the snow or pick up such as are brought to view by the fury of the wind, and, as the weather clears once more they return to their usual haunts upon the open country. In Manitoba they reach us from the north, during the middle of October and leave again in late April, a few remaining well into May.

In this age of practical knowledge something more is required, however, than mere statements. We are asked to look upon the economic side of things, be they what they may, and therefore if we wish to picture, however lightly, a bird's life we must not forget its value in dollars and cents. A casual observer would probably describe a Snowflake as a bird of small value economically, which fed chiefly upon the wild seeds found about the prairies. There are other opinions, however, and some individuals actually go so far as to advocate a general war of extermination on the grounds of injury to grain, both in the stack and when it is sprouting in the fields during spring time. We will, therefore, endeavour to present the evidence.

To begin with, Snowflakes reach us as I have already related, about the middle of October. They then congregate largely upon ploughed fields or cultivated land. What fall wheat there is growing is already too far advanced to be damaged, and as there is no other crop, so far as I am aware, to be injured, the birds must occupy themselves at this time in picking up either useless material, such as spilt grain or weed seeds, and as there is no grain on summerfallow, land much frequented by snow birds, and as weed seeds are nearly always present, we must conclude that it is these which are being eaten. In winter time as the snow becomes deep the birds desert the ploughed fields and gather more upon stubble land and prairies. It is at this time that they have been accused of collecting around grain stacks and destroying them. But, here again the evidence appears much exaggerated. Supposing the birds do gather upon stacks, and this is not a common habit, the most they could do would be to destroy the top sheaves, amounting in all to not more than half a dozen on each stack. Not a very great loss, even supposing them to be fit for feed, which, as a matter of fact, they seldom are on account of continued exposure to weather. It must be admitted, however, that when large areas are left unthrashed for several months, as is occasionally the case, and left too in the stack that there is a chance for more than slight damage, though even then I doubt its being very extensive, and it must be incomparably less than is the loss by exposure to climatic conditions.

Now, let us view the other side of the question. In winter time the covering of snow prohibits more than casual ground feeding, therefore, it is those plants standing above the snow that afford or offer food in the form of seeds. What are the plants that are most commonly met with at such times? Answer: lamb's-quarters. redroot, Russian pigweed, docks, ragweeds, false ragweeds, wormwoods and foxtails, besides many more; weeds which take a heavy annual toll from the farmer. In addition to these the seeds of many grasses and wild plants are eaten, all of which are of small importance economically.

In spring time, before they leave us, Snowflakes have been accused of eating sprouted grain, as well as that recently sown. The former charge has undoubtedly some foundation in fact, though the evidence does not warrant a condemnation on that account, particularly as the sprouts are usually broken off, enabling the lower portion to grow again. As for the birds eating sown grain, that is an impossibility, when it is sown correctly with modern machinery. On the other hand it cannot be doubted that the birds pick up many weed seeds while on the fields in spring time, and so once again more than balancing any injury done.

Such is a summary of the evidence as it appears to me from field observations, and this has been amply borne out by the examination of stomachs elsewhere.

During the winter of 1910-11 my brother Talbot captured a male Snowflake with a damaged wing and gave it to his sister Alma. It was wild at first but soon learnt to recognize its mistress, and in time the other members of the household, so that it would allow not only a close approach, but welcome them with raised crest and a cheerful cry oft repeated, sometimes followed by a call note when left alone. In July the bird commenced to sing, softly at first as if afraid of being heard, but later with a loud clear voice often uttered in our presence as if he were proud of it. He continued to sing on cheerfully for about a month and then stopped.

As might be expected, such an opportunity of learning something of the food habits of the species was taken advantage of, and so our "Snowie," as he was called, was fed, or rather, given all manner of things to test his tastes. He was fed as a rule and flourished upon weed seeds, consisting chiefly of wild buckwheat, green foxtail and lamb's-quarters, but was also given many other seeds, including wheat, oats, barley and rye. Among the weeds a decided preference was shown for foxtails (*Setaria* sp.) When all were present at once, including the grains, several of the different kinds would be eaten in rotation, though a slight preference seemed to be shown for wheat. All were readily pulled from the heads when offered in that form, and with oats the husk was removed and the kernel alone devoured. Barley and rye proved far less palatable and were, as a rule, discarded, but several grasses and seeds of other wild plants such as *Aster*, *Solidago*, *Taraxacum* and *Liatris* were readily consumed. This bird would also occasionally pull a few sprouts from a pot of newly growing wheat, breaking them off near the ground, but as the plants got stronger they were ignored.

