JUNE, 1907
VOL. ~~XXIII~~, No. 3
21

THE OTTAWA NATURALIST

Published by The Ottawa Field-Naturalists' Club.

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ISSUED JUNE 21, 1907.

OTTAWA, CANADA;
THE ROLLA L. CRAIN CO. LIMITED
WELLINGTON ST.

Entered at the Ottawa Post Office as second class matter.

THE OTTAWA NATURALIST

VOL. XXIII. OTTAWA, JUNE, 1907 No. 3

CLIMATE IN RELATION TO HEALTH.*

By PETER H. BRYCE, M.A., M.D., Chief Medical Officer, Interior Department, Ottawa.

Mr. Chairman and Ladies and Gentlemen:—

In order to comprehend the problem of climate in relation to health, we must for a moment consider the relation of the atmosphere to the human body. Herbert Spencer has defined life "as the concordance of a series of internal movements in correspondence with a series of external acts;" or, as the Spanish poet-scientist would put it, . . . "Life is the harmonic rythm of the infinitude of individual cell-organisms of the body in consonance with the Mechanism of the Universe (Mechanica ritmica)."

Briefly stated, the oxygen of the air is *life* and upon its entrance into the system depends the functioning of the tissues and organs of the body. We respire 17 times in a minute normally, and inhale some 25 cubic inches at each inspiration, or in twenty-four hours some 11 metres of air, of which one-fifth is oxygen. In health this air enters by way of the nose, but in increased exercise by the mouth as well. It is evident, therefore, that normal inspiration depends upon healthy air passages; without them the chest becomes depressed and finally deformed. Mouth-breathing is abnormal and injurious since the air reaches the lungs too soon to be warmed, while in addition, its impurities reach the mucous membrane directly instead of being filtered by the cilia of the nose. Indeed, physicians are now agreed that it is by the mouth that infections most commonly reach the system through the tonsils; while on the other hand, the air entering by the nostrils is filtered, warmed and moistened before reaching the delicate lung tissues. Assuming that this air is dry and cold, we find that it takes up in the air passages moisture to 92% of saturation, and is raised to 97° F. before being expired. The water thus abstracted from the body amounts to 7,000 grains, or 1 pound, in twenty-four hours. Moreover, Miquel has shown that air has as high as 70 living germs even in pure outer air per metre, and as many as 20,000 in the air of hospitals and other crowded buildings. Assume that the air inspired is in an impure, infected house atmosphere and we cannot fail to

*Address delivered at Normal School, Jan. 22nd, 1907.

see how the *bacilli* of tuberculosis reach the tissues. We thus see that it is in the foul, deoxidized air of tenements that we are to look for congested, catarrhal mucous membranes, and for infection reaching the mouth, through nasal catarrh making mouth-breathing inevitable. We thus have the double evils of imperfect nutrition from insufficient oxygen, and of the poisonous effects of infected air. These slum conditions, however bad they may be in southern cities, are relieved by the outdoor life possible even in winter, while in northern cities we have the impure air of houses with the abnormal dryness of furnace-heated houses, due to the great differences in temperature and moisture between indoor and outdoor air in the winter months. When it is realized, for instance, that in Ireland, with its small chilly cabins, heated only with turf fires, the deaths from diphtheria in 1893 were but 0.08 per 1,000, and in London 0.78, and that while the death-rate in all Scotland in 1892 was 2.3 per 1,000, that in the rural fishing villages with their cold and wet, was 1.7 per 1,000, it will be seen that the conditions of house atmospheres are the most potent influences of any single factor in climate. To give but a single Canadian example: I have found that in the beautiful foot-hill climate of our own Alberta, the death rate of some of the Indians on certain reservations, where they live in small, crowded and insanitary houses, reached last year as high as 80 per 1,000, largely due to consumption.

Manifestly then, the maintenance of cleanliness in houses, together with an abundance of warm air with sufficient moisture, is primarily of all conditions that upon which health in temperate climates depends.

