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THE OTTAWA NATURALIST

VOL. XXIV.

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PLANT PHYSIOLOGY VERSUS PSYCHOLOGY.

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

When an infant of tender years performs spontaneously some purely instinctive feat, proud parents wonder at his early manifestation of intellect. When he succeeds in calculating, in reasoning, we take it as a matter of course as the awakening of intellect. Intellect is said to be the power of the human soul by which it comprehends, as distinguished from will power and senses of touch, hearing, etc. *Homo sapiens* is the only animal possessing a soul; a soul by which we distinguish between good and evil, for this knowledge is absent in other animals. Animals have a similar faculty, namely instinct. Now, this term is used to describe actions which are spontaneous, which are a natural desire arising in the mind. The difference between intellect and instinct I understand indicates a certain faculty of forethought present in intellectual beings, in human beings, which when only spontaneously or involuntarily dictated becomes instinct. It has been shown that no amount of training is capable of developing this power of discrimination—acting properly in the proper place—in even the most intelligent of animals. It is a long recognized fact that man and all other animals possess certain gifts which make them totally different from any other organic being.

In these more highly developed forms of creation we can locate the motive power in the nerve centres, which regulate physical and psychical functions or impulses. Although plants are all more or less capable of certain striking reactionary movements, which testify that they possess the sense of feeling (*Dionæa*, *Mimosa*, etc.), yet in the absence of nerve centres acting upon a well organized nervous and muscular system we are inclined to regard these functions as merely responding to local irritation. But when regarding really sensible movements of which some plants are capable—so capable that they become perceptible to the observer—then we do not for a moment consider the

possibility of some kind of system in plants analogous to the nervous system in animals, but simply regard them as involuntary, spontaneous, natural responses. In animals we term such actions instinctive for the reason that we can observe the working of a brain power, and knowing the function we are satisfied that they are instinctive. People who are familiar with the growth of plants in rooms have had occasion to observe their desire to turn to the light. Thus they are enabled to make the best of the unnatural conditions; they must indeed succeed in obtaining as much light as possible, or they will die. What compels the plant to this action? Grain that has been laid flat on the ground after a storm, or heavy rain, will begin to grow erect after a few hours, and, under normal circumstances, it will "get up" sufficiently to produce its seeds. The sole object of grain is to produce seeds, and the plants endeavor to perform this purpose at all costs. When examining grain that is rising up again we notice that the stem bends in the nodes until it is quite erect. The nodes here act similarly to the joints in animals. Physiologically this is simply an expansion and contraction of certain cells in the nodes. Nature, I presume, is responsible for this function? Climbing plants (*Wisteria*, *Hedera*, etc.), send out their flower-bearing shoots far beyond the shade of their leaves, and if prevented in this movement by a repeated tucking of these shoots underneath others, the plant will postpone the opening of the flowers for a considerable time until it succeeds in getting towards the light; if, however, continued, the flowers will eventually open, the plant doing then its utmost to become fertilized. These movements in plants which are often strongly perceptible, make the observer realize that they serve some purpose, and this action to fulfill a set aim is simply natural. Is it? The plant grows towards the light, the grain "getting up" after a storm, both to escape destruction, the climbing plants anxiously endeavouring to become fertilized, are these merely physiological functions, or are they instinctive? Is this really wonderful or is it simply nature? But why then are similar functions in man and animals, intellect or instinct, not simply nature? Nature then is the motive in plants which performs wonderfully intelligent feats—as they are not capable of reasoning? We have often seen recorded most surprising feats performed by domesticated and wild animals in their search after food. Now consider for a moment the germinating *Cuscuta*. The coil contained in the seed pushes to the surface when germinating and the top revolves slowly, snake-like, erect, until it spies a suitable host plant to which it may attach itself and find food ready and available upon which to maintain itself. This parasitic plant finds no food in the soil and must succeed in