Among all the food eaten, however, none was so much relished as insects. The greatest luxury probably being meal-worms, though flies were also eagerly looked for and expected when any one entered the room. Spiders, bugs and beetles also occupied a place in its diet, the latter, however, in small numbers only, and potato beetles not at all. Grasshoppers were taken readily, so were cutworms, indeed the latter proved quite an attractive dish, even the moths being partaken of after the wings had been bitten off with its beak.

This little bird still continues to live, to all appearances, happily and contentedly. He does not like strangers but calls out at one on the approach of his own people, puffing out his feathers and twisting continuously as they draw near, with, as he hopes, a choice example of his favourite food, a nice stout fly or juicy mealworm. Like all wild birds in captivity, however, he retains his winter plumage, the only outward indication that he is not truly free.

Addendum.—I had already completed this little history when I received word from home that poor little "Snowie" was no more. He had shown signs of sickness a few days previously, then seemed to have recovered, but on being visited one morning was found dead. Thus the moral comes back to us, that no matter what our intentions may be—no matter how kind we are—a wild bird enclosed within a cage is but a captive, and though it may be happy for some time, lack of exercise and insufficient knowledge of food habits are sure to tell at last, just as they would with us. Birds were made to be free, to roam the woods or prairies as their instincts indicated, and the only excuse for taking them in, is, as was the case with poor "Snowie," when they are unable to take care of themselves.

ABUNDANCE OF THE COTTON MOTH IN ONTARIO.

BY ARTHUR GIBSON.

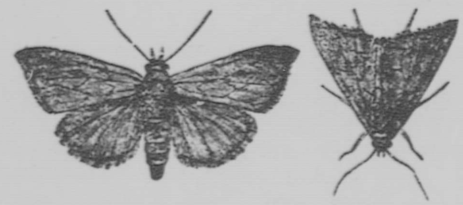
In the Province of Ontario there occurs periodically, in autumn, conspicuous flights of the southern Cotton Moth, *Aletia argillacea.* During September, 1911, an extraordinary flight of these moths was observed in Western Ontario. Mr. W. A. Dent, of Sarnia, Ont., reports that on the evening of September 15th "these moths arrived at Sarnia in countless numbers, for underneath the electric lights in various parts of the town, the ground was covered several inches deep, and for a space of several yards in diameter with their bodies." At St. Thomas, Ont., immense swarms of the moths were also present and attracted a good deal of attention. Mr. S. J. English reported that on September 30th "they were in heaps all along the principal street—Talbot Street—and in other parts of the city." Similar flights were also observed in the United States. In *Science*, Oct. 13th, 1911, Dr. H. T. Fernald reports that the moths were rather abundant, during the last week in September, at Amherst, Mass., and Dr. Henry Skinner, in *Entomological News*, Nov., 1911, states that "from September 23rd to 26th, Philadelphia experienced a large flight of the Cotton Moth, *Aletia argillacea.* They swarmed in some parts of the city and hundreds were resting head down on the electric light poles and on plate glass windows of stores. There were many thousands of them and nearly all that I saw were in perfect condition as though just from the chrysalis. These moths are known to migrate in numbers, but it is quite strange if the great numbers seen here came from the cotton districts in the south. The moths in some places appeared to create considerable alarm, people thinking they would cause damage to plant life here."

The occurrence of this moth in noticeable numbers in Canada is by no means rare, but its appearance during the past autumn in such excessive numbers, as observed in widespread districts, is indeed remarkable. In September last the moths were present in the Ottawa district, but were not abundant. In other years they have, however, been very common in this latter locality. In 1887, Dr. C. J. S. Bethune records * the moths as having occurred in large numbers at Port Hope, Ont., on October 7th to 10th. During the same year they were abundant at Ottawa, when on October 10th, Mr. W. H. Harrington saw at least 250 or 300 upon the front of the Bank of Ottawa building, opposite Parliament Square. During the same year immense

*Eighteenth Annual Report, Entomological Society of Ontario.

swarms appeared at Hamilton on October 7th. In the year 1903, on October 5th and 8th, the late Dr. Fletcher and the writer when "sugaring" for noctuid moths, at the Central Experimental Farm, collected many specimens of this moth which had been attracted to the trees upon which the "bait" had been applied.