Carbonic Acid—It has been already explained how oxygen obtains entrance to the tissues, and to what extent. In the tissues it is taken up by the red corpuscles through the thin lining membrane of the lungs, and by them carried to the tissues where it unites with their carbon to form carbonic acid. Some 1,400 grains, or 2 pounds of carbonic acid is given off by the lungs in twenty-four hours. Thus we see that oxygen burns up the wastes of the body to the extent of nearly 3 pounds given off daily, further increased one-third by active exercise. It need hardly be pointed out that this active life process produces heat, and that it goes on best and normally in the pure outdoor air, which on the plains and mountains is almost germ-free. If then, wastes are produced by this organic combustion and are thrown off by the lungs, skin and kidneys, it is apparent that the fuel thus burnt up demands that a fresh supply, in other words, food, be taken into the system. So we see how absolutely essential it is if we

wish not only to maintain health but also to reconstruct diseased tissues, that we have not only an abundant supply of pure oxygen, but also food to restore tissues, or to make new blood and more heat and energy.

Humidity of the Atmosphere.—It has already been stated that oxygen of the air is to nitrogen as 1 to 4 in volume. But we have in the atmosphere water as vapor in varying amounts. Normal air on a bright day in this climate contains about 70 to 75% of saturation with water vapour. All are aware how depressing a damp day is. We say the air is 'heavy,' but as a matter of fact the barometer shows it is lighter. This physical effect means simply that with excessive moisture the air breathed with each respiration has less of oxygen, and we are not then receiving enough to supply the demands of the body tissues, and so they are being over-loaded with effete matter. Moreover, the excessive air moisture prevents our bodies from throwing off body wastes by evaporation.

Temperature of the Atmosphere.—But there is yet another factor of importance in our climate which effects us, that is the coldness of the air. Remembering that air expands 1-273 part of its volume with every degree F. it is plain that air at zero is, as we may say, more condensed, that is every 15 cubic inches which we inhale contains more oxygen than at 90 degrees by about 25%. But air at zero holds less than 1 grain of moisture as vapor, so that cold air inhaled means increased chemical action in the tissues; more combustion, more wastes produced, more waste thrown off and more desire for food.

Regnault's Tables show air at 70 degrees to actually hold 7.992 grains of moisture, or 16 times as much as at zero; so that cold, dry air means that the body throws off by both respiration and evaporation much more moisture and with it more wastes from the body in solution. This same condition is attained in the high, dry climate of our western foot-hills, where with a relative humidity of often 50%, the amount of moisture actually cast off in twenty-four hours is, according to Dr. Denison, 25% more in twenty-four hours.

Sunlight.—But while the consumption of oxygen is greater in such climates, and the increased wastes cast off with moisture are likewise increased, we have further another influence in the effects of the direct sunlight of the plains and in our own climate on bright days. Much has of late been told us regarding the actinic rays of the sunlight, these being those at the farthest end of the spectrum, viz., the red and ultra violet. These rays

actually do penetrate the tissues and, like the Roentgen rays and radium, do produce actual changes in tissues. Such rays, we know, are obstructed and diffused by vapor and clouds, and in the summer, create with heat those conditions under which fungi, as rust and mildew, develop on plants and in houses.

Influence of Altitude.—One of the most remarkable effects of high altitudes, as in the Alps, is the notable increase of red corpuscles in the blood. When one goes quickly from say Vera Cruz in Mexico to Mexico City, at 7,300 feet of altitude, in 12 hours, he is conscious at once of exhaustion on the slightest exercise. The reason is that the 4,000,000 corpuscles per cubic centimetre are not normally capable of absorbing enough of oxygen to supply the needs of the tissues, hence there is actually an anoxydation. Now it is probable that the defective supply of oxygen which is rapidly overcome, say in a fortnight, through an increase of the corpuscles to 6,000,000, or more is due to the bright sunshine. Rapid metabolism or changes of tissue results, since to get enough of oxygen deeper and more frequent inspirations invariably and necessarily are the temporary effect.

Thus we have here again rapid reconstruction of tissue by increased demands for food, and the rapid increase of red corpuscles is insured, provided that exhaustion is prevented by temporary rest or slight exercise, and protection is insured against a loss of body heat by adequate clothing, with the very rapid fall of often 40 degrees of temperature within two hours as sunset approaches.