reaching a living plant and is hence endowed specially with the power of motion. But what will this little plant do if we remove a large number of plants in its immediate neighborhood and provide it with props of all kinds of inorganic matter (glass rods, pins, matches, etc.)? It grows towards these obstacles but turns away scornfully after realizing its error, and continues its life crawling about until it has succeeded, as it generally does, in discovering the living plant, or plants. Is this also nature, this intellectual power of discrimination? Then, dear reader, if you answer in the affirmative, give your reasons and explain nature, instinct, intellect! An infant beginning to walk eagerly catches hold of anything to support itself, but when having mastered a few steps it indignantly refuses support—this not being needed becomes dispensable. Plants like *Ampelopsis* or *Clematis* attach themselves by means of haustoria or tendrils for support. This function becomes immediately arrested if we provide them with supports by tying them up. The plants having achieved their purpose consider it unnecessary to support themselves and haustoria and tendrils remain inactive. Several genera of Amaryllidaceæ have the power, under given conditions, of moving their anthers towards the style, but they only so exert themselves when no insect fertilization is likely to take place.

I have chosen here examples which strikingly illustrate these points, they exist in hundreds of others, and probably in all plants; only far less readily perceptible. We strangely hesitate to regard plants as being possessed of anything more than spontaneous, responsive, actions. We disregard the fact that plants, being confined to their place of growth, cannot display their intellectual powers like animals capable of moving about. The movements which I have referred to certainly are intelligent, we cannot deny this. Within comparatively recent years botanists have begun to pay attention to such phenomena. And, if the physiologist has an explanation for many phenomena, yet not all are satisfactorily explained, and whether we have psychological functions besides, is a question the study of which will make botany one of the most interesting of the sciences. Charles Darwin, the great natural philosopher, the distinguished geographer, geologist, mineralogist, zoologist and botanist, also advanced our knowledge of psychology more than is generally acknowledged. His observations directed our thoughts into these channels. Those who are unfamiliar with his works—"Climbing Plants," "Movements in Plants," "Insectivorous Plants"—should read them and they will get a glimpse of this marvellous man's mind. He has left, in his son Francis, a powerful observer who goes further than his father, who refers

to the *Drosera*, a plant much beloved by him, as like a highly sensitive animal. Francis Darwin, in his address before the British Association, actually refers to the instinctive power of memory in plants! In Europe many investigators have interested themselves in this study, and, in 1908, at one of the meetings of the Royal Academy of Sciences in Vienna, Dr. Haberlandt, one of our foremost botanists, declared that the intellectual physiological functions in plants find their perfect analogy in the intellectual psychological functions of mankind. So after all, Aristotle, the celebrated Greek philosopher, forestalled modern ideas by speaking of the soul of plants!

My remarks on this subject I trust will not be misunderstood, though many will ridicule the idea of a plant psychology. But the ardent observer, the true lover of the study of plants, may find in these observations some hints to make the science of botany still dearer to him, when realizing that he deals not only with an inanimate soulless vegetation.

BIRD MIGRATION IN NORTHERN BRITISH COLUMBIA.

BY REV. J. H. KEEN.

The following notes may be of interest as helping to show the movements of the migratory birds in this region. They are scrupulously correct as far as they go, but they were made during the brief intervals of leisure in a busy clergyman's life, and are by no means as complete as they might be. In 1906 no observations were made, as the writer was away from home.

The regularity with which some migrants appear is truly wonderful. The humming-bird and white-bellied swallow, for instance, have varied scarcely more than a fortnight during the ten years covered by these records, and the robin less than three weeks during the same time.

The failure of the osprey to appear during recent years is strange. He is too large to be overlooked, especially as a sharp look-out has been kept for him.

Most of the resident species of birds here are partial migrants, as appears by the obvious increase in their numbers in spring, and a corresponding decrease towards winter.

EARLIEST SPRING APPEARANCE OF MIGRATING BIRDS AT METLAKATLA, B.C.