The fact that these moths migrate to Ontario in autumn from the Southern States is most interesting. The remarkable thing too, is that large numbers of the specimens are in such perfect condition, that one wonders how the moths make such long flights without in some way damaging themselves. Their wings, however, are very closely-scaled, so can withstand considerable knocking about.



THE COTTON MOTH, (AFTER RILEY).

The figure herewith shows the Cotton Moth, with the wings spread, and also illustrates its habit of resting with its head downward. In colour it is brownish-yellow with a purplish sheen On the front wings are indistinct wavy transverse lines and near the centre of each a conspicuous dark spot, paler in the middle.

The caterpillars of this moth have caused enormous losses in the cotton fields of the south. Before the year 1873, annual losses from the ravages of the Cotton Worm amounted to millions of dollars, in fact in certain years of general prevalence of the worm, the loss totalled as high as $30,000,000. Since the above year, however, the insect has been kept largely under control by a change in cultural methods and the use of Paris green and other arsenical poisons. The caterpillars are, therefore, not now, nor have they been for some years, a serious factor in cotton growing.

THE NATURE OF PARASITIC FUNGI AND THEIR INFLUENCE UPON THE HOST PLANT.

BY H. T. GUSSOW, DOMINION BOTANIST, OTTAWA.

By far the largest number of fungi causing plant diseases are of microscopic character, hence I will confine my remarks exclusively to this large enough group. The average fruitgrower's and the average farmer's acquaintance with microscopic fungi, is, I believe I am correct in stating, one of practical knowledge rather than of scientific conception. This knowledge again is mainly based on personal observations of such common forms as moulds, which are met with in all places and of probably some of the more prominent symptoms noticeable on vegetation, resulting from the attacks of parasitic fungi, than by the actual study of these forms. Of these latter the rust and smut fungi, no doubt, are the best known forms.

Many of the microscopic forms of fungi which we may find on dead plants and parts of plants, have appeared considerably like moulds on clothing, wallpaper, bread, etc.—i.e., they have not been responsible for the death of the plant. These fungi have been designated as saprophytes and are by their mode of life distinguished from parasitic fungi which are capable not only of attacking living plant tissues, but also of maintaining themselves from the food manufactured by the attacked plant for its own use, which partnership frequently results in serious injury or death of the host plant.

Microscopic fungi as the name indicates are extremely minute organisms whose study necessitates a more or less powerful microscope. Indeed, we will find that notwithstanding the minuteness of these objects, some are of a decidedly complicated structure. The use of a microscope will readily reveal a vegetative and a generative portion in each of these individuals.

The vegetative part of fungi is analogous in a certain degree to the roots, stem, branches and leaves of higher organized plants inasmuch at any rate as the vegetative parts of a fungus are responsible for the taking up of food required for its own use. The vegetative portions of fungi consist of very fine, branched, more or less long, transparent or coloured tubes, which may be likened to a human hair or fine capillary glass tubes. These tubes are technically known as vegetative hyphae. They are exceedingly small, measuring often less than a two-thousandth part of an inch in breadth, while their length may vary from a twenty-fifth of an inch to large dense masses covering whole parts of plants. The contents of these tubes consist of protoplasm which is in many cases partitioned off by means of small separating walls or septa. The hyphae may develop within the tissues of plants or cover their surface; collectively they are spoken of as the mycelium.

As soon as the vegetative part of a fungus has had time to undergo a certain development or growth, the generative portion is produced. This consists of the reproductive organs or fructification which may be of very diverse construction, but which like the seeds in flowering plants, serves the purpose of reproducing its kind. Reproduction of fungi is effected by spores which when ripe leave the parent plant in various ways and which are capable of growing independently into new plants. The sexual development of fungus spores, similarly to the seeds of higher plants is accurately known in a few instances. It is generally accepted that most fungus spores are produced asexually, that is without egg and sperm cells. The simplest form of spore production is that of the conidiospores. It takes place by the rising up from the mycelium of a number of erect hyphae, all of which produce at their tips a single or a series of spores. These spore-bearing branches are known as conidiophores. Frequently these conidiophores branch and each branch segments it self into successive spores. This is the case for instance in the fungus causing the common potato disease *Phytophthora infestans*. In other fungi the production of spores does not take place by this act of segmentation, but the contents of the hyphae itself generally form into spherical spores. In this way the smut spores of grain are produced.