I have thus, as briefly as possible, indicated not only how air or oxygen enters the system and produces effects there, but have also shown how its normal constituents, oxygen and moisture, and its abnormal contents, disease germs, produce certain effects and how house atmospheres or excess of moisture, cold, sunshine, and altitude all play their parts for good or ill upon the human body. We have to deal now with actual climatic conditions as we find them in Canada, and to indicate some conclusions which seem to grow out of these.

Remembering that in tuberculosis we have a disease which yearly takes its toll of some 9,000 deaths in Canada, and realizing that all sanitarians call it essentially a house-disease, increasing directly with house density of population, we may properly study it in relation to climate and in this include house atmospheres or *artificial climates*. It will further be apparent that whatever climatic conditions influence this disease, influence probably equally other diseases.

The problem of lessening tuberculosis presents two factors;

first, its *prevention*, and second, its *cure*.

Prevention of Tuberculosis.—Assuming that tuberculosis does not exist in a family or in a house, it is plain that with cleanliness in the house, in its atmosphere, in the food and clothing, the disease cannot come there. Extend this to shops, street-cars, schools, etc., and it could not be generated there. But experience and scientific experiment both readily teach us that in our cities and towns, expectoration and coughing leave its germs in every public place. Nevertheless, it is well known that persons with healthy mucous membranes, if care is taken to destroy sputum and use handkerchiefs when coughing, may act as nurses for years in consumptive hospitals and yet not become infected. Clearly then, house, school and shop cleanliness are first essentials. But inasmuch as infected persons must be taught these facts, and those nursing them as well, it is apparent that education by the family physician, by the district nurse, by the school-teacher, and by public lectures is absolutely essential to prevent infection where the disease has once been present.

But from what has been said regarding the atmosphere of houses, as regards purity, moisture and heating, it is apparent that municipal provisions, with the assistance of charity workers, by which house construction, house sanitation and the number of persons to a certain air-space are regulated, must be strictly enforced. We thus see that the task is a large one, and one which we have as yet scarcely begun to cope with.

Cure of Tuberculosis.—But assuming that we have set all this in motion, we have yet to deal with the actual cases of disease. As all have observed, it is seldom that persons in rugged health take tuberculosis, and it is usually where the vital powers have been reduced by some acute disease, as pneumonia, typhoid or pleurisy, that naturally healthy persons are infected. The reason for this is plain: the germs do not enter the system ordinarily except by the respiratory tract, and obtain a lodgement only when its vitality is reduced. If, however, house air is infected, if it is abnormally dry, if its oxygen is lessened by over-crowding and non-ventilation, if catarrhs prevent normal breathing through the nose, if lack of exercise, lack of food and loss of rest occur, and all these too often *do* occur amongst the employees of city factories, shops and many homes, it is apparent that infection is almost inevitable. But having occurred, it is apparent that the only hope of preventing the progress of the disease is in removing the patients at once from the effects of such conditions.

Home Treatment.—Can treatment of tuberculosis be carried out at home? Yes, in many cases, if the patient be intelligent and willing to submit to regulations and friends are willing and able to provide the means. For the patient's sake, leaving out the public, it is apparent, however, that consumptives must not continue to work indoors. It may be hard to arrange, but a life is at stake. If then the patient remains at home, she may find light employment in rooms, bright and fresh, and hope for time and care to assist in recovery. But if, as is commonly the case, the disease is not diagnozed till fever is present, it is evident that active measures are demanded. At once then the patient may in a balcony on the south side of any house live in the pure condensed oxygen of our winter days, and exposed to the sunshine and wrapped in flannels and furs, breath such an amount of oxygen that reconstruction of tissue by increased food may be fairly expected to follow. If men engaged indoors become infected, then a similar rest cure till the fever is reduced and strength increased must be instituted, after which we may find it possible to engage in light work in the outer air, and recover health.

Sleeping in tents in the open is equally effective, and in doubled-walled tents I have had hundreds of persons, smallpox patients, live comfortably at 20 degrees below zero.