A.O.U. No.	1900	1901	1902	1903	1904	1905	1907	1908	1909	1910
761	Mar. 14	Mar. 18	Mar. 27	Mar. 13	Mar. 19	Mar. 17	Mar. 16	Mar. 27	Apr. 3	Apr. 3
433	Apr. 10	Apr. 20	Apr. 18	Apr. 23	Apr. 14	Apr. 10	Apr. 13	Apr. 26	Apr. 20	Apr. 19
758a	May 29	May 4	June 4	June 4	May 29	May 23	May 4	May 1	May 4	Apr. 25
614	Apr. 27	Apr. 18	Apr. 20	Apr. 18	Apr. 15	Apr. 11	Apr. 15	Apr. 28	Apr. 29	Apr. 19
652	May 23	May 25	June 3	June 3	May 22	June 2	June 2	May 23	June 10	May 22
646a	Apr. 14	Apr. 14	Apr. 14	Apr. 24	May 4	Apr. 23	Apr. 24	Apr. 15	May 3	May 1
364	May 24	June 2	June 2	Apr. 24	May 10	May 10	Apr. 23	Apr. 24	Apr. 15	May 1
542a	Apr. 18	Apr. 11	Mar. 31	Apr. 26	Apr. 19	Apr. 23	Apr. 25	Apr. 25	May 1	Apr. 23
697	Apr. 27	Apr. 27	Apr. 27	Apr. 25	Apr. 25	Apr. 19	Apr. 10	Apr. 21	May 8	Apr. 25
557	Apr. 28	Apr. 28	Apr. 25	May 1	May 2	Apr. 26	Apr. 26	Apr. 27	May 2	Apr. 24
685	May 19	May 19	May 19	May 22	May 22	May 22	May 2	May 11	May 9	May 4
554	May 1	May 1	Apr. 28	Apr. 28	Apr. 14	Apr. 30	Apr. 29	Apr. 29	Apr. 28	Apr. 30
243 ^h	Apr. 21	Apr. 21	Apr. 21	Apr. 21	Apr. 14	Apr. 14	Apr. 29	Apr. 29	Apr. 4	Apr. 30
206	Apr. 8	Apr. 8	Apr. 3	Apr. 3	May 7	Apr. 7	Apr. 30	Apr. 30	May 1	Apr. 24
536 _a	Apr. 8	Apr. 8	Apr. 3	Apr. 3	Mar. 18	Apr. 18	Apr. 5	Apr. 5	Apr. 26	Apr. 26
583	Apr. 8	Apr. 8	Apr. 3	Apr. 3	Mar. 18	Apr. 18	Apr. 5	Apr. 5	Apr. 26	Apr. 26
585a	Apr. 8	Apr. 8	Apr. 3	Apr. 3	Mar. 18	Apr. 18	Apr. 5	Apr. 5	Apr. 26	Apr. 26
585a	June 16	June 16	June 16	June 16	Apr. 24	Apr. 24	Apr. 24	Apr. 24	Apr. 25	May 7

EXCURSION TO GREEN'S CREEK.

The first fall excursion of the season was held to Green's Creek on Saturday afternoon, September 24th. The outing was most enjoyable in every way. The party, although only seventeen in number, left the Post Office in a large van at 1.45, and arrived at the destination an hour later. The coolness of the afternoon undoubtedly kept many from attending. It is many years since the Club used buses for an excursion, and although the result was not a financial success in the present instance, the experiment is well worth a repetition another year. In the old days of the Club many an enjoyable outing was held in such conveyances, and given warmer weather there is no reason why similar excursions in the future could not be held successfully to nearby places not reached by any of the railways.

Green's Creek is about six miles from the Post Office, out on the Montreal road. In the spring of the year when the water is higher and when there are more flowers, birds and insects about, the Club should, in the opinion of the writer, arrange to hold another outing to the same locality.

Mr. Alex. McNeill, Chief of the Fruit Division of the Department of Agriculture, piloted the party to the satisfaction of everyone. On leaving the bus we first of all went along the Canadian Northern Railroad track a short distance and examined an interesting cutting where our Leader told us much of geological interest.

Although nothing uncommon in the way of botanical specimens was collected, still many plants of interest were observed. Large beds, so to speak, of beautiful autumn asters were abundant; *Aster puniceus* was particularly admired. Mr. McNeill found a fine example of giant puff ball (*Lycoperdon giganteum*). The specimen was 41 inches in circumference; it was still in a growing condition and possibly might have exceeded even that size if it had been left longer. It was found growing at the base of a very rotten pine stump. The roots of the stump were examined and found to be permeated in every direction with the mycelium. This is a comparatively rare find, although Mr. McNeill reported that he had found a similar puff ball a few weeks previously about 200 yards from the spot where the above specimen occurred. When taken home and cut it was found to be in perfect condition, and when cooked proved excellent eating to those who tasted this delicacy. Practically all of the family of puff balls are edible. Many are fairly abundant, and, for want of information, large numbers are allowed to go to waste. Those who have tried puff balls, either

stewed or fried, or, in fact, cooked in any way suitable for mushrooms, will bear witness to their delicious flavor.