A very common method of spore production is that in which the spores are produced in separate tubes, small sac-like organs, technically termed asci These are much broader than the hyphae and are generally club-shaped. Each ascus contains from two to eight spores often more, but always an even number. The spores produced in this manner are known as ascospores and the whole group endowed with this method of reproduction is known as ascomycetes. These forms of fungi are again subdivided according to the number of spores in each ascus and by the manner the asci are produced, which may be singly as in the Peach Leaf-curl fungus, or in flat or rounded discs as in peziza or in fruiting bodies similar to pycnidia , but here termed perithecia. These conditions of spore production may become still more complicated, as even one species may produce several kinds and crops of spores.

The spores of microscopic fungi differ greatly in size and form. Their colour is more generally hyaline or transparent, but they may also be brown, grey, pink, etc. Their form varies greatly: they may be oval, round, rod-shaped, or sickle-shaped, with pointed or rounded ends. They may be of single cells, or divided into two or many sections, smooth or pitted, with netlike markings or appendages. Thus they will be found to be very different objects, but their appearance is constant in each fungus. These characters, together with the manner in which they are produced are regarded as specific and generic distinctions and are largely used for the purpose of classification. When ripe the spores are shed in various ways, the conidiospores simply become detached and are carried by the air.

Spores produced in pycnidia or perithecia may either ooze out, or be expelled with force through a hole at the apex of the fruiting bodies. Others again are freed by the collapse or decay of the conceptacles in which they are produced. When ripe the spores either pass through a period of rest, as winter spores, or they immediately germinate, when they may be regarded as summer spores. Germination can only be accomplished successfully when there is sufficient moisture available. Hence we all have had the experience of seeing some fungus disease spreading rapidly during moist warm weather (Apple and Pear Scab, Potato Disease, Mildews, and others). Under favourable conditions the spores take up a large quantity of water and begin to swell, often to double their original size. The next step in germination is a rupture in a cell wall and the protruding of a germinal hypha, which is pushed into the particular substratum (leaf, twig, etc.), where it quickly begins to ramify. We have considered previously the great variation of the fungus spores. The germination of the various spores is likewise very different and frequently an important factor for distinction of species. Conidiospores most generally germinate by producing directly one or more germinal tubes which are capable of infecting plant tissues. Smut spores, however, produce first a so-called short promycelium on which secondary and even tertiary spores may be formed which on germination produce the tube causing infection. The loose smuts of barley and wheat, however, produce infection tubes directly. Similar in behaviour are the teleutospores of our rust fungi. They also produce a promycelium and secondary spores when germinating.

Still more different is the germination of the spores of the common potato fungus. Here the contents of the conidia produced by segmentation of the branches breaks up into minute microscopic bodies, which for some time may be seen rapidly swarming about. After a very short period, however, these swarm spores become stationary and their walls thicken until they finally germinate by producing the typical infection tube.

There are numerous fungi which produce both summer and winter spores. The Black Knot of plums and cherries, the Powdery Mildew of grapes, Scab of pears and apples all produce two forms of spores. The ascospores are nearly always winter spores. The teleutospores of rusts, or egg spores of the Peronosporae, which cause the downy mildews are not ascospores, though typical winter spores. The summer spores serve the purpose of a rapid propagation of the fungus, while the winter spores are responsible for carrying diseases over the winter. Very rarely may summer spores be carried through the winter alive, owing to their feeble protection and short life. The winter spores are produced in conceptacles, which are exceedingly well protected. They adhere firmly to the substratum on which they have been produced or are imbedded therein.

Our next problem to consider is the mode of life of fungi and their influence upon the host plant.

Green plants or chlorophyll-bearing plants manufacture their food, as you know, from the carbonic acid of the air by means of the small chlorophyll grains in their leaves and by the action of sun and water. This physiological process is known as "assimilation." The first visible product of assimilation is starch. The starch again undergoes certain changes and forms carbohydrates like dextrose and sugar, which are used as food by the plants. In other words, the manufacture of food necessary for the growth of the green plants takes place in the chlorophyll-bearing portions by means of this chlorophyll substance. Fungi possess no chlorophyll. Hence, they are not able to utilize directly the carbonic acid of the air. They are compelled to search elsewhere for the carbohydrates essential for their development and accomplish this by living upon substrata from which they are able to obtain a "ready-made" supply of food. Parasitic fungi live upon plants in various ways. They may be confined to the surface entirely like the mildew fungi, when there will be produced on the mycelium peculiar sucker-like organs—so-called haustoria—by which they absorb their food from underlying cells. Other fungi, by far the greatest number, live within the tissues of the host plant. They may also produce haustoria, but more generally the absorption of food takes place directly by the action of the vegetative hyphae on the infected tissues.