Treatment in Sanatoria.—It is evident, however, that for poor persons, removal from home surroundings for a time would be better, and hence within recent years sanatoria, or health Homes, have been instituted in different places, where under wise medical supervision patients are instructed in every thing likely to promote health. First, they are removed from the danger of infecting those at home; the varieties of type in the disease may be studied, the digestion corrected, the amount and kind of food regulated, and education in the many details of daily habits carried on.

Climatic Treatment—But after what has been said regarding differences of climate, it is only natural to suppose that certain places where the air is pure and cold, exposed to no great changes as regards moisture and temperature, would seem to provide conditions especially favorable to cure. We have in Canada three distinct types of climates, which, for reasons already stated, appear to me to possess superior advantages.

They are, first, the great Laurentide areas of Quebec and Ontario, where in winter, the climate if cold is equable, the atmosphere, owing to the forests, free from great changes, while the air, ozonized by the evergreen forests, supplies for

many cases conditions which have proved perfect. But there is, perhaps, too great an absence of sunshine. Second: The climate of the foothills of the Rockies, from 2,000 to 4,000 feet in altitude. Cold, bright, dry, elevated prairies, they provide ideal conditions, only affected unfavorably in my judgment by often disagreeable winds. But this latter is largely absent in the remarkable elevated belt lying between the Rockies and the Selkirks; the East Kootenay Valley. It is a bright, always dry belt, where we have in addition great forests of pines in open park lands, lessening the wind and the too rapid radiation, yet permitting, owing to the absence of much snow, exercise on horseback or walking almost every day in the year. Yet it possesses the stimulating effects of 4,000 feet above the sea. Third: But there are cases for whom this high altitude is excessive, viz., those with poor circulation or defective hearts. For them we have the lovely valley of the West Kootenays and Kamloops country. There at heights not greater than the hills of the Gatineau, yet where 4,000 may be reached in an hour, almost daily sunshine, with light snowfall, permits of a constant outdoor life under pleasant, easy conditions; usually not very cold, no great daily variations, and yet more, a country where the cured consumptive can very readily undertake a healthy outdoor occupation in fruit growing. With dryness, brightness, slight elevation and with no excessive changes, this glorious climate with pleasant material prospects, may well lure the patient who, under the stress of modern life in our cities, has proved himself unequal to the task, and who may with good reason, expect to gradually recover health through a reconstruction of tissue, where a healthy life in our more rugged eastern climate may prove to him impossible.

THE WEATHER.

By OTTO KLOTZ.

The continued cool weather during the past spring together with a heavy snow-fall on the 4th May, and some snow on 28th of the same month here in Ottawa, has not passed without comment by old and young, and by the Press.

The question naturally is asked—Why is there such a continuance of low temperature?

If the meteorologist is able to tell us what the weather is going to be tomorrow, why not that of a month or several months hence? Let us try and get a clear idea of how the daily weather forecasts are made. Weather is essentially a matter of the circulation of the atmosphere, and the circulation in turn is due to difference of pressure, the movement of the air being towards those parts of the earth's surface where the pressure is least. The instrument used for measuring the pressure or weighing the air is the barometer, and it is the principal one used in obtaining data from which to make the forecasts. Over the continent from the Yukon to the Gulf of Mexico are distributed stations which daily report telegraphically at the same time either to Toronto or to Washington the state of the atmosphere, that is, the pressure, temperature, direction and velocity of wind, so that the probability officer has the equivalent of an instantaneous photograph of the weather conditions.

Entering the data for the respective places on a map prepared for the purpose, and joining places having the same pressure, or more strictly speaking, the places for which the pressures are given, serve for drawing the lines along which the pressure is expressed in inches and tenths of an inch. Such a line is called an isobar, and the interval between any two isobars represents a difference of a tenth of an inch. If the isobars are crowded together, it is something like having a steep roof, the water running down it faster than on a flatter roof, similarly it is with the air, it is a matter of gradient. When the daily map has thus been filled with isobars immediately on receipt of the data, the officer sees at a glance how the great atmospheric swirl is moving, moving of course from where the pressure is great to where it is less, or technically speaking from an area of "high" barometer to an area of "low" barometer.—The area of "high" barometer we may describe as one where the air is piled up and flowing towards the valley of the "low". Now when this "high" is pouring down, and our

"highs" originate mostly in the Northwest, it brings with it the cold air of the upper regions, although modified in its temperature by descent. From years of experience the forecaster, having his constructed weather chart before him, showing the conditions at an absolute instant, can make a pretty accurate estimate what the atmospheric movements are going to be for the next 24 or 36 hours, that is, he gives us our daily probabilities. It may be mentioned that our Canadian Meteorological Service in accuracy of prediction is second to none other.