The day was too dull for insects to be moving about, but close search revealed many specimens. Large numbers of the bug *Lygaeus turcicus* were seen clustered on several kinds of plants. A single specimen of the Monarch butterfly was found by one of the ladies. Although late in the season some larvæ were still found to be feeding. The false caterpillars of one of the sawflies were seen in numbers feeding on willow, and a single specimen of the larva of the noctuid moth, *Apatele impressa*, was collected. A specimen of the moth, *Noctua clandestina*, was found beneath a flat slab of stone, and one of *Xylina grotei*, which was resting on a flower. Some colonies of ants were examined, the species being the common ones, *Lasius niger* var. and *Myrmica scabrinodes* var. Mr. G. E. Sanders found a specimen of *Cremastogaster lineolata* attached by its jaws to the antenna of a specimen of *M. scabrinodes*. Several lately dealeated queens of a *Lasius* species were found hibernating under stones. The case-bearer, *Coleophora tiliæ joliella*, was collected from basswood by Mr. G. O. McMillan. This species is rare in the Ottawa district.

Beneath a flat stone a young milk snake was found. It had evidently but recently gone into hibernation. Scurrying across a pasture field was an old ground hog, and down at the creek many specimens of the interesting clay nodules were seen and examples taken by members of the party.

Birds were scarce with the exception of robins, quite a number of which were seen.

At 5 o'clock the party left the creek, all feeling that they had had a most delightful afternoon.

A. G.

REPORT OF THE ENTOMOLOGICAL BRANCH, 1909.

The Leaders of the Entomological Branch present herewith a brief report for the year 1909. The members of the Branch have been active during the year, not only in the Ottawa district, but elsewhere throughout Canada. The season on the whole, comparatively speaking, was a poor one for collecting purposes, but where any systematic work was done, many desirable species were captured or found. In the Ottawa district a number of interesting specimens were taken, chiefly of the orders Lepidoptera, Hymenoptera, Coleoptera and Neuroptera. All of these captures have not as yet been worked up. A beginning has been made of a list of neuropteroid insects, exclusive of Odonata.

Much work, however, is yet to be done, before such a list could be presented. The Caddis-flies, Stone-flies and May-flies are not by any means well known and an interesting field is here awaiting investigation.

During the year several meetings of the Branch were held at the houses of some of the members. These were most enjoyable, many specimens being brought for examination and short papers on various subjects presented.

The Branch was glad to welcome to Ottawa Dr. C. Gordon Hewitt, who succeeded our late co-worker, Dr. Fletcher, as Dominion Entomologist.

Among the many insects collected in the district during the year, the species mentioned below are of special interest. As stated above, considerable work is yet to be done in getting much of the material taken during the year accurately determined. As the species are worked out, mention of the more interesting will be made in the annual Entomological Record, prepared by Mr. Gibson, and published in the Annual Reports of the Entomological Society of Ontario.

LEPIDOPTERA:—

Ampelophaga versicolor Harris. This rare species was collected near Britannia on July 26th (Baldwin).

Sphinx luscitiosa Clemens. This hawk-moth is also of uncommon occurrence in the district. Two specimens were taken near Britannia, one on July 9th and another on July 22nd (Baldwin).

Harrisimemna trisignata Walk. Mr. H. Groh found a full-grown larva of this species on ash, at Hull, on August 28th.

Tapinostola variana Morr. Britannia, July 28th (Baldwin).

Eunomos subsignarius Hbn. Another visitation of these moths appeared at Ottawa on August 5th and 6th. Large numbers of the moths were seen throughout the city, but the swarms did not seem so large as they were in 1908.

Tortrix jumiferana Clemens. Thousands of the moths flying around trees and shrubs in the district, July 20th.

Sparganothis flavibasana Fern. Mature larvæ collected from Lonicera, June 15th (Gibson).

Psilocorsis fletcherella Gibson. Larvæ found on *Populus tremuloides*, June 10th (Gibson).