Following the growth and development of parasitic fungi, a collapse of these cells, robbed of their contents, takes place and the earliest symptoms of disease appear. Often the infection is exceedingly local and the result is the production of smaller or larger spots of dead tissue. The shot hole fungi of plums, cherries and peaches, illustrate well this peculiarly confined growth. Quite recently my attention was called to the outbreak of an alarming disease among cherries in Prince Edward Island. On investigating the epidemic I found that this trouble was due to a common plum and cherry leaf spot fungus which had defoliated practically all attacked trees. Two or three years' repetition of this malady has resulted in the wholesale destruction of cherries in this Province.

Other fungi may attack, besides the leaves and fruit, the young shoots of trees and destroy last year's growth and thus much of the expected harvest. Others again, cause cankers which spread from year to year until the whole branch is ringed and shut off from the food supply. Formations like the enlarged portions of plants, which occur in black knot, plum pocket, club root, etc., are also very common.

It now becomes necessary to briefly consider the question of the predisposition of plants towards disease. The word predisposition may not be fortunately chosen to describe the peculiar observations that may be made in the direction of resistance or susceptibility towards disease. In medicine as well as in plant pathology we often meet with typical cases of immunity in animals or plants. For some reason or other some individuals escape a disease altogether, or remain singularly resistant in recovering unhurt from an attack. Hence, modern investigators claim that the successful selecting of resistant varieties would sooner or later decide the question of treatment for disease. This expectation is undoubtedly quite reasonable, but at present we have only just begun to open our eyes and the results obtained so far have more of a scientific than a practical value. Disease resistance has been established to a certain degree in grain—considering the rust problem, but unfortunately the varieties fairly rust-proof showed other undesirable characters, or they were disease-proof only in a small locality. We must also bear in mind that the adaptation of disease-causing organisms to new conditions will play a very important role, and at present while there is every hope of improving our knowledge in this respect, our results are not established long enough to speak the last word in the breeding of disease-resistant varieties. It would, however, be quite erroneous to construe my remarks in a manner in which they were not intended. While pointing out the difficulties, yet there is every hope of making important discoveries along these lines.

Next, let us consider the resistance to disease. In medicine we are informed that living according to common, normal sense, avoiding foods or practices which lead to the weakening of the organism, we will not only reach but maintain a condition which we describe simply as health. Health, to my mind is nothing else but the keeping of body and mind sound by performing the normal functions of our organs. Thus, by following closely our needs and by living correctly we can bring our bodies into a state of great resistance and even immunity, though we may be living amidst a serious epidemic at the moment. Infectious germs, though surrounding us constantly, will have no chance of exercising their serious effect upon us if we are in a perfectly sound state of body. It is quite impossible to avoid contact with disease germs and this being the case, prevention of disease is largely dependent upon success in bringing our organism into a strong condition of resistance. This, of course, is exactly the same in plants. Plants are living beings subject to all kinds of ills without being actually diseased, i.e., being attacked by a specific organism bringing about a pathological condition. Prof. Marshall Ward of Cambridge, England, has expressed himself very instructively on the subject of predisposition to disease in plants. He refers to two plants of the same kind as much alike as possible in every respect, size, condition, development, etc., and goes on to say, "Picture to yourself one of these plants growing under the most perfect conditions, supplied with the proper amount of food, its roots expanding into a well-ventilated soil, rich in humus and plant food, etc., and the other growing under absolutely reverse conditions." The result will be in one case a strong healthy plant and in the other, a poor weakened plant just strong enough to keep alive. Now the conditions, not to say constitutions of these two plants must be very different. Different modes of nutrition we know produce different chemical changes within a living plant. And, no doubt, this difference in the condition of the host plant is accountable for its power of resistance or state of susceptibility. There may be a number of other factors producing similar differences in constitution or in composition, if this is more correct. A potato tuber sound and fresh, will remain free from fungi if kept in an ordinary room, while one that has been exposed to frost or steam heat for a moment will soon be covered with mould fungi of various kinds. We know of course that we have changed the chemical composition of the potato exposed to frost or heat, but we have also partly destroyed its life. The same may be said of Prof. Ward's "ill-treated" plants. Together with the changes of the chemical composition, we have reduced its vital power; hence, would it not be reasonable to expect an increased resistance to disease if the vital power of any living organism is kept up to the highest mark? That this contention is fundamentally correct is amply proven by the fact that cultivated plants which we grow under conditions to which they are not fully accustomed are, generally speaking, more subject to disease, likewise as Europeans are much more liable to disease in tropical climates and vice versa. Sudden or even gradual changes frequently result in lowering the vitality of a living organism. Cultivated trees are constantly subject to such unnatural changes.