If we know what time a train leaves Calgary or Edmonton across the continent we have a pretty fair notion (barring blizzards) when it is going to arrive at Ottawa, and so the forecasters having been advised from many sources of the departure of the atmospheric currents knows pretty well when they will arrive here and how they are going to behave. We must bear in mind that electricity travels faster than weather. If the telegraph wires were all cut and the meteorologist were dependent wholly on his own local observations, our daily "probabilities" would have little value. We see then that the meteorologist simply tells us from what has begun to happen what is going to happen.

But why does it happen, why has the air persisted to pile itself up sky-high so to speak in the Northwest, and many other whys?

It is not known, is the answer in brief. But in saying so, it must not be imagined that the problem is not being attacked, and vigorously attacked. The explanation of the beginning of the circulation is very simple. Our great furnace, the Sun, oblivious of the price of coal, is pouring his heat into space and our earth intercepts a very, very small part of it. Where the rays fall vertically or nearly so, more heat is received than where they fall slantingly; compare the melting of snow on a roof facing the sun straight, with one facing sideways, that's exactly the effect in the equatorial and temperate regions. The earth and air in the former become in consequence our terrestrial furnace, receiving the most heat. The heated air rises, and necessarily air to the south and north of the equator flows along the surface to take the place of the ascending air. The circulation of the air has begun. The rotation of the earth modifies the currents in direction and otherwise. Without pursuing the circulation of the air thus started any further, being outside the scope of the present note, it may be pointed out that the earth revolves on its axis from year to year in the same time and its journeys around the sun follow the same old trail during our life-time, the mountains and valleys on the earth or other topographic

features that influence surface atmospheric currents are for our ephemeral existence unchanged, yet who doesn't remember that "the weather is so different now from what it was the same time of the year ten years ago." It seems absolute certainty then that the *causa belli* must be sought in our source not only of all heat but also of all life and of all energy of whatsoever nature upon the earth—the sun.

A good deal is known about the sun, but a good deal more is not known. The sun as has been said is our furnace. Now the trouble is we don't know how the furnace is run, we don't know what kind of heating material is used; it doesn't seem to be fed regularly; we haven't been able to measure accurately yet just how much heat is poured out, on to say a square foot; it is a seething boiling cauldron that is now under pretty close scrutiny, although at rather long range, and its inner working must yield up its story ere we can hope to give a satisfactory answer as to the "why" of weather; for the sun and weather stand in the relation of cause and effect to each other. Variation in the cause produces corresponding variations in the effect. The most promising investigation in solar physics at the present time is the one begun at Mt. Wilson, California, and supported by the Carnegie Institution for at least eleven years, a sun-spot cycle.

What the weather is going to be to-morrow we know, but why it is not the same as last year, we don't know.

PECULIAR NESTING SITE OF AMERICAN BITTERN.

Last evening while walking through a clover field where bobolinks were breeding abundantly, I flushed an American bittern off a nest containing four fresh eggs. The nest was placed in some long, coarse grass about 1½ feet high and was merely composed of a little dead grass flattened out by the bird. I was rather surprised at this find, as there is no marsh within a mile of the locality. Evidently this bird does not always nest in or near swamps. Six other nests of this species have been examined this year, but they were all located in large areas of bulrush swamps.

W. J. BROWN.

Westmount, Que., June 13th, 1907

THE GOLDEN-CROWNED KINGLET IN ONTARIO IN SUMMER.

While so far no nests have been found, there is sufficient evidence at hand to show that the golden-crowned kinglet breeds in the more southerly portions of Ontario more frequently than is usually supposed. Mr. McIlwraith, in "The Birds of Ontario," records the fact that he once in June met with a pair, evidently mated, in a swamp near Hamilton. Mr. James H. Fleming, in his list of the birds of Muskoka and Parry Sound says, "On two occasions I have met with birds in May, that from their actions must have been nesting."