Scythris impositella Zell. Mer Bleue (Young).

HEMIPTERA:—

The following species, all collected by Mr. W. Metcalfe, are new records for the district.

Livia maculipennis Fitch. On pine, April 30th.

Livia vernalis Fitch. On pine, April 30th.

Aphalara calthæ Linn. May 10th.

Aphalara marginata Harris. June 7th.

Psylla carpina Fitch. On ironwood, August 25th.

The Leaders of the Entomological Branch would gladly welcome to the meetings of the Branch any of the members of the Club who are interested in any way in insect life. The subject is extremely fascinating and anyone who cares to take up the study of insects will find a very wide field for investigation. As there is so much yet to be learned about almost every kind of insect, any careful observation on the habits of these creatures is of value.

W. H. HARRINGTON,	} Leaders.
ARTHUR GIBSON,	
C. H. YOUNG,	
J. W. BALDWIN.	

NOTES ON THE FLORA OF THE NEREPIS MARSH, NEW BRUNSWICK.

By A. B. KLUGH, QUEEN'S UNIVERSITY, KINGSTON.

At Westfield, New Brunswick, where the Nerepis River empties into the St. John River, there is an extensive marsh the flora of which is rich enough to be worth recording.

On August 12th, 13th, 14th and 15th, 1910, I explored this marsh in a canoe, and found that most of the upstanding vegetation in the centre consisted of *Scirpus fluviatilis*, *Scirpus validus*, and *Zizania palustris*. I finally selected a portion of the west shore as a favourable place to make an ecological survey.

There is not a sufficient depth of water, except in the narrow channel, to preclude the development of Helophytes (marsh-plants) and consequently the Hydrophytes (aquatics) are found between and among the Helophytes, and no clear line of demarcation exists between these two ecological groups. But a zoned distribution is observable depending upon the depth of the water, and it will be noticed that the outer zone, where the water is from 8 inches to 3 feet in depth, is composed mostly of the Limnæa formation of Hydrophytes. The following plants occur in this zone:—

- Potamogeton heterophyllus*. Abundant.
- Potamogeton perfoliatus*. Common.
- Potamogeton pectinatus*. Common.
- Myriophyllum alterniflorum*. Common.
- Vallisneria spiralis*. Common.
- Nymphaea advena*. Abundant.
- Castalia odorata*. Frequent.

Utricularia vulgaris. Frequent.
Ranunculus aquatilis capillaceus. Frequent

Zizania palustris. Abundant.

Scirpus validus. Abundant.

Scirpus fluviatilis. Scarce at this point, but very abundant further up the marsh.

The next zone is apparent where the water is 8 inches and less in depth and contains the following plants:—

Potamogeton dimorphus. Frequent.

Hippuris vulgaris. Frequent.

Isoetes echinospora braunii. Common.

Zizania palustris. Abundant.

Lobelia Dortmanna. Frequent.

Scirpus americanus. Common.

Alisma Plantago. Frequent.

Sagittaria latifolia hastata. Common.

Najas flexilis. Frequent.

The inner zone is found in the wet soil from the margin of the water inwards and is composed of the following:—

Spartina Michauxiana. Abundant.

Scirpus americanus. Common.

Sium cicutaejodium. Common.

Glyceria canadensis. Common.

Calamagrostis canadensis. Common.

Scirpus atrovirens. Common.

Dulichium arundinaceum. Common.

Polygonum Muhlenbergii. Common.

Campanula uliginosa. Frequent.

Juncus filiformis. Common.

Potentilla palustris. Scarce.

Menyanthes trifoliata. Frequent.

Onoclea sensibilis. Common.

A RECORD CATCH.

BY L. H. SITWELL, *Captain*.

The salmon fisherman from the Gaspé, the sea trout artist from Nova Scotia, the specialist on the Rainbow trout from British Columbia, the tarpon enthusiast from Florida escaping the glorious Canadian winter, the Mahsur crank from India who knows no better game fish than that which his heathen climate affords, have their yarns about their respective countries, districts and game fish. The story I am here recording refers to a fish-eating bird commonly called a loon, but

more properly known as the Great Northern Diver, *Gavia imber*. The cry of this bird is well known to the lover of the rod in the solitudes of Lakeland; it is a weird uncanny sound to the tenderfoot, a plaintive mournful cry, especially before wet weather.