I have endeavoured to explain briefly, in the foregoing remarks, the life and nature of parasitic fungi. We have considered how fungous diseases are spread by means of the spores produced by the causal organism, we know how different may be their modes of fructification and that winter and summer spores must be looked for in many kinds, and we have further discussed the effect of a fungus on the host plant and hinted at certain factors rendering plants more or less susceptible to disease.

From the practical standpoint of the control of disease in our crops a knowledge of these different aspects of the subject is necessary in order that the organism causing the disease may be attacked where it is most vulnerable. We see that in spite of certain general principles the methods to be adopted against different diseases will vary with the life-history of the causal organism and hence has arisen the necessity for close investigation of these life-histories and the finding of methods of treatment based upon them which together form so large a portion of the work of the Plant Pathologist.

THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Forty-eighth Annual Meeting of the Entomological Society of Ontario was held at the Ontario Agricultural College, Guelph, on November 23rd and 24th. The reports of Directors Gibson, Grant, Cosens and Treherne on the destructive insects of the year in their respective districts showed that many of the well known pests had been present in large numbers and that consequently much damage to various kinds of crops had resulted from their attacks. Such insect pests as the Codling Moth, Apple Maggot, San Jose Scale, Plum Curculio, Oyster Shell Scale, Cutworms, Root Maggots, etc., were reported upon by the above Directors, and by Dr. C. Gordon Hewitt and Mr. L. Caesar, of the O.A.C., during the afternoon of the first day's session. An interesting account of "The Work of the Division of Entomology" of Ottawa was given by Dr. Hewitt, in which statements were made of the several branches of the work which is now carried on under his direction. During the same afternoon a paper by Rev. Dr. T. W. Fyles, of Hull, Que., on "Notes of the Season of 1911" was presented, in which observations were recorded which had been made by this veteran entomologist during the past summer.

At the evening meeting, held in Massey Hall, a happy address of welcome was presented to the members by President Creelman. Dr. William Riley, of Cornell University, who was to have delivered the Popular Lecture, unfortunately was too ill to be present, but his place was taken by Dr. Hewitt, who gave a most interesting address on "Insect Scourges of Mankind." The two dreaded diseases which are rampant in sections of Africa, viz.: Nagana, which is destructive to domestic cattle and horses, and the Sleeping Sickness, which depopulates many districts, both of which are spread by tsetse flies, was fully discussed by the lecturer. The question of the spread of malaria and yellow fever through the agency of mosquitoes was also gone into and facts given of the early work in demonstrating that both of these very fatal diseases can only be spread by micro-organisms developed within the body of certain species of *Anopheles* in the case of malaria, and of the *Stegomyia* mosquito in the case of yellow fever. Slides illustrating various points in the lecture were shown on the screen; those illustrating the African diseases above mentioned, indicated only too well what terrible scourges these are.

In the morning of the second day's session, Dr. E. M. Walker, of Toronto University, presented his presidential address This dealt largely with the present status of entomology in Canada and offered many suggestions as to certain studies in some of the lesser known orders of insects, which have been largely neglected by students, and concerning which much information is desired. During the afternoon of the same day the following papers were read:—

"Some Forest Insects from DeGrassi Point, Lake Simcoe."
—Dr. E. M. Walker.
"Thrips Affecting Cereals."—Dr. C. Gordon Hewitt.
"The Stream."—Rev. Dr. Fyles.
"Blister Beetles."—Mr. Arthur Gibson.
"A Parasite of Hepialus thule."—Mr. A. F. Winn.
"Common Scolytids of Eastern Canada."—Mr. J. M. Swaine.
"Insect Migrations in Manitoba."—Mr. Norman Criddle.
"Catalogue of Canadian Insects."—Dr. C. Gordon Hewitt.
"Entomological Record for 1911."—Mr. Arthur Gibson.
"Notes on Hepialus hyperboreus."—Mr. A. F. Winn.
"The Bot-flies of Ontario."—Prof. T. D. Jarvis.