On June 3rd, 1904, the writer found a pair in a dense growth of tall black spruce, at the edge of a bog near Guelph. Both were feeding, and the male was singing in an undertone. On June 12th, 1906, some 14 miles west of Kingston, the writer came across a pair in a fringe of trees between the road and Lake Ontario. In this fringe were many white spruces. The birds repeatedly flew into a bunch of twigs near the end of one of the branches of a white spruce. The male was singing a subdued song.

A. B. KLUGH.

Kingston, Ont.

NESTING OF THE AMERICAN GOSHAWK IN LATITUDE 49.42.

By NORMAN CRIDDLE, Aweme, Manitoba.

On the 14th of April, 1906, while in heavy timber near the Assiniboine River, I was attracted by loud shrill cries to a pair of goshawks. Suspecting that they were nesting, I left the neighborhood with the intention of visiting them again later. This I did in about a week's time, and then found the nest, which was nearly completed, in a large balsam poplar, some 30 feet from the ground, and about 70 yards from the edge of the larger trees. The male bird made several close swoops at me as I walked past, but the female continued sitting just below the nest. The remains of several bush rabbits (*L. Americana*) were noted some distance from the nest on a fallen tree, and the male bird was seen to make a dive at one in a brush pile, coming down with a bang among the twigs and sticks, but the rabbit escaped, owing to the thickness of the underbrush. I again met the male later in the afternoon nearly a mile away,

returning from an unsuccessful raid on a poultry yard, and he made a half-hearted swoop at me as he passed.

On the 30th of April, my brother Evelyn and I again visited the locality with the intention of securing, if possible, both birds and nest. The female was shot with difficulty, as she was very shy, but the male did not appear, in spite of the loud cries of his mate. The nest, which was securely fastened between a large limb and the trunk, and supported by numerous small branches, was a bulky structure about two feet wide, almost a foot high, and about ten inches across inside. The material used for building consisted of sticks, twigs and bark; a coating of about an inch of the latter being used for lining. There were four eggs in the nest, of a bluish-white color, unspotted. An examination of the female hawk revealed another egg ready for being laid. The measurements of this bird were: length, 23½ inches; across the wings, 42 inches. The plumage was practically the same in every respect as that of young birds, perhaps a little grayer. The primaries and tail feathers were much worn at the tips, and showed nearly an inch of the midrib bare. The stomach was empty, with the exception of a few broken bones of a small bird, some dead leaves and bark. The bird was in good condition, having quite a lot of fat upon it.

The male was apparently in perfect plumage, being a rich blue gray above. We waited fully two hours without his appearing.

These birds uttered loud cries when disturbed, somewhat like a sharp-shinned hawk, but deeper and louder. When alone they uttered a more prolonged cry two or three times in succession.

The eggs were evidently sat upon, as soon as laid, as they showed different stages of incubation, one being fresh.

This is the first occasion on which goshawks have been found nesting at Aweme, Man. They are, however, rather numerous in winter, especially the old blue birds, when they do much harm by preying upon the different species of grouse, which with the bush rabbit (*L. Americana*) form their principal food in these parts.

MEETING OF COUNCIL.

A meeting of the Council of the Club was held in the Normal School on April 30th, with the President, Mr. W. J. Wilson, in the chair. The members present were, Messrs. Halkett, Gibson, Gallup, Lemieux, Eifrig, and Clarke, Miss Jackson, and Miss Ritchie. The following new members were elected: the Director of the Christian Brothers' Academy, Sussex St., Messrs. W. C. Ewing, M.A.; R. M. Baker, G. S. Malloch, B.A., Ed. Hampson, and Miss K. Waddell. A communication was read from the New York Academy of Sciences, inviting the Club to participate in the celebration of the 200th anniversary of the Swedish naturalist, Carl von Linné, by sending an authorized representative and by presenting an official document, appreciative of the work of Linné, to be read before the members of the New York Academy of Sciences and the assembled guests. It was felt that the Club could not send a representative, but arrangements were made for the preparation of the document suggested.