I am not writing this story with a view of puffing up the Grand Trunk Railway and the Algonquin National Park as a holiday resort, for that fact is amply expounded in the various folders issued by that illustrious corporation.

The trout season had just been heralded in by a burst of fine weather and the old longing to get busy with "the spots" came over me before the plague of flies prevented pleasure. The date was 7th May, 1903, the day warm, trout hungry, speckled beauties up to three pounds waiting to be caught. Black bass were also abundant but out of season and biting freely. I managed to get some lovely silver minnows at the rear of the Superintendent's cottage and armed with a light greenheart rod, a reel with not too much line on—that somewhat old and rotten—a double length casting line of fine gut and a pellet of buckshot for a sinker, I started off to fish on the long trestle to the east of Algonquin Park Railway Station. I was out for sport and I certainly got it. My first strike was a bass which fought gamely and was returned to the water somewhat tired. I put on a fresh minnow and cast in again into about fifteen feet of clear cold water; hardly had the bait gone down five feet when it was siezed and carried away at a rapid rate, and thinking I had hooked a large trout I paid out line to enable the fish to swallow the hook well before striking. I struck and the pace increased and my little rod bent almost double, without a sign of checking the rush, and when my line was more than half run out up comes my fish in the shape of an old cock loon hooked apparently firmly by the beak. I had to lower the tip of my rod as his weight was too great for it and simply held on, trusting to luck that the line would hold. I was near the end of the trestle and managed to edge on to firm ground. Then began a battle royal. The bird, dived, twisted, turned, flapped his wings and tried to fly but he got dragged down by a straight pull. Finally, the line got twisted under his right wing and the hook was torn from his mouth and became fast in the big sinew of the right wing. Now, he had more power as his head was free and I had great difficulty in holding him down. To make matters worse my reel dragged out and fell on to the ground at my feet and I dared not stoop to pick it up as all my attention was needed to mind the bird. Before long he began to show signs of fatigue and I managed to drag him shorewards by degrees, the line getting tangled at my feet. I had till now been fighting for an

hour, when to my joy I saw the work train pull into the siding across the trestle with engine No. 667 in front. Her engineer I knew well as a sportsman and I yelled like a wild Indian for Cameron. Off he dropped and came over to me, and to his eternal credit he went into the ice cold water up to his waist and stood there until I could get Mr. Loon near enough for him to grab. There was enough life left in the bird to make several strikes at Cameron's hands, but finally he was caught by the neck and brought ashore. I got his wings in between my trembling knees while Cameron, with chattering teeth, held his neck until I cut the hook out of his back. I got him under my arm with his neck in my hand and marched him across the trestle where Mr. Bartlett, the Superintendent of the Algonquin Park resides, and who had been watching the latter part of the performance, having been disturbed by my shouts for Cameron. My captive was duly handed over and put into a large wire netting enclosure on the lake shore where he remained for two days, and on my return to Cache Lake a few days later, Mr. Bartlett told me that as the bird would not live in captivity he had let it go free. He was a good fighter and deserved his life in the end, but I fancy he would confine his diet to weeds for a while and leave minnows alone until he had forgotten his experience with them.

ANIMAL INSTINCT.

BY R. C. TREHERNE, GRIMSBY, ONT.

A rather interesting example of animal instinct occurred within the last year, and in recalling the circumstances I thought it might be of interest in the pages of THE OTTAWA NATURALIST. At a certain boarding house in Guelph, Ontario, there was a canary, caged and hanging before a window. During a meal, while we were all seated around the table, this canary suddenly became greatly excited. It twittered and flew wildly against the bars of the cage evidently attempting to escape. It continued this procedure for possibly a minute, but finally subsided to a corner of the cage, as far away from the window as possible. While we were all watching the agitation on the part of the canary, we became aware of the reason. A hawk, presumably a sparrow hawk, was perched on the fence railing not 10 yards from the window, and, even while we were watching, it flew to the window and then back to the fence. It remained on the fence rail for 3 or 4 minutes and then presumably finding its

attempts to catch and kill the small canary futile, finally flew away.