All of the above papers, reports, etc., will be published in full in the annual report of the Society which will appear early in the new year.

It was decided that the next annual meeting be held in the City of Ottawa during the autumn of 1912, the exact date to be decided upon later.

LECTURE ON LANDSCAPE GARDENING.

On November 14th, Prof. F. A. Waugh, Head of the Division of Horticulture and Professor of Landscape Gardening at the Massachusetts Agricultural College, Amherst, Mass., addressed a joint meeting of the Ottawa Field-Naturalists' Club and the Ottawa Horticultural Society in the Assembly Hall of the Normal School. His subject was "Landscape Gardening," and by means of a fine set of lantern slides he showed the large audience which had gathered to hear him the proper relationship between architecture and landscape gardening, and in a very lucid explanation of the principles of landscape art, as expressed by the pictures which illustrated his lecture, he was able to impress his hearers with the importance of his subject.

Civic art, was first taken up as a branch of landscape architecture. It was shown that the same principles apply in civic art as apply in good landscape gardening. The main requirement is that the work should be done in a systematic and orderly way, instead of an unsystematic and disorderly way, and that the aim is to achieve the maximum of beauty combined with a maximum of utility. Neither can civic art ignore beauty. These two elements are not antagonistic in any case, but coöperate with one another.

Ottawa, as the capital city of a great nation, deserves special development along the lines now laid out by civic art. It has an unusually fine location, on the banks of rivers and on ground of varied topography. It would naturally profit by the experience of the other great capital cities of the world, such as Berlin, Washington, Vienna, Paris, London. A number of lantern slides were shown to illustrate the possibilities of beautiful civic development, as shown in the cities mentioned. Adequate space should be reserved for public buildings and streets and open places so arranged as to give ample effect to the large public buildings which will be required in Ottawa. Another point in the development of this city must be the preservation and beautification of the river fronts. Of these, Ottawa has several miles and has already begun, in a commendable manner, to preserve and improve them. Such preservation should be extended and the methods of improvement should be brought up to date. Aside from this, the city should reserve ample park areas, which should be selected with respect to the preservation of types of native scenery in the immediate neighborhood. At the present time, the park areas in Ottawa are distinctly inadequate. Any forecast of the future makes it certain that much larger areas should be secured at no distant date. These should be secured at once, both because the selection is easier now and because the cost of land is much less.

Landscape gardening as applied to domestic life was then discussed and illustrated by various lantern slides showing types of gardening in continental Europe, England, Japan, the United States and Canada.

With regard to landscape art in general, the speaker advanced the theory that the strictly characteristic thing on the continent of North America was a high regard for large aspects of natural scenery. Lantern slides were exhibited showing the beauties of native scenery, special attention being given to the magnificent views in the Canadian Rockies. Canadians and Americans dearly love this wild scenery, and its preservation in large public parks is a great national duty. The speaker said that while landscape gardening in many of the older countries of Europe had often meant gardening with the landscape left out, it might well mean on the continent of North America landscape with the gardening left out. While this should not be interpreted to cover the whole of landscape art, it should always be recognized as one of the most important manifestations of it in Canada and the United States.

BOOK NOTICES.

THE HOME-LIFE OF THE OSPREY, photographed and described by Clinton G. Abbott, B.A., Associate of the American Ornithologists' Union, with thirty-two mounted plates. London: Witherby & Co., 326 High Holborn, W. C. Published price 6/- net.

This delightful story of the home-life of the Osprey is a companion volume to "The Home-life of a Golden Eagle", which was noticed in the July number of the OTTAWA NATURALIST. It is the third volume of the "Bird-lover's Home-life Series" which are being published by the above firm. The author's observations were mostly made on Gardiner's Island, which is a well known breeding ground for Ospreys, and which lies about three miles from the eastern point of Long Island. The photographs which accompany the volume are particulary good and well arranged. The whole work is very pleasing and it will undoubtedly have a ready sale among students and lovers of birds.

THE LIFE OF THE COMMON GULL, TOLD IN PHOTOGRAPHS, by C. Rubow, 1/6 net, is another bird booklet recently published by Witherby & Co. This contains 25 half-tone reproductions from photographs, illustrating the nesting habits, etc. of *Larus canus*, which is one of the most frequent gulls on the coast of the North Sea and the Baltic, and which has also been occasionally met with on the Labrador Coast.

A. G.

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