SUB-EXCURSIONS

The first sub-excursion of the season was held at Rockliffe, on Saturday afternoon, 20th April. About fifteen persons attended, including four leaders of branches. The day was rather cold, but the sun shone brightly in a clear blue sky, so that a very pleasant time was spent. After exploring the woods, the more open spaces, or the cliffs, the party re-assembled at the side of a sunny knoll, where the President called upon a few of the members to speak on what they had observed; the following is a summary of what was said.

Mr. McNeill was first called upon, and spoke in an interesting way about the harmonies to be observed in nature, pointing out how the lichens absorb elements out of the stones, and decompose them, so that other plants can assimilate them as nutriment. He also said that there is a harmonious co-mingling of colors among certain plants during winter (so that that phenomenon is not altogether peculiar to the milder seasons): instancing that the dog-wood is red, the conifers green, and the birches white.

Rev. Mr. Eifrig was next called upon to speak about the birds seen by him, which embraced two juncos (*Junco hyemalis*), two song-sparrows (*Melospiza fasciata*), two phoebes (*Sayornis phoebe*)—which were mating—a large flock of red-polls (*Acanthis linaria*), and five or six robins (*Merula migratoria*). He said that more birds would evidently have been seen had not the day been windy, as birds venture out less in windy than in calm weather.

Mr. Eifrig also spoke about the mysteries enshrouding the migrations of birds, remarking, in this connection, that there had been this season an earlier migration than usual, with a subsequent lull in April. Numbers of crows (*Corvus americanus*) were also seen during the afternoon.

Following, Mr. Halkett mentioned a chipmunk (*Tamias striatus*), which a few of the party saw running towards and entering its burrow, the entrance to which was inspected; and another chipmunk seen only by himself. He also made a few remarks on various invertebrates collected during the afternoon: such as, specimens of two kinds on wood-lice, *Oniscus* and *Armadillo*, pointing out that the latter is so called on account of the habit of the creatures rolling themselves up into a ball, after the manner of the mammals of that name; certain spiders, remarking that some members of the Club are at present engaged in making a list of the species of that group in the Ottawa district; and various insects, myriapods, and land-snails.

Mr. Gibson then spoke in particular about the insects observed, especially alluding to two kinds of small hibernating caterpillars, and showing examples of their work; and the following in his own words give the gist of what he said about them: "The first of these was the larva of *Argyresthia thuiella*, which has been doing noticeable injury to the white cedars in the Ottawa district during the last year or two. The young larvæ bore inside the tips of the young twigs, killing them and giving the cedars a rusty, sickly appearance. The other species was a beneficial one, the larva of *Hebesana penthina*, which lives in the seeds of the common weed, Mullein, eating them out, and of course destroying them."

"With regard to the insects observed," Mr. Gibson furthermore says, "several specimens of the hedge-hog caterpillar, *Isia isabella*, were found under flat stones, and one larva of *Ctenucha virginica*, another common 'woolly bear.' Of the beetles, several species of Carabidæ and Staphalinidæ were collected. The large tortoise-shell butterfly, *Grapta j-album*, was seen, as well as the Camberwell beauty, *Vanessa antiopa*, flitting about in sunny spots in the woods."

Finally, Mr. Wilson, President of the Club, drew the attention of the party to the structure of the rocks examined along the side of the cliff, explaining that they belong to the Black River and Trenton formations. Slabs of stones which he showed contained fossils of brachiopods, trilobites, etc., and he alluded further to other fossils contained in these rocks, such as those of corals.

One flower, at least, of the Hepatica, was found, otherwise

the few leaves of perennials protruding above the ground, betokened the backwardness of the season. A. H.

Ottawa, 24th April, 1907.

The second field excursion of the season was held by the Field Naturalists' Club on Saturday at Beechwood, the search for Hepatica being one of the chief interests.

The day was perfect, and a good crowd arranged themselves at three o'clock under the direction of the various leaders. Mr. Wilson, the President, took charge of the Geological section, Mr. Halkett, of the Entomological, Mr. Eifrig, of the Ornithological, and Messrs. Attwood and Blackadar, of the Botanical section. At the close of the afternoon, the Club assembled at the green-houses and speeches were delivered on the various interests of the afternoon's outing.