Two thoughts occurred to me at the time. First, it was interesting to observe how the canary, born and bred in a cage, could recognize danger on the instant; and, secondly, I found myself wondering: would a wild bird on the approach of a hawk show as much agitation as did this little canary? Possibly a wild bird would, if it was caged under similar conditions, but I feel morally certain that if it was allowed the free life of the woods, its first motive would be self-preservation and it would not attempt to make itself conspicuous by any form of agitation or flight. I remember at the time thinking that the canary—by domestication and lack of experience—had not developed the sense of self-preservation while it could realize danger. However, the realization of danger was the most important observation, and being so it helps to recall other instances of a similar nature.

To one who has raised chickens, for instance, how usual it is to notice a hen call her chickens to her when any danger approaches. She can spy a hawk aloft far quicker than can a human being and can realize that it is a hawk and that her chickens are in danger even if she had never seen one before. Is not this case quite similar to the canary? They are two cases of pure instinct—instinct being defined as a term including all original impulses and that apparent knowledge and skill which animals have without experience.

I was reading only the other day about a case, told by Ernest Thompson Seton, of a "young mink, still blind, which sucked at a mother cat till fed and then tried to kill her." Surely, if such a case was true, and I have no reason to doubt that it was not, coming from such an authority, it is interesting to notice the hereditary instinct of legitimate prey present in the mind of this young mink. I believe it is a generally recognized rule that among wild animals it is very uncommon to find them destroying one of their own kind. This young mink would not have attacked its own mother and yet it realized, even in that young state of its career, that the cat was lawful prey.

Such cases as these demonstrate very forcibly that natural untaught wisdom of the animal world—and we designate it as instinct. Classify it as we will, however, we could not say it was the product of mental activity, or in other words reason similar to the human reason.

Nevertheless, with but a moment's thought we find that a great deal of the conduct in the human life is the result of this same unconsciousness, unreasoning obedience to natural forces. How common it is for us to utter exclamations of surprise or

fear, to give vent to emotions for which we cannot account. We have no reason why we do these things—things perhaps we often regret after the occasion has passed—we can only classify them as instinct. It is undoubted that a child is entirely governed by stimuli up to a certain stage in its life—until the dawn of reason gradually breaks and we get development from the animal to the human plane.

In closing I would just like to draw attention to similar conditions in the plant world. Compare an animal, a child just born, for instance, in a darkened room with but one window, with a plant growing in a darkened place with but one loophole of light. Both turn instinctively to the light. In the former the reason implies a nervous system, but in the latter we are taught it is a purely mechanical process. And yet there is a similarity. Again, Huxley informs us that a frog, from which the brain has been removed, will retain its centre of gravity even when revolved. Compare this frog with a plant placed in an inverted position, with the root upwards and the stem downwards. If growth continues this plant will right itself and will grow normally. This cannot be explained, yet the fact remains that there is a similarity between the frog and the plant. And so on, we could find similar instances of comparison which only serve to show the great complexity of nature, and the uniformity of all things.

In such a short article, such instances as I have recorded open up a great field of conjecture; and, I for one, would be greatly interested to read accounts in this magazine of recorded observations which tend to illustrate the difference between animal instinct and reason.

PRELIMINARY LIST OF THE CRATÆGI OF THE OTTAWA DISTRICT.

BY HERBERT GROH.

Encouraged by the results which have attended the closer study of the Hawthorns in other parts of Eastern North America, and knowing that no such study had been made, as yet, at Ottawa, I was led, in the spring of 1909, to undertake systematically the collecting of material for this purpose.

For my first attention I chose the section of country reaching southward from the city to the Rideau River, and lying, roughly, between Bank Street on the east, and the Experimental Farm and the Hog's Back locks on the west. While not confining my work to these limits, I endeavoured to cover this area with some degree of thoroughness.

Specimens in flower were taken from the trees in June; and others, from the same trees, were taken for the fruit, when it matured. Notes were taken at the time of collecting, on such points of importance which might be lost in the drying, as the number of styles, the number of stamens, and the color of the anthers; and numbered tags were fastened to the trees when they were first visited to preclude the possibility of mistakes when returning to them later. Flowering and fruiting specimens were secured from about fifty trees, most of which showed some variation, which was the reason for their being selected.