The President, Mr. Wilson, spoke of the formation of the rocks in the neighborhood, making special reference to the cliffs about McKay's Lake, which, from a distance, have a white, ashy appearance, but which are composed of shells of varying sizes now in process of solidification into fossil rocks. Mr. Attwood spoke on the necessity for having correct names for things, whether the names be English or Latin, and of the disadvantages of misleading names founded on a superficial and unscientific classification, such as that of our American "Robin," which is not a robin at all but a thrush.

Mr. Eifrig reported that though the day was warm, there were few birds to be seen, which he attributed to the preceding cold snap, causing the birds either to return further south, or else to remain quietly here in some very sheltered spot. He also spoke of it being an "off season" in migration for a couple of weeks, the early birds having arrived some time ago, and it not yet being late enough in the season to expect the warblers and later varieties. He also gave a list of the various species that have already been noticed this season.

Mr. Halkett exhibited a number of specimens collected during the afternoon, amongst them being the somewhat rare Salamander Batrachian. Mr. Blakadar named the various plants that had been gathered by the members during the afternoon. ANNA E. SINCLAIR.

O. F. N. C. BOTANICAL CLUB.

April 11. An interesting meeting of the Club was held at Dr. Fletcher's house, present: J. Fletcher in the chair, Prof. Macoun, Dr. H. M. Ami and Messrs Attwood, G. H. Clarke, T. E. Clarke, Harrington, J. M. Macoun and R. B. Whyte.

The chairman alluded to the suspension in the work of the

Club owing to various causes which could not be avoided. He also drew attention to the advantages of the meetings which provided not only interesting reunions but also could with a little effort be of great assistance to the Editor of THE OTTAWA NATURALIST if the members would prepare short notes on botanical subjects to be read at the meetings and then published in the monthly magazine.

The chairman spoke of the Tarry Cockle, *Silene antirrhina* as a Farm weed in the West and also read some very interesting extracts from letters by Mr. W. Collingridge Bing of Castlegar, B.C., describing annoyance and losses in his poultry runs from the young chicks being caught and held fast prisoners by the tarry patches on the stems sticking to their down. Even a five weeks old chick is powerless to free itself if caught over the back. The weed is very abundant in his chicken run of 7 acres. Mr. James Macoun had seen the weed occurring in remarkable abundance in some parts of British Columbia.

Other remarkable weeds mentioned by the chairman were *Draba nemorosa*, *Draba Caroliniana* and *Corydalis aurea* all of which occurred on stubble field in Manitoba.

Mr. G. H. Clarke spoke of the abundance of the seeds of dodder in samples of alfalfa and other kinds of clover seed now being offered for sale. Owing to a shortage in the Canadian crop of 1906, a great deal of clover seed was being imported. From past experience, the speaker did not anticipate that there would be much trouble from dodder in Canadian fields although some species might persist for a time. Mr. Clarke also exhibited a full set of the beautiful plates by Norman Criddle for the illustrated bulletin on Farm Weeds of Canada which he hoped would soon be issued.

Prof. Macoun gave an excellent address on the value of critical study in botany instancing the remarkable number of new species of flowering plants detected by Prof. Fernald in a few weeks collecting in Lower Canada. The speaker urged the members to collect and study carefully all the local plants of the district. Many of the old species under critical study in all their parts had been found to cover several distinct species. Dr. H. M. Ami read an account of the Sugar Maple and the manufacture of Maple sugar from an old work published early in the last century. This article brought out a most interesting discussion on the general subject.

Dr. Ami also protested vigorously against private corporations as telegraph and telephone companies being allowed to cut and injure the shade trees which were such an attractive feature of many cities and which belonged to the public.

Mr. James Macoun reminded those present of an interesting lecture which would be delivered in Ottawa on May 31 by Dr. Pollard on the work of the Wild-flower Preservation Society. J. F.

The Ottawa Field-Naturalists' Club, 1907-1908

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Zoology: E. E. Prince, A. Halkett, W. S. Odell, E. E. Lemieux.

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