Material of all the specimens was then submitted to Mr. W. W. Eggleston, of the New York Botanical Garden, an acknowledged authority on the genus and the contributor of the revision of *Cratægus* in Gray's New Manual, Seventh Edition. Mr. Eggleston has distinguished in this material fourteen species and varieties, and has regarded ten other specimens as hybrids.

In view of the incompleteness of the survey of the Ottawa district, so far accomplished, and also owing to the fact that further specimens have been collected this summer, which, together with a considerable amount of material collected earlier by Professor John Macoun, have still to be named, no treatment of the subject of Ottawa *Cratægi* can yet be attempted. A list is here given, however, which it is hoped may serve as a basis for the work which still remains to be done. The following species were collected by the writer in the localities indicated after each name.

CRATÆGUS.

ROTUNDIFOLIA Moench. E. of Dow's Swamp; Hog's Back; Victoria Hospital; E. and W. of Beaver Meadow.

ROTUNDIFOLIA Moench. var. FAXONI (Sarg.) Eggleston. Bank of Rideau River, W. of Billing's Bridge.

JACKII Sarg. Hog's Back locks

MACROSPERMA Ashe. Glebe; Bank Street, Stewarton; Montreal Road, beyond Eastview.

ALNORUM Sarg. Woods in C. E. Farm Arboretum; Ottawa South.

GRAYANA Eggleston. S. of Dow's Swamp; Hog's Back; bank of Rideau River, W. of Billing's Bridge.

FLABELLATA (Bosc) Koch. Glebe; Harbor locks.

PEDICELLATA Sarg.? W. of Dow's Swamp.

POLITA Sarg. E. of Dow's Swamp.

SUBMOLLIS Sarg. W. of Dow's Lake; N., E. and S. of Dow's Swamp; near Hog's Back; Ottawa South.

BRAINERDI Sarg. var. EGGLESTONI (Sarg.) Robinson. Ottawa South; bank of Rideau River, near Hog's Back.

BRAINERDI Sarg. var. ASPERIFOLIA (Sarg.) Eggleston. E

of Beaver Meadow.

MACRACANTHA Lodd. Glebe; Ottawa South; S. of Dow's Swamp.

PRAECOX Sarg. S. of Dow's Swamp.

MACROSPERMA Ashe. x ROTUNDIFOLIA Moench. Billing's Bridge.

MACRACANTHA Lodd. x MACROSPERMA Ashe. S. of Dow's Swamp.

MACRACANTHA Lodd. x CRUS-GALLI L. S. of Dow's Swamp.

MACRACANTHA Lodd. x PUNCTATA Jacq. Ottawa South; E. of Dow's Swamp.

MACRACANTHA Lodd. x. W. of Dow's Swamp; Hog's Back; Billings' Bridge; W. of Beaver Meadow.

NOTE.

PLANTS INJURED BY CREOSOTE.—For some time past considerable speculation has been indulged in regarding the curious and somewhat mysterious malady which has affected many varieties of plants in this city, the leaves turning black and falling before maturity. Roses, delphiniums, laurels, maples, ferns and some other plants, were the principal sufferers. The gardens in the vicinity, to the northward and eastward of the city creosoting plant, were amongst the first to suffer, last season being bad and the present season worse. Then last season the leaves of the eastern maples in front of the Union Club and the Presbyterian Church turned black and fell, and on examination I thought the infection to be of a fungous nature; this season they are only slightly affected, the streets in the vicinity having been paved last year with creosoted blocks.

A few days ago I was asked to look at the plants on the southern boundary of the Empress Hotel grounds. These I found to be in a very bad state and the suspicions I had entertained as to the cause seemed to be amply confirmed, viz., the exhalations from the creosoted blocks in Belleville Street. The plants on the northern boundary next to Humboldt Street, which street was also paved with creosote blocks, are not affected whilst those on the other or northern side, being the southern side of the Macdonald property, are badly affected. Our prevailing winds during the summer are from the south and southwest, and this fact seems to indicate that the creosote exhalations are directly responsible for all the injury. How plants can be protected adjoining newly paved streets I cannot say, but it is certain that much injury to gardens seems likely to result in the future from the cause mentioned.

Victoria, B.C., 29th July, 1910.

J. R. ANDERSON.

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